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**THE SANGAMON FIELD EXPERIMENTS:
OBSERVATIONS OF THE DIURNAL EVOLUTION OF THE
PLANETARY BOUNDARY LAYER OVER LAND**

by

**B. B. Hicks, G. D. Hess, M. L. Wesely,
T. Yamada, P. Frenzen, R. L. Hart,
D. L. Sisterson, P. E. Hess, F. C. Kulhanek,
R. C. Lipschutz, and G. A. Zerbe**

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Atmospheric Physics Section
Radiological and Environmental Research Division

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September 1981

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Foreword

During the summers of 1975 and 1976, two complementary field investigations designed to observe and record the principal phases of the diurnal evolution of that portion of the lower atmosphere known as the planetary boundary layer were conducted by teams from this Laboratory's Atmospheric Physics Section. The experiments were conducted in the farmlands of Sangamon County in central Illinois, an extensive and very nearly level area consisting almost entirely of alternate fields of soybeans and maize. For three weeks in July and August of 1975, the evolving lower atmosphere was monitored from before sunrise and on through the morning hours during which the daytime mixed layer forms and grows; for two weeks in July of 1976, the experiment was shifted to the late afternoon and evening period when the mixed layer disappears and a ground-based inversion forms and intensifies.

These experiments are two members of a series of atmospheric field investigations carried out by the ANL Atmospheric Physics Section over the last decade. Earlier studies were conducted during the summers of 1971, 1972, and 1973 in conjunction with the multilaboratory METROMEX study of inadvertent weather modification effected by the urban plum, downwind of the city of St. Louis. In many ways, these experiments were precursors to the work described here. For example, they provided important practical opportunities to test in the field several methods of boundary-layer measurement and analysis which were then still being developed.

In more recent years this series of experimental field studies has continued. During October 1977, the less rapid growth of the daytime mixed layer, more or less characteristic of the fall (and presumably, the spring) season, was monitored near Shelbyville, Indiana in conjunction with a regional scale, pollutant transport experiment conducted by the Multistate Atmospheric Power Production Pollution Study (MAP3S). In July 1979, several days of round-the-clock observations of the evolving structure of the lower atmosphere were made during another MAP3S experiment near Urbana, Illinois. Analyses of these more recent measurements are proceeding, and additional data extending the results of the Sangamon investigations will be published in due course. These later observations include, for example,

extensive bodies of information obtained with quantitative sodar equipment not available in previous years.

Recent initiatives to increase coal combustion, when combined with simultaneous proposals to relax clean air standards, aggravate a number of regional atmospheric environmental concerns. The improved understanding and accurate modeling of regional-scale atmospheric transport and dispersion has therefore taken on new importance. In particular, there is growing awareness that effective amelioration of regional air pollution and reduction of the deposition of airborne contaminants to the surface may well require emission controls imposed at considerable distances upwind, frequently beyond national as well as state or provincial boundaries. Understanding pollutant transport over the long distances involved requires an adequate understanding of the changing structure of the entire planetary boundary layer. Accurate delineation of the evolving structure of the atmosphere's first few km by sequential observations such as those reported here has therefore acquired considerable practical importance.

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ABSTRACT

Two complementary experimental studies of the evolving structure of the lower 2 km of the atmosphere, conducted over farmlands in central Illinois during essentially the same mid-summer weeks of two successive years, are described. The first experiment (21 July - 13 August 1975) investigated the early morning break up of the nocturnal stable layer and the rapid growth of the mixed layer before noon; the second (16-30 July 1976) examined the decline of the mixed layer through the late afternoon and evening, and the formation and intensification of the ground-based inversion before midnight. Methods of observation and data reduction are summarized in some detail, and the data obtained in the form of hourly wind and temperature profiles, plus sufficient surface flux information to characterize the lower boundary conditions, are tabulated in a series of appendices. These results constitute complete data sets which may be used to test models of the diurnal evolution of the lower atmosphere.

1. Introduction

In the 1960's, many experimental studies of the lower atmosphere were designed to examine the physics of only the first 10 or 20 m above the ground (the so-called constant flux layer) in near-ideal circumstances. Observation sites were carefully selected to avoid the effects of complex topography and nonuniform vegetation, and care was taken to ensure that data were only recorded in conditions as stationary and reproducible as possible. These earlier experiments have provided the basis for our

present understanding of the turbulent exchange characteristics of the atmospheric surface layer and to a large extent have developed the foundation on which studies of more complex processes in the lower atmosphere are building today. For example, present-day investigations of atmospheric boundary layers over forests typically attempt to extend the relations between turbulent fluxes and mean gradients, originally obtained in ideal circumstances over short grass, to conditions in which the sources and sinks of momentum, heat, moisture, and airborne pollutants are located at different levels within a deep vegetation canopy. Other studies, including the present experiments investigate the evolving structure of the entire portion of the atmosphere directly influenced by the presence of the earth's surface below, the so-called planetary boundary layer (PBL).

Unlike the steady-state condition assumed by experimentalists to characterize the atmosphere's surface boundary layer for the comparatively short time required for representative measurements to be made close to the ground, the deeper PBL is a dynamic, evolving region which, more often than not, is in some degree of transition between daytime and nighttime extremes. Its depth ranges from several kilometers in the well-mixed regimes of mid-day and early afternoon, to essentially zero in the stably-stratified, windless conditions of the fully-established, ground-based inversions often observed between midnight and sunrise. Experimental investigations of the PBL therefore require a considerably greater investment of time, effort, and equipment in order to obtain an accurate picture of the evolving structure of this most important portion of the atmosphere.

The Sangamon PBL studies employed concurrent surface-layer, momentum and heat flux measurements in order to provide quantitative information on lower boundary conditions, and a particular effort was made to develop an average view of these conditions which could be taken to represent the entire mesoscale surface surrounding the observation site. Because of the nature of this very large area, it was necessary to consider the effects of nonuniform vegetation carefully avoided in the earlier, surface layer experiments. While the surface vegetation on the site used for these studies was not perfectly uniform over the mesoscale, the terrain itself was essentially simple. In fact, the coordinated planetary and surface

boundary-layer observations obtained and listed here can be considered to provide baseline data for future investigations of the evolving lower atmosphere over complex terrain, a subject now receiving increased attention by experimentalists and modelers alike.

Decisions regarding the relative merits of alternative air pollution control strategies are often supported by cost/benefit analyses based on atmospheric transport models. Since both the accuracy and the relevance of such simulations are subject to critical review, the models must be constructed in a logical, realistic, and defensible manner. When regional rather than local problems are considered, it becomes apparent that modeling pollutant dispersion over long distances requires considerably more than simple extrapolation of steady-state Gaussian plume or average wind-rose methods judged adequate for simulation of pollution transport over the short range. The basic difference is fairly obvious. Once pollutants have been airborne more than a few hours, the diurnal evolution of the lower atmosphere causes significant changes in the dispersive mechanism; it cannot be assumed that the controlling meteorological conditions remain constant for such long periods of time. In particular, transport and dispersion regimes change quite rapidly across both sunset and sunrise; pollutants injected into the nighttime air from tall stacks sometimes collect in layers aloft that tend to remain stratified until the breakup of the nocturnal inversion following sunrise, whereupon they are rapidly mixed downward in a process graphically termed "fumigation". The height at which pollutants are released is therefore a particularly important parameter in regional models, one whose ultimate effect on dispersion downstream cannot be simulated accurately unless the model includes a reasonable representation of the evolving structure of the PBL.

The major features of the diurnal PBL cycle and their various effects on pollutant transport and dispersion are qualitatively well known. The familiar and well-characterized daytime mixed layer gives way after sunset to stably-stratified conditions in which vertical mixing is often so small that pollutants released from elevated sources remain essentially out of contact with the surface for extended periods. Consequently, dry deposition at night is typically much smaller than it is during the day. As the night proceeds, radiation cooling increases the relative humidity in

layers near the surface, and the resulting increase in available moisture can modify the chemical and physical characteristics of airborne pollutants such as the oxides of sulfur. Then too, a few hours after sunset, nocturnal decoupling (caused by the damping effects of strong stability on turbulence and a consequent drastic reduction in vertical exchange) often releases the winds a few hundred meters above the ground from frictional contact with the surface. These layers of air then accelerate and become capable of carrying pollutants long distances at night in relatively undiluted form. In the daytime, on the other hand, pollutant emissions are sometimes effectively trapped beneath slowly rising PBL-capping inversions, and are thus held for many hours in well-mixed reservoirs in relatively close contact with the underlying surface. Unfortunately, quantitative observations of these and other qualitatively well-known PBL characteristics are relatively few; detailed data sets sufficient to test regional pollution transport models are fewer still.

In order to obtain sets of observations sufficiently complete to develop and test numerical models of these phenomena, a series of field investigations of the evolution of the PBL was undertaken by this Laboratory's Atmospheric Physics Section as a contribution to the Multistate Atmospheric Power Production Pollution Study (MAP3S). MAP3S is a multilaboratory research program initiated by the Department of Energy and sponsored since 1979 by the Environmental Protection Agency. The two complementary field experiments described here were also conducted in conjunction with the EPA Midwest Interstate Sulfur Transformation and Transport (MISTT) program which, during the summers of 1975 and 1976, investigated the physical and chemical nature of the urban plume over distances up to 200 km downwind of the city of St. Louis.

The major purpose of the ANL field experiments was to document the two most important phases of the diurnal cycle of the PBL. Conducting similar observations over the same site during the same mid-summer periods in two successive years, the program first investigated the early morning breakup of the nocturnal stable layer and the subsequent period of the mixed-layer's rapid growth before noon. In the second year, the observations were shifted to the late afternoon period of the mixed-layer's decline and the period of the formation and intensification of the nocturnal, ground-

based inversion during the hours before midnight. The field experiments were conducted in Sangamon County in central Illinois, about 25 km south of the city of Springfield. The studies are therefore known as the Sangamon Experiments.

Data obtained in these studies and listed in the appendices to this report can be used to test numerical models of PBL evolution, including those devised in recent years by Deardorff (1974 a,b), Wyngaard and Côté (1974), Yamada and Mellor (1975), Zeman (1975), Brost and Wyngaard (1978), and Zeman (1979). Models of specific PBL features such as the evolving depth of the mixed layer can also be tested with this information; examples include simulations by Carson (1973), Tennekes (1973), Mahrt and Lenschow (1976), Stull (1976), and Yamada and Berman (1979). Other potential applications include testing boundary-layer similarity theories such as those by Melgarejo and Deardorff (1974), Clarke and Hess (1974), and Arya (1977). In addition, the Sangamon data supply objective information on which to base parameterization schemes for the principal PBL characteristics required for inclusion in regional pollution dispersion models; these features include ventilation wind velocities, time-dependent measures of the depth of the mixed layer, and the heights and velocities of low-level, nocturnal wind maxima.

The data presented here have been carefully examined, and potential sources of error are identified and discussed. In compiling this catalog, the authors have contributed little interpretation and have utilized no more interpolation than the spacing of the observations permit. Only in the case of the surface friction velocities have other than directly measured values been listed: representative area averages of this important parameter were necessarily derived by combining measurements made over each of the two crops that characterized the area, namely, soybeans and maize. A summary of the method used to combine these data is included in this report; a more detailed discussion has been given elsewhere by Hicks and Wesely (1981).

2. The Experimental Site

The main site used for the Sangamon field experiments is located at 39° 32' 30" N latitude and 89° 43' 03" W longitude, approximately 5 km SSE of Auburn, Illinois. As can be seen in Figure 1, the local terrain is quite flat; there is, however, a gradual slope of about 4 parts in 10,000 downward to the NE, that is, toward 58° east of true north. The surrounding area is almost entirely devoted to farming. Fields are separated by a rectangular grid of gravel or blacktop roads, 1.6 km apart, with about half the area of the one-mile square sections thus defined planted in maize (Zea mays) and half in soybeans (Glycine max), an arrangement which produces a near-random distribution of 20 - 40 hectare fields, as can be seen in Figure 2. Thus, unlike the general terrain used for the Wangara experiment (Clarke et al., 1971), or that used for the Minnesota experiment (Kaimal et al., 1976), the surface surrounding the Sangamon site was not sufficiently homogeneous to establish a deep atmospheric boundary layer which could be considered characteristic of the flow over a single type of vegetation. It was therefore necessary to determine area-wide, representative values of the surface fluxes of momentum and sensible heat by spatial averaging. This procedure was greatly aided by the fact that the general area was almost equally divided between just two crops, and that within each field the vegetation was dense and uniform. On a larger scale, this statistically uniform pattern of level terrain and approximately evenly divided areas of only two types of surface cover extended up to 30 km to the south and west, up to 20 km to the north, and more than 50 km to the east. As can be seen in Figure 2, there were occasional exceptions due to isolated farm buildings and associated shade trees. In addition, there were a few small villages in the general area, none closer than 5 km in the sector normally upwind.

Heights of the soybean and maize were measured during the experiments as part of the surface layer study routine. The average height of the larger, upper leaves of the maize in the summer of 1975 was about 2.25 m; the tassels of the maturing crop extended to about 2.85 m. The average crop height of maize was therefore taken to be 2.55 m; very little growth was detected during the several weeks of either experiment. The soybeans, on the other hand, grew rapidly during the observation period in both

Fig. 1. View looking south of the main field site in July, 1975, showing the micrometeorological instrumentation in the soybean field; the edge of a field of maize can be seen in the background.

Fig. 2. Aerial photograph looking southwest showing the general terrain surrounding the main field site; the 1975 experiment was primarily located in the (darker) soybean field in the middle distance near the center of the picture, and in which a barn and silo may be seen.

years. In mid-July, the soybean leaves were not yet fully developed and some bare soil was exposed between the rows; but by the middle of August, no bare soil was visible from above. The vertical growth of the soybean crop recorded during the 1975 field experiment is shown in Figure 3.

Fig. 3. Soybean growth recorded during the 1975 experiment. Solid circles correspond to measurements from the northern end, open circles the southern end, and crosses the center. The curve has been drawn through the data by eye; no significant differences observed between different locations in the same field.

3. Methods of Observation

Although the basic methods used to measure PBL parameters are fairly well known, a number of new techniques and some useful variations on older ones were developed for the Sangamon field experiments. All of the observation procedures used are summarized here along with brief descriptions of a number of other studies related to air pollution problems also conducted during the field program.

a) Pilot balloon, radiosonde, and kytoon operations

Conducted between 21 July and 13 August 1975, the first of the two Sangamon field experiments investigated the evolution of the PBL from 0400 to 1200 CST, the period of the mixed layer's formation and principal growth. Almost exactly one year later (16-30 July 1976), the second field experiment examined the onset and development of the nocturnal inversion. During each of these studies wind and temperature profiles were measured up to about 2 km by serial ascents of free balloons equipped with miniature radiosonde transmitters especially developed for PBL investigations (Hart

Fig. 4a. The ANL miniature radiosonde; equipped with a temperature sensor only, this device transmits a continuous audio frequency of about 2 kHz on the 403 MHz meteorological band with an output power of about 30 mW.

Fig. 4b. Circuit diagram for the ANL miniature radiosonde.

Fig. 4c. A typical radiosonde launch at the main site in July, 1975.

(Hart et al., 1978) Figure 4. Balloons were tracked with two digitized theodolites also especially developed for profile measurements in the lower atmosphere (Frenzen and Prucha, 1973). These units are manually operated in the manner of standard pilot-balloon theodolites, but the tracking angles from both instruments are automatically recorded on a single, computer-compatible tape every second. The radiosonde flights employed a simple barometric release (described by Hart et al., 1978) which separated

the transmitter and its parachute (see Figure 4c) from the balloon at an elevation of approximately 2 km. In most cases, profiles were also measured during the transmitter descents by tracking the parachutes. Standard, 30-g pilot balloons were used, each balloon filled to rise at a rate of about 3 m s^{-1} .

Fig. 5. The profiling kytoon, shown here with the telemetry package and propellor anemometer attached to the tethering line. PNL's Cessna 411 aircraft can be seen in the background.

Balloons were launched hourly throughout the daily observation periods of each field experiment. During the 1975 daytime series, radiosonde transmitters were omitted from the 0500, 0700, and 0900 CST flights, and

the pilot balloons were tracked for wind profiles alone. During the nocturnal experiment of the second field season, balloons were launched from 1800 to 2400 CST, with the transmitters omitted from the 2100 and 2300 CST runs. Immediately before each of the evening balloon ascents, a set of high-resolution profiles were recorded through the first 200 m with the instrumented kytoon shown in Figure 5. As described by Hart (1979), continuous wind and temperature signals were telemetered to the surface while the kytoon was slowly winched down and the sensor package was tracked by the double-theodolite system. The wind and temperature signals received were automatically integrated over consecutive 1-s intervals and recorded on tape along with the tracking data.

b) Surface pressure, surface temperature, and sodar

The PBL profile observation programs were supported by measurements of surface pressure, temperature, and humidity recorded at the main field site and at special stations located near the Illinois towns of Galesburg and Champaign; these three points define a triangular network approximately 160 km on a side. Instruments used were hygrothermographs and microbarographs. The latter were sealed units of the marine type equipped with extension tubes that connected the air inlet of each barograph case to the outside atmosphere at a point not affected by dynamic pressure effects. These recording sensors were housed in standard Stevenson screens located in open fields and were checked against secondary calibration standards every two or three days. Along with routine hourly pressure and temperature values reported by midwestern stations of the National Weather Service, the data obtained were used to calculate geostrophic and thermal winds as detailed in Section 4(d) below.

Additional information on the structure of the atmospheric boundary layer over the main observation site was provided during the 1975 experiment by an array of four sodars placed at an average separation distance of about 20 km. Records obtained by this network were used in a preliminary study of mesoscale inhomogeneities in the PBL capping inversion. During the nocturnal boundary layer studies of the following year, two sodars separated by a distance of about 1 km were operated at the main site for an exploratory study of gravity waves. The record was

interrupted briefly during the second experiment when the sodar equipment was utilized to provide mobile ground support for "Project da Vinci", a manned-balloon launched from St. Louis in an experiment co-sponsored by the Energy Research and Development Administration and the Environmental Protection Agency (Miller, 1976). The mobile ANL sodar equipment leap-frogged along the path of the slow-moving da Vinci balloon and provided the scientists on board with measurements of the depth of the mixed layer, information required for their studies of pollutant transport and transformation.

Fig. 6a. Locations of solar sensors (O), acoustic sounders (●), and both solar and acoustic instruments (⊙) operated during the 1975 experiment; the main observation site is a few km east of the village of Auburn.

Fig. 6b. Locations of the National Weather Service (O) and ANL microbarograph stations (X), where pressure data for surface geostrophic wind calculations were recorded.

Locations of ancillary observation sites and the distribution of special equipment used during the Sangamon field experiments are shown in

Figure 6. Only the sodar information recorded at the main experimental site is presented in the appendices.

c) Micrometeorological observations

Basic meteorological data were continuously recorded during both experiments in the middle of a soybean field about 1.3 m above the vegetation canopy. These measurements of wind speed, wind direction, air temperature, and humidity, automatically recorded on magnetic tape, provided the basis for parameterizing the surface fluxes in terms of relatively easily measured quantities. This information was supplemented by more detailed sets of micrometeorological measurements of wind, temperature (including surface infrared values), dew point, insolation, and net radiation collected over one or both crops.

Fig. 7. The eddy-correlation equipment mounted on the mobile mast; a fixed 8-m profile tower located in a maize field can be seen in the background.

Direct measurements of turbulent fluxes of momentum and sensible heat were made by the eddy-correlation method over both crops during daylight hours in the first field experiment. As shown in Figure 7, the eddy-flux equipment was portable and could be readily moved from one crop to the other, or adjusted in response to significant changes in wind direction. As mentioned earlier, direct flux measurements were attempted on only a few occasions in the nocturnal experiment, and only over maize. This reduced micrometeorological effort recognized the inherent difficulties involved in making turbulent flux measurements in strongly stabilized atmospheric conditions. As described by Hicks (1970), the eddy-correlation equipment used in these studies employs a propeller anemometer as a vertical velocity sensor, a device whose limited sensitivity and frequency response restricts its use in the conditions of strong stability and low wind velocity often encountered at night. Relatively few direct flux measurements were therefore attempted during the 1976 nocturnal experiment.

During the daytime experiments, a number of trial comparisons were made between time-averaged measurements of heat fluxes at a point and line-averaged estimates obtained by a remote sensing technique that utilizes measures of the optical blurring of distant objects viewed through a telescope (Wesely and Derzko, 1975; Wesely, 1976). Results obtained were only partially successful, and are therefore not included in this report.

d) Air quality studies

In addition to the core planetary and surface boundary layer investigations, a number of other studies related to air quality problems were made on the Sangamon field site during both field experiments. Data from these studies have not been included in this report, but several are discussed elsewhere as noted below. Others were essentially preliminary field trials of new techniques whose contributions have appeared indirectly in subsequent related work.

On a number of occasions in 1975, air samples were collected above and below the rising inversion with light-weight, battery-powered samplers carried aloft by a kytoon. Vertical gradients of ozone in the surface layer and surface concentrations of ozone, sulfur dioxide, nitrogen

dioxide, and hydrocarbons were measured during the entire period. Other experiments measured aerosol particle concentration, aerosol sulfate speciation, and oxygen isotope ratios (Holt et al., 1978). Rainfall samples were collected and analyzed to determine pH and trace metal concentrations. Direct and diffuse components of solar radiation were recorded for atmospheric turbidity estimates over the network shown in Figure 6. This work used a unique, periodically shaded solar sensor previously developed for regional turbidity studies (Wesely, 1981). On a number of occasions during the 1975 experiment, high frequency fluctuations of wind speed and temperature were recorded from a kytoon at various heights in and near the rising inversion, for a preliminary study of the turbulent structure of the layers detected by sodar.

During the second field experiment, a Cessna 411 aircraft operated by Battelle Pacific Northwest Laboratory participated in the first few hours of a number of the nocturnal PBL observation periods. This aircraft was equipped to measure temperature, humidity, ozone, cloud condensation nuclei, and aerosol concentration by optical back-scatter ("b-scat"). On one occasion, an instrumented EPA helicopter provided an additional capability for air pollutant measurements above the surface layer. However, these efforts were usually of limited duration since it was necessary to end flight operations 30 min after sunset.

In 1976, surface micrometeorological investigations included direct measurements of the rate of dry deposition of ozone to the maize canopy (Wesely et al., 1978; also reported in Eastman and Stedman, 1977). In addition, trace metal concentrations were evaluated in particles collected over a soybean field, and samples were collected for subsequent aerosol sulfate speciation determinations by infrared spectrometry (Cunningham and Johnson, 1976).

A number of cooperating research groups participated in the Sangamon field experiments at various times. These included scientists from the Environmental Protection Agency, the ANL Chemical Engineering Division, the ANL Energy and Environmental Systems Division, the Ecological Sciences Section of the ANL Radiological and Environmental Research Division, Battelle Pacific Northwest Laboratory, the Illinois State Water Survey,

Florida State University, the University of Michigan, the University of Minnesota, Pennsylvania State University, and North Carolina State University.

4. Data Reduction Procedures

Just as the methods used to observe the PBL are familiar to many readers, so also may be the procedures used to reduce the measurements obtained. A few variations have been employed in preparing the Sangamon data, but the following accounts of data reduction procedures are included here primarily to place the results of these experiments in a more complete context. This summary may also serve as a brief introduction to PBL data analysis for those not familiar with the subject.

a) Wind profile data

Wind velocities aloft were evaluated by tracking the motions of pilot balloons with a digitized double-theodolite system. Successive balloon positions at 1-s intervals initially calculated in a spherical frame were converted to Cartesian coordinates with a computer program based on that described by Thyer (1962). The effective resolution of each balloon position calculated is determined by the length of the base line between the theodolites, and by the limiting resolution of the tracking-angle transducers, namely $360/10^4 = 0.036^\circ$ per digital pulse registered. Each theodolite line of sight therefore has a narrow cone of uncertainty, and the position of any point in space cannot be specified any better than that it lies somewhere within the volume defined by the intersection of two such cones. With the base line of 400 m used in these experiments, a balloon 2.5 km away (a distance attained, for example, about 7 min after release in winds averaging 6 ms^{-1} , when the balloon has attained an altitude of 1.2 km) can only be said to lie somewhere within an irregular volume with a major axis (essentially bisecting the two lines of sight) along the line of sight of nearly 20 m and minor, transverse axes of a little less than 2 m. This example assumes that the winds are perpendicular to the base line; the error increases as the angle to the base line departs from the perpendicular and it quadruples each time the slant range doubles.

To reduce the consequences of position error at large slant range, and also to minimize the effects of occasional noise in the data recording system, an averaging scheme was applied to the 1-s balloon positions computed from the original data record. These were averaged in consecutive groups of three to produce, a smoothed data set of average balloon positions at 3 s intervals. Overlapping 9-s balloon displacements were then calculated and these were again averaged over successive groups of three to define consecutive, average balloon velocities centered 9 s apart. Components of the three-dimensional velocity vectors thus determined were then resolved and used in turn to calculate the speeds and directions of the horizontal wind. Finally, each of these values was identified with its average height calculated from the balloon position data corresponding to the appropriate central time.

Smoothed velocities were computed in this manner for the first 45 s of each balloon ascent (approximately the first 125 m). For the remainder of the flight, overlapping, 18-s balloon displacements were averaged over groups of three to define winds at intervals of 18 s. Wind distributions calculated in this way were then linearly interpolated to obtain values corresponding to the standard heights of 30, 50, 75, and 100 m, and every 50 m above 100 m, as tabulated in the appendices.

b) Temperature profile data

Temperature measurements aloft were obtained from the recorded radiosonde signals with the calibration formula,

$$1/T \equiv 1/T_0 + (1/\beta) \ln (f_0/f) \quad (1)$$

(see Hart et al., 1978). Here T_0 is the baseline temperature in deg C observed to correspond to a particular radiosonde audio frequency f_0 in Hz, and the factor β is a thermistor calibration constant (typically 3890 for the Fenwall type GA51J1 bead thermistor used). Since the time constant of the thermistor was 2.7 s, and since each temperature value was derived from a frequency integrated over 1 s, no further data averaging was imposed.

Initial values of T_0 and f_0 required for Eq. 1 were measured in baseline checks just prior to each radiosonde launch and used for preliminary computations. Subsequent profile calibration corrections were based either on temperatures extracted from nearby surface layer data measurements that were judged to be more representative than the baseline measurements, or on values obtained by matching radiosonde or kytoon profiles aloft and extrapolating to the surface (also see Section 5 below). The relative consistency of run-to-run temperature profiles at upper levels was used as a further check of this, in effect, zero offset adjustment. This comparison proved to be especially useful in reducing the spurious differences often found between successive temperature profiles recorded in light winds at night or in the early morning, conditions in which both the temperatures measured at the launch point and those recorded by nearby surface layer systems were often disturbed by local effects.

c) High resolution profiles

The wind and temperature sensing unit suspended from a kytoon as shown in Figure 5 was used to measure low-level profiles during the nocturnal experiment of the second year. This instrument package was tracked by the double-theodolite system as the kytoon was slowly brought down from approximately the 200-m level at a rate of about 0.75 m s^{-1} . Elevation and azimuth angles reported by the theodolite transducers, plus the short-period integrated values of the temperature and wind signals transmitted by dual-channel radiotelemetry, were automatically recorded on the same digital magnetic tape each second. Wind speeds were subsequently calculated from the taped data by averaging the audio frequency signal generated by the instrument package's propeller anemometer over the ~ 13 -s periods required for the unit to descend through 10-m height intervals centered on the three lowest standard elevations, 10, 20, and 30 m. Wind speeds at the intermediate levels of 50, 75, and 100 m were averaged for approximately 27 s over layers 20 m deep; above 100 m averaging intervals of ~ 35 s were used, these corresponding to layers 25 m deep.

Winds measured in this way were corrected for the relative motion of the instrument package imposed as the kytoon was drawn upwind, toward the winch, during descent. The effects on the wind sensor of lateral motion

caused by kytoon instability or turbulence could not be eliminated entirely; however, the use of a propeller rather than a cup anemometer reduced the sensitivity of the system to this effect. Further, since most kytoon runs were made in stable, nocturnal conditions (some were made an hour or two before sunset), lateral swinging was usually small, especially during the slow, steady descent employed in these experiments.

Fig. 8. A comparison of wind profiles obtained from kytoon (V) and radiosonde (Δ) measurements in the 1976 Sangamon Experiment. Overlapping error bars indicate twice the standard error for each set of data.

A comparison of near-simultaneous, low-level wind profiles recorded with the free-balloon and the tethered-kytoon wind systems shows differences as large as 20 percent, but this is not unexpected since the signal averaging processes were not identical and since tracking free balloons in the first 200 meters (typically, during the first minute of ascent) is difficult. In the quasisteady conditions of these experiments, differences between the two types of wind data should be randomly distributed. That this was essentially the case is shown in Figure 8 where average wind speeds and standard errors obtained from 37 near-simultaneous (± 15 min) kytoon and radiosonde profiles are plotted. At every level where measurements were made by both systems, the average wind speeds agree quite well: each mean value given by either system lies within the error

bars defined by values measured at the same level by the other. Additional wind speeds obtained from the kytoon system alone at 10, 20, and 125 m, plus those derived from the free balloons alone at levels above 150 m are included in the figure to complete the picture.

A wind direction corresponding to each wind speed derived from the kytoon data was estimated from the mean azimuthal position of the instrument package during the speed-averaging interval as viewed from the location of the winch. No correction was made for the fact that this determined wind directions at the height of the kytoon, rather than at the height of the instrument package about 10 m below. Direction errors should not have been large unless there was a very strong shear in wind direction, or if the kytoon had been rigged asymmetrically in a manner that would cause it to yaw across the wind. In any event, wind directions aloft obtained from the kytoon in this way were found to agree quite well with those determined from near-simultaneous, free-balloon profiles.

Highly detailed temperature profiles can apparently be obtained from the temperatures reported during the slow descent of the kytoon. This system's temperature measurements are nominally accurate to ± 0.15 C with a resolution of 0.03 C. This compares to temperatures obtained from the radiosondes which have a nominally superior resolution of 0.05 C (due to a higher modulating audio frequency), but are accurate only to ± 0.4 C because of calibration (i.e., baseline temperature) uncertainties. Since the radiosonde temperature sensor had a 2.7-s time constant and the free balloon rise rate was $\sim 3 \text{ m s}^{-1}$, the sensor rose about 8 m during one time constant. On the other hand, although the thermoliner thermistor used in the kytoon package had a larger time constant of 4.5 s, the slower descent rate of 0.75 m s^{-1} resulted in the sensor falling only about 3.5 m during one time constant. This figure will be seen to be large enough to require lag corrections to be included in any efforts to extract detailed temperature profiles from the kytoon data. Such corrections were not applied to data listed in the appendix since these are 13-s and 27-s averages.

d) Surface geostrophic and thermal winds

The surface geostrophic and thermal winds, two important external forcing parameters required for investigating and modeling planetary boundary layer flow, are unfortunately quite difficult to measure. Components of the surface geostrophic wind can be written

$$U_{go} \equiv - (1/f\rho)(\partial p/\partial y)_o \quad (2)$$

and

$$V_{go} \equiv (1/f\rho)(\partial p/\partial x)_o \quad (3)$$

in which f represents the Coriolis parameter, ρ the air density, and p the pressure. For the Sangamon field experiments, values of these components were computed from pressure measurements reduced to mean sea level which had been obtained either from an expanded network consisting of fourteen midwestern stations of the National Weather Service plus three special ANL microbarograph stations, or from a minimal network consisting of the three microbarograph stations alone (see maps in Figure 6). For the case of the larger network, surface pressure distributions were smoothed by fitting the data to the quadratic surface

$$p_i = c_1 x_i + c_2 y_i + c_3 x_i^2 + c_4 y_i^2 + c_5 x_i y_i + c_6 \quad (4)$$

(after Clarke et al., 1971). Here p_i is the deviation of the i -th station pressure from the mean of all values used, and the coordinates x_i and y_i locate the i -th observation site relative to the geometric mean station location; the coefficients c_j (for $j = 1$ to 6) are constants obtained by applying the least squares method to obtain the best fit with the hourly data. Data from the three-station microbarograph network alone were used to define the plane surface

$$P_i = a_1 X_i + a_2 Y_i, \quad (5)$$

where the upper case letters P_i , X_i , and Y_i refer to actual pressure values and station coordinates rather than departures from means. Once expressions for area-wide pressure distributions had been determined from Eqs. 4 and 5, local pressure gradients were evaluated at the coordinates of the main site, and geostrophic wind components were obtained from Eqs. 2 and 3.

In addition to estimates calculated from surface pressures, measures of the geostrophic wind can be obtained from observed wind profiles by computing the amount these differ from wind distributions predicted by simplified equations of motion. Known as the geostrophic departure method, this procedure makes use of the fact that in steady flow over the rotating earth, the vertically integrated difference between the observed wind and that which would exist in the absence of friction (that is, in circumstances where pressure forces are balanced by the Coriolis acceleration alone and geostrophic balance obtains) is equal to the change in momentum flux across the layer considered. Since the change in momentum flux across the entire PBL equals the surface stress τ , implicit relations for components of the geostrophic wind can be written

$$\tau_x = \rho f \int_0^H (v - v_g) dz \quad (6)$$

and

$$\tau_y = \rho f \int_0^H (u_g - u) dz \quad (7)$$

where u and v , each functions of z , are the components of the observed wind profile. By assuming that the geostrophic wind profile is linear (equivalent to assuming the thermal wind to be invariant with height) and that the level H at which the observed wind attains the appropriate geostrophic value (i.e., the top of the PBL) is known, the relations Eqs. 6

and 7 can be integrated either graphically or numerically to obtain estimates of geostrophic wind components (e.g., see Johnson, 1965, or Yamada et al., 1976). The latter method has been used here to provide the third set of data in Figs. 9 and 10, where hourly variations of geostrophic winds computed by the three procedures for both field experiments are shown.

Analysis of the 1975 daytime results found good agreement between geostrophic wind values based on ANL microbarograph data alone and values derived from the reports of the larger network including NWS stations. Estimates derived by the geostrophic departure method from profiles measured in these well-mixed conditions also seem to agree quite well. However, results calculated from the data of the microbarograph network are considerably more scattered than those obtained from data of the expanded network, as would be expected in view of the smaller network's reduced spatial averaging and greater sensitivity to measurement error. Variations of this kind are, for example, especially apparent on days 204, 221 and 222. Nevertheless, the additional time resolution afforded by the smaller network does make the corresponding data set useful for some purposes. On these grounds, geostrophic winds derived from the ANL microbarograph data are also listed in the appendices.

Consistent differences are evident in Figure 10 between the geostrophic winds derived for the 1976 nocturnal experiment from the ANL microbarograph data and those based on the reports of the expanded network. Causes of these discrepancies are yet to be identified, but local temperature effects on the sea level pressure corrections are probably involved. The less scattered geostrophic winds obtained from the expanded data set are to be preferred for the second experiment, even though some detail is lost.

Equating the vertical change of geostrophic wind with the thermal wind, components of the latter can be written

$$\partial U_g / \partial z = (U_g / T) (\partial T / \partial z) - (g / f T) (\partial T / \partial y) \quad (8)$$

Fig. 9. Geostrophic wind components for the 1975 experiment computed from pressure gradients measured by the three-microbarograph network ($\bullet$), and from the expanded ANL/NWS network ($\circ$); also shown are estimates made by the geostrophic departure method ($\blacktriangle$). The dotted lines have been drawn by eye through values computed from the data of the expanded network.

Fig. 10. Same as in Figure 9, for the 1976 experiment.

and

$$\partial V_g / \partial z = (V_g / T) (\partial T / \partial z) + (g / fT) (\partial T / \partial x) \quad (9)$$

where T represents surface temperatures. Through relatively shallow layers, the first terms on the right-hand sides of Figs. 8 and 9 are normally an order of magnitude less than the second. When these are neglected and the second terms are assumed invariant with height, thermal wind components can, in principle, be evaluated from these relations using gradients derived from surface temperature measurements. The temperatures recorded by the two networks were therefore corrected for station elevation differences and, in the same manner as that used for the pressure measurements, were fitted to quadratic and plane surfaces in order to calculate local gradients. With these values substituted in Figs. 8' and 9 hourly thermal wind values were computed.

Unfortunately, results of the thermal wind analyses proved inconclusive in both years. The 1975 measurements yielded diurnal cycles which, although fairly smooth, seem unrealistic; the 1976 results are highly scattered. Only the 1975 estimates have therefore been included in this report. Conceivably some of the difficulty may be attributed to a problem similar to that encountered in the radiosonde baseline checks, namely that of obtaining surface temperature measurements that are truly representative of the area surrounding a point observation. Computing representative horizontal temperature gradients from widely separated and relatively uncertain point measurements compounds the difficulty.

e) Micrometeorological data

Figure 11 shows the locations of the micrometeorological equipment installed on the main Sangamon site during the 1975 and 1976 Sangamon field experiments. Data were collected over both soybeans and maize in each season, but the instrument positions were changed between the two years because of crop rotation. Equipment placement was dictated by the prevailing summer conditions of southerly flow, plus the fact that these experiments were designed to cooperate with the EPA/MISTT program's

Fig. 11a. Layout of the 1975 main field site, showing the location of the two theodolites (O), two theodolite baselines (used in different wind directions), the sites of micrometeorological measurements (x), and the area used for kytoon operations (Δ); hatching indicates fields of maize and clear areas represent soybeans.

Fig. 11b. Field site layout as in (a), but for the 1976 nocturnal experiment.

investigation of the urban plume generated by the city of St. Louis, located about 120 km south-southwest of the Sangamon site. During each experiment, instrument masts were therefore set up in locations that provided the longest uniform fetches over both soybean and maize fields in southerly winds.

Momentum fluxes were measured over the two crop surfaces by the direct eddy-correlation method whenever uniform fetches of sufficient length could be utilized. As noted earlier (and as shown in Figure 7), the eddy-flux equipment was mounted on a mobile mast which could be moved to adjust to

small changes in wind direction in order to utilize the maximum fetch available. The principal goals of the surface layer component of the experiment were to measure surface stresses characteristic of the two types of field crops, to evaluate roughness lengths and displacement heights characteristic of both crop canopies, and to use these data to determine spatially averaged momentum and heat fluxes characteristic of the general area surrounding the main observation site. These goals were essentially accomplished during the 1975 daytime experiment when fluxes were relatively large. Accordingly, and because of the known difficulties associated with flux measurement in light winds and stable conditions, the effort assigned to surface layer flux measurements in the 1976 study of the nocturnal case was reduced.

A detailed discussion of the comparative studies of the micrometeorological characteristics of flows over soybeans and maize has been presented by Hicks and Wesely (1981).

f) Roughness lengths and zero-plane displacement heights

It was expected that the aerodynamic roughness scale length z_0 and the zero-plane displacement height d characteristic of each crop canopy would change with time during the two- to three-week periods of the field experiments, especially in the case of the rapidly growing soybeans. A large number of momentum flux and wind profile measurements were therefore made over soybeans in an attempt to delineate this change accurately. Unfortunately, fetch considerations dictated elimination of all data except those obtained in favorable conditions on three days: 28 July, 31 July, and 6 August 1975. This limited data set proved insufficient to quantify the rate of change in z_0 and d with confidence, although the geometric mean z_0 derived from data obtained on the two days in July (namely, 3.5 ± 0.6 cm from 11 evaluations) was significantly less than that obtained about one week later on 6 August (5.9 ± 0.8 cm from 19 evaluations). The earlier value corresponds to a roughness length equal to about 4 percent of the height of the soybean canopy at that time, whereas the second is about 6 percent of the crop height on the later date. In any event, an approximate mean value of $z_0 = 5$ cm has been used for soybean fields in comparisons of flow conditions over the two crops. The average zero-plane displacement

height inferred from wind data measured above the soybeans was $d = 90 \pm 7$ cm, a value amounting to about 90 percent of the average crop height.

Values of z_0 and d for the maize canopy were also determined from relatively small sets of data. After measurements in extremely light winds had been deleted, 21 observations made over maize in the first experiment remained. These yielded an average z_0 of 17 ± 2 cm, about 6.5 percent of the average crop height. The average value of d was found to be 151 ± 12 cm, about 60 percent of the average height of the maize. Similar results were obtained in 1976 from a limited number of momentum flux and wind gradient measurements collected over maize in special daytime studies: data obtained in near-neutral stability and steady-wind conditions gave $z_0 = 24.5 \pm 1.6$ cm and $d = 166 \pm 5$ cm. Neither figure is significantly different from the 1975 values for maize, especially in view of the inherent uncertainty attached to determinations of larger values of these two surface layer scaling factors.

To obtain these results, eddy flux measurements have been corrected for the effects of limited high-frequency sensor response, following procedures given by Hicks (1972). When appropriate, stability corrections were applied as recommended by Dyer (1974); contributions of water vapor to the total buoyancy flux were included through incorporation of estimated fractions of the latent heat flux. The latter were determined from the surface energy balance: $L_w E \approx 0.95 R_n - H$, where E is the evaporation rate, L_w is the latent heat of vaporization, R_n represents the net radiation, and H is the sensible heat flux. The factor 0.95 is included to allow for heat transfer to the ground, here taken from past experience to be about 5 percent of R_n . Since only about 7 percent of $L_w E$ figures in the buoyancy flux, the stability calculation is quite insensitive to errors in the estimated magnitude of the comparatively small amount of heat transferred to the ground.

g) Momentum fluxes

Values of momentum flux over the two crops were compared by analyzing data recorded on those occasions with southerly winds when mean wind speeds

were measured over both surfaces, and when the net radiation and sensible heat fluxes were measured directly over one or both crops. Values of u_* were then calculated with friction coefficients (the square root of the drag coefficient, defined as $u_*/\bar{u}$) previously determined for each crop by direct eddy-correlation measurements in near-neutral conditions. These coefficients were corrected for stability effects, assuming that the heat fluxes over both crop canopies were approximately the same when only one measurement was available. The small, but systematic difference observed in H over soybeans and maize is discussed later; the assumption of equality in the present context has only a minor influence on the stability correction, and hence only a minor effect on values of u_* .

Fig. 12. A comparison between simultaneous evaluations of friction velocity made over adjacent soybean and maize canopies; the straight line has a slope of 1.17.

Figure 12 compares u_* values evaluated in this way over the two crops. It is clear that a close relationship exists, and that a simple proportionality factor provides an adequate description of the relation. The 29 individual pairs of values incorporated in Figure 12 give 1.17 ± 0.03 as the average ratio of the friction velocities, maize to soybeans.

As noted earlier, the farmland surrounding the Sangamon field site was very nearly evenly divided between fairly large fields of maize and soybeans during both years. In the second year, annual crop rotation replaced one crop with the other in virtually every field, thus changing the surface detail but essentially preserving the overall aspect of the

entire area. Assuming that unweighted flux averaging is appropriate to this relatively simple mixed surface, spatial averages of friction velocity characteristic of the general area can be estimated from values measured over each crop individually. Indeed, a good estimate can be made from observations made over only one of the two surface types since the ratio of friction velocities is known. Thus, to estimate mean values of surface momentum flux appropriate to the larger scale area, u_* values measured over soybeans should be increased by about 9 percent while those measured over maize should be decreased by a similar amount.

Fig. 13. Diurnal cycles of the average differences between net radiation recorded over maize (R_{n1}) and over adjacent soybeans (R_{n2}) and of the corresponding differences in infrared surface temperature ($T_{s1} - T_{s2}$). Average values and standard errors are plotted; numbers indicate sample size.

h) Net radiation and surface temperature

Net radiometers mounted a few meters above each crop surface during the 1975 experiment were used to measure the radiation balance typical of each type of vegetation. Figure 13 shows that the net radiation R_n recorded over maize exceeded simultaneous values recorded above soybeans during the mornings and late afternoons by small but consistent amounts

averaging less than 10 percent. The curve drawn by eye through the plotted averages will be seen to be roughly symmetrical about local noon.

A slight difference in the thermal emission properties of the two crops was also indicated by surface temperatures measured with a hand-held infrared thermometer. On the average, the "IR" temperatures of maize were found to be about 0.4 C warmer than those of soybeans during the morning; by noon, however, the maize surface was about 0.4 C cooler. The similarity between the surface temperature and the net radiation data evident in Figure 13 is surprising: where surface albedoes and thermal emissivities are identical, lower R_n values should be detected above the warmer surface, but the Figure 13 shows the opposite behavior. Albedo differences between the two crops may have varied diurnally, perhaps in part as a result of greater mid-day wilting of soybean leaves, a feature clearly visible on a number of occasions. Differences in the amount of dewfall to the two crop surfaces may also have occurred, and it seems likely that dew would have been distributed more evenly through the less dense maize canopy. It follows that differences in crop surface albedo may indeed have played a role during the morning hours. However, a more important factor could have been the exposure of bare soil between soybean rows during the first part of the 1975 experiment, that is, before the crop plants were in full leaf. For the first week or so, patches of soil were exposed to direct insolation during a period centered about noon, with the amount of soil shaded by plants increasing uniformly with increasing time, both before and after solar noon. However, the information available is insufficient to examine this problem in greater detail.

i) Sensible heat fluxes

Average diurnal cycles of net radiation and sensible heat flux recorded in 1975 are given in Figure 14. Values of H measured over the two surfaces are plotted separately in order to show that the averages measured above soybeans were consistently about 10 percent smaller than those recorded over maize. Using the same unweighted averaging method employed with the u_* data, larger scale spatial averages of H over the approximately evenly divided, dual-crop surface can therefore be estimated as follows:

values of H measured over soybeans should be increased by about 5 percent, while those evaluated over maize should be decreased by the same amount.

Fig. 14. Average diurnal cycles of net radiation (upper curve) and sensible heat flux (lower curves) measured during the 1975 experiment. Open circles (O) represent heat fluxes measured over soybeans, and solid circles (●) indicate heat fluxes measured over maize.

5. Presentation of Data

Data obtained during the two Sangamon field experiments are presented here in a series of appendices organized to provide a comprehensive set of surface and PBL measurements suitable for testing numerical models or for carrying out independent analyses. In compiling this body of information there has been a minimum of data interpretation. Emphasis has instead been placed on detecting and eliminating errors, and on identifying those cases in which there is some reason to question the degree of precision of the value or values reported, relative to other information in the same category. In those instances where the results listed have been inferred either by an interpolation scheme or by a parameterization method that utilized other measurements, the values so obtained are clearly marked.

Appendices A1 through A4 catalog data obtained in the 1975 study of the growth of the daytime mixed layer; Appendices B1 through B4 list

results of the 1976 study of the nocturnal case. The two data sets are presented in similar format, starting with general comments (A1 and B1) and followed by PBL structure data (A2 and B2), surface micrometeorological information (A3 and B3), and reproductions of sodar records (A4 and B4). For the most part, conventional notation has been used throughout; Appendix C provides a key to the less familiar and special symbols used.

General comments extracted from log books and other records maintained in the field are condensed in Appendices A1 and B1. This information has been arranged to draw attention to difficulties encountered in the field in order to identify data that may be questionable. Hourly meteorological observations for the period of each day's field operations are also given.

Appendix A2 tabulates the radiosonde and pilot balloon data obtained in the first experiment. As explained in Section 4(a), these observations of average winds and temperatures through the developing, daytime PBL have been smoothed and interpolated to provide profile data at standard levels of 30, 50, 75, and 100 m, and every 50 m thereafter up to 2 km. Doubtful wind measurements (defined as values that depart more than 25 percent from the local mean and usually attributable to short periods of poor tracking or to limited resolution at large slant range) are flagged with a question mark. Completely erroneous wind data generated by long periods of poor tracking have been deleted. Corrected temperature profile data are identified according to whether the corrections used have been derived from surface layer temperature measurements (designated TEMP FLUX) or obtained by matching temperature profiles recorded well above the surface layer immediately before and immediately after the run in question (designated TEMP MATCH). Temperature values apparently contaminated by telemetry noise (attributable to weak signals and usually caused by the receiving antenna being misaligned or by the transmitter being carried directly overhead) have been deleted. Surface geostrophic winds (SURF GEOS) and thermal winds (DELTA GEOS) calculated as outlined in Section 4(d) have been included for each radiosonde and pilot balloon observation in the 1975 data set. Only the geostrophic wind estimates are included for the 1976 experiment since, as previously noted, thermal winds computed from the nocturnal surface temperature measurements were too scattered for inclusion in this listing.

Appendix B2 Part (a) presents radiosonde and pilot balloon data measured during the late afternoon and evening of the 1976 field experiment in the same format used to list the daytime data obtained in the previous year. As described in Section 3(a), this second experiment also recorded detailed velocity and temperature profiles through the lowest few hundred meters of the developing nocturnal boundary layer with a tethered kytoon sounding system. These results are listed in Appendix B2 Part (b) for standard heights of 10, 20, 30, and 50 m, and every 25 m above that level up to as high as 225 m; data reduction procedures used are summarized in Section 4(c). Since the run-to-run reproducibility of the kytoon temperature profiles was very good, and since these runs were nearly simultaneous with the free-balloon runs, radiosonde temperature profile data were corrected with measurements obtained from the kytoon system (and designated TEMP CORR), when these data were available. On those occasions when kytoon runs were not attempted (for example, when winds exceeded 10 m s^{-1}), radiosonde temperature corrections were made using neighboring radiosonde profiles, as in the 1975 data.

Appendix B2 Part (c) provides a graphical representation of the evolution of the nocturnal boundary layer in the form of successive, hourly kytoon wind speed and temperature profiles. Plots of individual runs have been shifted along the abscissa (either 4 or 8 C) in order to separate the profiles.

Surface layer data recorded during the two field experiments are given in Appendices A3 and B3. Measurements made at various times and recorded over a range of time intervals have been interpolated to some extent in order to provide mean values appropriate to successive half-hour intervals throughout each daily observation period. Insolation R and net radiation R_n were primarily recorded on strip charts; 30-min means were subsequently extracted with a digitized chart reader. Surface wind speeds U and directions DD were recorded at a height of about 1.3 m by an automatic tape system located at the center of a soybean field. Dry bulb and wet bulb temperatures were also recorded by the same automatic recording system, but the primary measurements of these data are considered to have been those made at regular intervals with an aspirated psychrometer; the taped temperature data were used for interpolation when required. Surface

temperatures T_0 were measured at various times over each of the two crops with a hand-held infrared thermometer; values for the standard times listed have been obtained by averaging and interpolation.

During the 1975 daytime experiments, sensible heat fluxes were measured by eddy correlation over both soybeans and maize. As noted in Section 4(i), a small systematic difference was detected between the sensible heat source properties of the two canopies, and more substantial differences were found in the momentum sink characteristics of the two crops. Friction velocity values listed as $u_*(A)$ are estimates of area-wide averages based upon direct flux measurements obtained with the eddy-flux equipment over one crop or the other, using the averaging rationale outlined in Section 4(g). Values listed as $u_*(B)$ are estimates of area-wide averages based upon bulk estimates of u_* calculated from surface winds and friction coefficients over one crop (in which case the single-point averaging method of Section 4(g) was used), or over both crops (in which case actual averages were used).

Substantially fewer direct eddy-flux measurements were made during the nocturnal experiment of 1976. The data in Appendix B3 are listed as in Appendix A3, except that the flux measurements were only made above the maize canopy in the second year. As explained earlier, very few reliable values could be obtained because of poor sensor performance in strongly stable conditions and light winds. It might be supposed that the few values of u_* and H measured over maize could provide estimates of the momentum and heat fluxes over nearby fields of soybeans; but there are no data to suggest that the degrees of similarity observed in these parameters over the two crop surfaces in fully-mixed, daytime conditions can be extended to the highly-stratified, nocturnal case.

Sodar records obtained at the main site during the two field experiments are presented in Appendices A4 and B4. In these representations, the daytime mixed layer appears as a region of moderately strong acoustic back-scatter, usually featuring traces of vertical ground-based structures associated with thermal plumes; the layer is often capped during morning hours by a rising, darker band which represents the lifting inversion. Late afternoon records show declining thermal activity during

the hours before sunset and clearly depict the formation of the ground-based inversion (sometimes multilayered) during evening hours. These graphic records usually provide accurate and convincing measures of the evolving depth of the mixed layer, but on some occasions the return signal is obscured by excessive noise.

6. Concluding Remarks

The Sangamon Experiments of 1975 and 1976 collected a large number of highly detailed atmospheric boundary layer measurements in a variety of formats which have required considerable time and effort to reduce and summarize. In the years since the field work was completed, preparation of this data catalog has frequently been interrupted by the press of other research activities, but subsets of the Sangamon data have already been utilized by members of the Atmospheric Physics Section for a number of special studies which have been published elsewhere. This complete listing of the data and descriptive summary of the experiment is being made available in a format suitable for independent analyses and model testing by others.

Papers based on these data published by members of the ANL Atmospheric Physics Section staff include the following. Sisterson and Frenzen (1978) and Sisterson and Hicks (1979) have described the evolution of the low-level nocturnal wind maximum, mainly from the viewpoint of the additional energy and additional hazard this phenomenon presents to wind energy conversion systems. Nocturnal PBL data have also been used by Yamada (1979) to test a method for predicting the height of the nocturnal inversion. Data from the daytime case were used by Yamada and Berman (1979) in a related investigation of the development of the mixed layer; and the observed rates of PBL growth have been incorporated in statistical regional air pollution models by Sheih (1977) and Shannon (1981). Descriptions of various components of the Sangamon field experiments have also appeared in the Annual Reports produced by this Section during the intervening years. A list of these articles is appended to the References, below.

Special surface layer studies of airborne pollutant exchange processes conducted during these experiments have proved to be quite rewarding. Some important new work on the direct measurement by eddy correlation of pollutant fluxes to natural surfaces was done by Wesely et al. (1978; also described in Eastman and Stedman, 1977), and a detailed study of momentum flux profiles within a maize canopy was carried out by Hicks and Sheih (1977). Attempts to measure profiles of pollutant concentration above the surface layer met with little success, however.

7. Acknowledgements

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More inclusively, those who participated in the preparation of this catalog and the areas of their principal contributions are as follows. Radiosonde wind and temperature profile data were analyzed by G. Dale Hess¹, Tetsuji Yamada², Paul E. Hess, Douglas L. Sisterson, Richard L. Hart, and Stephen Berman. Kyttoon data were prepared by Richard L. Hart. Geostrophic and thermal wind calculations were carried out by Tetsuji Yamada, G. Dale Hess, Robert G. Everett³, Robert C. Lipschutz⁴, and Stephen Berman. Acoustic sounding records were

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prepared by Douglas L. Sisterson and Edward L. Miller⁵. Surface-layer meteorological data were analyzed by Bruce B. Hicks⁶ and Marvin L. Wesely. The organization and presentation of the data listed is the product of a joint effort by many of the aforementioned contributors, but the final data editing was performed by Douglas L. Sisterson and Richard L. Hart. Using material provided by virtually all those listed above, an initial draft of the descriptive text was written by G. Dale Hess and Bruce B. Hicks; the final draft was prepared by Paul Frenzen and Marvin L. Wesely. Rebecca Spencer and Laurel Chapman typed the many working drafts involved.

Simultaneously carrying out the several components of these intensive atmospheric field experiments required many hands. The very willing and able assistance provided by a number of Student Aides from the Argonne Undergraduate Research Participation Program is hereby gratefully acknowledged. Student participants included Long S. Chiu, Dennis P. Swaney, and Harold Zimmerman during the summer of 1975, and Ada L. Chisholm and Michael Davis in the summer of 1976; Arthur Karlin participated in the experiments during both field seasons. In 1975, the experimental work was also assisted by Krishna Vernekar, an international visitor from the India Institute of Tropical Meteorology; and Professor Stephen Berman, whose contribution to the analysis and modeling of the PBL has already been cited above, came to the Section from the State University College, Oneonta, New York, as a member of the Argonne Faculty Research Participation Program during the summers of both 1977 and 1978.

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Appendix A

The Developing Daytime Mixed Layer,

21 July - 13 August 1975

Appendices A1 through A4 catalog the data obtained in the 1975 study of the growth of the daytime mixed layer. Appendix A1 lists general comments extracted from field logs and other records to draw attention to difficulties encountered in order to identify data that may be questionable. Appendix A2 tabulates the radiosonde and pilot balloon data. Surface and micrometeorological data are recorded in Appendix A3. Sodar records obtained at the main site are presented in Appendix A4.

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Appendix A1. General Comments.

Day 202 Sunrise 0448 Sunset 1923

0900 E250 @ 15+ 300/1.0, 25.7
ci 5/10

0845-0902 RADIOSONDE - improper theodolite
zeroing, possible error in height and
wind data.

1000 E250 @ 15+ 360/2.1, 27.1
ci 6/10

1001-1018 RADIOSONDE- operator error, run
eliminated.

1100 E250 @ 15+ 340/2.6, 28.4
ci 4/10

1107-1120 PIBAL - good run.

1200 E250 @ 15+ 340/2.1, 28.8
few cu, ci 3/10

1218-1229 RADIOSONDE - good run.

Day 203 Sunrise 0449 Sunset 1922

0500 E250 @ 2GF 150/1.1, 14.6
ci 9/10

0442-0448 RADIOSONDE - poor tracking due to fog,
run eliminated.

0600 E250 @ 2GF 270/msg, msg
ci 8/10

0541-0556 PIBAL - good run.

0630 E250 @ 10 msg/0.6, 18.9
ci 7/10

0622-0631 RADIOSONDE - frequency shift,
temperature data eliminated above 1150 m.

0700 E250 @ 15+ 090/1.0, 22.8
ci 6/10

0709-0722 PIBAL - good run.

0800 E250 @ 15+ msg/1.1, 26.0
ci 5/10

0757-0812 RADIOSONDE - released at 1860 m,
good run.

0900 E250 @ 15+ msg/1.0, 27.4
ci 6/10

0907-0920 PIBAL - good run.

1000 E250 @ 15+ 250/1.9, 26.4
few cu, ci 8/10

1100 E250 @ 15+ msg/1.4, 27.9
few cu, ci 7/10

1200 E250 @ 15+ 250/2.4, 27.5
few cu, ci 8/10

1000-1012 RADIOSONDE - good run.

1114-1124 PIBAL - lost behind cloud at 1700 m,
good run.

1159-1209 RADIOSONDE - good run.

Day 204 Sunrise 0450 Sunset 1922

0400 E30 @ 15 160/1.6, msg
cu 4/10

0500 B40 @ E250 @ 6H 160/2.7, 20.1
cu 4/10, ci 8/10

0600 E75 @ E250 @ 6H 170/2.3, 22.1
alto cu 2/10, ci 10/10

0700 E75 @ E250 @ 5H 180/3.8, 23.7
alto cu 4/10, ci 10/10

0830 B20 @ E250 @ 5H 360/3.4, 25.2
scud 2/10, ci 10/10, cb SE

1100 E35 @ E250 @ 8 110/6.4, 27.5
cu 2/10, ci 9/10

1300 E250 @ 6H msg/msg, msg
ci 9/10

0406-0416 RADIOSONDE - tracking light, lost
in cloud at 1350 m.

0503-0515 PIBAL - good run.

0557-0609 RADIOSONDE - good run.

0700 - RADIOSONDE - run delayed, equipment
repairs.

0835-0837 RADIOSONDE - launched through gust
front, data eliminated. Runs delayed
due to lightning interference.

1138-1200 PIBAL - rough tracking, data eliminated
first 100 m.

1254-1306 RADIOSONDE - rough tracking first 60 m.

Day 206 Sunrise 0452 Sunset 1920

0430 E250 @ 15 330/msg, msg
ci 2/10

0500 E250 @ 8 330/1.5, 13.6
ci 2/10

0600 E250 @ 350/1.6, 16.4
ci 1/10

0700 O 10 360/1.7, 18.2

0800 O 15 060/1.2, 21.5

0900 O 15+ 110/1.6, 23.7

1000 E250 @ 15+ 070/1.7, 25.0
ci 3/10

1100 E250 @ 15+ 040/2.3, 25.9
ci 4/10

1200 E250 @ 15+ msg/3.2, 27.7
ci 4/10

0414-0425 RADIOSONDE - tracking light, good run.

0501-0514 PIBAL - good run.

0554-0604 RADIOSONDE - operator error,
run eliminated.

0704-0715 PIBAL - good run.

0808-0819 RADIOSONDE - no temperature signal
after launch.

0842-0852 RADIOSONDE - noisy temperature signal.

1000-1007 RADIOSONDE - released at 1670 m,
good run.

1100-1113 PIBAL - good run.

1158-1206 RADIOSONDE - improper tracking first
400 m; height and wind questionable.

Day 207 Sunrise 0453 Sunset 1919

0400 E250 @ 1/8GF 070/msg, msg
ci 4/10

0530 E250 @ 1/16GF 200/msg, msg
ci 4/10

0359-0408 RADIOSONDE - tracking light, lost in fog
at 1400 m, good run.

0520-0522 PIBAL - poor tracking in fog,
run eliminated.

0600 E250 @ 1/16F 150/msg, msg
ci 3/10

0700 E250 @ 2GF 130/msg, msg
ci 5/10

0800 E250 @ 6H 170/1.5, 22.1
ci 5/10

0900 E250 @ 10 190/1.3, 24.5
ci 8/10

1000 E250 @ 15+ 200/1.1, 26.0
few cu, ci 8/10

1100 E35 @ E250 @ 15+ 220/msg, 26.4
cu 1/10, ci 8/10

1200 E35 @ E250 @ 15+ 220/1.4, 27.0
cu 3/10, ci 5/10

0557-0608 RADIOSONDE - poor tracking, balloon
overhead, run terminated at 1900 m.

0701-0712 PIBAL - poor tracking first 100 m.

0758-0806 RADIOSONDE - poor tracking first 100 m,
released at 1500 m.

0902-0913 PIBAL - good run.

0956-1004 RADIOSONDE - good run.

1058-1110 PIBAL - good run.

1208-1216 RADIOSONDE - operator error, no
temperature data.

Day 208 Sunrise 0453 Sunset 1918

0400 O 6H 230/msg, 16.3

0500 O 6H 240/2.7, 17.2

0600 O 5H 240/1.9, 19.3

0700 O 3H 260/3.1, 22.6

0800 O 6H 270/3.3, 25.3

0400-0404 RADIOSONDE - tracking light, lost
at 500 m, visual obstruction, good run.

0500-0504 PIBAL - lost at 800 m, visual
obstruction, good run.

0558-0600 RADIOSONDE - lost at 330 m, visual
obstruction, good run.

0706-0717 PIBAL - good run.

0753-0803 RADIOSONDE - released at 1585 m,
good run.

0900 O 6H 270/3.5, 27.4

1000 O 6H 290/3.7, 28.9

1100 O 6H 290/3.6, 30.6
few cu

1200 O 6H 270/3.7, 31.3
few cu

0911-0925 RADIOSONDE - noisy temperature signal.

1000-1013 RADIOSONDE - lost in haze at 1900 m,
good run.

1056-1105 RADIOSONDE - transmitter separated at
launch, tracked for winds above 100 m.

1114-1124 RADIOSONDE - good run.

1216-1226 RADIOSONDE - good run.

Day 209 Sunrise 0454 Sunset 1917

0400 O 10 300/msg, 19/5

0500 O 6H 010/1.3, 18.8

0630 O 4H 360/1.3, 20.8

0700 O 5H 040/1.7, 23.3

0800 O 8 040/3.1, 26.4

0900 O 15 050/2.7, msg

1000 O 15 070/3.2, 29.5

1100 E250 Ø 060/2.6, 30.2
few cu, ci 3/10

0413-0414 RADIOSONDE - poor tracking, bad
temperature signal, run eliminated.

0445-0457 RADIOSONDE - good run.

0514-0525 PIBAL - good run.

0614-0627 RADIOSONDE - good run.

0658-0713 PIBAL - good run.

0802-0814 RADIOSONDE - released at 1900 m,
good run.

0902-0913 RADIOSONDE - released at 1850 m,
good run.

1000-1011 RADIOSONDE - good run.

1118-1128 RADIOSONDE - released at 1990 m,
good run.

1200 E30 @ 030/2.5, 30.5
cu 7/10

1201-1212 RADIOSONDE - good run.

Day 210 Sunrise 0455 Sunset 1916

0430 E100 @ 6H 080/1.8, msg
alto st 2/10

0438-0451 RADIOSONDE - tracking light, poor
tracking first 200 m.

0500 O 6H 090/1.5, 18.7
alto st 1/10

0513-0525 PIBAL - good run.

0600 O 6H 090/0.5, 19.8

0552-0605 RADIOSONDE - released at 2000 m,
good run.

0700 O 5H 110/2.2, 22.2

0700-0713 PIBAL - good run.

0800 O 5H 120/2.9, 26.5
haze layer aloft

0811-0822 RADIOSONDE - good run.

0900 O 5H 150/2.6, 28.2
haze layer aloft

0904-0916 RADIOSONDE - good run.

1030 O 4H 150/2.8, msg
haze layer aloft

1025-1040 RADIOSONDE - released at 1950 m,
good run.

1100 E25 @ 3H 160/3.4, 31.3
cu 7/10, haze layer aloft

1117-1121 RADIOSONDE - operator error, run
eliminated.

1200 E25 @ 2H 170/4.2, msg
cu 7/10, haze layer aloft

1205-1212 RADIOSONDE - poor tracking, run
eliminated.

Day 211 Sunrise 0456 Sunset 1915

0430 @ 1/8F 110/msg, 21.0

0430-0500 RADIOSONDE - equipment failure, no data.

0500 @ 1/8F 090/msg, 21.2

0600 O 1/4GF 080/msg, 21.8

0700 O 1/2GF 120/2.5, 24.9

0800 O 3/4GF 120/2.8, 26.7

0900 O 1GF 150/2.7, 28.5
haze layer aloft

1000 O 1GF 150/2.4, 30.0
haze layer aloft

1100 O 3GF 140/3.6, 30.4
few cu, haze layer aloft

1200 E30 @ 5H 140/4.6, 30.6
cu 2/10, haze layer aloft

0507-0517 PIBAL - no data first 150 m due to fog,
lost in fog at 1475 m.

0553-0606 RADIOSONDE - good run.

0700-0713 PIBAL - poor tracking first 75 m,
run terminated at 2000 m.

0757-0807 RADIOSONDE - lost in haze at 1200 m,
good run.

0848-0900 RADIOSONDE - good run.

1004-1014 RADIOSONDE - balloon lost in haze at
1575 m, good run.

1105-1116 RADIOSONDE - operator error, run
eliminated.

1152-1202 RADIOSONDE - lost in haze at 1860 m,
good run.

Day 212 Sunrise 0457 Sunset 1914

0400 O 1GF 070/200, 20.1

0500 O 1/4GF 090/1.3, 19.5
haze layer aloft

0600 O 1/2GF 090/1.4, 20.7
haze layer aloft

0700 O 1GF 130/3.1, 23.2

0800 O 2GF 170/3.6, 26.7

0406-0419 RADIOSONDE - tracking light, good run.

0500-0513 PIBAL - good run.

0600-0613 RADIOSONDE - good run.

0700-0714 PIBAL - good run.

0801-0813 RADIOSONDE - good run.

0900 O 6H 180/3.9, 27.9

1000 O 8 170/2.9, 29.5

1100 O 8 140/3.6, 30.4
few cu

1200 B40 O 10 140/4.6, 30.6
cu 2/10

0904-0912 RADIOSONDE - released at 1520 m,
good run.

0958-1008 RADIOSONDE - good run.

1058-1109 RADIOSONDE - good run.

1200-1205 RADIOSONDE - lost in cloud at 1300 m,
good run.

Day 218 Sunrise 0503 Sunset 1908

0400 B13 O 10 020/msg, 17.7
st cu 10/10

0500 B13 O 10 030/2.6, 17.0
st cu 10/10

0630 B13 O 10 020/3.6, msg
st cu 10/10

0700 B13 O 10 030/3.9, 18.6
st cu 10/10

0800 B30 O 15+ 050/4.7, 19.4
st cu 9/10

0900 B25 O 15+ 050/4.9, 21.9
st cu 9/10

1000 B35 O 15+ 040/5.0, msg
cu 4/10

1100 E35 O 15+ 060/5.6, msg
cu 3/10

0407-0410 RADIOSONDE - tracking light, lost in
cloud at 410 m, good run.

0500-0504 PIBAL - lost in cloud at 460 m,
good run.

0626-0629 RADIOSONDE - lost in cloud at 460 m,
good run.

0700-0702 PIBAL - lost in cloud at 470 m,
good run.

0757-0801 RADIOSONDE - lost in cloud at 850 m,
good run.

0914-0916 RADIOSONDE - lost in cloud at 620 m,
good run.

1007-1013 RADIOSONDE - lost in cloud at 1400 m,
transmitter separated at launch.

1125-1132 RADIOSONDE - frequency shift, temperature
data eliminated above 1050 m.

1200 E35 Ø 15+ 070/5.3, 24.5
cu 2/10

1200-1210 RADIOSONDE - good run.

Day 219 Sunrise 0504 Sunset 1907

0400 O 15+ 020/msg, 9.5

0357-0410 RADIOSONDE - tracking light, released
at 2000 m, good run.

0500 O 15+ 330/1.3, 9.5

0500-0511 PIBAL - good run.

0600 O 15+ 360/1.8, 10.2

0555-0607 RADIOSONDE - released at 1735 m,
good run.

0700 O 15+ 020/1.8, msg

0710-0721 PIBAL - good run.

0800 O 15+ 110/2.2, 18.4

0800-0808 RADIOSONDE - released at 1650 m,
good run.

0900 O 15+ 140/2.3, 21.0

0854-0907 RADIOSONDE - released at 1925 m,
good run.

1000 O 15+ 145/2.5, 23.2
few cu

0959-1009 RADIOSONDE - lost in cloud at 1660 m,
good run.

1100 B50 Ø 15+ 140/2.2, 23.4
cu 4/10

1110-1119 RADIOSONDE - released at 2030 m,
good run.

1200 B50 Ø 15+ 130/2.6, 24.2
cu 2/10

1152-1201 RADIOSONDE - released at 1875 m,
good run.

Day 220 Sunrise 0504 Sunset 1905

0400 O 15 msg/msg, 13.0

0400-0414 RADIOSONDE - tracking light, released at 1400 m, noisy temperature signal at launch and near release.

0500 O 3GF msg/msg, 9.8

0457-0508 RADIOSONDE - released at 1700 m, good run.

0600 O 3GF msg/1.4, 12.2

0556-0605 RADIOSONDE - released at 1575 m, good run.

0700 O 8 msg/2.2, msg

0700-0711 PIBAL - good run.

0800 O 8 msg/2.4, 19.7

0757-0808 RADIOSONDE - released at 1775 m, good run.

0900 O 8 msg/3.7, 23.5
haze layer aloft

0903-0914 RADIOSONDE - released at 1840 m, good run.

1000 E30 @ 10 200/3.3, 25.2
cu 2/10

0958-1004 RADIOSONDE - released at 1620 m, good run.

1100 E30 @ 15+ 220/3.3, 25.4
cu 2/10

1056-1106 RADIOSONDE - operator error, run eliminated.

1200 O 10 210/2.5, 26.5
few cu

1159-1208 RADIOSONDE - good run.

Day 221 Sunrise 0505 Sunset 1904

0400 O 3GF 220/msg, 14.5

0400-0413 RADIOSONDE - tracking light, released at 1950 m, good run.

0500 O 1GF 240/msg, 15.7

0501-0514 PIBAL - good run.

0600 O 3/4GF 200/1.4, 15.1

0700 O 1GF 240/2.2, msg

0800 O 2GF 200/2.4, 22.6

0900 O 2GF 280/3.7, 24.7
haze layer aloft

1000 O 2GF 310/3.3, 26.2
few cu, haze layer aloft

1100 O 3H 310/3.3, 27.5
few cu, haze layer aloft

1230 E250 Ø 6H 210/2.2, msg
few cu, ci 1/10, haze layer aloft

1500 ob msg

1600 ob msg

1700 ob msg

1800 ob msg

1900 E250 Ø 2H msg/msg, msg
ci 3/10, haze layer aloft

2000 E250 Ø 4H msg/msg, msg
ci 2/10

0557-0607 RADIOSONDE - released at 1680 m,
good run.

0700-0712 PIBAL - equipment malfunction, run
eliminated.

0756-0809 RADIOSONDE - equipment malfunction
run eliminated.

0854-0906 RADIOSONDE - equipment malfunction
run eliminated.

0955-1006 RADIOSONDE - equipment malfunction
run not recorded.

1058-1109 RADIOSONDE - equipment malfunction,
no data first 300 m.

1217-1229 RADIOSONDE - released at 1960 m,
poor temperature signal after 850 m.

1504-1506 RADIOSONDE - poor tracking and bad
temperature signal, run eliminated.

1600-1616 RADIOSONDE - good run.

1707-1713 PIBAL - lost in haze at 760 m,
good run.

1818-1826 RADIOSONDE - lost in haze at 1310 m,
no temperature data.

1904-1917 PIBAL - tracking light, good run.

1957-2011 RADIOSONDE - tracking light, good run.

2100 O 6H msg/msg, msg

2055-2109 RADIOSONDE - equipment malfunction,
run eliminated.

Day 222 Sunrise 0506 Sunset 1903

0400 O 15 220/msg, 17.1

0358-0409 RADIOSONDE - tracking light, temperature
signal lost at 900 M, released at 1200 m.

0500 O 1/2GF 210/1.6, 17.4

0458-0508 RADIOSONDE - operator error, data not
recorded.

0600 E35 @ E250 @ 3/4GF 260/1.2, 17.9
cu 2/10, ci 1/10

0559-0610 RADIOSONDE - released at 1430 m,
good run.

0700 E35 @ E250 @ 1/2GF 210/1.2, 20.4
cu 1/10, ci 1/10

0700-0711 PIBAL - good run.

0800 O 1H 240/1.6, 22.5
haze layer aloft

0800-0810 RADIOSONDE - released at 1670 m,
good run.

0900 O 1H 240/2.9, 25.2
haze layer aloft

0859-0910 RADIOSONDE - good run.

1000 O 2H 220/2.4, msg
haze layer aloft

1034-1045 RADIOSONDE - good run.

1100 O 3H 220/2.3, 27.8
haze layer aloft

1113-1126 PIBAL - good run.

1200 O 5H 200/1.3, 30.2
haze layer aloft

1213-1224 RADIOSONDE - good run.

1430 ob msg

1423-1434 RADIOSONDE - lost in cloud at 1720 m,
good run.

1600 ob msg

1607-1620 RADIOSONDE - good run.

1700 ob msg

1830 E30 @ E250 @ 5H msg/msg, msg
st cu 3/10, ci 1/10

1900 E30 @ E250 @ 5H msg/msg, msg
st cu 1/10, ci 1/10

2000 0 5H msg/msg, msg

1700-1711 PIBAL - good run.

1820-1828 PIBAL - good run.

1906-1917 RADIOSONDE - no temperature signal,
released at 1815 m.

1958-2012 RADIOSONDE - tracking light, poor signal,
temperature data eliminated.

Day 224

Sunrise 0508

Sunset 1900

1630 E30 @ E250 @ 15+ msg/msg, msg
st cu 1/10, ci st 8/10

1700 E250 @ 10+ msg/msg, msg
ci st 8/10

1800 E250 @ 10 msg/msg, msg
ci st 10/10

1900 E250 @ 10 msg/msg, msg
few cu, ci st 10/10

2000 0 10 msg/msg, msg

2100 E250 @ 10 msg/msg, msg
ci 1/10

2200 E250 @ 10 msg/msg, msg
ci 1/10

2300 E250 @ 10 msg/msg, msg
ci 1/10

1609-1622 RADIOSONDE - good run.

1700-1711 PIBAL - good run.

1800-1813 RADIOSONDE - good run.

1857-1909 PIBAL - good run.

1958-2011 RADIOSONDE - tracking light, rough
tracking, data eliminated above 1000 m.

2100-2113 PIBAL - tracking light, rough tracking,
data eliminated above 900 m.

2200-2204 RADIOSONDE - tracking light, lost at
590 m, good run.

2300-2305 PIBAL - tracking light, lost at 820 m,
good run.

2400 E250 @ 10 msg/msg, msg
ci 1/10

2357-2406 RADIOSONDE - tracking light, rough
tracking, data eliminated above 1000 m.

Day 225

Sunrise 0509

Sunset 1859

1600 E35 @ E250 @ 15 msg/msg, msg
alto cu 5/10, ci st 8/10

1557-1602 RADIOSONDE - lost in cloud at 850 m,
good run.

1700 E12 @ B40 @ E250 @ 15 msg/msg, msg
st cu 4/10, alto cu 2/10, ci 9/10

1659-1708 RADIOSONDE - lost in cloud at 1450 m,
good run.

1800 E12 @ E40 @ E250 @ 15 msg/msg, msg
cu 7/10, alto st 5/10, ci 7/10

1758-1810 RADIOSONDE - released at 1940 m,
good run.

1900 E40 @ E120 @ E250 @ 15 msg/msg, msg
cu 1/10, alto st 5/10, ci 7/10

1857-1910 RADIOSONDE - good run.

2000 E120 @ E250 -@ 15 msg/msg, msg
few cu, alto st 5/10, ci 6/10

1958-2009 RADIOSONDE - tracking light, released
at 2000 m, good run.

2100 E250 @ 15 msg/msg, msg
ci 2/10

2058-2109 RADIOSONDE - tracking light, equipment
malfunction, no data 100-250 m.

Appendix A2. Wind and Temperature Profiles.

JLN DAY 202 0845 CST				JLN DAY 202 1107 CST				JLN DAY 202 1218 CST			
WIND				WIND				WIND			
Z (M)	SPEED (CM/S)	DIR (DEG)	T (C)	Z (M)	SPEED (CM/S)	DIR (DEG)	T (C)	Z (M)	SPEED (CM/S)	DIR (DEG)	T (C)
30	176	?	46	24.9	150	355	****	193	349	27.7	I
50	133	?	50	24.6	104	356	****	225	332	****	I
75	134	?	54	24.6	127	1	****	233	325	****	I
100	123	?	51	24.4	149	354	****	234	332	27.1	I
150	91	?	68	23.8	148	351	****	330	325	26.7	I
200	108	?	47	23.3	228	?	7	377	337	26.3	I
250	248	?	37	23.1	177	?	342	403	333	25.7	I
300	373	?	33	23.7	171	?	332	435	339	25.3	I
350	409	?	41	23.5	257	339	****	340	343	24.8	I
400	424	?	35	23.4	292	335	****	226	344	24.2	I
450	357	?	31	23.1	334	331	****	194	333	24.0	I
500	293	?	32	23.0	333	331	****	208	338	23.6	I
550	229	?	16	22.5	378	346	****	254	323	23.1	I
600	210	?	8	22.3	416	337	****	232	329	22.7	I
650	193	?	4	22.0	410	340	****	261	339	22.2	I
700	187	?	6	21.5	382	347	****	173	346	21.8	I
750	185	?	5	21.3	350	355	****	223	356	21.4	I
800	171	?	5	20.8	322	1	****	169	7	21.0	I
850	163	?	355	20.3	304	357	****	115	250	20.4	I
900	176	?	330	20.1	236	351	****	159	353	20.0	I
950	220	?	307	19.6	219	336	****	135	350	19.6	I
1000	230	?	295	19.3	233	331	****	129	358	19.1	I
1050	337	?	291	19.2	229	339	****	165	346	18.8	I
1100	395	?	294	18.7	219	353	****	102	345	18.4	I
1150	439	?	299	18.4	246	346	****	151	345	17.8	I
1200	474	?	309	17.7	342	335	****	119	349	17.6	I
1250	631	?	314	17.9	357	333	****	156	354	17.1	I
1300	713	?	314	18.7	305	345	****	168	354	16.8	I
1350	673	?	317	19.1	345	338	****	242	344	16.7	I
1400	718	?	322	18.9	314	346	****	314	329	17.7	I
1450	685	?	320	18.7	413	310	****	379	310	18.0	I
1500	665	?	317	18.6	444	307	****	500	300	17.3	I
1550	650	?	315	18.1	457	363	****	522	259	17.5	I
1600	673	?	315	17.8	490	315	****	473	304	17.1	I
1650	717	?	314	17.5	443	314	****	401	313	16.9	I
1700	760	?	313	16.9	509	320	****	421	315	16.8	I
1750	782	?	345	16.4	537	337	****	492	317	16.4	I
1800	691	?	313	16.3	541	339	****	537	321	16.3	I
1850	659	?	311	15.9	704	?	333	524	327	16.0	I
1900	662	?	318	15.2	593	?	323	507	332	15.8	I
1950	656	?	328	15.0	613	?	335	543	333	15.6	I
2000	613	?	334	14.8	502	?	328	531	326	15.5	I
SURF.											
GEOS.	356	354		493	52			447	39		
DELTA											
GEOS.	****	***		****	***			****	***		
TEMP.											
FLUX			2.7				****			3.5	
TEMP.											
HATCH			****				****			****	

JLN DAY 203 0541 CST				JLN DAY 203 0622 CST				JLN DAY 203 0709 CST				JLN DAY 203 0757 CST				JLN DAY 203 0907 CST			
WIND				WIND				WIND				WIND				WIND			
Z (M)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	
30	291	90	****	270	86	18.3	172	65	****	98	103	22.5	51	124	****				
50	337	92	****	289	90	19.9	232	83	****	82	96	22.2	61	93	****				
75	374	93	****	314	94	21.1	275	91	****	110	103	22.1	121	73	****				
100	385	103	****	321	100	21.3	299	83	****	162	115	22.0	103	82	****				
150	389	111	****	355	107	21.6	293	100	****	221	118	22.3	72	119	****				
200	370	114	****	333	116	21.6	264	107	****	205	118	22.2	110	153	****				
250	338	120	****	275	119	21.4	239	109	****	174	115	22.0	117	154	****				
300	310	121	****	260	119	21.1	218	110	****	158	119	21.7	126	155	****				
350	256	121	****	235	119	20.8	236	111	****	164	119	21.4	119	162	****				
400	182	123	****	190	123	20.8	210	111	****	166	118	21.0	123	154	****				
450	140	124	****	181	123	20.5	191	107	****	149	114	20.6	121	151	****				
500	137	123	****	197	121	20.1	175	96	****	149	113	20.1	103	153	****				
550	215	120	****	232	118	19.7	160	90	****	149	112	19.7	117	132	****				
600	226	122	****	226	124	19.3	183	95	****	160	107	19.3	112	140	****				
650	232	117	****	232	123	19.0	198	98	****	168	106	18.9	126	133	****				
700	263	114	****	249	118	18.4	189	107	****	165	113	18.5	135	137	****				
750	302	111	****	285	112	18.2	192	109	****	180	111	18.1	143	147	****				
800	295	109	****	304	107	17.9	183	103	****	163	110	17.6	150	144	****				
850	260	107	****	312	103	17.4	195	95	****	138	96	17.4	116	133	****				
900	248	96	****	304	102	17.0	225	88	****	179	83	17.1	81	125	****				
950	184	70	****	256	94	16.7	234	79	****	212	84	16.7	75	98	****				
1000	144	50	****	197	80	16.4	218	63	****	233	79	16.4	109	77	****				
1050	123	74	****	133	59	16.5	183	39	****	239	63	16.0	137	64	****				
1100	43	164	****	42	112	17.5	111	33	****	222	37	15.8	173	45	****				
1150	101	220	****	61	262	17.3	50	281	****	143	30	16.0	178	26	****				
1200	117	223	****	106	234	****	130	268	****	76	309	16.8	112	231	****				
1250	171	240	****	196	262	****	182	233	****	138	305	16.6	150	311	****				
1300	203	250	****	210	277	****	253	290	****	234	316	16.5	180	324	****				
1350	216	260	****	211	293	****	361	294	****	311	318	16.5	361	330	****				
1400	221	268	****	268	297	****	337	298	****	401	319	16.3	441	332	****				
1450	243	277	****	316	293	****	437	307	****	507	336	16.3	519	340	****				
1500	339	286	****	352	299	****	484	312	****	422	337	16.7	545	346	****				
1550	357	291	****	361	304	****	428	318	****	308	343	16.8	454	353	****				
1600	331	295	****	302	315	****	400	329	****	257	7	16.6	375	4	****				
1650	266	294	****	249	338	****	264	346	****	266	33	16.6	340	22	****				
1700	177	310	****	290	359	****	250	11	****	305	37	16.5	378	41	****				
1750	170	356	****	279	358	****	246	7	****	359	31	16.2	424	37	****				
1800	240	8	****	255	355	****	241	11	****	331	33	16.0	451	29	****				
1850	222	7	****	241	353	****	271	30	****	****	****	****	466	33	****				
1900	197	2	****	311	16	****	304	28	****	****	****	****	368	40	****				
1950	238	8	****	346	18	****	312	15	****	****	****	****	284	44	****				
2000	304	19	****	351	13	****	312	357	****	****	****	****	217	44	****				
SURF.																			
GEOS.	15	55		179	80		270	115		186	134		135	186					
DELTA																			
GEOS.	126	293		126	290		100	313		36	331		83	271					
TEMP.																			
FLUX			****			****			****			****			****				
TEMP.																			
MATCH			****			0.6			****			-0.2			****				

JLN DAY 203 1000 CST				JLN DAY 203 1114 CST				JLN DAY 203 1159 CST			
WIND				WIND				WIND			
Z (M)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)		
30	76	102	25.3	69	77	****	225	61	25.4		
50	95	91	24.8	79	55	****	211	57	25.9		
75	121	82	24.5	114	59	****	194	52	25.4		
100	133	86	24.4	142	51	****	195	49	25.2		
150	119	84	24.1	163	34	****	213	57	24.6		
200	105	94	23.2	182	40	****	311	66	24.2		
250	92	124	22.9	211	49	****	324	67	23.7		
300	100	121	22.7	239	50	****	294	79	23.2		
350	126	120	22.3	250	46	****	246	93	22.7		
400	161	126	21.5	265	37	****	167	86	22.3		
450	154	132	21.1	265	38	****	210	94	21.9		
500	125	136	20.6	254	44	****	230	92	21.5		
550	114	138	20.1	256	47	****	212	87	21.1		
600	147	134	19.8	269	48	****	264	84	20.5		
650	184	133	19.2	203	58	****	225	89	20.2		
700	179	138	18.9	194	94	****	174	98	19.7		
750	157	131	18.5	197	101	****	134	106	19.3		
800	115	133	18.2	173	112	****	129	138	19.0		
850	72	125	17.6	204	124	****	195	126	18.4		
900	42	71	17.0	241	120	****	249	130	17.9		
950	81	94	16.5	244	119	****	215	120	18.1		
1000	137	110	16.5	136	131	****	155	112	17.6		
1050	164	98	16.1	112	135	****	164	59	16.9		
1100	207	74	16.1	39	97	****	81	78	17.1		
1150	209	52	16.0	73	31	****	106	44	16.9		
1200	162	28	16.0	129	18	****	196	35	17.1		
1250	151	339	16.5	135	12	****	329	26	17.2		
1300	223	330	16.4	230	19	****	441	27	17.6		
1350	270	339	16.4	275	17	****	431	29	17.5		
1400	311	343	16.4	339	16	****	436	33	17.4		
1450	433	350	16.0	350	18	****	409	35	17.5		
1500	502	355	16.1	333	24	****	370	42	17.3		
1550	484	356	16.2	326	38	****	337	57	17.1		
1600	411	0	16.2	323	51	****	270	54	17.4		
1650	328	13	15.8	****	****	****	249	48	17.4		
1700	287	34	15.8	****	****	****	126	38	17.2		
1750	314	43	15.7	****	****	****	148	25	17.1		
1800	320	38	15.9	****	****	****	145	23	17.0		
1850	280	45	15.7	****	****	****	146	23	16.7		
1900	244	52	15.7	****	****	****	154	43	16.5		
1950	213	59	15.2	****	****	****	203	58	16.1		
2000	265	57	14.8	****	****	****	245	58	15.7		
SURF.											
GEOS.	153	218		51	128		352	123			
DELTA											
GEOS.	163	266		255	267		325	257			
TEMP.											
FLUX			-0.1		****				-0.9		
TEMP.											
MATCH			****		****				****		

JLN DAY 204 0406 CST				JLN DAY 204 0503 CST				JLN DAY 204 0557 CST				JLN DAY 204 1138 CST				JLN DAY 204 1254 CST			
WIND				WIND				WIND				WIND				WIND			
Z	SPEED	DIR	T	SPEED	DIR	T		SPEED	DIR	T		SPEED	DIR	T		SPEED	DIR	T	
(H)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)		(CH/S)	(DEG)	(C)		(CH/S)	(DEG)	(C)		(CH/S)	(DEG)	(C)	
30	I 512	I 165	I 21.5	I 502	I 165	****	I	I 562	I 175	I 22.0	I	****	***	****	I	I 833	? 133	I 27.7	I
50	I 687	I 165	I 21.9	I 693	I 173	****	I	I 739	I 181	I 21.9	I	****	***	****	I	I 888	? 131	I 27.4	I
75	I 925	I 173	I 22.5	I 942	I 179	****	I	I 968	I 185	I 22.0	I	****	***	****	I	I 1029	? 133	I 27.3	I
100	I 1029	I 182	I 24.0	I 1130	I 185	****	I	I 1148	I 189	I 22.6	I	I 964	I 132	****	I	I 907	I 133	I 27.0	I
150	I 1090	I 192	I 25.2	I 1228	I 195	****	I	I 1203	I 199	I 23.9	I	I 929	I 127	****	I	I 867	I 140	I 26.7	I
200	I 1128	I 195	I 25.2	I 1218	I 201	****	I	I 1241	I 211	I 24.4	I	I 921	I 125	****	I	I 938	I 145	I 26.0	I
250	I 1132	I 198	I 25.1	I 1186	I 206	****	I	I 1304	I 216	I 25.2	I	I 914	I 131	****	I	I 953	I 147	I 25.7	I
300	I 1150	I 201	I 24.8	I 1290	I 212	****	I	I 1245	I 214	I 25.2	I	I 894	I 141	****	I	I 937	I 149	I 25.3	I
350	I 1180	I 204	I 24.5	I 1233	I 217	****	I	I 1163	I 212	I 25.0	I	I 874	I 151	****	I	I 857	I 150	I 25.0	I
400	I 1192	I 207	I 24.1	I 1133	I 214	****	I	I 1090	I 209	I 24.6	I	I 903	I 160	****	I	I 854	I 155	I 24.6	I
450	I 1114	I 209	I 23.8	I 1102	I 210	****	I	I 1127	I 207	I 24.3	I	I 962	I 168	****	I	I 1005	I 166	I 24.5	I
500	I 1063	I 209	I 23.4	I 1070	I 206	****	I	I 1121	I 206	I 24.1	I	I 1025	I 176	****	I	I 1171	I 181	I 24.2	I
550	I 1018	I 203	I 23.1	I 1099	I 204	****	I	I 1119	I 206	I 23.8	I	I 1081	I 186	****	I	I 1169	I 188	I 24.8	I
600	I 989	I 203	I 23.1	I 1143	I 201	****	I	I 1078	I 206	I 23.3	I	I 1101	I 189	****	I	I 1139	I 193	I 24.6	I
650	I 1137	I 199	I 23.0	I 1120	I 193	****	I	I 1043	I 207	I 22.8	I	I 1145	I 190	****	I	I 1152	I 193	I 24.5	I
700	I 851	I 201	I 23.0	I 1066	I 199	****	I	I 1016	I 209	I 22.5	I	I 1131	I 191	****	I	I 1031	I 199	I 24.7	I
750	I 1017	I 206	I 22.9	I 978	I 202	****	I	I 1036	I 211	I 22.1	I	I 1030	I 201	****	I	I 890	I 209	I 24.7	I
800	I 883	I 211	I 22.5	I 933	I 204	****	I	I 1129	I 214	I 21.7	I	I 1069	I 207	****	I	I 893	I 214	I 24.8	I
850	I 794	I 215	I 22.0	I 870	I 206	****	I	I 1137	I 216	I 21.4	I	I 1010	I 207	****	I	I 983	I 213	I 24.7	I
900	I 769	I 219	I 21.6	I 858	I 208	****	I	I 995	I 219	I 21.1	I	I 933	I 218	****	I	I 870	I 224	I 24.4	I
950	I 733	I 221	I 21.3	I 893	I 210	****	I	I 893	I 227	I 20.9	I	I 890	I 234	****	I	I 790	I 236	I 24.1	I
1000	I 719	I 222	I 20.9	I 861	I 214	****	I	I 999	I 234	I 20.9	I	I 867	I 241	****	I	I 817	I 239	I 23.9	I
1050	I 782	I 222	I 20.6	I 792	I 219	****	I	I 1046	I 242	I 21.0	I	I 923	I 245	****	I	I 736	I 239	I 23.7	I
1100	I 700	I 230	I 20.3	I 777	I 225	****	I	I 1110	I 247	I 20.7	I	I 901	I 249	****	I	I 744	I 244	I 23.6	I
1150	I 752	I 235	I 20.0	I 792	I 232	****	I	I 1032	I 254	I 20.4	I	I 835	I 253	****	I	I 796	I 243	I 23.4	I
1200	I ****	I ****	I ****	I 784	I 240	****	I	I 1302	I 246	I 20.2	I	I 845	I 256	****	I	I 763	I 250	I 23.1	I
1250	I ****	I ****	I ****	I 794	I 250	****	I	I 1264	I 248	I 20.0	I	I 807	I 270	****	I	I 754	I 256	I 22.7	I
1300	I ****	I ****	I ****	I 897	I 257	****	I	I 1109	I 253	I 19.7	I	I 800	I 262	****	I	I 783	I 255	I 22.3	I
1350	I ****	I ****	I ****	I 979	I 258	****	I	I 1128	I 250	I 19.4	I	I 755	I 263	****	I	I 865	I 247	I 21.9	I
1400	I ****	I ****	I ****	I 889	I 260	****	I	I 1075	I 247	I 19.6	I	I 779	I 267	****	I	I 841	I 244	I 21.5	I
1450	I ****	I ****	I ****	I 803	I 258	****	I	I 915	I 249	I 18.9	I	I 802	I 262	****	I	I 727	I 257	I 21.3	I
1500	I ****	I ****	I ****	I 711	I 258	****	I	I 692	I 256	I 18.6	I	I 917	I 251	****	I	I 828	I 243	I 20.8	I
1550	I ****	I ****	I ****	I 658	I 258	****	I	I 843	I 252	I 18.3	I	I 877	I 253	****	I	I 852	I 249	I 20.4	I
1600	I ****	I ****	I ****	I 540	I 265	****	I	I 785	I 256	I 17.8	I	I 766	I 263	****	I	I 874	I 250	I 19.9	I
1650	I ****	I ****	I ****	I 558	I 257	****	I	I 895	I 253	I 17.4	I	I 861	I 259	****	I	I 840	I 256	I 19.6	I
1700	I ****	I ****	I ****	I 536	I 260	****	I	I 800	I 253	I 17.0	I	I 930	I 255	****	I	I 917	I 253	I 19.1	I
1750	I ****	I ****	I ****	I 498	I 270	****	I	I 832	I 258	I 16.6	I	I 787	I 269	****	I	I 951	I 250	I 18.6	I
1800	I ****	I ****	I ****	I 597	I 265	****	I	I 716	I 263	I 15.2	I	I 846	I 263	****	I	I 926	I 246	I 18.2	I
1850	I ****	I ****	I ****	I 681	I 263	****	I	I 709	I 262	I 15.9	I	I 936	I 257	****	I	I 959	I 246	I 17.8	I
1900	I ****	I ****	I ****	I 559	I 282	****	I	I 899	I 253	I 15.5	I	I 1112	I 250	****	I	I 937	I 245	I 17.4	I
1950	I ****	I ****	I ****	I 677	I 272	****	I	I 812	I 253	I 15.3	I	I 930	I 253	****	I	I 932	I 247	I 17.0	I
2000	I ****	I ****	I ****	I 675	I 272	****	I	I 614	I 275	I 15.0	I	I ****	I ****	****	I	I 1033	I 245	I 16.6	I
SURF	I			I			I	I			I	I			I	I			I
GEOS.	I 485	I 125		I 1390	I 113		I	I 691	I 166		I	I 1783	I 199		I	I 1829	I 226		I
DELTA	I			I			I	I			I	I			I	I			I
GEOS.	I 384	I 300		I 354	I 301		I	I 341	I 292		I	I 1066	I 314		I	I 929	I 317		I
TEMP.	I			I			I	I			I	I			I	I			I
FLUX	I		****	I		****	I	I		****	I	I		****	I	I		****	I
TEMP.	I			I			I	I			I	I			I	I			I
HATCH	I		0.4	I		****	I	I		-0.8	I	I		****	I	I		-0.3	I

THIS PAGE
WAS INTENTIONALLY
LEFT BLANK

JLN DAY 206 0414 CST				JLN DAY 206 0501 CST				JLN DAY 206 0704 CST				JLN DAY 206 0808 CST			
WIND				WIND				WIND				WIND			
Z	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T
(M)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)
30	509	337	15.6	491	340	****	227	4	****	84	212	****			
50	604	349	16.5	605	350	****	297	24	****	68	219	****			
75	639	1	17.2	640	2	****	412	38	****	50	233	****			
100	641	12	17.6	636	15	****	482	52	****	30	258	****			
150	646	35	18.2	589	40	****	537	68	****	110	59	****			
200	630	53	18.6	611	60	****	540	68	****	239	77	****			
250	628	60	19.2	625	68	****	521	66	****	407	78	****			
300	648	61	19.0	585	65	****	483	62	****	397	72	****			
350	609	58	18.7	579	59	****	445	59	****	355	64	****			
400	559	50	18.4	615	55	****	437	55	****	346	59	****			
450	523	44	18.1	599	52	****	464	51	****	397	47	****			
500	510	33	17.7	521	51	****	515	46	****	460	39	****			
550	488	23	17.4	526	44	****	547	46	****	487	33	****			
600	453	26	16.8	554	38	****	528	36	****	479	29	****			
650	386	29	16.5	519	30	****	489	35	****	445	27	****			
700	286	27	16.1	473	26	****	454	34	****	437	25	****			
750	311	26	15.6	421	21	****	434	30	****	442	23	****			
800	334	24	15.1	425	18	****	434	26	****	426	20	****			
850	327	21	14.6	369	15	****	438	23	****	409	18	****			
900	313	20	14.1	406	12	****	432	22	****	381	17	****			
950	318	20	13.7	438	9	****	409	22	****	351	15	****			
1000	323	17	13.2	400	7	****	369	22	****	330	11	****			
1050	333	12	12.7	346	5	****	344	19	****	304	7	****			
1100	360	11	12.2	368	10	****	316	15	****	275	2	****			
1150	340	6	11.7	330	9	****	276	12	****	260	354	****			
1200	345	4	11.3	330	10	****	286	8	****	250	351	****			
1250	362	4	10.7	327	8	****	254	3	****	272	347	****			
1300	****	***	10.3	****	***	****	****	***	****	352	341	****			
1350	****	***	9.7	****	***	****	376	337	****	485	338	****			
1400	419	333	9.4	369	334	****	594	344	****	558	333	****			
1450	672	340	10.1	614	336	****	687	343	****	636	342	****			
1500	802	335	11.4	815	338	****	733	343	****	681	343	****			
1550	843	333	11.8	847	337	****	773	343	****	632	339	****			
1600	793	328	11.9	912	339	****	797	338	****	636	344	****			
1650	729	324	12.1	894	335	****	794	331	****	724	350	****			
1700	720	316	12.4	809	329	****	818	331	****	802	349	****			
1750	654	306	12.3	742	323	****	780	335	****	691	340	****			
1800	741	317	12.3	686	317	****	767	331	****	656	332	****			
1850	741	315	12.2	742	319	****	746	333	****	683	335	****			
1900	759	317	11.9	845	324	****	729	339	****	743	340	****			
1950	732	315	11.7	875	323	****	681	313	****	844	339	****			
2000	870	317	11.3	829	321	****	828	321	****	837	330	****			
SURF.	I			I		I	I		I	I		I			
GEOS.	I	593	353	I	483	0	I	415	35	I	339	10	I		
DELTA	I			I			I			I			I		
GEOS.	I	821	242	I	534	250	I	288	244	I	216	245	I		
TEMP.	I			I			I			I			I		
FLUX	I		****	I		****	I		****	I		****	I		
TEMP.	I			I			I			I			I		
MATCH	I		0.0	I		****	I		****	I		****	I		

JLN DAY 206 0842 CST				JLN DAY 206 1000 CST				JLN DAY 206 1100 CST				JLN DAY 206 1158 CST			
WIND				WIND				WIND				WIND			
Z	SPEED	DIR	T	Z	SPEED	DIR	T	Z	SPEED	DIR	T	Z	SPEED	DIR	T
(M)	(CH/S)	(DEG)	(C)	(M)	(CH/S)	(DEG)	(C)	(M)	(CH/S)	(DEG)	(C)	(M)	(CH/S)	(DEG)	(C)
30	117	123	22.7	337	66	23.8	204	5	192	74	24.0	192	74	24.0	24.0
50	157	111	22.2	352	64	23.8	211	15	174	58	23.6	174	58	23.6	23.6
75	213	103	21.9	371	61	23.5	203	23	176	36	23.2	176	36	23.2	23.2
100	270	99	21.6	361	63	22.9	197	26	176	36	23.2	176	36	23.2	23.2
150	159	86	21.1	373	57	22.4	139	24	116	40	22.6	116	40	22.6	22.6
200	103	44	21.2	239	79	21.8	220	39	137	35	22.2	137	35	22.2	22.2
250	239	71	20.4	159	88	21.5	219	14	164	42	21.6	164	42	21.6	21.6
300	322	74	20.0	176	88	21.0	280	11	192	46	21.1	192	46	21.1	21.1
350	349	71	20.3	169	74	20.4	259	14	221	53	20.8	221	53	20.8	20.8
400	322	57	20.1	210	46	19.9	237	12	253	58	20.2	253	58	20.2	20.2
450	362	45	20.0	152	47	19.5	254	355	236	63	19.8	236	63	19.8	19.8
500	404	38	19.5	103	44	19.1	291	339	245	69	19.2	245	69	19.2	19.2
550	422	33	19.0	138	47	18.6	322	328	230	71	18.7	230	71	18.7	18.7
600	435	31	18.5	173	35	18.1	326	322	203	64	18.2	203	64	18.2	18.2
650	444	29	18.3	172	15	17.5	318	346	184	55	17.9	184	55	17.9	17.9
700	431	27	17.7	172	359	17.0	200	34	203	53	17.4	203	53	17.4	17.4
750	414	25	17.2	213	254	16.6	249	57	221	51	16.9	221	51	16.9	16.9
800	403	23	16.7	200	276	16.2	206	43	204	53	16.3	204	53	16.3	16.3
850	389	20	16.4	452	6	15.5	335	41	174	57	16.0	174	57	16.0	16.0
900	379	16	15.6	365	8	15.1	365	41	156	53	15.4	156	53	15.4	15.4
950	369	13	15.3	****	****	14.8	357	43	166	35	15.1	166	35	15.1	15.1
1000	352	10	14.8	****	****	14.3	317	37	174	20	14.4	174	20	14.4	14.4
1050	****	****	14.4	****	****	13.6	****	****	****	****	14.1	****	****	****	14.1
1100	****	****	13.9	362	353	13.0	****	****	****	****	13.6	****	****	****	13.6
1150	288	352	13.5	429	351	12.8	220	30	****	****	13.0	****	****	****	13.0
1200	275	349	13.1	430	347	12.3	187	24	****	****	12.5	****	****	****	12.5
1250	282	348	12.4	523	347	11.9	229	32	****	307	11.8	307	354	11.8	11.8
1300	309	342	12.0	551	350	11.5	215	20	****	299	11.5	299	358	11.5	11.5
1350	403	341	11.6	537	351	10.9	270	3	****	309	11.1	309	358	11.1	11.1
1400	515	343	12.1	520	352	10.6	241	1	****	363	10.4	363	349	10.4	10.4
1450	628	344	12.5	538	353	10.1	295	7	****	433	10.0	433	338	10.0	10.0
1500	701	343	13.6	642	351	9.8	320	14	****	512	9.7	512	331	9.7	9.7
1550	664	343	14.1	741	354	10.7	463	14	****	535	9.7	535	347	9.7	9.7
1600	642	346	14.1	****	****	****	665	11	****	549	11.3	549	3	11.3	11.3
1650	684	352	14.0	****	****	****	642	11	****	563	12.5	563	18	12.5	12.5
1700	799	356	14.4	****	****	****	613	6	****	594	13.4	594	17	13.4	13.4
1750	819	354	14.5	****	****	****	550	1	****	612	13.3	612	14	13.3	13.3
1800	777	349	14.8	****	****	****	363	342	****	627	13.0	627	11	13.0	13.0
1850	706	342	14.3	****	****	****	464	217	****	653	13.1	653	6	13.1	13.1
1900	608	334	14.5	****	****	****	530	357	****	520	12.9	520	356	12.9	12.9
1950	733	342	14.6	****	****	****	512	216	****	615	12.8	615	244	12.8	12.8
2000	799	340	14.4	****	****	****	467	325	****	****	****	****	****	****	****
SWRF															
GEOS.	329	29		404	56		259	35		316	51				
DELTA															
GEOS.	175	251		226	245		204	283		230	290				
TEMP.															
FLUX			****			-0.3			****		****				
TEMP.															
MATCH			0.2			****			****		-1.7				

JLN DAY 207 0902 CST				JLN DAY 207 0955 CST				JLN DAY 207 1058 CST				JLN DAY 207 1208 CST			
WIND				WIND				WIND				WIND			
Z	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T
(H)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)
30	190	161	****	163	247	25.3	251	224	****	559	185	****			
50	184	162	****	173	244	24.4	162	222	****	550	185	****			
75	176	163	****	186	241	23.9	185	231	****	539	185	****			
100	157	164	****	200	238	23.6	213	231	****	527	185	****			
150	139	158	****	179	238	23.1	245	221	****	504	185	****			
200	145	159	****	237	236	22.6	242	214	****	481	185	****			
250	153	161	****	264	234	22.1	276	206	****	458	185	****			
300	178	162	****	273	231	21.7	280	198	****	435	185	****			
350	195	166	****	243	216	21.1	269	192	****	412	185	****			
400	183	170	****	264	199	20.7	244	185	****	389	186	****			
450	139	184	****	230	197	20.2	243	180	****	366	186	****			
500	135	190	****	203	202	19.7	164	166	****	343	186	****			
550	141	213	****	139	209	19.2	170	166	****	319	186	****			
600	137	219	****	178	220	18.7	223	190	****	296	186	****			
650	131	216	****	176	232	18.2	187	198	****	273	186	****			
700	121	212	****	139	229	17.7	241	198	****	249	187	****			
750	110	214	****	92	214	17.2	219	187	****	226	187	****			
800	114	215	****	67	136	16.7	236	154	****	203	187	****			
850	101	209	****	74	128	16.3	202	181	****	180	188	****			
900	87	202	****	82	189	15.9	156	180	****	157	188	****			
950	103	186	****	113	166	15.3	164	187	****	123	200	****			
1000	112	182	****	168	151	14.8	175	190	****	114	203	****			
1050	121	194	****	192	151	14.2	164	192	****	96	195	****			
1100	145	205	****	182	164	13.8	135	194	****	116	194	****			
1150	160	205	****	149	176	13.2	144	199	****	138	203	****			
1200	162	205	****	104	197	13.3	156	205	****	142	214	****			
1250	130	216	****	****	****	4.4	136	217	****	151	219	****			
1300	****	****	****	****	****	15.3	104	217	****	167	221	****			
1350	****	****	****	****	****	15.5	****	****	****	192	221	****			
1400	****	****	****	****	****	16.5	****	****	****	185	231	****			
1450	****	****	****	****	****	16.4	139	347	****	156	244	****			
1500	****	****	****	370	343	16.6	221	342	****	123	290	****			
1550	379	335	****	355	334	16.6	253	333	****	167	278	****			
1600	382	325	****	296	326	16.4	229	331	****	191	261	****			
1650	343	321	****	314	321	16.2	197	323	****	215	256	****			
1700	343	319	****	275	319	15.9	191	316	****	240	257	****			
1750	323	316	****	263	319	15.7	213	317	****	239	256	****			
1800	323	316	****	270	323	15.5	235	318	****	258	265	****			
1850	330	318	****	233	326	15.2	247	312	****	261	252	****			
1900	351	320	****	235	323	15.0	210	311	****	268	253	****			
1950	382	321	****	263	331	14.7	203	317	****	274	259	****			
2000	373	325	****	237	331	14.4	231	319	****	258	266	****			
SURF.															
GEOS.	361	196		413	195		453	191		289	222				
DELTA															
GEOS.	183	290		130	312		123	308		161	319				
TEMP.															
FLUX			****			-0.9			****			****			
TEMP.															
HATCH			****			****			****			****			

	JLN DAY 208 0400 CST				JLN DAY 208 0500 CST				JLN DAY 208 0558 CST				JLN DAY 208 0705 CST				JLN DAY 208 0753 CST			
	WIND				WIND				WIND				WIND				WIND			
Z (M)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)		
30	573	217	18.9	675	221	****	568	224	19.3	406	255	****	454	276	24.8					
50	896	221	19.8	761	230	****	675	242	20.0	521	261	****	474	278	24.2					
75	1030	226	21.3	837	238	****	865	256	20.9	670	266	****	500	281	23.9					
100	1161	233	22.6	979	248	****	1039	264	21.8	790	273	****	539	282	23.7					
150	1267	243	22.9	1090	266	****	1179	235	22.9	1065	285	****	754	256	23.5					
200	1127	244	23.8	1164	276	****	1319	292	23.5	1206	296	****	909	237	23.4					
250	1072	239	24.2	1205	230	****	1379	297	24.3	1322	299	****	1075	292	24.2					
300	1056	245	24.1	1213	284	****	****	****	****	1264	296	****	1192	295	25.5					
350	1012	254	24.1	1221	237	****	****	****	****	1213	293	****	1177	299	25.4					
400	1020	261	23.8	1183	289	****	****	****	****	1143	295	****	1237	301	25.0					
450	1007	256	23.7	1117	287	****	****	****	****	1116	297	****	1199	302	24.6					
500	****	****	****	1033	293	****	****	****	****	1106	297	****	1166	301	24.2					
550	****	****	****	999	278	****	****	****	****	1069	296	****	1095	300	23.8					
600	****	****	****	958	278	****	****	****	****	1020	294	****	1013	298	23.5					
650	****	****	****	874	282	****	****	****	****	895	291	****	1064	254	23.1					
700	****	****	****	776	287	****	****	****	****	853	290	****	1048	254	22.7					
750	****	****	****	712	295	****	****	****	****	906	291	****	1005	253	22.5					
800	****	****	****	****	****	****	****	****	****	837	295	****	921	331	22.3					
850	****	****	****	****	****	****	****	****	****	795	300	****	943	303	22.1					
900	****	****	****	****	****	****	****	****	****	803	304	****	994	302	21.9					
950	****	****	****	****	****	****	****	****	****	643	312	****	675	310	21.7					
1000	****	****	****	****	****	****	****	****	****	657	312	****	754	309	21.3					
1050	****	****	****	****	****	****	****	****	****	567	317	****	573	312	21.0					
1100	****	****	****	****	****	****	****	****	****	542	324	****	605	303	20.7					
1150	****	****	****	****	****	****	****	****	****	606	325	****	548	313	20.3					
1200	****	****	****	****	****	****	****	****	****	685	325	****	613	317	20.1					
1250	****	****	****	****	****	****	****	****	****	748	327	****	667	321	19.6					
1300	****	****	****	****	****	****	****	****	****	824	327	****	651	323	19.2					
1350	****	****	****	****	****	****	****	****	****	774	334	****	801	327	18.8					
1400	****	****	****	****	****	****	****	****	****	699	336	****	834	333	18.6					
1450	****	****	****	****	****	****	****	****	****	651	335	****	****	****	13.1					
1500	****	****	****	****	****	****	****	****	****	601	334	****	572	339	18.0					
1550	****	****	****	****	****	****	****	****	****	546	333	****	444	334	17.9					
1600	****	****	****	****	****	****	****	****	****	487	330	****	****	****	****					
1650	****	****	****	****	****	****	****	****	****	483	325	****	****	****	****					
1700	****	****	****	****	****	****	****	****	****	619	320	****	****	****	****					
1750	****	****	****	****	****	****	****	****	****	650	319	****	****	****	****					
1800	****	****	****	****	****	****	****	****	****	473	323	****	****	****	****					
1850	****	****	****	****	****	****	****	****	****	529	320	****	****	****	****					
1900	****	****	****	****	****	****	****	****	****	469	321	****	****	****	****					
1950	****	****	****	****	****	****	****	****	****	496	320	****	****	****	****					
2000	****	****	****	****	****	****	****	****	****	512	318	****	****	****	****					
SURF.																				
GEOS.	662	233		688	239		622	239		679	245		781	250						
DELTA																				
GEOS.	353	353		337	2		326	22		222	4		135	31						
TEMP.																				
FLUX			****			****			0.1			****			****					
TEMP.																				
MATCH			0.6			****						****						0.1		

	JLN DAY 208 0911 CST				JLN DAY 208 1000 CST				JLN DAY 208 1056 CST				JLN DAY 208 1114 CST				JLN DAY 208 1216 CST			
	HIND				HIND				HIND				HIND				HIND			
Z (M)	SPEED (CH/S)	DIR (DEG)	T (C)		SPEED (CH/S)	DIR (DEG)	T (C)		SPEED (CH/S)	DIR (DEG)	T (C)		SPEED (CH/S)	DIR (DEG)	T (C)		SPEED (CH/S)	DIR (DEG)	T (C)	
30	I 349	263	26.4	I	I 404	259	27.3	I	I ****	I ***	I ****	I	I 511	252	29.4	I	I 667	253	30.5	
50	I 375	275	26.0	I	I 443	251	27.1	I	I ****	I ***	I ****	I	I 505	254	29.1	I	I 654	255	30.1	
75	I 421	277	25.7	I	I 531	263	26.8	I	I ****	I ***	I ****	I	I 497	256	28.7	I	I 644	262	29.9	
100	I 432	271	25.7	I	I 572	264	26.6	I	I ****	I ***	I ****	I	I 510	257	28.5	I	I 638	257	29.7	
150	I 472	266	24.9	I	I 549	264	26.1	I	I 631	271	****	I	I 559	254	28.0	I	I 644	275	29.2	
200	I 433	271	24.3	I	I 578	264	25.8	I	I 570	264	****	I	I 551	257	27.6	I	I 632	278	28.8	
250	I 421	282	23.8	I	I 550	283	25.3	I	I 463	276	****	I	I 586	257	27.0	I	I 618	276	23.4	
300	I 609	297	23.6	I	I 503	289	24.9	I	I 371	277	****	I	I 604	255	26.4	I	I 630	273	27.9	
350	I 736	295	23.2	I	I 556	292	24.6	I	I 392	282	****	I	I 623	274	26.2	I	I 637	270	27.3	
400	I 926	299	23.5	I	I 648	289	24.1	I	I 446	285	****	I	I 633	286	25.6	I	I 607	263	26.9	
450	I 1103	303	23.9	I	I 713	291	23.7	I	I 512	285	****	I	I 651	290	25.3	I	I 538	270	26.6	
500	I 1103	299	24.4	I	I 811	294	23.4	I	I 538	285	****	I	I 662	291	24.9	I	I 519	276	26.0	
550	I 1021	295	23.9	I	I 953	297	24.3	I	I 613	286	****	I	I 679	294	24.5	I	I 518	276	25.6	
600	I 949	291	23.7	I	I 1001	298	24.5	I	I 646	289	****	I	I 711	296	24.1	I	I 518	276	25.2	
650	I 875	258	23.3	I	I 987	299	24.2	I	I 692	292	****	I	I 693	295	23.8	I	I 518	283	24.7	
700	I 921	257	22.9	I	I 973	301	23.8	I	I 739	295	****	I	I 645	300	23.4	I	I 543	285	24.2	
750	I 1030	258	22.9	I	I 913	301	23.5	I	I 702	299	****	I	I 633	305	22.7	I	I 571	291	23.6	
800	I 936	292	22.2	I	I 801	301	23.6	I	I 837	301	****	I	I 730	300	22.7	I	I 606	286	23.2	
850	I 853	297	21.9	I	I 754	302	23.3	I	I 857	301	****	I	I 848	302	22.5	I	I 656	302	23.3	
900	I 869	300	21.7	I	I 694	307	23.1	I	I 804	303	****	I	I 855	301	22.7	I	I 655	302	23.1	
950	I 773	300	21.6	I	I 705	313	22.8	I	I 758	307	****	I	I 716	304	22.6	I	I 741	302	22.8	
1000	I 705	300	21.4	I	I 631	320	22.5	I	I 723	311	****	I	I 662	310	22.5	I	I 743	303	22.6	
1050	I 583	309	21.1	I	I 523	322	22.2	I	I 646	315	****	I	I 531	312	22.1	I	I 700	305	22.7	
1100	I 683	313	20.8	I	I 603	319	21.8	I	I 644	315	****	I	I 514	312	21.9	I	I 634	305	22.4	
1150	I 751	313	20.4	I	I 541	324	21.4	I	I 576	317	****	I	I 434	314	21.5	I	I 621	304	22.0	
1200	I 691	326	19.9	I	I 554	325	20.9	I	I 491	321	****	I	I 330	317	21.1	I	I 609	303	21.7	
1250	I 628	332	19.7	I	I 535	328	20.5	I	I 446	325	****	I	I 351	319	20.8	I	I 545	303	21.3	
1300	I 627	333	19.4	I	I 534	327	20.1	I	I 421	323	****	I	I 348	320	20.4	I	I 481	302	20.9	
1350	I 554	335	19.2	I	I 499	329	19.7	I	I 333	327	****	I	I 346	320	20.0	I	I 466	300	20.4	
1400	I 527	339	18.7	I	I 415	336	19.3	I	I 370	323	****	I	I 334	318	19.5	I	I 458	300	19.9	
1450	I 424	346	18.5	I	I 415	334	18.9	I	I 359	319	****	I	I 332	313	19.1	I	I 417	300	19.6	
1500	I 522	332	18.2	I	I 391	333	18.5	I	I 322	319	****	I	I 311	308	18.5	I	I 371	295	19.1	
1550	I ****	****	17.7	I	I 330	339	18.1	I	I 251	317	****	I	I 267	303	18.1	I	I 370	292	18.7	
1600	I 421	329	17.4	I	I 304	337	17.7	I	I 209	310	****	I	I 214	301	17.8	I	I 308	291	18.2	
1650	I 410	318	17.4	I	I 228	339	17.4	I	I 214	302	****	I	I 264	292	17.3	I	I 335	287	17.8	
1700	I 198	302	17.1	I	I ****	****	17.1	I	I 233	295	****	I	I 273	289	16.8	I	I 323	281	17.4	
1750	I 540	300	16.8	I	I 280	326	16.8	I	I 290	291	****	I	I 245	282	16.5	I	I 492	279	17.0	
1800	I 625	297	16.3	I	I ****	****	****	I	I 255	287	****	I	I 302	281	16.0	I	I 510	272	16.9	
1850	I 491	277	16.2	I	I ****	****	****	I	I 497	283	****	I	I 353	282	15.8	I	I 495	265	16.6	
1900	I 631	293	15.9	I	I ****	****	****	I	I 578	299	****	I	I 397	285	15.4	I	I 553	267	16.4	
1950	I 521	300	15.5	I	I ****	****	****	I	I 571	286	****	I	I 501	288	15.2	I	I 609	271	16.1	
2000	I 623	299	15.4	I	I ****	****	****	I	I 557	285	****	I	I 596	291	15.1	I	I 725	274	16.0	
SUMF.	I			I	I			I	I			I	I			I	I			
GECS.	I 721	254		I	I 847	235		I	I 610	294		I	I 610	294		I	I 488	304		
DELTA	I			I	I			I	I			I	I			I	I			
GECS.	I 102	23		I	I 115	8		I	I 102	25		I	I 102	25		I	I 144	7		
TEMP.	I			I	I			I	I			I	I			I	I			
FLUX	I		-1.5	I	I		****	I	I		****	I	I		0.3	I	I		1.8	
TEMP.	I			I	I			I	I			I	I			I	I			
MATCH	I		****	I	I		0.2	I	I		****	I	I		****	I	I		****	

	JLN DAY 209 0445 CST			JLN DAY 209 0514 CST			JLN DAY 209 0614 CST			JLN DAY 209 0653 CST			JLN DAY 209 0802 CST		
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JLN DAY 209 0902 CST				JLN DAY 209 1000 CST				JLN DAY 209 1118 CST				JLN DAY 209 1201 CST			
WIND				WIND				WIND				WIND			
Z (M)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)
30	289	29	26.6	398	69	27.2	319	10	29.0	155	17	29.0			
50	281	35	26.5	406	68	26.9	350	16	28.4	203	16	28.6			
75	277	43	26.1	413	67	26.8	393	21	28.2	213	15	28.6			
100	285	57	25.8	450	65	26.3	433	26	28.0	217	11	27.9			
150	321	67	25.4	380	64	25.9	402	13	27.4	233	26	27.6			
200	394	63	24.8	351	53	25.5	363	23	26.9	309	32	27.0			
250	416	67	24.5	334	50	25.0	290	33	26.6	319	37	26.5			
300	459	77	24.4	337	49	24.6	257	40	25.8	313	41	26.2			
350	555	69	24.0	334	48	24.2	244	33	25.4	292	45	25.5			
400	534	69	24.1	350	46	23.6	253	23	24.9	270	42	25.2			
450	467	60	23.6	406	47	23.3	212	9	24.4	250	41	24.6			
500	429	55	23.2	432	46	22.7	216	13	23.9	237	33	24.3			
550	419	56	22.7	415	44	22.2	232	26	23.5	257	38	23.7			
600	420	52	22.4	354	41	21.7	244	42	23.0	237	41	23.1			
650	403	49	22.1	305	39	21.7	210	55	22.4	207	44	22.8			
700	387	51	21.8	284	36	21.9	199	43	22.2	293	33	22.3			
750	347	54	21.5	282	29	21.8	228	32	21.5	309	24	21.9			
800	299	47	21.1	275	22	21.4	236	26	21.0	320	18	21.4			
850	266	32	20.9	253	15	21.0	213	15	20.8	325	16	20.9			
900	****	***	20.6	****	***	20.6	227	6	20.4	313	19	20.5			
950	****	***	20.3	****	***	20.3	152	355	20.0	307	24	20.1			
1000	234	348	19.9	232	336	20.0	160	354	19.5	337	23	19.7			
1050	268	336	19.5	246	310	19.6	****	****	19.3	357	27	19.3			
1100	274	335	19.3	268	337	19.2	****	****	18.9	355	22	18.9			
1150	279	333	18.9	275	341	18.8	260	337	18.5	355	13	18.1			
1200	283	334	18.3	317	341	18.4	305	333	18.1	****	***	18.1			
1250	285	333	18.2	371	347	17.9	333	340	17.7	171	326	17.5			
1300	280	330	17.9	453	347	18.0	343	344	17.4	180	330	17.3			
1350	301	334	17.6	529	345	16.5	339	343	17.4	214	322	16.6			
1400	354	338	17.2	544	335	18.5	256	342	17.9	219	323	16.5			
1450	492	341	17.4	548	327	18.5	272	334	18.1	181	322	16.0			
1500	572	336	17.5	508	322	18.2	259	321	17.9	167	312	15.7			
1550	530	325	17.3	474	322	18.0	252	318	17.5	175	315	15.4			
1600	518	318	17.1	439	323	17.4	279	317	17.3	268	325	17.0			
1650	517	313	17.0	449	323	17.1	329	325	16.8	229	331	17.0			
1700	514	319	16.6	471	331	16.7	377	326	16.4	239	325	16.8			
1750	505	323	16.1	483	334	16.2	437	329	16.0	321	333	16.3			
1800	533	328	15.5	478	339	15.6	333	329	15.6	310	333	16.0			
1850	****	***	****	477	345	15.4	339	330	15.3	293	334	15.7			
1900	****	***	****	487	347	15.0	274	335	15.0	296	334	15.4			
1950	****	***	****	475	350	14.7	305	344	14.6	277	332	15.0			
2000	****	***	****	471	353	14.3	****	****	****	241	326	14.9			
SURF.															
GEOS.	741	74		917	78		912	85		847	87				
DELTA															
GEOS.	217	292		286	296		284	391		415	302				
TEMP.															
FLUX			-2.2			****			0.5			0.8			
TEMP.															
HATCH			****			-1.4			****			****			

JLN DAY 210 0438 CST				JLN DAY 210 0513 CST				JLN DAY 210 0552 CST				JLN DAY 210 0700 CST				JLN DAY 210 0811 CST				JLN DAY 210 0904 CST				JLN DAY 210 1025 CST					
WIND				WIND				WIND				WIND				WIND				WIND				WIND					
Z	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T		
(H)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)		
30	I	****	***	****	I	351	80	****	I	260	103	21.3	I	279	96	****	I	406	109	25.9	I	359	139	27.3	I	358	133	29.3	I
50	I	****	***	****	I	483	95	****	I	432	109	21.6	I	322	105	****	I	359	116	25.6	I	348	137	27.0	I	415	132	29.2	I
75	I	****	***	****	I	684	105	****	I	650	112	22.3	I	408	116	****	I	309	127	25.4	I	335	134	26.8	I	403	130	23.9	I
100	I	****	***	****	I	869	112	****	I	846	117	23.1	I	514	120	****	I	290	132	25.1	I	303	128	26.6	I	309	132	28.6	I
150	I	****	***	****	I	997	127	****	I	948	132	24.8	I	642	133	****	I	369	135	24.6	I	292	136	26.2	I	313	135	23.1	I
200	I	833	131	12.0	I	877	139	****	I	800	141	25.0	I	553	142	****	I	517	143	24.8	I	343	133	25.9	I	310	143	27.8	I
250	I	796	137	25.7	I	732	138	****	I	624	143	25.5	I	511	138	****	I	505	134	26.3	I	374	141	25.9	I	301	139	27.5	I
300	I	803	136	26.0	I	704	138	****	I	620	138	26.0	I	525	132	****	I	519	123	26.6	I	415	139	26.0	I	278	154	27.1	I
350	I	723	135	26.0	I	696	135	****	I	639	135	26.1	I	593	126	****	I	544	121	26.5	I	458	137	26.2	I	308	150	26.6	I
400	I	717	135	26.0	I	685	134	****	I	646	132	26.1	I	615	123	****	I	538	119	26.4	I	533	129	26.2	I	484	169	26.1	I
450	I	724	133	25.8	I	683	132	****	I	650	129	26.3	I	616	119	****	I	629	118	26.1	I	617	125	26.0	I	512	153	25.5	I
500	I	693	133	25.4	I	684	131	****	I	649	127	25.9	I	643	117	****	I	659	119	25.9	I	672	122	25.6	I	621	154	25.3	I
550	I	664	135	24.2	I	652	132	****	I	604	124	25.3	I	646	118	****	I	684	113	25.7	I	708	121	25.4	I	619	151	25.8	I
600	I	596	135	24.2	I	593	130	****	I	520	123	24.7	I	618	116	****	I	692	117	25.4	I	703	121	25.0	I	624	154	25.3	I
650	I	569	133	23.8	I	547	127	****	I	566	120	24.3	I	629	113	****	I	669	117	24.8	I	721	120	24.8	I	644	156	24.9	I
700	I	508	132	23.6	I	499	125	****	I	525	115	23.9	I	646	111	****	I	644	117	24.5	I	714	120	24.4	I	643	153	24.5	I
750	I	476	132	23.1	I	455	124	****	I	545	113	23.4	I	634	109	****	I	667	116	24.1	I	702	119	24.0	I	627	159	24.0	I
800	I	394	131	22.7	I	402	124	****	I	467	106	23.1	I	622	106	****	I	654	115	23.8	I	722	119	23.7	I	644	159	23.7	I
850	I	310	127	22.4	I	314	120	****	I	330	107	22.6	I	605	101	****	I	652	112	23.3	I	711	120	23.1	I	663	153	23.4	I
900	I	208	119	22.3	I	241	116	****	I	313	95	22.3	I	535	99	****	I	****	****	****	I	678	120	22.5	I	650	156	23.0	I
950	I	218	118	22.1	I	216	115	****	I	301	97	22.4	I	508	99	****	I	****	****	****	I	674	120	22.4	I	670	156	22.7	I
1000	I	241	119	21.8	I	264	117	****	I	281	96	22.0	I	456	103	****	I	****	****	****	I	593	119	22.0	I	631	153	22.3	I
1050	I	177	117	21.3	I	223	117	****	I	266	102	21.7	I	423	110	****	I	****	****	****	I	742	120	21.7	I	570	159	22.0	I
1100	I	239	129	21.0	I	217	123	****	I	244	107	21.2	I	428	115	****	I	****	****	****	I	704	121	21.5	I	576	155	21.7	I
1150	I	166	132	20.6	I	223	132	****	I	226	110	20.9	I	407	120	****	I	****	****	****	I	656	124	21.2	I	573	150	21.2	I
1200	I	230	140	20.2	I	207	137	****	I	229	114	20.4	I	354	129	****	I	****	****	****	I	619	125	20.7	I	592	150	21.1	I
1250	I	233	147	19.7	I	202	144	****	I	270	120	20.1	I	339	139	****	I	****	****	****	I	536	124	20.4	I	578	151	20.9	I
1300	I	215	153	19.2	I	214	147	****	I	280	124	19.7	I	349	137	****	I	****	****	****	I	528	124	19.9	I	594	153	20.7	I
1350	I	231	152	18.8	I	226	146	****	I	278	125	19.4	I	310	137	****	I	****	****	****	I	551	131	19.7	I	527	150	20.4	I
1400	I	243	153	18.4	I	202	151	****	I	269	124	19.0	I	322	142	****	I	****	****	****	I	417	147	19.4	I	521	147	20.0	I
1450	I	279	150	18.0	I	206	150	****	I	218	134	18.9	I	347	150	****	I	****	****	****	I	506	143	18.9	I	471	152	19.6	I
1500	I	198	163	17.8	I	202	148	****	I	211	146	18.4	I	359	147	****	I	****	****	****	I	427	152	18.5	I	424	162	19.2	I
1550	I	219	172	17.5	I	220	151	****	I	248	142	17.8	I	291	163	****	I	****	****	****	I	401	167	18.1	I	556	167	18.9	I
1600	I	206	191	17.3	I	239	150	****	I	220	143	17.5	I	307	166	****	I	****	****	****	I	431	166	17.8	I	472	178	18.7	I
1650	I	236	183	16.9	I	232	176	****	I	192	150	17.1	I	315	177	****	I	****	****	****	I	396	175	17.3	I	705	175	13.5	I
1700	I	239	194	16.6	I	232	183	****	I	235	144	16.8	I	334	181	****	I	****	****	****	I	447	176	16.9	I	709	174	13.4	I
1750	I	234	195	16.6	I	244	183	****	I	282	162	16.9	I	366	183	****	I	****	****	****	I	559	179	16.5	I	653	179	18.2	I
1800	I	266	181	16.6	I	257	174	****	I	362	167	16.6	I	406	184	****	I	****	****	****	I	574	187	16.2	I	756	176	17.9	I
1850	I	325	170	16.3	I	272	167	****	I	396	181	16.4	I	431	190	****	I	****	****	****	I	617	189	16.1	I	821	176	17.8	I
1900	I	331	165	16.0	I	282	167	****	I	429	189	16.2	I	493	156	****	I	****	****	****	I	601	192	15.6	I	****	****	****	I
1950	I	431	165	15.9	I	350	174	****	I	483	193	16.0	I	503	195	****	I	****	****	****	I	691	181	15.6	I	****	****	****	I
2000	I	366	173	15.7	I	449	173	****	I	****	****	****	I	524	192	****	I	****	****	****	I	605	191	15.5	I	****	****	****	I
SURF.	I				I				I				I				I				I				I				I
GEOS.	I	780	126		I	834	130		I	609	132		I	745	129		I	725	130		I	838	123		I	862	123		I
DELTA	I				I				I				I				I				I				I				I
GEOS.	I	349	266		I	349	266		I	325	265		I	239	256		I	191	266		I	221	276		I	177	292		I
TEMP.	I				I				I				I				I				I				I				I
FLUX	I		****		I		****		I		****		I		****		I		****		I		0.2		I		****		I
TEMP.	I				I				I				I				I				I				I				I
MATCH	I		2.7		I		****		I		2.3		I		****		I		0.2		I		****		I		1.5		I

	JLN DAY 211	0507 CST	I	JLN DAY 211	0553 CST	I	JLN DAY 211	0700 CST	I	JLN DAY 211	0757 CST	I	JLN DAY 211	0848 CST	I	JLN DAY 211	1004 CST	I	JLN DAY 211	1152 CST	I	
			I			I			I			I			I			I			I	
	WIND		I	WIND		I	WIND		I	WIND		I	WIND		I	WIND		I	WIND		I	
Z	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	
(H)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	
30	****	***	****	450	72	23.2	297	?	104	****	351	100	26.1	218	111	27.6	357	110	29.0	583	105	30.5
50	****	***	****	538	80	23.7	404	?	103	****	412	109	25.8	276	125	27.4	337	112	28.7	601	103	30.3
75	****	***	****	658	91	24.2	502	?	109	****	453	101	25.6	362	135	27.0	317	114	23.6	628	93	30.0
100	****	***	****	661	105	25.1	561	?	120	****	437	102	25.4	365	140	26.8	339	114	23.2	616	109	29.9
150	825	? 143	****	704	129	26.3	739	139	****	331	111	25.1	358	144	26.3	269	115	27.9	626	103	29.4	
200	I 847	146	****	810	138	27.1	809	152	****	437	123	24.8	387	142	25.8	264	130	27.3	640	102	29.0	
250	I 863	143	****	773	140	27.5	761	151	****	472	152	25.2	414	144	25.3	272	141	25.9	623	105	28.7	
300	I 735	141	****	691	134	27.6	695	155	****	533	159	26.7	416	156	25.1	245	143	25.3	610	107	23.1	
350	I 635	139	****	654	131	27.5	637	141	****	614	143	26.9	408	162	25.5	375	145	26.2	529	103	27.6	
400	I 694	135	****	626	123	27.2	736	130	****	695	132	26.9	396	161	25.8	419	139	25.7	541	97	27.1	
450	I 674	134	****	668	128	26.9	785	126	****	845	123	26.8	411	149	25.8	451	134	25.5	404	100	26.6	
500	I 644	132	****	691	126	26.5	771	123	****	862	123	26.7	462	136	25.8	519	131	25.2	479	113	26.1	
550	I 623	132	****	659	125	26.1	772	121	****	842	131	26.4	591	129	25.7	598	128	25.4	525	126	25.6	
600	I 627	135	****	604	125	25.9	787	123	****	816	? 129	26.1	671	129	25.6	651	128	25.2	473	130	24.9	
650	I 522	133	****	578	126	25.7	750	124	****	634	? 124	25.9	630	133	25.6	679	127	25.1	454	127	24.5	
700	I 466	137	****	543	125	25.3	742	123	****	705	? 122	25.7	549	132	25.4	638	127	24.6	425	115	24.1	
750	I 470	135	****	508	121	25.0	712	119	****	690	119	25.1	558	131	25.1	639	123	24.4	479	114	23.7	
800	I 468	136	****	473	119	24.5	643	? 114	****	771	119	24.7	578	129	24.6	526	125	23.8	457	115	23.3	
850	I 427	135	****	467	119	24.1	682	? 114	****	752	118	24.1	618	126	24.2	538	124	23.5	505	117	22.6	
900	I 373	132	****	445	117	23.7	581	? 109	****	700	? 117	23.7	639	122	23.9	622	119	23.1	576	119	22.2	
950	I 351	132	****	397	116	23.4	534	? 107	****	605	? 110	23.2	654	122	23.6	615	115	23.0	628	120	21.9	
1000	I 383	136	****	360	116	22.8	533	? 105	****	721	? 113	22.7	667	120	23.1	621	114	22.6	825	118	22.1	
1050	I 356	141	****	289	114	22.5	435	? 99	****	694	? 110	22.3	685	119	22.5	723	115	22.1	895	118	21.8	
1100	I 369	145	****	321	120	22.0	395	? 96	****	693	? 112	21.9	673	116	22.0	719	113	21.8	771	113	21.5	
1150	I 395	? 150	****	350	134	21.6	459	? 105	****	619	? 111	21.3	667	114	21.5	772	113	21.1	790	116	21.0	
1200	I 412	? 160	****	343	? 147	21.4	404	? 114	****	****	****	****	660	112	21.1	727	113	20.7	781	115	20.5	
1250	I 523	? 157	****	403	? 148	21.0	332	? 122	****	****	****	****	598	? 114	20.6	792	113	20.3	809	115	20.0	
1300	I 496	? 174	****	351	? 155	20.6	479	? 125	****	****	****	****	603	? 119	20.3	757	109	19.8	905	? 114	19.6	
1350	I 552	? 172	****	403	? 153	20.1	452	? 130	****	****	****	****	521	? 122	19.9	746	107	19.5	734	? 119	19.5	
1400	I 433	? 194	****	461	? 158	19.8	405	? 136	****	****	****	****	584	? 127	19.5	763	110	19.0	751	? 124	19.1	
1450	I ****	? ****	****	443	? 160	19.4	499	? 136	****	****	****	****	609	? 127	19.1	703	112	18.6	655	? 119	18.4	
1500	I ****	? ****	****	389	? 158	19.0	534	? 135	****	****	****	****	557	? 127	18.5	638	115	13.2	828	? 121	13.0	
1550	I ****	? ****	****	389	? 143	18.3	461	? 138	****	****	****	****	498	? 128	18.2	****	****	****	827	? 126	17.7	
1600	I ****	? ****	****	350	? 145	18.4	335	? 143	****	****	****	****	476	? 121	17.8	****	****	****	639	? 135	17.3	
1650	I ****	? ****	****	292	? 144	17.8	442	? 137	****	****	****	****	518	? 118	17.3	****	****	****	530	? 138	16.7	
1700	I ****	? ****	****	325	? 136	17.4	420	? 144	****	****	****	****	576	? 115	16.7	****	****	****	554	? 132	16.3	
1750	I ****	? ****	****	330	? 128	16.9	497	? 131	****	****	****	****	482	? 110	16.4	****	****	****	****	****	****	
1800	I ****	? ****	****	453	? 129	16.7	317	? 124	****	****	****	****	629	? 110	16.2	****	****	****	****	****	****	
1850	I ****	? ****	****	390	? 130	16.5	381	? 116	****	****	****	****	572	? 106	15.7	****	****	****	****	****	****	
1900	I ****	? ****	****	371	? 128	16.2	447	? 116	****	****	****	****	666	? 111	15.1	****	****	****	****	****	****	
1950	I ****	? ****	****	407	? 134	15.8	573	? 118	****	****	****	****	377	? 97	14.7	****	****	****	****	****	****	
2000	I ****	? ****	****	295	? 134	15.6	****	****	****	****	****	****	852	? 121	14.6	****	****	****	****	****	****	
SURF.	I ****		I ****			I ****			I ****			I ****			I ****			I ****			I ****	
GEOS.	I 807	131	I ****	742	132	I ****	872	141	I ****	626	155	I ****	611	160	I ****	678	140	I ****	867	141	I ****	
DELTA	I ****		I ****			I ****			I ****			I ****			I ****			I ****			I ****	
GEOS.	I ****	****	I ****	****		I ****	****		I ****	****		I ****	****		I ****	****		I ****	****		I ****	
TEMP.	I ****		I ****			I ****			I ****			I ****			I ****			I ****			I ****	
FLUX	I ****		I ****			I ****			I ****			I ****			I ****			I ****			I ****	
TEMP.	I ****		I ****			I ****			I ****			I ****			I ****			I ****			I ****	
MATCH	I ****		I ****			I ****			I ****			I ****			I ****			I ****			I ****	

JLN DAY 212 0406 CST				JLN DAY 212 0500 CST				JLN DAY 212 0600 CST				JLN DAY 212 0700 CST			
WIND				WIND				WIND				WIND			
Z (M)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)
30	410	97	23.7	335	89	****	198	75	23.2	444	119	****			
50	529	115	24.7	395	108	****	130	119	23.9	495	125	****			
75	697	125	25.3	426	129	****	171	185	24.3	510	127	****			
100	784	131	26.0	507	149	****	307	211	24.8	593	133	****			
150	785	143	26.2	658	163	****	424	204	27.1	597	140	****			
200	859	154	26.4	789	177	****	378	175	28.4	568	156	****			
250	832	152	27.3	854	188	****	344	155	28.4	577	171	****			
300	810	148	27.1	706	177	****	357	142	28.1	489	182	****			
350	784	144	26.9	625	164	****	412	133	27.9	395	183	****			
400	744	147	26.7	610	156	****	451	130	27.6	353	173	****			
450	754	153	26.3	553	149	****	480	128	27.2	353	150	****			
500	710	156	26.4	523	147	****	533	129	26.8	361	132	****			
550	678	157	26.3	519	147	****	607	129	26.5	407	123	****			
600	674	155	25.9	510	145	****	680	128	26.1	476	123	****			
650	670	154	25.5	492	141	****	652	127	25.7	547	124	****			
700	642	155	25.1	536	140	****	663	128	25.2	597	123	****			
750	608	154	24.7	493	137	****	629	126	24.8	635	122	****			
800	516	153	24.4	469	136	****	606	125	24.4	661	121	****			
850	478	149	24.0	437	136	****	589	124	24.0	671	120	****			
900	536	147	23.6	422	131	****	575	120	23.5	663	118	****			
950	516	146	23.3	402	126	****	563	115	23.0	660	117	****			
1000	424	145	22.9	375	124	****	535	109	22.7	648	115	****			
1050	279	146	22.5	346	123	****	498	101	22.4	689	116	****			
1100	299	149	22.0	308	126	****	493	98	22.0	704	116	****			
1150	463	154	21.7	289	130	****	474	96	21.5	731	115	****			
1200	447	162	21.3	303	127	****	438	93	21.2	710	115	****			
1250	379	169	21.1	336	114	****	457	96	21.0	724	115	****			
1300	363	162	20.8	339	105	****	435	93	20.6	639	113	****			
1350	297	156	20.3	383	110	****	435	98	20.2	646	113	****			
1400	270	150	20.0	363	115	****	451	103	19.8	681	114	****			
1450	287	151	19.7	316	116	****	448	105	19.3	628	112	****			
1500	267	148	19.3	325	119	****	500	106	18.9	676	110	****			
1550	304	149	18.9	335	116	****	531	104	18.5	635	107	****			
1600	301	143	18.5	405	119	****	642	109	18.1	670	113	****			
1650	481	148	18.3	340	113	****	612	109	17.8	732	110	****			
1700	322	148	17.9	393	115	****	538	105	17.4	761	110	****			
1750	193	147	17.6	406	113	****	695	107	16.9	828	111	****			
1800	229	141	17.1	449	114	****	614	103	16.6	719	114	****			
1850	232	133	16.8	405	108	****	544	100	16.3	833	120	****			
1900	226	120	16.5	407	108	****	611	106	15.8	833	121	****			
1950	438	126	16.0	413	101	****	583	108	15.5	918	122	****			
2000	422	119	15.9	487	102	****	657	113	15.1	956	122	****			
SURF.															
GEOS.	647	133		693	137		850	132		541	143				
DELTA															
GEOS.	****	***		****	***		****	***		****	***				
TEMP.															
FLUX			****			****			****			****			
TEMP.															
MATCH			0.8			****			0.9			****			

JLN DAY 212 0801 CST				JLN DAY 212 0904 CST				JLN DAY 212 0958 CST				JLN DAY 212 1058 CST				JLN DAY 212 1200 CST			
WIND				WIND				WIND				WIND				WIND			
Z (M)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	
30	539	170	25.8	357	135	27.6	354	137	28.5	409	110	29.3	641	108	****				
50	527	169	25.7	394	142	27.0	406	134	28.3	413	109	28.9	655	111	29.8				
75	514	168	25.4	446	148	26.8	394	137	28.2	419	107	28.6	676	116	29.6				
100	511	163	25.0	503	153	26.5	354	129	27.9	380	111	28.4	700	120	29.2				
150	548	154	24.7	530	150	26.0	419	120	27.5	393	125	27.8	753	115	28.7				
200	649	155	24.3	477	161	25.5	462	125	27.0	451	127	27.4	665	112	28.1				
250	723	164	23.7	482	167	24.9	467	130	26.7	391	121	26.9	638	111	27.6				
300	798	172	23.7	438	166	24.6	428	133	26.1	380	116	26.4	599	115	27.1				
350	797	177	23.7	480	162	24.1	394	135	25.6	380	111	25.8	553	124	26.5				
400	737	179	23.7	621	158	24.8	367	132	25.1	309	117	25.1	533	132	26.0				
450	638	184	23.4	710	158	24.7	364	133	24.6	347	116	24.7	553	136	25.8				
500	503	191	23.6	714	159	24.1	393	139	24.1	405	112	24.2	535	131	25.1				
550	321	194	23.7	647	157	23.6	416	139	23.5	489	106	23.9	529	126	24.6				
600	224	155	24.1	569	156	23.2	433	138	23.0	584	105	23.3	594	131	24.0				
650	260	114	24.4	502	148	22.8	442	140	22.6	611	106	23.3	615	132	23.6				
700	301	114	24.1	489	131	22.8	501	137	22.2	617	109	22.9	615	131	23.2				
750	357	113	23.8	553	119	23.2	573	131	21.7	707	115	22.5	626	132	22.7				
800	508	115	23.7	644	117	22.8	658	120	22.6	834	118	22.8	644	133	22.1				
850	505	115	23.4	748	121	22.5	760	113	23.1	870	121	22.3	665	134	21.6				
900	540	109	23.2	814	123	22.3	855	116	23.1	852	127	22.1	676	134	21.2				
950	601	103	23.0	785	121	21.7	934	122	22.8	869	130	22.0	703	133	20.8				
1000	647	103	22.9	728	118	21.8	909	127	22.7	857	135	22.4	755	131	20.5				
1050	709	109	22.5	843	117	21.8	1004	133	22.6	1027	136	22.0	713	130	20.0				
1100	761	110	22.1	932	117	21.8	960	135	22.4	1006	135	21.7	709	126	19.8				
1150	771	109	21.8	964	117	21.4	910	136	21.8	1044	133	21.5	877	121	20.3				
1200	777	103	21.5	951	117	21.1	858	132	21.5	981	134	21.1	949	117	20.9				
1250	789	106	21.1	1016	122	20.8	934	131	21.3	905	133	20.8	979	116	20.6				
1300	811	105	20.6	1159	124	20.4	941	126	20.7	682	130	20.4	****	****	****				
1350	800	104	20.2	942	118	20.0	1015	122	20.4	1097	125	19.9	****	****	****				
1400	815	104	19.8	1090	117	19.6	1073	118	20.2	1107	123	19.7	****	****	****				
1450	816	103	19.3	1020	114	19.3	938	115	19.8	1158	125	19.3	****	****	****				
1500	741	99	19.0	****	****	****	1034	115	19.4	1012	125	19.1	****	****	****				
1550	769	100	18.5	****	****	****	1275	115	19.4	1140	127	18.4	****	****	****				
1600	717	99	18.0	****	****	****	1012	110	19.1	1363	129	18.0	****	****	****				
1650	810	103	17.7	****	****	****	1044	110	18.7	1030	132	17.6	****	****	****				
1700	774	103	17.3	****	****	****	1132	111	18.3	1258	131	17.8	****	****	****				
1750	811	103	16.9	****	****	****	1052	111	17.9	1213	126	17.3	****	****	****				
1800	779	109	16.7	****	****	****	1035	112	17.4	1605	124	17.0	****	****	****				
1850	813	112	16.4	****	****	****	1076	114	16.9	1388	123	16.6	****	****	****				
1900	908	115	16.1	****	****	****	1302	118	16.8	1186	121	16.2	****	****	****				
1950	829	113	15.6	****	****	****	1203	119	16.5	1189	121	15.9	****	****	****				
2000	986	117	15.1	****	****	****	1134	121	16.1	1589	124	15.5	****	****	****				
SURF.																			
GEOS.	821	160		827	175		749	181		945	167		854	159					
DELTA																			
GEOS.	****	***		****	***		****	***		****	***		****	***					
TEMP.																			
FLUX			****			****			1.1			0.4			****				
TEMP.																			
HATCH			0.1			0.8			****			****					0.0		

JLN DAY 218 0914 CST				JLN DAY 218 1007 CST				JLN DAY 218 1125 CST				JLN DAY 218 1200 CST			
WIND				WIND				WIND				WIND			
Z (M)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)
30	670	29	21.2	****	***	****	301	64	23.2	835	67	23.6			
50	654	29	20.7	****	***	****	410	58	22.4	766	61	23.3			
75	635	30	20.2	****	***	****	550	54	22.2	695	52	23.0			
100	616	31	19.9	823	36	****	691	52	21.8	663	42	22.7			
150	646	30	19.7	845	37	****	754	53	21.3	787	42	21.8			
200	717	32	19.5	827	39	****	810	51	20.9	741	44	21.3			
250	705	32	18.9	830	38	****	804	50	20.3	739	47	20.9			
300	670	32	18.6	852	40	****	804	50	19.8	793	47	20.4			
350	647	38	17.8	853	46	****	831	46	19.4	857	47	20.0			
400	639	46	17.3	846	43	****	859	43	18.9	862	45	19.5			
450	667	53	16.9	836	47	****	871	44	18.3	803	45	19.1			
500	734	58	16.5	840	45	****	877	45	17.9	711	43	18.7			
550	****	***	****	843	47	****	854	50	17.3	653	46	18.2			
600	****	***	****	838	52	****	811	53	16.8	608	44	17.9			
650	****	***	****	852	55	****	709	55	16.2	674	42	17.4			
700	****	***	****	873	56	****	690	56	15.8	731	41	16.8			
750	****	***	****	837	55	****	748	57	15.3	703	45	16.3			
800	****	***	****	890	54	****	768	63	14.9	731	48	15.7			
850	****	***	****	852	56	****	779	67	14.2	818	51	15.7			
900	****	***	****	820	58	****	749	66	13.6	830	53	15.3			
950	****	***	****	847	55	****	769	66	13.5	835	55	18.6			
1030	****	***	****	958	50	****	854	67	13.3	824	56	14.8			
1050	****	***	****	917	45	****	829	65	12.8	804	55	14.3			
1100	****	***	****	949	42	****	810	59	****	813	54	14.0			
1150	****	***	****	1079	42	****	857	52	****	819	50	13.8			
1200	****	***	****	1074	38	****	948	48	****	877	49	13.3			
1250	****	***	****	1067	34	****	948	44	****	957	47	13.1			
1300	****	***	****	1046	33	****	918	42	****	999	45	12.6			
1350	****	***	****	****	****	****	910	42	****	931	44	12.2			
1400	****	***	****	****	****	****	918	42	****	947	41	11.9			
1450	****	***	****	****	****	****	968	42	****	887	40	11.4			
1500	****	***	****	****	****	****	996	41	****	814	40	11.0			
1550	****	***	****	****	****	****	970	40	****	787	41	10.7			
1600	****	***	****	****	****	****	1012	40	****	841	43	10.4			
1650	****	***	****	****	****	****	927	40	****	692	43	9.9			
1700	****	***	****	****	****	****	917	39	****	650	46	9.6			
1750	****	***	****	****	****	****	823	39	****	714	47	9.1			
1800	****	***	****	****	****	****	671	46	****	757	48	9.1			
1850	****	***	****	****	****	****	821	51	****	674	49	8.6			
1900	****	***	****	****	****	****	811	53	****	797	48	8.4			
1950	****	***	****	****	****	****	708	54	****	876	50	8.0			
2000	****	***	****	****	****	****	715	53	****	749	52	7.7			
SURF.															
GEOS.	1032	66		983	61		1083	64		1079	64				
DELTA															
GEOS.	****	***		****	***		****	***		****	***				
TEMP.															
FLUX			1.2			****			-1.1			0.1			
TEMP.															
HATCH			****			****			****			****			

JLN DAY 219 0357 CST				JLN DAY 219 0500 CST				JLN DAY 219 0555 CST				JLN DAY 219 0710 CST				JLN DAY 219 0800 CST			
WIND				WIND				WIND				WIND				WIND			
Z	SPEED	DIR	T	SPEED	DIR	T		SPEED	DIR	T		SPEED	DIR	T		SPEED	DIR	T	
(M)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)		(CM/S)	(DEG)	(C)		(CM/S)	(DEG)	(C)		(CM/S)	(DEG)	(C)	
30	533	58	14.2	387	39	****		429	51	13.4		203	63	****		209	96	17.8	
50	672	65	15.1	501	52	****		502	65	14.0		225	73	****		213	106	17.5	
75	760	74	16.1	542	67	****		537	83	14.9		260	84	****		226	116	17.3	
100	817	82	16.7	561	80	****		625	96	15.5		312	91	****		245	126	17.2	
150	876	96	17.2	691	101	****		794	115	17.0		579	109	****		399	130	16.6	
200	773	107	18.1	859	117	****		972	121	18.3		799	123	****		642	123	16.5	
250	630	106	18.6	808	124	****		933	127	18.6		893	133	****		779	135	17.5	
300	557	98	18.4	673	129	****		817	129	18.5		829	137	****		807	138	18.5	
350	496	93	18.0	560	130	****		769	133	18.1		709	140	****		770	140	18.2	
400	453	92	17.6	462	128	****		659	137	17.8		672	144	****		695	142	17.9	
450	435	88	17.1	381	125	****		599	139	17.6		573	145	****		602	144	17.5	
500	439	85	16.7	367	120	****		594	140	17.2		480	150	****		520	146	17.5	
550	431	81	16.2	351	114	****		529	143	16.7		402	150	****		455	147	16.9	
600	411	76	15.9	343	112	****		475	141	16.3		343	148	****		379	149	16.2	
650	343	73	15.6	349	114	****		342	152	15.7		308	149	****		312	146	15.9	
700	270	65	15.4	343	122	****		341	150	15.4		290	143	****		256	141	15.4	
750	219	57	15.1	307	125	****		343	142	14.8		302	145	****		227	137	14.8	
800	245	66	15.0	232	118	****		335	139	14.3		309	143	****		228	138	14.5	
850	260	78	14.8	201	111	****		344	140	13.9		310	144	****		207	138	14.1	
900	361	79	14.6	203	112	****		262	147	13.7		323	145	****		235	143	13.6	
950	414	76	14.4	196	116	****		194	142	13.4		271	149	****		239	143	13.1	
1000	415	73	13.8	231	121	****		176	152	13.4		103	149	****		232	145	12.7	
1050	429	70	13.3	239	111	****		****	?	13.1		189	152	****		196	142	12.1	
1100	415	63	13.0	310	87	****		184	?	13.2		185	147	****		193	138	11.9	
1150	422	56	12.9	309	61	****		164	?	13.2		223	126	****		112	140	11.9	
1200	398	48	12.5	330	47	****		252	37	13.2		262	107	****		145	120	11.9	
1250	391	51	12.1	322	35	****		319	32	13.0		277	89	****		241	106	11.7	
1300	381	46	11.7	319	29	****		326	21	12.8		267	65	****		303	92	11.3	
1350	371	37	11.3	313	20	****		292	29	12.9		279	51	****		322	80	11.4	
1400	312	24	11.0	315	6	****		292	45	12.6		295	55	****		334	66	11.7	
1450	326	17	10.6	326	8	****		365	54	12.4		328	55	****		352	59	11.7	
1500	367	25	10.6	303	32	****		439	53	12.5		427	66	****		375	61	11.5	
1550	374	43	11.0	334	41	****		530	53	12.2		479	68	****		425	67	11.2	
1600	425	50	10.6	453	45	****		549	61	11.9		504	62	****		473	71	11.1	
1650	518	46	10.6	543	47	****		506	65	11.8		456	?	****		****	****	****	
1700	582	49	10.5	549	?	****		474	57	11.5		391	?	****		****	****	****	
1750	527	54	10.3	481	?	****		****	****	****		476	?	****		****	****	****	
1800	493	59	10.1	440	?	****		****	****	****		564	50	****		****	****	****	
1850	425	47	10.0	547	34	****		****	****	****		651	47	****		****	****	****	
1900	512	25	9.9	608	27	****		****	****	****		680	45	****		****	****	****	
1950	565	18	10.2	666	33	****		****	****	****		732	44	****		****	****	****	
2000	****	****	****	662	41	****		****	****	****		752	43	****		****	****	****	
SURF.																			
GEOS.	438	73		318	104			632	115			267	104			497	121		
DELTA																			
GEOS.	****	****		****	****			****	****			****	****			****	****		
TEMP.																			
FLUX			****			****				****				****				0.6	
TEMP.																			
MATCH			0.7			****				0.8				****				****	

JLN DAY 219 0854 CST				JLN DAY 219 0959 CST				JLN DAY 219 1110 CST				JLN DAY 219 1152 CST			
WIND				WIND				WIND				WIND			
Z (M)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)
30	193	133	20.0	336	129	21.3	311	27	22.5	127	23	23.1			
50	243	126	19.6	357	126	20.9	325	40	21.9	169	65	22.8			
75	319	121	19.4	335	122	20.7	354	53	21.4	232	87	22.5			
100	348	114	19.1	332	122	20.5	419	64	21.1	412	96	22.2			
150	373	118	18.8	463	122	20.2	407	73	20.5	350	109	21.6			
200	404	119	18.2	360	130	19.7	476	75	20.0	417	101	21.1			
250	467	123	18.3	363	144	19.2	458	77	19.5	467	102	20.6			
300	568	137	17.7	233	149	18.6	472	82	18.8	514	107	20.0			
350	601	142	13.2	233	132	18.3	399	95	18.3	501	139	19.5			
400	526	143	17.9	259	127	17.8	400	110	18.1	443	110	19.1			
450	475	147	17.6	313	123	17.5	472	119	17.9	415	114	18.6			
500	419	151	17.2	275	121	16.8	402	118	17.3	414	116	18.0			
550	364	148	16.9	241	125	16.4	487	115	16.6	377	103	17.6			
600	355	146	16.3	249	127	15.9	472	114	16.0	267	110	17.0			
650	314	146	15.8	249	122	15.6	443	113	15.5	233	110	16.6			
700	283	144	15.4	276	125	15.4	386	113	14.9	232	110	16.2			
750	258	136	14.9	280	124	14.9	369	117	14.4	242	112	15.7			
800	217	134	14.5	269	123	14.5	359	114	13.9	257	114	15.2			
850	218	136	13.8	240	125	13.9	374	121	13.6	245	122	14.7			
900	240	142	13.4	239	127	13.6	314	123	13.1	212	?	141	14.3		
950	229	145	13.0	233	123	13.0	256	125	12.8	295	?	131	13.6		
1000	242	145	12.5	272	130	12.5	270	135	12.4	320	?	133	13.2		
1050	197	143	12.0	267	125	11.9	223	140	12.0	301	?	131	12.7		
1100	216	138	11.6	253	122	11.6	233	142	11.5	291	?	124	12.3		
1150	164	138	11.1	248	122	11.3	287	140	11.7	315	?	118	11.9		
1200	137	134	10.9	239	121	10.8	316	147	10.3	297	?	122	11.4		
1250	174	116	11.1	232	123	10.2	263	141	10.1	294	?	123	10.9		
1300	309	164	10.8	219	106	10.3	273	122	10.1	327	?	115	10.4		
1350	397	95	10.6	309	93	10.6	234	?	107	9.8	?	329	107	10.1	
1400	200	93	11.0	320	85	10.5	167	?	93	9.4	?	334	100	10.3	
1450	327	79	10.9	337	83	10.7	185	?	86	9.3	?	373	96	10.1	
1500	409	78	11.0	416	85	10.9	367	?	83	10.4	?	472	93	11.5	
1550	412	32	10.8	361	87	10.9	364	?	86	10.5	?	528	85	11.8	
1600	441	50	10.6	405	83	11.1	429	?	78	11.2	?	634	79	12.0	
1650	440	87	10.3	****	****	****	550	?	69	11.2	?	653	82	12.3	
1700	436	82	10.4	****	****	****	625	?	65	12.0	?	639	83	12.6	
1750	310	53	10.3	****	****	****	632	?	73	11.9	?	597	89	12.2	
1800	476	61	10.2	****	****	****	622	?	80	11.6	?	684	95	12.3	
1850	597	57	10.6	****	****	****	651	?	86	11.4	?	****	****	****	
1900	595	50	10.7	****	****	****	754	?	89	11.4	?	****	****	****	
1950	****	****	****	****	****	****	761	?	83	11.2	?	****	****	****	
2000	****	****	****	****	****	****	****	****	****	****	****	****	****	****	
SURF.															
GEOS.	569	125		677	124		644	132		736	124				
DELTA															
GEOS.	****	***		****	***		****	***		****	***				
TEMP.															
FLUX			0.4						-1.6						
TEMP.															
HATCH			****			-0.5			****			****			

JLN DAY 220 0757 CST				JLN DAY 220 0903 CST				JLN DAY 220 0958 CST				JLN DAY 220 1159 CST			
WIND				WIND				WIND				WIND			
Z	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T
(M)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)
30	388	160	20.0	500	192	23.0	414	206	24.6	474	165	25.8			
50	400	159	19.9	458	186	22.5	427	203	24.1	498	165	25.3			
75	417	159	20.0	414	177	22.2	444	193	23.7	527	166	24.6			
100	440	166	19.9	386	164	21.9	465	194	23.6	510	169	24.4			
150	600	177	20.2	404	162	21.4	420	192	22.8	463	180	23.9			
200	653	181	21.1	468	162	20.9	330	171	22.2	514	130	23.2			
250	621	184	20.8	601	170	20.4	321	174	22.0	578	130	22.6			
300	601	183	20.5	622	175	21.0	322	176	21.3	633	178	22.3			
350	581	190	20.1	615	180	20.5	330	171	20.9	613	130	21.9			
400	583	192	19.7	606	182	20.2	337	170	20.3	516	137	21.5			
450	560	192	19.3	588	185	19.6	341	173	20.1	426	198	20.9			
500	550	189	18.8	560	185	19.2	351	176	19.3	332	199	20.3			
550	523	188	18.4	550	184	18.6	373	177	13.9	347	197	20.0			
600	501	189	17.9	546	186	18.1	395	178	18.7	344	199	19.5			
650	470	189	17.3	536	187	17.6	391	178	17.8	365	203	18.9			
700	444	189	17.0	527	183	17.2	385	178	17.1	311	216	18.4			
750	449	189	16.6	530	187	16.8	338	177	16.8	283	213	17.9			
800	477	189	16.1	545	186	16.2	394	177	16.4	323	189	17.4			
850	511	190	15.7	566	185	15.7	424	179	16.2	439	189	16.8			
900	530	190	15.3	565	185	15.4	477	183	15.6	444	179	16.5			
950	544	192	14.7	536	185	14.8	533	183	15.3	328	173	16.2			
1000	526	195	14.2	551	184	14.2	588	180	14.6	154	175	15.5			
1050	567	195	13.7	587	183	13.8	625	178	13.9	156	189	15.1			
1100	578	194	13.3	554	183	13.5	624	179	13.2	168	203	14.6			
1150	560	196	12.7	591	184	12.9	582	179	12.9	214	213	14.0			
1200	575	195	12.3	503	187	12.5	551	179	12.3	265	219	13.5			
1250	597	195	11.8	414	190	12.2	525	180	11.9	255	215	13.1			
1300	430	205	11.9	221	210	13.0	322	180	12.8	231	207	12.6			
1350	254	240	13.0	59	243	13.9	126	161	14.1	268	203	12.9			
1400	202	265	14.1	52	321	14.7	76	136	15.1	407	193	13.6			
1450	149	264	14.3	58	211	14.7	93	151	15.0	553	189	14.7			
1500	93	210	14.6	100	113	15.0	212	118	15.2	621	190	14.5			
1550	95	54	15.1	225	83	15.3	407	86	15.2	714	194	14.5			
1600	146	81	15.7	252	116	15.7	****	****	****	782	194	14.6			
1650	243	128	15.8	345	134	15.9	****	****	****	771	189	14.8			
1700	441	135	15.9	575	138	15.9	****	****	****	849	189	15.2			
1750	562	122	15.9	609	136	16.2	****	****	****	717	184	15.6			
1800	****	****	****	****	****	****	****	****	****	585	173	15.5			
1850	****	****	****	****	****	****	****	****	****	507	153	15.4			
1900	****	****	****	****	****	****	****	****	****	449	139	15.4			
1950	****	****	****	****	****	****	****	****	****	404	119	16.1			
2000	****	****	****	****	****	****	****	****	****	450	117	16.1			
SURF.															
GEOS.	808	204		754	188		740	189		732	201				
DELTA															
GEOS.	163	308		220	319		188	335		317	343				
TEMP.															
FLUX			****			0.0			****			0.7			
TEMP.															
MATCH			0.7			****			0.0			****			

JLN DAY 221 0400 CST				JLN DAY 221 0501 CST				JLN DAY 221 0557 CST				JLN DAY 221 1053 CST				JLN DAY 221 1217 CST			
WIND				WIND				WIND				WIND				WIND			
Z (M)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)		SPEED (CM/S)	DIR (DEG)	T (C)		SPEED (CM/S)	DIR (DEG)	T (C)		SPEED (CM/S)	DIR (DEG)	T (C)	
30	699	184	15.7	315	217	****		306	210	16.0	****	****	****	****		****	****	26.5	
50	911	191	17.5	405	207	****		446	213	17.0	****	****	****	****		114	306	25.7	
75	999	192	19.3	559	205	****		615	216	18.3	****	****	****	****		62	6	25.3	
100	1022	192	19.9	739	209	****		703	217	19.2	****	****	****	****		47	319	25.2	
150	1009	191	20.0	826	210	****		759	218	20.0	****	****	****	****		79	312	24.6	
200	1014	189	19.7	809	209	****		752	219	19.9	****	****	****	****		86	302	24.1	
250	983	189	19.5	778	206	****		747	220	19.9	****	****	****	****		61	289	23.7	
300	967	189	19.2	814	204	****		736	221	19.7	****	****	****	****		35	323	23.1	
350	936	188	18.9	773	204	****		731	221	19.4	****	****	****	****		19	321	22.8	
400	902	183	18.7	801	204	****		731	221	19.2	151	275	22.1	113		113	54	22.4	
450	821	186	18.6	786	203	****		739	221	18.9	191	291	21.8	78		78	22	22.0	
500	739	184	18.8	703	200	****		737	219	18.8	173	284	21.2	96		96	357	21.4	
550	670	185	19.2	795	195	****		673	214	18.7	108	257	20.7	65		65	357	21.1	
600	492	187	19.0	806	189	****		689	208	18.7	157	243	20.3	79		79	19	20.6	
650	409	184	18.8	695	189	****		765	202	18.7	195	236	19.8	91		91	356	20.2	
700	439	176	18.6	520	192	****		715	200	18.7	231	223	19.6	94		94	353	19.8	
750	323	159	18.5	512	189	****		619	197	18.7	280	218	18.9	91		91	27	19.3	
800	318	162	18.4	404	183	****		519	195	18.4	278	226	18.7	96		96	51	18.9	
850	229	173	18.2	353	177	****		432	191	18.1	203	243	18.2	78		78	51	18.7	
900	444	190	18.1	312	171	****		393	184	17.7	174	254	17.8	80		80	114	****	
950	355	203	17.8	385	168	****		416	175	17.4	165	250	17.6	115		115	145	****	
1000	366	209	17.4	387	169	****		463	174	17.3	214	222	17.6	135		135	167	****	
1050	333	212	17.0	394	178	****		490	182	17.0	243	209	18.2	146		146	184	****	
1100	293	218	16.5	366	184	****		441	184	16.6	258	202	18.0	132		132	196	****	
1150	334	223	16.2	293	190	****		453	187	16.5	258	199	17.7	103		103	204	****	
1200	326	231	15.9	386	198	****		329	188	16.1	240	197	17.5	64		64	202	****	
1250	355	233	15.7	366	208	****		341	198	15.6	219	194	17.1	32		32	178	****	
1300	398	231	15.1	299	219	****		247	202	15.3	189	189	16.7	67		67	155	****	
1350	462	233	14.7	311	226	****		329	213	14.9	195	190	16.6	107		107	153	****	
1400	354	252	14.8	312	232	****		271	214	14.7	213	191	16.4	185		185	166	****	
1450	357	247	14.5	292	241	****		207	219	14.2	240	185	16.2	217		217	163	****	
1500	359	251	15.2	405	229	****		262	212	14.1	253	179	16.1	162		162	156	****	
1550	314	244	15.0	387	237	****		248	225	13.5	230	176	15.9	131		131	166	****	
1600	261	238	14.7	375	237	****		346	235	13.7	191	182	15.3	155		155	154	****	
1650	260	231	14.2	357	233	****		399	231	13.4	147	174	15.1	151		151	149	****	
1700	315	225	13.9	269	240	****		****	****	****	****	98	154	120		120	136	****	
1750	358	226	13.6	240	219	****		****	****	****	****	106	149	126		126	137	****	
1800	353	228	13.1	343	207	****		****	****	****	****	127	149	147		147	154	****	
1850	356	229	12.6	223	220	****		****	****	****	****	145	150	171		171	161	****	
1900	333	224	12.2	273	217	****		****	****	****	****	163	152	189		189	160	****	
1950	****	****	****	357	216	****		****	****	****	****	188	155	217		217	146	****	
2000	****	****	****	320	216	****		****	****	****	****	213	151	****		****	****	****	
SURF.																			
GEO3.	600	193		786	226			993	222		521	211		886		886	216		
DELTA																			
GEO3.	156	313		145	303			105	301		225	284		126		126	308		
TEMP.																			
FLUX			****			****				-1.4			****					****	
TEMP.																			
MATCH			-1.8			****				****			0.6					-1.4	

JLN DAY 221 1606 CST				JLN DAY 221 1707 CST				JLN DAY 221 1818 CST				JLN DAY 221 1904 CST				JLN DAY 221 1957 CST			
WIND				WIND				WIND				WIND				WIND			
Z	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	
(M)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	
30	622	153	28.0	601	152	****	425	156	****	419	176	****	590	179	26.7				
50	570	155	27.8	621	151	****	505	156	****	517	179	****	667	180	27.7				
75	507	157	27.5	618	156	****	579	159	****	567	185	****	637	182	27.9				
100	450	159	27.3	638	155	****	621	161	****	566	188	****	735	183	27.8				
150	464	146	26.9	681	153	****	677	163	****	587	186	****	758	183	27.4				
200	460	144	26.4	672	154	****	692	162	****	625	185	****	777	189	27.1				
250	496	143	25.9	635	155	****	711	163	****	667	185	****	768	191	26.7				
300	498	145	25.4	663	154	****	768	166	****	693	184	****	757	191	26.2				
350	512	147	24.9	691	154	****	795	166	****	709	184	****	748	190	25.7				
400	553	147	24.5	659	157	****	803	169	****	741	183	****	737	190	25.3				
450	542	149	24.1	659	161	****	780	169	****	761	182	****	751	190	24.8				
500	484	150	23.6	641	161	****	732	172	****	780	182	****	775	191	24.4				
550	458	151	23.2	616	163	****	717	175	****	772	182	****	798	191	23.9				
600	484	154	22.6	592	163	****	744	176	****	770	180	****	840	192	23.5				
650	490	158	22.1	595	163	****	709	177	****	792	180	****	822	192	23.0				
700	431	161	21.7	683	166	****	718	179	****	808	181	****	872	192	22.5				
750	481	167	21.3	****	****	****	705	180	****	821	179	****	884	191	22.1				
800	474	171	20.8	****	****	****	688	181	****	841	180	****	898	190	21.6				
850	527	174	20.2	****	****	****	700	182	****	804	182	****	864	190	21.5				
900	540	174	20.0	****	****	****	672	183	****	792	181	****	855	191	21.1				
950	515	173	19.9	****	****	****	697	184	****	746	182	****	836	191	20.6				
1000	516	171	20.2	****	****	****	734	183	****	709	186	****	835	194	20.2				
1050	535	171	19.9	****	****	****	679	184	****	853	190	****	962	196	20.0				
1100	512	171	19.7	****	****	****	758	189	****	816	193	****	814	197	19.6				
1150	457	170	19.3	****	****	****	783	192	****	792	194	****	726	196	19.2				
1200	429	170	18.9	****	****	****	760	192	****	776	196	****	795	197	18.8				
1250	454	171	18.6	****	****	****	732	193	****	738	196	****	685	199	18.6				
1300	477	171	18.1	****	****	****	****	****	****	803	194	****	502	202	18.4				
1350	460	171	17.9	****	****	****	****	****	****	735	195	****	554	202	18.0				
1400	419	170	17.6	****	****	****	****	****	****	850	194	****	631	204	17.6				
1450	374	171	17.1	****	****	****	****	****	****	569	197	****	588	204	17.7				
1500	337	166	16.8	****	****	****	****	****	****	504	192	****	475	205	17.2				
1550	350	159	16.7	****	****	****	****	****	****	664	182	****	291	193	17.3				
1600	374	157	16.5	****	****	****	****	****	****	630	177	****	565	193	17.2				
1650	274	161	16.3	****	****	****	****	****	****	528	176	****	552	179	16.9				
1700	315	161	16.0	****	****	****	****	****	****	452	173	****	432	179	16.7				
1750	233	157	16.1	****	****	****	****	****	****	439	168	****	317	165	16.5				
1800	273	162	15.9	****	****	****	****	****	****	427	163	****	405	170	16.2				
1850	250	158	15.7	****	****	****	****	****	****	313	156	****	531	173	15.9				
1900	175	144	15.6	****	****	****	****	****	****	369	162	****	295	133	15.4				
1950	185	149	15.2	****	****	****	****	****	****	260	142	****	394	164	15.1				
2000	176	129	14.7	****	****	****	****	****	****	250	133	****	336	167	14.8				
SURF.																			
GEOS.	695	184		652	211		553	209		543	206		607	218					
DELTA																			
GEOS.	192	23		223	350		248	349		279	350		231	339					
TEMP.																			
FLUX			****			****			****			****			****			****	
TEMP.																			
MATCH			0.7			****			****			****			1.2				

	JLN DAY 222			1213 CST			JLN DAY 222			1423 CST			JLN DAY 222			1607 CST			JLN DAY 222			1700 CST			JLN DAY 222			1820 CST			JLN DAY 222			1906 CST			JLN DAY 222			1958 CST		
	HIND			HIND			HIND			HIND			HIND			HIND			HIND			HIND			HIND			HIND			HIND			HIND			HIND			HIND		
Z (H)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)						
30	I	505	170	I	754	177	I	28.3	I	421	235	I	28.1	I	437	239	I	****	I	515	210	I	****	I	609	190	I	****	I	642	186	I	****	I	****	I	****					
50	I	479	171	I	801	180	I	27.9	I	493	235	I	28.0	I	476	236	I	****	I	551	211	I	****	I	636	199	I	****	I	745	159	I	****	I	****	I	****					
75	I	447	173	I	860	183	I	27.7	I	581	235	I	27.8	I	526	233	I	****	I	597	212	I	****	I	671	203	I	****	I	815	192	I	****	I	****	I	****					
100	I	440	173	I	855	182	I	27.7	I	615	234	I	27.6	I	585	228	I	****	I	611	212	I	****	I	657	201	I	****	I	834	194	I	****	I	****	I	****					
150	I	456	184	I	924	180	I	27.2	I	587	231	I	27.2	I	566	222	I	****	I	632	217	I	****	I	645	205	I	****	I	777	197	I	****	I	****	I	****					
200	I	523	195	I	932	181	I	26.4	I	585	225	I	26.8	I	592	220	I	****	I	661	220	I	****	I	667	203	I	****	I	729	201	I	****	I	****	I	****					
250	I	532	203	I	974	182	I	26.0	I	564	221	I	26.2	I	623	217	I	****	I	647	222	I	****	I	703	211	I	****	I	745	206	I	****	I	****	I	****					
300	I	453	210	I	918	185	I	25.4	I	546	219	I	25.7	I	664	217	I	****	I	615	225	I	****	I	714	214	I	****	I	761	209	I	****	I	****	I	****					
350	I	451	214	I	832	188	I	25.1	I	562	220	I	25.3	I	659	217	I	****	I	610	224	I	****	I	713	216	I	****	I	784	213	I	****	I	****	I	****					
400	I	510	210	I	818	183	I	24.6	I	594	224	I	24.7	I	651	218	I	****	I	615	223	I	****	I	700	218	I	****	I	805	219	I	****	I	****	I	****					
450	I	580	199	I	799	189	I	24.0	I	603	224	I	24.2	I	657	219	I	****	I	639	225	I	****	I	690	219	I	****	I	795	223	I	****	I	****	I	****					
500	I	523	195	I	756	188	I	23.9	I	577	220	I	23.8	I	644	221	I	****	I	625	223	I	****	I	711	222	I	****	I	797	225	I	****	I	****	I	****					
550	I	492	205	I	826	189	I	23.6	I	572	219	I	23.3	I	596	224	I	****	I	601	219	I	****	I	701	227	I	****	I	840	227	I	****	I	****	I	****					
600	I	539	203	I	742	189	I	23.3	I	614	223	I	22.8	I	530	228	I	****	I	621	221	I	****	I	654	230	I	****	I	843	229	I	****	I	****	I	****					
650	I	565	204	I	766	191	I	22.7	I	631	223	I	22.4	I	579	226	I	****	I	639	224	I	****	I	669	231	I	****	I	733	233	I	****	I	****	I	****					
700	I	538	206	I	744	192	I	22.1	I	661	222	I	21.8	I	593	224	I	****	I	659	229	I	****	I	656	233	I	****	I	690	238	I	****	I	****	I	****					
750	I	618	204	I	751	191	I	22.0	I	667	221	I	21.4	I	605	223	I	****	I	654	232	I	****	I	637	236	I	****	I	633	245	I	****	I	****	I	****					
800	I	570	202	I	757	193	I	21.5	I	665	218	I	21.0	I	601	224	I	****	I	635	234	I	****	I	590	241	I	****	I	552	248	I	****	I	****	I	****					
850	I	563	203	I	897	194	I	21.1	I	650	217	I	20.5	I	576	227	I	****	I	554	239	I	****	I	545	247	I	****	I	477	252	I	****	I	****	I	****					
900	I	558	204	I	828	197	I	21.1	I	650	217	I	20.2	I	579	229	I	****	I	551	242	I	****	I	506	256	I	****	I	467	259	I	****	I	****	I	****					
950	I	419	203	I	838	197	I	20.8	I	633	215	I	19.3	I	616	232	I	****	I	605	245	I	****	I	464	268	I	****	I	429	271	I	****	I	****	I	****					
1000	I	367	207	I	729	197	I	20.2	I	614	211	I	19.3	I	568	234	I	****	I	629	249	I	****	I	444	281	I	****	I	344	282	I	****	I	****	I	****					
1050	I	358	213	I	699	201	I	20.0	I	621	210	I	18.8	I	537	231	I	****	I	641	252	I	****	I	473	286	I	****	I	371	298	I	****	I	****	I	****					
1100	I	334	222	I	677	203	I	19.9	I	603	212	I	18.3	I	577	225	I	****	I	626	254	I	****	I	548	301	I	****	I	456	297	I	****	I	****	I	****					
1150	I	347	224	I	605	208	I	19.8	I	674	213	I	17.9	I	635	221	I	****	I	523	260	I	****	I	593	301	I	****	I	573	293	I	****	I	****	I	****					
1200	I	338	226	I	398	229	I	19.7	I	642	210	I	17.4	I	577	222	I	****	I	546	263	I	****	I	611	303	I	****	I	630	297	I	****	I	****	I	****					
1250	I	303	229	I	503	232	I	19.6	I	641	211	I	16.9	I	593	226	I	****	I	478	270	I	****	I	611	306	I	****	I	601	305	I	****	I	****	I	****					
1300	I	263	232	I	509	222	I	19.1	I	560	211	I	16.8	I	616	232	I	****	I	486	273	I	****	I	637	310	I	****	I	612	309	I	****	I	****	I	****					
1350	I	259	235	I	480	227	I	19.4	I	466	221	I	16.9	I	534	240	I	****	I	515	276	I	****	I	602	339	I	****	I	535	317	I	****	I	****	I	****					
1400	I	153	246	I	631	221	I	19.0	I	534	234	I	16.9	I	452	245	I	****	I	506	275	I	****	I	667	310	I	****	I	570	312	I	****	I	****	I	****					
1450	I	102	249	I	328	264	I	18.8	I	442	252	I	16.8	I	433	247	I	****	I	504	280	I	****	I	629	329	I	****	I	543	313	I	****	I	****	I	****					
1500	I	120	258	I	418	241	I	18.4	I	453	262	I	16.6	I	408	250	I	****	I	511	287	I	****	I	620	363	I	****	I	560	331	I	****	I	****	I	****					
1550	I	177	267	I	383	246	I	17.9	I	526	256	I	16.4	I	449	257	I	****	I	502	283	I	****	I	600	387	I	****	I	482	320	I	****	I	****	I	****					
1600	I	196	273	I	511	241	I	17.5	I	414	256	I	15.9	I	507	262	I	****	I	509	290	I	****	I	593	402	I	****	I	451	327	I	****	I	****	I	****					
1650	I	198	283	I	550	243	I	17.5	I	403	274	I	15.8	I	497	264	I	****	I	556	293	I	****	I	572	320	I	****	I	429	320	I	****	I	****	I	****					
1700	I	200	290	I	****	****	I	****	I	589	255	I	15.6	I	452	266	I	****	I	575	296	I	****	I	504	304	I	****	I	387	327	I	****	I	****	I	****					
1750	I	218	293	I	15.1	I	****	I	592	260	I	15.4	I	474	262	I	****	I	581	299	I	****	I	492	309	I	****	I	359	334	I	****	I	****	I	****						
1800	I	232	285	I	14.6	I	****	I	358	283	I	15.1	I	392	272	I	****	I	573	300	I	****	I	****	****	I	****	I	386	333	I	****	I	****	I	****						
1850	I	319	266	I	14.1	I	****	I	399	281	I	14.8	I	413	282	I	****	I	517	300	I	****	I	****	****	I	****	I	429	324	I	****	I	****	I	****						
1900	I	335	268	I	14.2	I	****	I	533	272	I	14.4	I	426	289	I	****	I	483	300	I	****	I	****	****	I	****	I	441	337	I	****	I	****	I	****						
1950	I	360	266	I	14.1	I	****	I	400	291	I	14.1	I	443	295	I	****	I	491	300	I	****	I	****	****	I	****	I	469	329	I	****	I	****	I	****						
2000	I	386	264	I	13.7	I	****	I	544	280	I	13.3	I	464	300	I	****	I	499	301	I	****	I	****	****	I	****	I	526	336	I	****	I	****	I	****						
SURF.	I			I			I				I					I				I						I																
GECS.	I	977	227	I	593	154	I			441	176	I			729	222	I			715	220	I			691	220	I			705	225	I										
DELTA	I			I			I					I					I									I																
GEOS.	I	229	352	I	331	4	I			395	355	I			410	346	I			423	343	I			396	343	I			406	337	I										
TEMP.	I			I			I					I					I									I																
FLUX	I			I	****		I			****		I			****		I			****		I			****		I															

JLN DAY 224 1857 CST				JLN DAY 224 1609 CST				JLN DAY 224 1700 CST				JLN DAY 224 1800 CST			
HIND				HIND				HIND				HIND			
Z	SPEED	DIR	T	Z	SPEED	DIR	T	Z	SPEED	DIR	T	Z	SPEED	DIR	T
(M)	(CM/S)	(DEG)	(C)	(M)	(CM/S)	(DEG)	(C)	(M)	(CM/S)	(DEG)	(C)	(M)	(CM/S)	(DEG)	(C)
30	624	165	****	461	159	32.0	407	154	****	660	169	30.2			
50	747	168	****	496	162	31.8	434	165	****	774	170	30.4			
75	902	171	****	542	166	31.6	454	164	****	916	172	30.3			
100	1030	173	****	597	163	31.4	537	162	****	1022	174	30.3			
150	1177	178	****	647	172	31.0	566	165	****	1187	175	30.3			
200	1303	182	****	581	174	30.6	555	167	****	1213	177	30.0			
250	1382	184	****	557	173	30.3	537	159	****	1174	179	29.7			
300	1410	186	****	571	174	29.8	535	173	****	1144	181	29.4			
350	1408	189	****	592	179	29.3	499	180	****	1072	183	29.0			
400	1388	191	****	608	186	29.0	554	191	****	1079	183	28.6			
450	1335	192	****	595	189	28.6	619	199	****	1037	185	28.1			
500	1317	192	****	668	196	28.1	676	205	****	1019	188	27.8			
550	1265	193	****	677	195	27.7	680	205	****	1003	191	27.5			
600	1277	194	****	713	195	27.3	699	207	****	984	192	27.1			
650	1226	196	****	741	195	26.8	704	207	****	940	192	26.8			
700	1221	200	****	781	196	26.5	731	211	****	880	193	26.4			
750	1176	203	****	819	197	25.9	746	211	****	857	194	26.0			
800	1101	206	****	850	201	25.6	760	211	****	808	196	25.7			
850	1139	206	****	864	203	25.1	780	212	****	728	197	25.3			
900	1033	209	****	836	205	24.7	812	213	****	774	198	24.8			
950	1108	211	****	892	206	24.2	800	213	****	790	200	24.4			
1000	1012	214	****	847	206	23.9	792	213	****	794	201	23.9			
1050	1083	214	****	903	207	23.3	783	213	****	859	203	23.5			
1100	995	216	****	867	208	22.9	778	214	****	832	204	23.0			
1150	909	? 216	****	935	206	22.5	807	213	****	814	203	22.6			
1200	1088	? 214	****	939	206	22.0	810	213	****	851	203	22.2			
1250	968	? 216	****	947	208	21.6	820	213	****	907	204	21.7			
1300	866	? 220	****	945	215	21.0	825	213	****	1003	205	21.3			
1350	910	221	****	989	217	20.6	826	214	****	907	211	21.0			
1400	931	222	****	1041	217	20.1	829	214	****	1030	211	20.6			
1450	999	223	****	1029	218	19.7	839	214	****	1022	213	20.3			
1500	1004	? 227	****	1049	? 213	19.3	836	215	****	1001	215	19.9			
1550	872	? 232	****	925	? 221	18.8	804	215	****	1005	216	19.4			
1600	940	? 231	****	970	? 222	18.4	804	215	****	1084	216	19.0			
1650	1068	? 231	****	1005	223	18.1	825	214	****	1067	220	18.6			
1700	953	236	****	995	224	17.7	853	213	****	1106	227	18.6			
1750	999	235	****	1029	226	17.3	850	212	****	1039	233	18.3			
1800	939	239	****	1035	227	16.8	774	211	****	1000	? 237	18.0			
1850	935	243	****	1015	228	16.3	842	211	****	1024	? 230	17.6			
1900	970	? 247	****	1078	227	15.9	838	211	****	1028	? 243	17.3			
1950	1247	? 239	****	1055	? 228	15.3	824	214	****	1037	243	16.9			
2000	974	? 255	****	1237	? 226	14.9	905	214	****	1022	235	16.4			
SURF.															
GEOS.	1196	192		976	184		1124	186		1111	177				
DELTA															
GEOS.	****	***		625	342		650	336		****	***				
TEMP.															
FLUX			****				****		****		****				
TEMP.															
MATCH			****			-2.3			****			-1.1			

JLN DAY 224 1958 CST				JLN DAY 224 2100 CST				JLN DAY 224 2200 CST				JLN DAY 224 2300 CST				JLN DAY 224 2357 CST			
WIND				WIND				WIND				WIND				WIND			
Z	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	
(H)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	
30	790	178	27.5	796	183	****	877	201	27.7	656	193	****	871	201	26.2				
50	914	180	28.3	953	189	****	987	198	28.0	789	195	****	944	200	26.3				
75	1067	182	28.8	1148	190	****	1129	195	28.1	955	198	****	1037	199	26.5				
100	1220	184	29.1	1272	191	****	1307	195	28.1	1110	199	****	1128	199	26.5				
150	1451	188	29.4	1506	193	****	1536	198	28.3	1273	199	****	1305	202	26.0				
200	1610	191	29.5	1584	195	****	1629	200	28.0	1488	203	****	1545	207	26.3				
250	1647	193	29.4	1727	196	****	1783	202	27.8	1675	207	****	1744	212	26.4				
300	1632	193	29.0	1696	197	****	1953	206	28.0	1873	210	****	1897	217	26.9				
350	1604	193	28.6	1648	199	****	1939	209	28.2	1977	216	****	1961	223	27.4				
400	1544	193	28.2	1607	201	****	1917	209	28.2	1952	219	****	1962	227	28.1				
450	1431	194	27.8	1528	203	****	1831	209	27.9	1908	221	****	1911	229	27.9				
500	1408	196	27.7	1538	203	****	1759	210	27.7	1789	221	****	1857	230	27.8				
550	1474	199	27.4	1504	203	****	1758	212	27.6	1808	220	****	1812	230	27.4				
600	1476	201	27.2	1577	204	****	****	****	****	1639	221	****	1797	229	27.1				
650	1317	202	26.8	1641	205	****	****	****	****	1548	223	****	1669	230	26.7				
700	1323	202	26.6	1551	207	****	****	****	****	1651	224	****	1624	229	26.3				
750	1250	202	26.2	1517	208	****	****	****	****	1568	226	****	1611	228	25.9				
800	1127	204	25.7	1441	209	****	****	****	****	****	****	****	1439	228	25.6				
850	1192	204	25.2	1204	211	****	****	****	****	****	****	****	1676	227	25.2				
900	1212	206	24.7	1455	212	****	****	****	****	****	****	****	1472	228	24.8				
950	1234	209	24.3	****	****	****	****	****	****	****	****	****	1474	228	24.4				
1000	****	****	****	****	****	****	****	****	****	****	****	****	1302	228	24.0				
1050	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
1100	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
1150	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
1200	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
1250	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
1300	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
1350	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
1400	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
1450	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
1500	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
1550	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
1600	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
1650	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
1700	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
1750	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
1800	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
1850	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
1900	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
1950	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
2000	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
SURF.	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
GEOS.	1185	196	****	1200	206	****	1180	212	****	1269	225	****	1328	228	****				
DELTA	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
GEOS.	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
TEMP.	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
FLUX	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
TEMP.	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****				
MATCH	****	-1.1	****	****	****	****	****	****	-0.1	****	****	****	****	****	****			0.0	

	JLN DAY 225 1557 CST			JLN DAY 225 1659 CST			JLN DAY 225 1758 CST			JLN DAY 225 1857 CST			JLN DAY 225 1958 CST			JLN DAY 225 2058 CST		
	WIND			WIND			WIND			WIND			WIND			WIND		
Z	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T
(H)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)
30	434	277	26.3	190	262	26.1	368	272	26.0	394	234	24.1	341	240	23.4	329	262	22.8
50	408	277	26.0	188	267	25.9	356	270	25.9	425	235	24.2	424	245	23.9	385	261	23.5
75	439	277	25.8	188	273	25.7	363	272	25.7	441	234	24.0	437	245	24.0	383	261	23.6
100	418	276	25.5	216	273	25.4	362	271	25.4	425	236	23.8	425	246	23.8	****	****	****
150	428	278	25.1	208	263	25.0	360	273	25.0	373	239	23.4	354	245	23.5	****	****	****
200	423	274	24.6	204	255	24.5	335	275	24.5	327	243	23.0	352	245	23.1	****	****	****
250	461	273	24.1	200	254	24.1	330	275	24.1	286	249	22.6	309	249	22.7	****	****	****
300	463	280	23.7	198	257	23.7	338	278	23.6	235	256	22.3	253	254	22.4	151	321	22.6
350	464	294	23.1	199	251	23.2	337	279	23.2	200	268	22.0	178	266	22.2	150	316	22.5
400	492	305	22.8	197	242	22.7	336	279	22.7	203	275	21.6	158	271	22.1	153	318	22.1
450	486	306	22.4	187	242	22.3	325	280	22.3	176	291	21.6	139	274	21.8	179	326	21.7
500	470	301	21.9	190	239	21.8	352	281	21.8	191	298	21.4	133	279	21.6	262	331	21.5
550	478	301	21.4	191	243	21.4	355	282	21.4	201	303	21.1	159	295	21.3	289	332	21.1
600	500	302	21.0	175	249	20.9	345	285	21.0	241	308	20.8	185	300	21.0	323	334	20.6
650	473	302	20.6	133	261	20.5	368	293	20.7	301	309	20.6	247	316	20.7	333	334	20.2
700	448	301	20.1	117	285	20.3	393	300	20.7	329	308	20.2	326	323	20.5	318	328	19.7
750	425	299	19.9	152	293	19.9	353	309	20.4	339	308	19.8	358	323	20.2	287	324	19.5
800	373	296	19.3	196	294	19.5	295	316	20.2	353	306	19.4	376	322	19.7	259	325	18.8
850	355	293	18.7	228	299	19.4	297	314	20.1	374	296	19.2	372	321	19.3	253	317	18.9
900	****	****	****	242	300	19.1	275	314	19.7	379	290	18.8	350	316	19.0	225	304	18.7
950	****	****	****	267	300	18.8	267	310	19.4	432	293	18.4	321	315	18.6	255	315	18.4
1000	****	****	****	289	300	18.6	267	297	19.2	445	289	18.1	332	307	18.2	315	327	18.5
1050	****	****	****	292	300	18.5	295	299	18.7	482	289	17.7	344	304	18.0	317	329	18.1
1100	****	****	****	352	299	18.2	362	299	18.6	529	288	17.5	342	305	17.8	311	320	17.8
1150	****	****	****	410	297	17.9	409	296	18.2	540	289	17.2	367	303	17.7	331	315	17.6
1200	****	****	****	432	299	17.5	413	289	17.8	556	291	16.8	408	301	17.4	399	319	17.4
1250	****	****	****	455	294	17.2	430	284	17.5	592	292	16.5	440	294	17.0	468	314	17.2
1300	****	****	****	388	287	16.9	438	282	17.2	636	293	16.3	453	289	16.8	500	310	17.1
1350	****	****	****	338	280	16.5	418	282	16.7	668	296	16.0	454	294	16.6	430	310	16.7
1400	****	****	****	****	****	****	487	283	16.3	679	300	16.0	471	291	16.4	431	304	16.1
1450	****	****	****	****	****	****	458	283	16.0	725	301	15.6	495	287	16.4	484	293	15.7
1500	****	****	****	****	****	****	601	282	15.9	656	299	15.4	505	293	16.3	491	235	15.5
1550	****	****	****	****	****	****	682	284	17.0	656	293	15.1	505	298	16.1	572	283	15.3
1600	****	****	****	****	****	****	744	283	17.0	595	291	15.0	488	296	15.8	620	284	15.0
1650	****	****	****	****	****	****	772	282	16.6	692	286	14.6	446	293	15.5	652	283	14.6
1700	****	****	****	****	****	****	866	282	16.3	532	284	14.8	467	288	15.1	654	285	14.5
1750	****	****	****	****	****	****	900	284	16.0	561	284	14.5	524	282	14.7	740	286	14.8
1800	****	****	****	****	****	****	881	283	15.8	756	281	14.1	655	279	14.5	832	283	14.6
1850	****	****	****	****	****	****	888	273	15.7	938	273	14.0	770	280	14.4	873	276	14.2
1900	****	****	****	****	****	****	930	274	15.4	863	275	13.7	863	277	14.4	1033	275	14.1
1950	****	****	****	****	****	****	****	****	****	860	274	13.5	939	273	13.9	1059	275	13.9
2000	****	****	****	****	****	****	****	****	****	968	274	13.3	****	****	****	1071	277	****
SURF.	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
GEOS.	432	304	****	411	270	****	387	287	****	294	315	****	173	118	****	246	133	****
DELTA	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
GEOS.	****	****	****	****	****	****	88	274	****	113	326	****	118	305	****	102	294	****
TEMP.	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
FLUX	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
TEMP.	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
HATCH	0.5	****	****	0.0	****	****	0.0	****	****	0.0	****	****	0.0	****	****	0.0	****	0.0

Appendix A3. Micrometeorological Data

JULY 21 1975 JULIAN DAY 202											
CST	R	RN	H	U*(A)	U*(B)	U	DD	TD	TA	TH	
	---M/SQ. M---			---CM/S---			(DEG)		---DEGREES C---		
0400			-14		11.6		360				
0430			-10		8.0		10				
0500			-8		7.1		10				
0530	46	-3	5		8.2		10				
0600	186	36	18		12.0		340				
0630	232	97	32		12.0		350				
0700	232	170	53	18.3	10.5	150	340	25.0			
0730	466	255	76	19.3	10.3	150	360		22.4	19.5	
0800	604	318	95	21.7	14.1	180	10	25.2	24.0	21.2	
0830	698	375	101	17.0	15.1	120	30	26.8	24.9	21.5	
0900	740	469	121	16.5	13.5	100	300	28.2	25.7	21.5	
0930	834	557	137	23.9	17.2	190	360	28.6	26.5	21.5	
1000	930	617	146	30.6	19.1	210	360	29.4	27.1	21.5	
1030	930	664	147	24.5	23.4	170	350	31.7	27.9	21.1	
1100	930	705	140	31.1	24.7	260	340	32.0	28.4	21.5	
1130	884	737	137	28.1	26.7	220	340	32.0	28.6	21.4	
1200	976	750	130	27.5	25.7	210	340	33.8	28.8	21.7	
1230	930	745	117	28.6	14.9	230	340	33.5	29.0	21.7	

JULY 22 1975 JULIAN DAY 203											
CST	R	RN	H	U*(A)	U*(B)	U	DD	TD	TA	TH	
	---M/SQ. M---			---CM/S---			(DEG)		---DEGREES C---		
0400							120				
0430							120				
0500							110				
0530	46						150	15.7	14.6	14.4	
0600	136	74	4	1.4	3.7		160				
0630	232	118	23	8.8	7.4	60	270				
0700	372	185	55	10.9	13.5	100	90	21.1	18.9	18.3	
0730	558	230	83	13.1	16.3	90		23.6	22.8	20.5	
0800	604	336	86	15.5	14.3	110			24.0	21.6	
0830	698	418	83	19.4	13.6	140			26.0	21.6	
0900	652	483	81	13.7	13.3	100		30.2	26.5	21.5	
0930	839	541	96	18.7	13.7	120		31.0	27.4	22.2	
1000	884	620	110	23.0	20.1	190	250	31.1	27.2	20.6	
1030	930	629	111	22.2	15.8	150	350	31.1	26.4	21.2	
1100	976	615	132	20.8	20.2	140		29.7	27.6	22.0	
1130	976	480	150	19.8	25.6	140		29.1	27.9	21.6	
1200	930	663	147	27.5	22.6	240	250	28.2	26.5	22.4	
1230	1116	718	147		18.7			28.5	27.5	22.4	

JULY 23 1975 JULIAN DAY 204											
CST	R	RN	H	U*(A)	U*(B)	U	DD	TD	TA	TH	
	---M/SQ. M---			---CM/S---			(DEG)		---DEGREES C---		
0400					20.6	160	160				
0430		-27				150	270	20.5	20.7	19.7	
0500		-22				230	160	21.0	20.1	19.5	
0530	46	32	-29	23.3	24.5	230	160	21.0	21.0	20.0	
0600	140	67	-26	23.2	33.0	230	170	21.6	22.1	21.0	
0630	140	77	-29	36.6	35.3	360	170	21.7	23.1	21.5	
0700	140	79	-69	38.9	42.3	380	180	22.5	23.7	21.8	
0730	186	105	-41	39.3	37.7	380	180	23.7	23.9	22.1	
0800	232	130	-28	38.9	36.2	390	180	24.2	24.4	22.5	
0830	186	141	-10	35.1	41.9	340	360	25.5	25.2	23.1	
0900	326	200	79	54.8	49.2	540	40	24.1	24.0	22.0	
0930	418	349	137	50.9	56.1	530		24.6	24.2	22.0	
1000	512	329	140	51.1		520		25.1	25.0	22.5	
1030	744	566	139	57.4		580	90	26.7	26.2	23.2	
1100	834	687	137	65.6	70.0	640	110	27.5	27.5	24.5	
1130	744	726	132	60.9	54.1	580	110	29.1	29.0	24.8	
1200	790	740	129	60.4	48.5	590	130	30.9	30.0	26.0	
1230	833	739	110		48.1		120				

JULY 25 1975 JULIAN DAY 206											
CST	R	RN	H	U*(A)	U*(B)	U	DD	TD	TA	TH	
	---M/SQ. M---			---CM/S---			(DEG)		---DEGREES C---		
0400	0						310		14.5	14.0	
0430	0						330	12.0			
0500	0	-73		15.1		150	330	11.3	13.6	13.2	
0530	46	5		22.6		200	340	12.5	14.9	14.4	
0600	140	47	9	19.8		160	350	13.7	16.4	15.5	
0630	280	95	19	24.2		130	350	16.3	17.4	16.3	
0700	372	154	31	24.1		170	360	21.2	18.2	16.9	
0730	418	230	46	20.5		150	30	24.2	20.0	18.5	
0800	558	330	66	18.6		120	60	24.2	21.5	18.5	
0830	604	407	81	19.4		120	120	24.7	23.0	19.5	
0900	754	479	96	22.7		160	110	27.0	23.7	18.7	
0930	790	600	120	20.4		120	110	29.7	24.2	18.3	
1000	884	705	141	25.2		170	70	28.9	25.0	18.0	
1030	930	747	169	30.1	33.1	210	50	29.7	25.4	18.5	
1100	930	735	121	29.9		230	40	30.0	25.9	19.2	
1130	790	760	190	24.0		150		28.3	25.6	19.2	
1200	790	771	124	42.0		320		27.9	27.7	19.5	
1230	1024	770		50.6		400		28.5	25.4	18.9	

JULY 26 1975 JULIAN DAY 207										
CST	R	RH	H	U*(A)	U*(B)	U	DD	TO	TA	TH
	---W/SQ. M---			---CM/S---			(DEG)	---DEGREES C---		
0400	0						70			
0430	0	-1								
0500	0									
0530	46	4					200			
0600	94	31	6				150			
0630	140	77	15				140			
0700	186	149	30				130	18.7		
0730	466	217	43	19.2		150	150	21.0	21.0	18.5
0800	512	293	59	20.9		150	170	22.0	22.1	19.2
0830	558	368	74	17.4		110	180	23.9	23.4	19.4
0900	652	385	77	19.3		130	190	25.2	24.5	19.0
0930	698	500	100	22.2		160	180	27.7	25.8	19.0
1000	833	476	95	18.2		110	200	29.5	26.0	19.0
1030	833	488	93				220	28.7	25.8	18.5
1100	790	627	125				220	28.8	26.4	19.3
1130	833	646	129	20.8		140	230	28.7	27.0	19.7
1200	1024	691	138	21.2		140	220		27.0	19.7
1230	976	781	156	27.1		160	190			

JULY 27 1975 JULIAN DAY 208										
CST	R	RH	H	U*(A)	U*(B)	U	DD	TO	TA	TH
	---W/SQ. M---			---CM/S---			(DEG)	---DEGREES C---		
0400	0						230		16.3	15.9
0430	0						230			
0500	0						240	15.7	17.2	16.5
0530	46					270	240	16.3	18.0	17.2
0600	140	46	13	18.7		300	240	17.3	19.3	17.8
0630	186	107	30	25.4		240	250	20.7	21.5	19.7
0700	230	168	48	32.6	34.0	310	260	22.1	22.6	20.7
0730	418	243	74	33.1	34.5	310	270	23.7	23.8	21.3
0800	558	311	89	35.8	44.3	330	270	26.0	25.3	22.3
0830	558	363	103	40.6	43.9	330	280	27.4	26.7	23.0
0900	652	438	123	40.9	39.2	350	270	29.8	27.4	23.5
0930	693	476	149	40.6		350	280	31.9	28.1	23.9
1000	744	525	143	40.7	46.0	370	290	32.3	28.9	24.7
1030	833	571	165	41.2	49.0	350	290	32.5	30.2	25.7
1100	834	643	155	40.6	48.1	360	290	32.3	30.6	26.2
1130	930	696	195	43.1		370	280	31.9	30.7	25.7
1200	930	700	196	43.9		370	270	32.7	31.3	25.7
1230	976	721	205	41.8		370	270	33.7	31.7	26.5

JULY 28 1975 JULIAN DAY 209										
CST	R	RH	H	U*(A)	U*(B)	U	DD	TO	TA	TH
	---W/SQ. M---			---CM/S---			(DEG)	---DEGREES C---		
0400	0						300		19.5	18.8
0430	0						360	18.5		
0500	0			11.8		100	130	17.9	18.8	18.5
0530	46	0		8.6		160	360	17.5		
0600	140	39	8	8.1		130	340	19.8		
0630	186	113	24	15.0		130	360	21.9	20.8	20.2
0700	326	187	39	14.6		170	40	23.8	23.3	22.0
0730	466	268	56	22.4		210	40	26.2		
0800	466	347	73	30.0		310	40	27.2	26.4	23.5
0830	558	427	90	27.8		290	50	28.5		
0900	698	487	102	29.1		270	50	29.2		
0930	693	550	118	33.6		310	60	32.8		
1000	790	613	133	34.6	30.6	320	70	31.0	29.5	23.0
1030	833	650	163	32.3	26.7	280	60	33.2		
1100	930	685	147	30.0	28.2	260	60	33.5	30.2	23.5
1130	833	744	110	26.2	17.5	210	40	31.0		
1200	744	635	152	28.6	23.6	250	30	34.3	30.5	23.2
1230	884	730	147	28.8		250	50	35.2		

JULY 29 1975 JULIAN DAY 210										
CST	R	RH	H	U*(A)	U*(B)	U	DD	TO	TA	TH
	---W/SQ. M---			---CM/S---			(DEG)	---DEGREES C---		
0400	0						80			
0430	0						80			
0500	0	-32					150	90	18.1	18.2
0530	46	-1					110	90	18.0	
0600	94	45					50	90	13.3	19.0
0630	232	110	10	11.7	20.9	230	150	21.0		
0700	326	178	14	24.3	20.9	220	110	21.6	22.2	20.5
0730	418	251	49	24.4	24.7	260	110	24.5		
0800	512	351	72	30.3		290	120	26.5	26.5	23.2
0830	558	379	78	30.9		270	130	23.9		
0900	558	438	90	30.5	35.7	260	150	31.5	28.2	25.0
0930	604	497	89	30.1		250	150	32.4		
1000	744	553	87	35.6	31.6	290	140	33.5	29.2	26.4
1030	804	608	91	33.4		230	150	34.2		
1100	833	640	96	35.4	32.3	340	160	34.1	31.3	26.2
1130	790	635	95	34.5	33.2	370	170	34.2		
1200	834	652	98	42.0	39.5	420	170	34.7	31.5	25.8
1230	838	656	98	42.9	39.5	370	170	34.6		

JULY 30 1975 JULIAN DAY 211										
CST	R	RH	H	U(A)	U(B)	U	DD	TO	TA	TH
		W/SQ. H		CM/S			(DEG)		DEGREES C	
0400	0			15.0			80			
0430	0			13.4			110	18.5	21.0	20.2
0500	0			11.2			90		21.2	20.8
0530	0	15		12.8			80			
0600	94	49	10	15.8			80		21.8	21.6
0630	186	97	19	21.5		240	90	22.0		
0700	230	167	33	25.7		250	120	24.0	24.9	23.9
0730	372	238	48	29.3		280	120	25.1		
0800	512	300	60	30.8		230	120	27.6	26.7	24.5
0830	512	371	74	30.4		290	130	28.7		
0900	652	433	87	31.2		270	150	31.2	28.5	24.8
0930	698	504	101	28.2		220	160	31.8		
1000	790	562	112	27.5		240	150	33.2	30.0	26.5
1030	790	595	119	28.3		230	150	33.5		
1100	652	625	125	27.5		210	160	34.2	31.6	27.0
1130	790	650	130	30.1		270	120	35.5		
1200	834	676	135	33.4		390	110	34.0	31.5	27.5
1230	838						120	35.0		

JULY 31 1975 JULIAN DAY 212										
CST	R	RH	H	U(A)	U(B)	U	DD	TO	TA	TH
		W/SQ. H		CM/S			(DEG)		DEGREES C	
0400	0					200	70		20.1	19.5
0430	0					80				
0500	0					130	90	18.5	19.5	19.1
0530	46	4		12.9		130	60	19.0	19.5	19.2
0600	94	33	-4	12.6	11.5	140	90	20.0	20.7	20.3
0630	125	85	10	19.5	16.9	210	120	21.9	22.2	21.6
0700	326	127	17	29.8		310	130	22.8	23.2	22.2
0730	372	178	60	33.2	33.6	320	150	24.0	25.2	22.9
0800	512	264	66	37.9	35.7	350	170	26.5	26.7	23.1
0830	604	342	77	42.9	41.4	400	180	28.6	28.1	23.5
0900	652	412	66	44.5	34.0	390	180	30.7	27.9	22.8
0930	744	485	83	43.1	29.6	390	180	31.5	23.9	23.5
1000	744	550	115	35.2	33.5	290	170	31.7	29.5	23.9
1030	833	490	134	33.4	32.0	370	160	32.0	29.6	24.3
1100	884	526	130	40.4	34.3	360	160	32.8	30.4	24.4
1130	854	583	103	42.7	36.2	400	140	32.1	30.5	24.9
1200	854	586	105	48.1	40.1	460	140	32.6	30.6	25.5
1230	930	594	123	52.1	50.4	520	150	32.5	30.6	23.7

AUGUST 6 1975 JULIAN DAY 218										
CST	R	RH	H	U(A)	U(B)	U	DD	TO	TA	TH
		W/SQ. H		CM/S			(DEG)		DEGREES C	
0400							20		17.7	16.6
0430							30		17.0	16.5
0500				27.9		260	30		17.0	16.5
0530		19	2	21.7		220	30			
0600	94	48	6	29.5		350	30	15.7	16.8	16.4
0630	94	68	8	27.7		360	20	16.3		
0700	140	93	11	25.6	31.7	390	30	16.9	18.6	17.4
0730	186	172	21	27.6	32.1	350	50			
0800	372	254	45	29.5	34.2	470	50	19.9	19.4	18.5
0830	604	614	60	32.2	34.1	480	40	20.3		
0900	652	474	68	37.1	45.1	490	50	22.3	21.9	19.2
0930	790	545	76	43.9	46.5	510	50	24.1		
1000	652	582	115	38.6	46.0	500	40	26.1		
1030	884	622	95	41.0	51.5	530	50	27.8		
1100	652	692	91	39.7	48.5	550	50	28.4	23.7	20.2
1130	790	683	103	46.7	44.3	560	60	28.4		
1200	790	715	117	47.7	42.5	530	70		24.5	20.0
1230	838	711	110	45.8	44.9	530	70			

AUGUST 7 1975 JULIAN DAY 219										
CST	R	RH	H	U(A)	U(B)	U	DD	TO	TA	TH
		W/SQ. H		CM/S			(DEG)		DEGREES C	
0400	0						20			
0430	0					160	340		9.5	9.5
0500	0					130	330			
0530	0			11.7		150	330		9.5	9.5
0600	140	25	6	13.3	12.7	180	360	9.3	10.2	10.2
0630	280	83	18	19.6	16.0	150	360	12.3		
0700	372	154	24	20.6	12.7	130	20	13.7		
0730	466	234	30	24.0	18.0	210	90	14.8	16.9	14.6
0800	652	315	45	24.5		220	110	18.5	18.4	16.4
0830	693	395	62	28.3	31.9	260	120	19.0		
0900	790	458	78	28.2	24.9	230	140	23.2	21.0	18.3
0930	930	534	87	29.3	20.3	240	140	23.8		
1000	930	605	128	30.5	30.3	250	145	27.3	23.2	19.8
1030	884	609	102	29.7	28.5	250	130	27.5		
1100	1024	607	75	26.1		220	140	27.5	23.4	20.0
1130	930	668	137	32.8		290	100	28.3		
1200	930	627	117	31.0		250	130	26.3	24.2	21.3
1230	1070	617	91	32.5		290	85	30.2		

AUGUST 8 1975 JULIAN DAY 220											
CST	R	RH	H	U*(A)	U*(B)	U	DD (DEG)	TO	TA	TH	
		---W/SQ. M---		-----CM/S-----				---DEGREES C---			
0400	0								13.0	10.5	
0430	0										
0500	0								9.8	9.6	
0530	0										
0600		30		10.6		140		9.2	12.2	11.9	
0630		53	4	14.5	12.5	160		14.0			
0700		121	14	20.0	20.6	220		15.0			
0730		227	16	27.7	22.6	250		17.7	18.4	16.2	
0800		303	28	28.4	23.9	240		19.7	19.7	18.4	
0830		373	32	31.2	29.2	270		23.2			
0900		452	66	33.3	36.8	370		24.8	23.5	19.4	
0930	698	513	99	38.4	35.6	360	190	25.5			
1000	790	547	85	36.8	36.8	330	200	26.8	25.2	20.2	
1030	693	594	113	39.5	33.6	340	210	27.8			
1100	833	649	141	36.3	35.0	330	220	27.7	25.4	22.0	
1130	834	682	136	32.7	36.3	260	220	28.5			
1200	834	699	103	30.5	31.5	250	210	29.2	26.5	20.5	
1230	976	686	120	28.4	27.0	220	200	30.0			

AUGUST 9 1975 JULIAN DAY 221											
CST	R	RH	H	U*(A)	U*(B)	U	DD (DEG)	TO	TA	TH	
		---W/SQ. M---		-----CM/S-----				---DEGREES C---			
0400	0						220		14.5	14.5	
0430	0						270				
0500	0						240		15.7	15.7	
0530	0	-24					200	12.1			
0600	125	21		4.1		140	200	13.3	15.1	15.1	
0630	170	84	8	11.3		160	220	18.1			
0700	264	139	14	17.6		220	240	21.0			
0730	325	204	22	17.0		250	240	22.0	20.7	20.0	
0800	450	281	31	22.1		240	260	24.7	22.6	21.0	
0830	558	365	42	27.6		280	280	27.7			
0900	648	424	51	28.3		370	280	28.3	24.7	22.2	
0930	716	452	67	30.3		360	230	27.7			
1000	774	524	89	30.3		330	310	29.0	26.2	23.1	
1030	849	578	110	28.4		340	300	32.8			
1100	728	616	123	25.5		330	310	30.5	27.5	22.8	
1130	823	670	141	19.4		260	320	31.3			
1200	890	660	139			250	200	31.0	28.1	21.8	
1230	928	641	135	18.9		220	210	31.7			

AUGUST 10 1975 JULIAN DAY 222											
CST	R	RH	H	U*(A)	U*(B)	U	DD (DEG)	TO	TA	TH	
		---W/SQ. M---		-----CM/S-----				---DEGREES C---			
0400	0						220		17.1	16.9	
0430	0			17.3		250	210				
0500	0			13.0		160	210		17.4	17.1	
0530	0			9.2		180	220				
0600	50	6		2.7		120	260		17.9	17.6	
0630	64	34		4.5		110	250				
0700	200	100	11	13.6		120	210		20.4	19.2	
0730	316	163	18	16.5		130	230				
0800	436	240	23	18.4		160	250	23.5	22.5	21.8	
0830	524	297	34	23.7		220	290	26.0			
0900	636	386	46	30.3		290	240	26.3	25.2	22.5	
0930	716	456	66	27.4		250	230	27.3			
1000	744	508	86	26.8		240	220				
1030	710	567	108	27.6		240	220		27.8	23.0	
1100	832	618	127	26.0		230	220		27.8	22.5	
1130	834	645	135	21.6		170	210				
1200	906	668	140	16.8		130	200		30.2	23.2	
1230	896	666	140	18.1		130	190				

AUGUST 12 1975 JULIAN DAY 224											
CST	R	RH	H	U*(A)	U*(B)	U	DD (DEG)	TO	TA	TH	
		---W/SQ. M---		-----CM/S-----				---DEGREES C---			
0400	0						220				
0430	0						230				
0500	0						230				
0530	0						240				
0600	94						240				
0630	126						240				
0700	230						250				
0730	413						260				
0800	456						270				
0830	466						270				
0900	553						270				
0930	698						280				
1000	698						280				
1030	790						290				
1100	838						300				
1130	838						320				
1200	834						350				
1230	790						360				

AUGUST 13 1975				JULIAN DAY 225								
CST	R	RH	H	U*(A)	U*(B)	U	DD	TO	TA	TH		
		W/SQ. H			CM/S		(DEG)		DEGREES C			
0400	0	-30	-36		23.8		240					
0430	0	-29	-47		25.2		240					
0500	0	-30	-29		23.8		240					
0530	0	-13	-25		17.0		240					
0600	94	47	-8		20.1		240					
0630	186	78	-21		26.8		240					
0700	186	110	19		16.4		290					
0730	186	133	39		31.7		360					
0800	326	169	56		21.3		340					
0830	280	120	25		19.8		340					
0900	186	86	14		17.0		10					
0930	186	123	14				30					
1000	232						40					
1030	140						270					
1100	94	38					350					
1130	136	76					230					
1200	250	132					240					
1230	372	154					210					

AUGUST 14 1975				JULIAN DAY 226								
CST	R	RH	H	U*(A)	U*(B)	U	DD	TO	TA	TH		
		W/SQ. H			CM/S		(DEG)		DEGREES C			
0400	0	0										
0430	0	0										
0500	0	0								130		
0530	0	6								150		
0600	46	34								290		
0630	0	14								190		
0700	46	17								170		
0730	103	109								220		
0800	418	120								150		
0830	512									150		
0900	220									190		
0930	46									160		
1000	94									150		
1030	326									150		
1100	418									160		
1130	200									160		
1200	558									170		
1230	372									170		

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Appendix A4. Sodar Records

DAY 202-75

DAY 203-75

Appendix B

The Developing Nocturnal Boundary Layer,

16-30 July 1976

Appendices B1 through B4 catalog the data obtained in the 1976 study of the growth of the nighttime boundary layer. Appendix B1 lists general comments extracted from field logs and other records to draw attention to difficulties encountered in order to identify data that may be questionable. Appendix B2 Part (a) presents radiosonde and pilot balloon data; Appendix B2 Part (b) lists kytoon data; Appendix B2 Part (c) provides plots of kytoon wind speed and temperature profiles. Surface and micrometeorological data are recorded in Appendix B3. Sodar records obtained at the main site are presented in Appendix B4.

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Appendix B1. General Comments.

Day 198	Sunrise 0444	Sunset 1927
1600 E35 0 15+ 360/6.0, 24.4 cu 3/10		1550-1555 KYTOON - descent, good run.
		1609-1614 RADIOSONDE - temperature signal bad, poor tracking, data above 500 m eliminated.
1700 E35 0 15+ 350/5.5, 24.4 cu 2/10		1656-1711 PIBAL - poor tracking, data above 1500 m eliminated.
		1721-1726 KYTOON - descent, operator error, data not recorded.
		1752-1757 KYTOON - descent, operator error, run eliminated.
1800 E35 0 15+ 350/5.0, 23.3 cu 1/10		1803-1812 RADIOSONDE - released at 1380 m, good run.
		1846-1851 KYTOON - descent, good run.
1900 0 15+ 360/2.5, 21.1		1901-1915 RADIOSONDE - poor tracking, data above 1900 m eliminated.
		1947-1953 KYTOON - descent, tracking light, occasional noise in temperature signal, good run.
2000 0 15+ 290/0.5, 16.1		2012-2024 PIBAL - tracking light, poor tracking, data above 1850 m eliminated.

2100 O 15+ CALM, 13.9

2200 O 15+ CALM, 12.8

2300 O 15+ CALM, 12.2

2400 O 15+ CALM, 11.7

2052-2058 KYTOON - descent, tracking light,
good run.

2107-2124 RADIOSONDE - tracking light, lost at
1760 m, good run.

2149-2155 KYTOON - descent, tracking light,
occasional noise in temperature signal,
good run.

2201-2216 RADIOSONDE - tracking light, poor
tracking, data above 1650 m eliminated.

2251-2257 KYTOON - descent, tracking light,
good run.

2301-2320 PIBAL - tracking light, poor tracking,
data eliminated above 750 m.

2346-2355 KYTOON - kytoon motions extreme, run
eliminated.

0007-0019 RADIOSONDE - tracking light, bad signal,
temperature data above 800 m eliminated;
poor tracking, data eliminated above
1300 m.

Day 199

Sunrise 0445

Sunset 1926

1800 O 15+ 080/0.5, 26.1
few ci

1754-1757 KYTOON - descent, winds too light, run
eliminated.

1807-1820 RADIOSONDE - occasional noise in
temperature signal, good run.

1900 O 15+ 100/1.0, 21.7
few ci

2000 E200 O 15+ 130/1.0, 17.2
few ci 2/10

2100 O 15+ 150/0.2, 14.4

2200 O 15+ CALM, 13.3

2300 O 15+ CALM, 12.8

2400 O 15+ 220/1.0, 12.2

1850-1855 KYTOON - descent, occasional noise in
temperature signal, good run.

1902-1913 RADIOSONDE - released at 1830 m,
good run.

1953-1958 KYTOON - descent, tracking light,
good run.

2003-2011 RADIOSONDE - tracking light, lost
overhead at 1140 m, good run.

2053-2059 KYTOON - descent, tracking light,
good run.

2108-2116 PIBAL - tracking light, lost at 1000 m,
good run.

2153-2159 KYTOON - descent, tracking light,
good run.

2226-2238 RADIOSONDE - tracking light, lost at
1750 m, poor temperature signal.

2258-2304 KYTOON - descent, tracking light,
good run.

2310-2320 PIBAL - tracking light, good run.

2349-2355 KYTOON - battery dead, no data.

0001-0014 RADIOSONDE - tracking light, no
temperature signal, released at 1700 m,
good run.

Day 200

Sunrise 0446

Sunset 1925

1800 O 15+ 150/2.0, 26.7
few ci

1751-1757 KYTOON - descent, good run.

1804-1817 RADIOSONDE - good run.

1851-1856 KYTOON - descent, good run.

1900 O 15+ 140/0.5, 23.9
few ci

1909-1920 RADIOSONDE - released at 1500 m,
good run.

1949-1954 KYTOON - descent, winds to strong, run
eliminated, kytoon operations terminated.

2000 O 15+ 130/1.5, 18.9
few ci

2006-2014 RADIOSONDE - tracking light, equipment
malfunction, no data.

2100 O 15+ 130/1.0, 17.2
few ci

2106-2119 PIBAL - tracking light, good run.

2200 O 15+ 160/2.0, 16.7
few ci

2210-2222 RADIOSONDE - tracking light, released at
1970 m.

2300 O 15+ 180/2.0, 16.1

2302-2314 PIBAL - tracking light, good run.

2400 O 15+ 190/2.0, 15.6

2357-0009 RADIOSONDE - tracking light, released at
1800 m, good run.

Day 201

Sunrise 0447

Sunset 1925

1800 E200 Ø 15+ msg/msg, msg
ci 4/10

1744-1750 KYTOON - descent, kytoon swinging, noisy
wind and temperature data.

1758-1811 RADIOSONDE - occasional noise in
temperature signal.

1900 E200 Ø 15+ msg/msg, msg
ci 4/10

2000 E200 Ø 15+ 190/4.0, 23.3
ci 4/10

2100 E200 Ø 15+ 190/4.5, 22.8
ci 4/10

2200 E200 Ø 15+ 190/5.0, 22.2
ci 3/10

2300 E200 Ø 15+ 190/6.0, 21.7
ci 3/10

2400 E200 Ø 15+ 190/5.5, 20.6
ci 3/10

1847-1952 KYTOON - descent, good run.

1859-1911 RADIOSONDE - released at 1830 m,
good run.

1948-1953 KYTOON - descent, no temperature signal
below 50 m.

2000-2014 RADIOSONDE - tracking light, occasional
noise in temperature signal, good run.

2053-2058 KYTOON - descent, tracking light,
good run.

2114-2123 PIBAL - tracking light, good run.

2120- KYTOON - winds too strong, kytoon
operations terminated.

2206-2219 RADIOSONDE - tracking light, no
temperature signal after launch.

2258-2312 RADIOSONDE - tracking light, lost at
1850 m, poor tracking at end of run.

2354-2407 RADIOSONDE - tracking light, lost at
1900 m, good run.

Day 202

Sunrise 0447

Sunset 1924

1900 E200 Ø 15+ 220/2.0, 26.1
ci 5/10, few alto cu

1904-1910 KYTOON - descent, good run.

1916-1931 RADIOSONDE - rough tracking, data
eliminated above 900 m.

2000 E200 @ 15+ 200/4.0, 26.7
ci 5/10, few alto cu

2100 E200 @ 15+ 210/2.5, 25.0
ci 5/10, few alto cu
lightning distant NW

2200 E200 @ 15+ 220/4.0, 25.6
ci 6/10

2300 E200 @ 15+ 280/6.0, 26.1
ci 6/10, windshift at 2259

2400 E200 @ 15+ 040/6.5, 25.0
ci 6/10, few alto cu

1948-1954 KYTOON - descent, kytoon swinging, data may be in error, winds too strong, kytoon operations terminated.

2003-2016 RADIOSONDE - tracking light, occasional noise in temperature signal.

2105-2118 RADIOSONDE - tracking light, equipment malfunction, run eliminated.

2205-2220 RADIOSONDE - tracking light, occasional noise in temperature signal, rough tracking, data eliminated above 1500 m.

2321-2334 PIBAL - tracking light, rough tracking, data below 200 m and above 700 m eliminated.

0001-0013 RADIOSONDE - tracking light, good run.

Day 204

Sunrise 0449

Sunset 1922

1800 E200 @ 15+ 220/1.5, 31.7
ci 4/10

1750-1756 KYTOON -descent, good run.

1804-1818 RADIOSONDE - operator error, no temperature signal first 450 m, equipment malfunction, no data between 1400 m and 1550 m.

1900 E200 @ 15+ 210/1.0, 27.2
ci 4/10, lightning NW

1854-1900 KYTOON - descent, good run.

1905-1919 RADIOSONDE - good run.

2000 E200 @ 15+ 210/1.5, 23.9
ci 4/10, towering cu NW

2100 E200 @ 15+ 220/1.5, 22.8
ci 4/10, towering cu NW

2000 E200 @ 15+ 230/1.5, 21.7
ci 2/10, towering cu NW
lightning N-NW

2300 E200 @ 15+ 240/2.5, 21.7
ci 2/10, cb N-NW

2400 O 15+ 250/3.5, 23.3
cb N-NW

1800 O 15+ 250/2.0, 32.2
few ci

1951-1957 KYTOON - descent, good run.

2011-2022 RADIOSONDE - tracking light, released
at 1920 m, good run.

2105-2111 KYTOON - descent, tracking light
good run.

2119-2134 PIBAL - tracking light, good run.

2155-2200 KYTOON - descent, tracking light,
good run.

2209-2221 RADIOSONDE - tracking light, rough
tracking, data eliminated above 1600 m.

2244-2248 KYTOON - descent, tracking light, kytoon
swinging, data may be in error, winds too
strong, kytoon operations terminated.

2301-2315 PIBAL - tracking light, rough tracking,
data eliminated above 1300 m.

0004-0016 RADIOSONDE - tracking light, rough
tracking, data eliminated above 1050 m.

Day 205

Sunrise 0450

Sunset 1922

1744-1750 KYTOON - descent, good run.

1805-1817 RADIOSONDE - good run.

1844-1850 KYTOON - descent good.

1900 O 15+ 230/1.0, 27.8
towering cu NW

2000 O 15+ 220/1.0, 23.9
cb NW

2100 O 15+ 220/1.0, 23.3
few cu, cb N

2200 O 15+ 220/2.0, 23.3
cb N-NW

2300 E200 Ø 15+ 220/0.5, 22.2
ci 2/10

2400 E200 Ø 15+ 260/1.0, 21.7
ci 3/10

1858-1910 RADIOSONDE - released at 1875 m,
good run.

1946-1953 KYTOON - descent, no temperature
signal.

2004-2016 RADIOSONDE - tracking light, released
at 1990 m, good run.

2049-2056 KYTOON - descent, tracking light, strong
winds, kytoon swinging, data may be in
error.

2113-2120 PIBAL - tracking light, lost in cloud at
960 m, good run.

2149-2155 KYTOON - descent, tracking light, strong
winds, kytoon swinging, data may be in
error.

2205-2217 RADIOSONDE - tracking light, no
temperature signal above 350 m.

2256-2303 KYTOON - ascent, tracking light, no
temperature signal.

2313-2323 RADIOSONDE - tracking light, released
at 1440 m, good run.

2347-2353 KYTOON - ascent, tracking light, data
may be in error.

0014-0024 RADIOSONDE - tracking light, released at
1470 m.

Day 206

Sunrise 0451

Sunset 1921

1800 E200 @ 15+ 050/4.5, 27.8
ci 3/10

1900 E200 @ 15+ 070/2.5, 24.4
ci 3/10

2000 E200 @ 15+ 050/1.0, 20.6
ci 2/10

2100 E200 @ 15+ 050/0.5, 18.9
ci 2/10, lightning SW

2200 E200 @ 15+ 060/1.0, 17.8
ci 3/10

2300 E200 @ 15+ 050/1.0, 17.2
ci 3/10

1807-1822 RADIOSONDE - good run.

1837-1845 KYTOON - ascent, good run.

1855-1907 RADIOSONDE - released at 2000 m
good run.

1943-1950 KYTOON - ascent, no data above 75 m.

2009-2019 RADIOSONDE - tracking light, released at
1860 m, good run.

2053-2057 KYTOON - ascent, tracking light,
good run.

2103-2115 PIBAL - tracking light, rough
tracking first 75 m.

2150-2156 KYTOON - tracking light, strong winds,
kytoon swinging, data may be in error.

2208-2218 RADIOSONDE - tracking light, released at
1550 m, good run.

2245-2250 KYTOON - ascent, tracking light, strong
winds, kytoon swinging, data may be in
error.

2301-2313 PIBAL - tracking light, good run.

2340-2346 KYTOON - ascent, tracking light, strong
winds, kytoon swinging, data may be in
error.

2400 E200 Ø 15+ 060/0.5, 15.6
ci 3/10

0003-0015 RADIOSONDE - tracking light, good run.

Day 207

Sunrise 0452

Sunset 1920

1800 O 15+ 090/2.0, 28.3

1808-1817 KYTOON - ascent, good run.

1828-1839 RADIOSONDE - noisy signal, temperature
data may be in error, run terminated
at 1800 m.

1845-1853 KYTOON - ascent, good run.

1900 O 15+ 100/2.0, 25.0

1906-1919 RADIOSONDE - good run.

1942-1950 KYTOON - ascent, good run.

2000 O 15+ 110/2.0, 22.2

2003-2015 RADIOSONDE - tracking light, operator
error, no temperature data.

2048-2056 KYTOON - ascent, tracking light,
good run.

2100 O 15+ 150/1.0, 20.0

2108-2121 PIBAL - tracking light, good run.

2143-2147 KYTOON - ascent, tracking light, strong
winds, kytoon swinging, data may be in
error.

2200 O 15+ 170/0.5, 18.3

2156-2208 RADIOSONDE - tracking light, good run.

2245-2249 KYTOON - ascent, tracking light, no
temperature above 50 m.

2300 O 15+ 180/1.5, 18.3

2257-2310 PIBAL - tracking light, good run.

2400 O 15+ 200/2.0, 17.8

2354-2356 KYTOON - ascent, tracking light, strong winds, kytoon swinging, data may be in error.

0005-0014 RADIOSONDE - tracking light, released at 1500 m, bad signal, temperature data eliminated below 150 m.

Day 208

Sunrise 0453

Sunset 1919

1800 E45 @ E200 @ 5H 150/0.5, 30.0
cu 3/10, ci 7/10, cb NW
frequent distant lightning

1754-1759 KYTOON - ascent, good run.

1815-1826 RADIOSONDE - lightning interference, wind data may be in error.

1851-1854 KYTOON - ascent, operator error, no data.

1900 E50 @ E200 @ 4H 030/3.5, 27.2
cu 3/10, ci 10/10, cb N
windshift

1902-1914 RADIOSONDE - released at 2020 m, no temperature signal after launch.

1943-1951 KYTOON - ascent, light winds, kytoon swinging, data may be in error.

2000 E50 @ E200 @ 5H 050/0.5, 23.9
cu 3/10, ci 8/10, cb N
frequent lightning

2002-2012 RADIOSONDE - tracking light, lost overhead at 1430 m, operations terminated due to approaching storms.

Day 211

Sunrise 0455

Sunset 1916

1800 O 15+ 020/2.0, msg
few ci

1745-1753 KYTOON - ascent, good run.

1900 O 10 080/1.0, msg
few alto cu, few ci

2000 E120 Ø 200 Ø 5H 100/1.0, msg
alto cu 2/10, ci 3/10

2100 O 10 130/0.5, msg
few alto cu, few ci

2200 O 10 030/0.5, msg
few ci

2300 O 10 CALM, msg
few ci

2400 O 5GF 360/0.5, msg

1808-1824 RADIOSONDE - good run.

1845-1953 KYTOON - ascent, good run.

1906-1919 RADIOSONDE - released at 1860 m,
bad signal, temperature data eliminated.

1945-1953 KYTOON - ascent, good run.

2001-2013 RADIOSONDE - tracking light,
released at 1800 m, good run.

2043-2050 KYTOON - ascent, tracking light,
good run.

2059-2012 PIBAL - tracking light, good run.

2145-2159 KYTOON - ascent and descent; tracking
light, ascent data eliminated; kytoon
swinging below 75 m, descent data may
be in error.

2211-2223 RADIOSONDE - tracking light, released
at 2000 m, noisy signal, temperature
data above 1350 m eliminated.

2248-2256 KYTOON - descent, tracking light, no
temperature signal.

2306-2315 RADIOSONDE - tracking light, released
at 1360 m, rough tracking first 250 m,
poor signal, temperature data above
1150 m eliminated.

2351-0003 KYTOON - ascent and descent, tracking
light; ascent, wind data only; descent,
good run.

0100 O 4GF CALM, msg

0200 O 4GF 100/0.5, msg

0300 O 3GF 090/0.5, msg

0400 O 3GF 120/1.0, msg

0500 E200 -0 3GF 120/0.5, msg
ci 4/10

0600 E200 -0 3GF 120/2.0, msg
ci 9/10

0013- RADIOSONDE - run aborted due to fog.

0050-0057 KYTOON - descent, tracking light,
good run.

0104-0113 PIBAL - tracking light, lost overhead at
1370 m, good run.

0215-0222 KYTOON - descent, tracking light,
good run.

0258-0311 RADIOSONDE - tracking light, lost at
1340 m, good run.

0350-0356 KYTOON - descent, tracking light,
good run.

0404-0416 PIBAL - tracking light, lost at 1915 m in
fog, good run.

0505-0515 RADIOSONDE - released at 1350 m,
good run.

0547-0556 KYTOON - descent, no temperature signal.

0622-0624 RADIOSONDE - released at 1650 m,
good run.

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Appendix B2 Part (a). Free Balloon Data

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	JLN DAY 198 2012 CST			JLN DAY 198 2107 CST			JLN DAY 198 2201 CST			JLN DAY 198 2301 CST			JLN DAY 199 0007 CST		

	JLN DAY 199 1807 CST				JLN DAY 199 1902 CST				JLN DAY 199 2003 CST				JLN DAY 199 2108 CST				JLN DAY 199 2226 CST				JLN DAY 199 2310 CST				JLN DAY 200 0001 CST			
	HIND				HIND				HIND				HIND				HIND				HIND				HIND			
Z	SPEED	DIR	T		SPEED	DIR	T		SPEED	DIR	T		SPEED	DIR	T		SPEED	DIR	T		SPEED	DIR	T		SPEED	DIR	T	
(M)	(CH/S)	(DEG)	(C)		(CH/S)	(DEG)	(C)		(CH/S)	(DEG)	(C)		(CH/S)	(DEG)	(C)		(CH/S)	(DEG)	(C)		(CH/S)	(DEG)	(C)		(CH/S)	(DEG)	(C)	
30	I 25	33	23.6	I	367	95	22.5	I	460	104	21.2	I	420	130	****	I	508	149	14.2	I	574	161	****	I	635	205	****	I
50	I 50	52	23.5	I	432	89	22.8	I	527	100	22.1	I	534	126	****	I	556	139	18.8	I	565	153	****	I	651	197	****	I
75	I 52	65	23.3	I	472	89	22.8	I	536	97	22.3	I	574	124	****	I	517	141	19.0	I	555	155	****	I	666	185	****	I
100	I 70	82	23.0	I	506	90	22.8	I	546	97	22.2	I	596	122	****	I	476	143	19.3	I	501	157	****	I	650	178	****	I
150	I 67	65	22.6	I	516	90	22.3	I	514	96	21.9	I	551	119	****	I	423	149	19.7	I	472	166	****	I	573	174	****	I
200	I 49	35	22.1	I	517	92	21.8	I	474	96	21.5	I	492	120	****	I	389	154	19.4	I	455	176	****	I	544	181	****	I
250	I 55	30	21.6	I	513	95	21.4	I	426	101	21.1	I	439	119	****	I	386	166	19.0	I	434	187	****	I	589	194	****	I
300	I 63	11	19.6	I	488	96	21.0	I	359	111	20.7	I	334	121	****	I	332	181	18.6	I	393	199	****	I	531	204	****	I
350	I 49	4	20.7	I	449	100	20.6	I	305	122	20.4	I	347	131	****	I	336	195	18.3	I	333	211	****	I	551	211	****	I
400	I 72	327	20.3	I	413	100	20.1	I	230	134	20.0	I	302	140	****	I	304	210	18.0	I	290	229	****	I	521	219	****	I
450	I 115	301	19.8	I	380	103	19.6	I	251	140	19.6	I	296	155	****	I	260	223	17.6	I	311	236	****	I	539	231	****	I
500	I 122	300	19.2	I	346	101	19.2	I	225	148	19.2	I	283	172	****	I	257	229	17.2	I	323	241	****	I	561	239	****	I
550	I 138	301	18.8	I	239	105	18.9	I	223	163	18.7	I	251	183	****	I	228	242	16.8	I	326	245	****	I	498	240	****	I
600	I 160	304	18.1	I	160	115	18.5	I	203	175	18.3	I	239	193	****	I	279	251	16.3	I	334	246	****	I	476	240	****	I
650	I 147	311	17.8	I	88	107	18.0	I	187	190	17.9	I	227	210	****	I	293	247	15.8	I	354	245	****	I	406	243	****	I
700	I 137	315	17.2	I	31	120	17.6	I	182	203	17.5	I	213	221	****	I	289	247	15.3	I	336	252	****	I	387	245	****	I
750	I 137	315	16.9	I	48	235	17.3	I	195	227	17.1	I	187	231	****	I	296	245	14.9	I	293	261	****	I	332	253	****	I
800	I 142	316	16.4	I	60	318	16.7	I	196	232	16.6	I	181	235	****	I	282	246	14.4	I	237	268	****	I	358	255	****	I
850	I 136	328	15.9	I	72	326	16.3	I	217	235	16.2	I	207	244	****	I	262	252	13.9	I	210	279	****	I	341	260	****	I
900	I 138	326	15.3	I	90	316	15.9	I	222	246	15.7	I	235	253	****	I	269	249	13.4	I	212	288	****	I	297	277	****	I
950	I 143	323	14.8	I	89	325	15.4	I	228	253	15.2	I	215	261	****	I	276	256	13.0	I	203	295	****	I	318	273	****	I
1000	I 159	322	14.3	I	84	327	15.0	I	219	260	14.8	I	223	266	****	I	231	266	12.5	I	184	303	****	I	263	283	****	I
1050	I 165	320	13.9	I	80	332	14.5	I	220	260	14.3	I	****	****	****	I	214	273	12.1	I	207	314	****	I	272	280	****	I
1100	I 167	318	13.4	I	89	322	14.0	I	****	****	****	I	****	****	****	I	197	300	11.7	I	234	322	****	I	243	287	****	I
1150	I 165	321	12.9	I	104	319	13.5	I	****	****	****	I	****	****	****	I	209	311	11.2	I	264	329	****	I	227	305	****	I
1200	I 151	331	12.4	I	125	325	13.0	I	****	****	****	I	****	****	****	I	225	318	10.8	I	295	333	****	I	233	311	****	I
1250	I 139	333	11.9	I	154	322	12.5	I	****	****	****	I	****	****	****	I	263	331	10.4	I	332	336	****	I	262	327	****	I
1300	I 165	335	11.4	I	193	309	12.0	I	****	****	****	I	****	****	****	I	307	339	9.9	I	378	338	****	I	325	333	****	I
1350	I 129	352	10.9	I	229	309	11.4	I	****	****	****	I	****	****	****	I	352	343	9.5	I	425	338	****	I	415	345	****	I
1400	I 150	350	10.5	I	271	309	11.1	I	****	****	****	I	****	****	****	I	411	342	9.0	I	502	339	****	I	466	341	****	I
1450	I 184	351	10.0	I	301	311	10.7	I	****	****	****	I	****	****	****	I	482	344	8.6	I	584	337	****	I	555	347	****	I
1500	I 223	351	9.6	I	325	317	10.3	I	****	****	****	I	****	****	****	I	520	341	8.2	I	655	336	****	I	638	349	****	I
1550	I 210	8	9.1	I	343	317	9.8	I	****	****	****	I	****	****	****	I	577	343	7.7	I	725	335	****	I	779	355	****	I
1600	I 219	4	8.6	I	357	316	9.4	I	****	****	****	I	****	****	****	I	636	340	7.2	I	797	335	****	I	776	356	****	I
1650	I 257	358	8.0	I	405	317	9.3	I	****	****	****	I	****	****	****	I	715	337	****	I	851	335	****	I	809	357	****	I
1700	I 276	354	7.6	I	460	320	8.4	I	****	****	****	I	****	****	****	I	818	333	****	I	925	336	****	I	****	****	****	I
1750	I 320	346	7.3	I	488	324	8.0	I	****	****	****	I	****	****	****	I	****	****	****	I	1002	339	****	I	****	****	****	I
1800	I 355	336	7.1	I	523	327	7.4	I	****	****	****	I	****	****	****	I	****	****	****	I	1044	343	****	I	****	****	****	I
1850	I 409	333	6.7	I	****	****	****	I	****	****	****	I	****	****	****	I	****	****	****	I	1046	347	****	I	****	****	****	I
1900	I 452	330	6.3	I	****	****	****	I	****	****	****	I	****	****	****	I	****	****	****	I	1050	350	****	I	****	****	****	I
1950	I 466	329	6.0	I	****	****	****	I	****	****	****	I	****	****	****	I	****	****	****	I	1042	347	****	I	****	****	****	I
2000	I 513	328	5.6	I	****	****	****	I	****	****	****	I	****	****	****	I	****	****	****	I	994	347	****	I	****	****	****	I
SURF.	I			I				I				I				I				I				I				I
GEOS.	I 390	229		I	99	252		I	118	215		I	169	241		I	167	267		I	769	246		I	285	232		I
TEMP.	I			I				I				I				I				I				I				I
CORR.	I		-1.6	I			-2.8	I			1.7	I			****	I			-2.3	I			****	I			****	I

JLN DAY 200 1804 CST				JLN DAY 200 1909 CST				JLN DAY 200 2106 CST				JLN DAY 200 2210 CST				JLN DAY 200 2302 CST				JLN DAY 200 2357 CST			
HIND				HIND				HIND				HIND				HIND				HIND			
Z	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T		
(M)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)		
30	I 385	130	27.3	I 455	118	26.0	I 678	134	****	I 844	151	18.3	I 626	160	****	I 619	158	18.3	I				
50	I 404	132	27.4	I 433	122	26.5	I 887	134	****	I 995	153	20.5	I 928	160	****	I 828	160	19.3	I				
75	I 423	135	27.2	I 490	122	26.5	I 1001	133	****	I 1182	156	22.0	I 1176	160	****	I 1390	161	20.7	I				
100	I 430	134	26.9	I 492	125	26.3	I 995	137	****	I 1339	158	22.6	I 1276	156	****	I 1292	161	21.5	I				
150	I 427	134	26.4	I 518	131	25.9	I 1094	133	****	I 1471	157	22.6	I 1490	157	****	I 1479	159	22.4	I				
200	I 476	138	25.9	I 560	133	25.4	I 1195	143	****	I 1450	157	22.8	I 1450	153	****	I 1501	161	22.9	I				
250	I 488	140	25.4	I 566	135	25.0	I 1176	146	****	I 1382	156	22.6	I 1406	160	****	I 1388	164	22.8	I				
300	I 485	140	24.9	I 536	137	24.5	I 1059	143	****	I 1355	157	22.4	I 1292	161	****	I 1402	170	22.3	I				
350	I 489	142	24.4	I 566	140	24.0	I 937	150	****	I 1255	160	22.0	I 1210	165	****	I 1408	175	22.0	I				
400	I 480	144	23.9	I 556	143	23.6	I 864	153	****	I 1176	163	21.6	I 1334	169	****	I 1356	178	21.8	I				
450	I 489	147	23.4	I 550	144	23.1	I 848	157	****	I 1212	166	21.3	I 1300	173	****	I 1259	181	21.4	I				
500	I 492	148	22.9	I 562	145	22.6	I 794	162	****	I 1130	171	21.3	I 1219	178	****	I 1166	182	20.9	I				
550	I 497	147	22.4	I 503	147	22.1	I 691	167	****	I 1068	173	21.0	I 1130	180	****	I 1036	185	20.6	I				
600	I 457	149	21.9	I 526	152	21.6	I 722	168	****	I 1040	174	20.4	I 1005	183	****	I 995	191	20.2	I				
650	I 415	153	21.4	I 545	154	21.1	I 753	171	****	I 1004	176	20.0	I 991	183	****	I 904	194	20.0	I				
700	I 460	157	20.9	I 605	155	20.5	I 723	175	****	I 894	176	19.6	I 963	182	****	I 933	194	19.6	I				
750	I 472	158	20.3	I 629	158	20.1	I 692	177	****	I 953	175	19.1	I 878	184	****	I 875	196	19.2	I				
800	I 505	158	19.8	I 575	161	19.6	I 669	179	****	I 874	179	18.6	I 866	184	****	I 812	197	18.9	I				
850	I 497	162	19.4	I 619	163	19.1	I 688	180	****	I 745	181	18.1	I 673	187	****	I 709	201	18.4	I				
900	I 455	161	18.9	I 533	167	18.6	I 690	183	****	I 848	182	17.8	I 697	186	****	I 672	201	18.0	I				
950	I 573	168	18.4	I 611	166	18.1	I 666	185	****	I 745	189	17.5	I 806	185	****	I 719	199	17.4	I				
1000	I 589	173	17.9	I 524	172	17.6	I 647	187	****	I 794	183	17.0	I 647	190	****	I 671	200	16.9	I				
1050	I 521	177	17.5	I 514	177	17.1	I 699	187	****	I 872	182	16.5	I 667	191	****	I 614	202	16.5	I				
1100	I 529	180	16.9	I 534	182	16.6	I 725	183	****	I 714	183	16.1	I 629	192	****	I 604	201	16.1	I				
1150	I 516	185	16.5	I 550	184	16.0	I 587	193	****	I 714	190	15.5	I 415	206	****	I 527	203	15.6	I				
1200	I 447	194	16.0	I 537	193	15.6	I 674	198	****	I 737	139	15.2	I 617	199	****	I 559	205	15.1	I				
1250	I 520	191	15.5	I 563	200	15.1	I 656	201	****	I 562	191	14.5	I 448	220	****	I 424	218	14.8	I				
1300	I 543	191	15.0	I 630	201	14.6	I 703	205	****	I 748	186	14.2	I 500	228	****	I 516	222	14.4	I				
1350	I 540	195	14.5	I 618	206	14.1	I 684	210	****	I 531	194	13.7	I 649	226	****	I 489	238	14.3	I				
1400	I 607	196	13.9	I 619	207	13.6	I 598	216	****	I 551	213	13.2	I 577	249	****	I 517	252	14.4	I				
1450	I 596	199	13.6	I 609	210	13.1	I 722	207	****	I 455	218	12.8	I 562	248	****	I 522	260	14.0	I				
1500	I 587	203	13.1	I ****	****	****	I 676	211	****	I 357	222	15.6	I 500	275	****	I 564	287	13.7	I				
1550	I 599	204	12.6	I ****	****	****	I 751	207	****	I 323	240	15.7	I 524	239	****	I 755	297	13.8	I				
1600	I 545	209	12.0	I ****	****	****	I 704	209	****	I 293	265	15.3	I 343	266	****	I ****	****	****	I				
1650	I 537	210	11.6	I ****	****	****	I 674	211	****	I 310	282	15.0	I 346	256	****	I 702	290	13.8	I				
1700	I 608	206	11.1	I ****	****	****	I 533	217	****	I 451	241	14.7	I 378	312	****	I 716	278	13.6	I				
1750	I 602	208	10.6	I ****	****	****	I 277	239	****	I 385	265	14.5	I 466	301	****	I 608	279	13.1	I				
1800	I 565	214	10.1	I ****	****	****	I 325	235	****	I 330	293	14.1	I 665	336	****	I ****	****	****	I				
1850	I 462	219	9.6	I ****	****	****	I 287	246	****	I 333	272	13.6	I 308	303	****	I ****	****	****	I				
1900	I 492	207	9.9	I ****	****	****	I 402	302	****	I 266	275	13.1	I 383	321	****	I ****	****	****	I				
1950	I 372	204	9.7	I ****	****	****	I 333	260	****	I ****	****	****	I 321	313	****	I ****	****	****	I				
2000	I 339	185	9.9	I ****	****	****	I 377	240	****	I ****	****	****	I 318	322	****	I ****	****	****	I				
SURF.	I			I			I		I				I		I				I				
GEOS.	I 648	185		I 651	188		I 695	196	I	685	196		I 734	198	I	804	197		I				
TEIP.	I			I			I		I				I		I				I				
CORR.	I		-0.6	I		-0.1	I		I	****			I		-1.2	I	****		I		****		

JLN DAY 201 1753 CST				JLN DAY 201 1859 CST				JLN DAY 201 2000 CST				JLN DAY 201 2114 CST				JLN DAY 201 2206 CST				JLN DAY 201 2258 CST				JLN DAY 201 2354 CST			
WIND				WIND				WIND				WIND				WIND				WIND				WIND			
Z	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T
(H)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)
30	I 649	179	28.6	I 621	170	26.1	I 800	179	25.8	I 639	184	****	I 736	184	****	I 750	185	24.6	I 853	190	22.9	I 853	190	22.9	I 853	190	22.9
50	I 683	179	28.8	I 740	176	27.1	I 913	131	26.5	I 787	185	****	I 906	186	****	I 883	188	24.7	I 965	192	23.4	I 965	192	23.4	I 965	192	23.4
75	I 737	181	23.9	I 897	181	28.1	I 1025	181	26.5	I 974	186	****	I 1120	137	****	I 1108	137	24.8	I 1107	194	24.0	I 1107	194	24.0	I 1107	194	24.0
100	I 755	179	28.9	I 938	184	28.3	I 1198	182	26.9	I 1101	187	****	I 1254	189	****	I 1261	188	25.0	I 1239	196	24.3	I 1239	196	24.3	I 1239	196	24.3
150	I 802	180	28.6	I 1013	185	28.0	I 1336	184	27.3	I 1437	189	****	I 1530	190	****	I 1511	192	25.6	I 1445	199	24.5	I 1445	199	24.5	I 1445	199	24.5
200	I 840	181	28.1	I 1007	184	27.6	I 1354	185	26.9	I 1556	190	****	I 1709	193	****	I 1691	196	25.8	I 1645	204	24.8	I 1645	204	24.8	I 1645	204	24.8
250	I 873	181	27.6	I 957	184	27.1	I 1351	136	26.6	I 1619	191	****	I 1692	195	****	I 1752	200	25.9	I 1727	209	25.4	I 1727	209	25.4	I 1727	209	25.4
300	I 870	182	27.1	I 974	183	26.7	I 1258	188	26.1	I 1579	192	****	I 1668	197	****	I 1747	203	25.6	I 1746	212	25.3	I 1746	212	25.3	I 1746	212	25.3
350	I 828	182	26.6	I 947	181	26.2	I 1271	189	25.7	I 1523	194	****	I 1594	198	****	I 1702	204	25.3	I 1706	214	25.0	I 1706	214	25.0	I 1706	214	25.0
400	I 841	184	26.1	I 953	180	25.8	I 1200	190	25.3	I 1448	194	****	I 1510	198	****	I 1665	206	24.9	I 1597	216	24.8	I 1597	216	24.8	I 1597	216	24.8
450	I 826	185	25.6	I 931	179	25.3	I 1100	189	25.0	I 1370	194	****	I 1476	200	****	I 1644	207	24.5	I 1615	217	24.6	I 1615	217	24.6	I 1615	217	24.6
500	I 832	185	25.1	I 1015	179	24.8	I 1055	188	24.6	I 1342	194	****	I 1532	203	****	I 1536	211	24.3	I 1514	221	24.3	I 1514	221	24.3	I 1514	221	24.3
550	I 817	185	24.6	I 846	179	24.4	I 990	187	24.3	I 1327	194	****	I 1444	206	****	I 1497	215	24.3	I 1477	223	24.1	I 1477	223	24.1	I 1477	223	24.1
600	I 822	187	24.1	I 830	179	23.9	I 837	187	23.8	I 1319	195	****	I 1478	209	****	I 1497	216	24.0	I 1418	225	23.9	I 1418	225	23.9	I 1418	225	23.9
650	I 881	188	23.6	I 739	180	23.3	I 932	189	23.3	I 1286	197	****	I 1404	211	****	I 1376	218	23.6	I 1316	227	23.6	I 1316	227	23.6	I 1316	227	23.6
700	I 897	191	23.2	I 843	184	22.7	I 1045	192	22.8	I 1228	200	****	I 1335	212	****	I 1351	220	23.3	I 1456	223	23.3	I 1456	223	23.3	I 1456	223	23.3
750	I 794	194	22.7	I 831	187	22.3	I 819	198	22.5	I 1184	204	****	I 1298	212	****	I 1345	220	23.0	I 1230	225	23.0	I 1230	225	23.0	I 1230	225	23.0
800	I 800	196	22.2	I 810	192	21.8	I 811	200	22.0	I 1024	208	****	I 1150	214	****	I 1328	220	22.8	I 1191	225	23.1	I 1191	225	23.1	I 1191	225	23.1
850	I 783	197	21.7	I 789	193	21.4	I 767	201	21.7	I 979	209	****	I 1153	215	****	I 1244	221	22.4	I 1157	226	22.5	I 1157	226	22.5	I 1157	226	22.5
900	I 833	199	21.2	I 627	194	21.0	I 718	205	21.4	I 913	211	****	I 1022	218	****	I 1345	220	22.0	I 1052	229	22.3	I 1052	229	22.3	I 1052	229	22.3
950	I 789	202	20.6	I 724	194	20.7	I 645	208	21.0	I 873	215	****	I 1133	218	****	I 1220	221	21.6	I 1042	231	21.8	I 1042	231	21.8	I 1042	231	21.8
1000	I 837	203	20.2	I 578	197	20.4	I 694	209	20.6	I 915	220	****	I 972	224	****	I 1104	225	21.2	I 1002	236	21.4	I 1002	236	21.4	I 1002	236	21.4
1050	I 745	207	19.7	I 478	199	20.2	I 657	216	20.1	I 942	222	****	I 890	228	****	I 681	240	21.0	I 1111	236	21.1	I 1111	236	21.1	I 1111	236	21.1
1100	I 697	209	19.2	I 433	204	20.0	I 616	219	19.6	I 938	223	****	I 911	230	****	I 1123	223	21.0	I 1078	240	20.5	I 1078	240	20.5	I 1078	240	20.5
1150	I 674	211	18.8	I 411	220	19.6	I 655	222	19.2	I 870	228	****	I 977	229	****	I 845	241	20.7	I 913	248	20.5	I 913	248	20.5	I 913	248	20.5
1200	I 566	217	18.5	I 473	224	19.1	I 593	233	18.8	I 789	233	****	I 836	236	****	I 1015	239	20.4	I 962	243	20.0	I 962	243	20.0	I 962	243	20.0
1250	I 581	219	18.3	I 530	229	18.6	I 706	233	18.4	I 746	236	****	I 765	250	****	I 852	250	19.9	I 1029	247	19.6	I 1029	247	19.6	I 1029	247	19.6
1300	I 513	219	18.3	I 618	229	18.1	I 607	251	18.1	I 817	234	****	I 719	248	****	I 811	259	19.5	I 897	249	19.3	I 897	249	19.3	I 897	249	19.3
1350	I 329	259	18.2	I 571	243	17.7	I 644	254	17.7	I 759	239	****	I 606	259	****	I 667	266	19.0	I 759	254	18.8	I 759	254	18.8	I 759	254	18.8
1400	I 397	235	17.9	I 580	252	17.2	I 736	245	17.4	I 660	248	****	I 537	266	****	I 903	246	18.7	I 810	247	18.6	I 810	247	18.6	I 810	247	18.6
1450	I 337	245	17.6	I 614	253	16.7	I 613	267	17.3	I 654	246	****	I 575	247	****	I 630	252	18.5	I 526	267	18.2	I 526	267	18.2	I 526	267	18.2
1500	I 389	248	17.1	I 648	254	16.3	I 620	267	16.7	I 605	248	****	I 551	249	****	I 551	249	18.0	I 553	267	18.0	I 553	267	18.0	I 553	267	18.0
1550	I 391	249	16.6	I 653	257	15.8	I 679	257	15.4	I 528	254	****	I 560	245	****	I 560	245	17.9	I 734	248	17.7	I 734	248	17.7	I 734	248	17.7
1600	I 420	251	16.1	I 582	270	15.7	I 593	231	15.4	I 374	236	****	I 406	278	****	I 406	278	17.6	I 678	247	17.4	I 678	247	17.4	I 678	247	17.4
1650	I 413	265	15.5	I 513	280	15.3	I 611	297	14.6	I 334	238	****	I 636	236	****	I 290	277	17.2	I 433	262	16.8	I 433	262	16.8	I 433	262	16.8
1700	I 433	252	15.1	I 473	275	15.0	I 711	264	14.0	I 308	272	****	I 426	293	****	I 411	239	16.7	I 645	249	16.3	I 645	249	16.3	I 645	249	16.3
1750	I 480	246	14.4	I 422	278	14.6	I 574	285	13.6	I 261	266	****	I 454	265	****	I 520	239	16.2	I 477	273	15.9	I 477	273	15.9	I 477	273	15.9
1800	I 400	264	14.1	I 383	277	14.1	I 507	285	13.6	I 205	275	****	I 402	269	****	I 342	230	15.8	I 577	245	15.4	I 577	245	15.4	I 577	245	15.4
1850	I 453	250	13.5	I ****	****	****	I ****	485	291	I 193	290	****	I 448	263	****	I ****	****	****	I ****	****	****	I ****	****	****	I ****	****	****
1900	I 403	255	13.2	I ****	****	****	I ****	358	289	I 210	293	****	I ****	****	****	I ****	****	****	I ****	****	****	I ****	****	****	I ****	****	****
1950	I 314	273	13.0	I ****	****	****	I ****	327	283	I 191	295	****	I ****	****	****	I ****	****	****	I ****	****	****	I ****	****	****	I ****	****	****
2000	I 298	260	12.6	I ****	****	****	I ****	293	252	I 116	273	****	I ****	****	****	I ****	****	****	I ****	****	****	I ****	****	****	I ****	****	****
SURF.	I			I			I			I		I			I			I			I			I			I
GEOS.	I	1096	211	I	1135	214	I	1217	217	I	1199	220	I	1215	224	I	1208	228	I	1470	229	I			I		
TEMP.	I			I			I			I		I			I			I			I			I			I
CORR.	I		1.0	I		0.3	I		0.4	I		****	I		****	I		2.1	I		1.0	I			I		

JLN DAY 202 1916 CST				JLN DAY 202 2003 CST				JLN DAY 202 2205 CST				JLN DAY 202 2321 CST				JLN DAY 203 0001 CST			
WIND				WIND				WIND				WIND				WIND			
Z (H)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	
30	664	192	28.8	693	185	27.4	632	200	26.2	****	***	****	821	7	25.3				
50	753	187	29.3	787	185	27.8	789	200	27.1	****	***	****	863	8	25.2				
75	860	185	29.3	907	183	27.8	990	202	27.3	****	***	****	927	8	25.1				
100	902	187	29.4	1073	191	28.0	1045	204	27.6	****	***	****	959	11	24.9				
150	1077	191	29.0	1122	192	27.7	1156	210	27.7	****	***	****	1055	12	24.6				
200	1130	194	28.7	1260	195	27.3	1248	219	27.7	812	273	****	1104	12	24.2				
250	1106	195	28.2	1380	197	27.2	1371	224	27.9	980	276	****	1168	11	24.1				
300	1159	196	27.7	1484	199	26.7	1487	227	27.6	921	274	****	1172	13	23.9				
350	1127	197	27.3	1536	204	26.5	1533	228	27.3	1035	278	****	1076	18	23.7				
400	1212	199	26.8	1383	209	26.5	1563	230	26.9	1100	276	****	903	23	23.6				
450	1155	202	26.3	1209	212	26.3	1734	232	26.5	1105	272	****	749	26	23.3				
500	1031	204	26.0	1146	214	26.1	1666	235	26.1	1051	269	****	575	24	23.0				
550	1069	205	25.6	1035	215	25.6	1742	239	25.9	1171	273	****	386	18	22.8				
600	798	211	25.2	969	222	25.5	1469	243	25.8	1050	272	****	334	348	22.5				
650	941	217	24.9	836	227	25.1	1345	245	25.4	1132	275	****	385	318	22.9				
700	842	223	24.5	993	229	24.7	1379	246	25.1	974	280	****	444	299	22.5				
750	875	232	24.3	805	239	24.3	1231	250	24.7	****	****	****	574	296	22.2				
800	1015	231	23.9	950	233	23.9	976	253	24.5	****	****	****	652	285	22.1				
850	956	234	23.4	1097	236	23.4	874	269	23.9	****	****	****	690	279	21.7				
900	1001	234	22.9	1035	239	23.0	867	270	23.3	****	****	****	775	277	21.4				
950	****	?	****	919	242	22.5	985	272	22.8	****	****	****	850	277	21.4				
1000	****	?	****	956	240	22.0	1015	274	22.4	****	****	****	895	284	21.3				
1050	****	?	****	996	242	21.5	962	281	22.0	****	****	****	854	284	21.0				
1100	****	?	****	700	260	20.9	1146	276	21.7	****	****	****	826	279	20.6				
1150	****	?	****	1179	242	20.4	1022	286	21.5	****	****	****	899	287	20.2				
1200	****	?	****	916	252	19.9	1010	293	21.0	****	****	****	827	281	19.7				
1250	****	?	****	844	256	19.3	1080	293	20.4	****	****	****	917	286	19.3				
1300	****	?	****	862	256	18.8	1270	280	19.9	****	****	****	965	287	18.9				
1350	****	?	****	823	257	18.3	1133	285	19.4	****	****	****	872	272	18.5				
1400	****	?	****	986	252	17.8	1221	281	18.9	****	****	****	1134	277	18.1				
1450	****	?	****	836	259	17.3	1071	288	18.3	****	****	****	1156	283	17.8				
1500	****	?	****	820	262	16.9	1143	284	17.9	****	****	****	1043	279	17.4				
1550	****	?	****	840	264	16.5	****	****	****	****	****	****	1232	289	17.0				
1600	****	?	****	1039	256	16.3	****	****	****	****	****	****	973	279	16.6				
1650	****	?	****	1173	251	15.6	****	****	****	****	****	****	893	278	16.0				
1700	****	?	****	1034	257	15.3	****	****	****	****	****	****	992	284	15.6				
1750	****	?	****	977	299	14.6	****	****	****	****	****	****	1018	285	15.1				
1800	****	?	****	1164	259	14.0	****	****	****	****	****	****	984	282	14.8				
1850	****	?	****	977	263	14.5	****	****	****	****	****	****	937	275	14.5				
1900	****	?	****	1034	267	14.0	****	****	****	****	****	****	963	269	14.0				
1950	****	?	****	1110	302	****	****	****	****	****	****	****	1032	274	13.6				
2000	****	?	****	1155	272	****	****	****	****	****	****	****	1055	274	13.2				
SURF.																			
GEOS.	723	245		574	241		478	272		613	268		561	256					
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	JLN DAY 204 1804 CST				JLN DAY 204 1905 CST				JLN DAY 204 2011 CST				JLN DAY 204 2119 CST				JLN DAY 204 2209 CST				JLN DAY 204 2300 CST				JLN DAY 205 0004 CST			
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JLN DAY 205 1805 CST				JLN DAY 205 1858 CST				JLN DAY 205 2004 CST				JLN DAY 205 2113 CST				JLN DAY 205 2205 CST				JLN DAY 205 2313 CST				JLN DAY 206 0014 CST			
WIND				WIND				WIND				WIND				WIND				WIND				WIND			
Z	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T
(H)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)	(CH/S)	(DEG)	(C)
30	402	230	32.2	467	236	32.7	678	231	29.5	676	230	****	682	228	26.8	562	251	27.6	564	270	27.1	564	270	27.1	564	270	27.1
50	460	232	32.9	555	237	33.2	745	234	30.7	844	233	****	782	236	28.7	707	258	29.3	662	282	28.7	662	282	28.7	662	282	28.7
75	535	233	33.2	662	237	33.4	829	236	32.2	972	238	****	926	244	29.6	793	271	30.1	859	291	30.0	859	291	30.0	859	291	30.0
100	561	233	33.2	695	238	33.3	862	238	32.3	968	243	****	997	253	30.2	897	278	30.7	979	297	30.6	979	297	30.6	979	297	30.6
150	596	239	32.8	710	239	32.9	890	240	32.1	952	247	****	992	266	31.3	1037	289	31.5	1169	293	31.3	1169	293	31.3	1169	293	31.3
200	618	244	32.5	733	241	32.5	890	243	31.7	956	253	****	1049	272	31.4	1176	292	31.7	1315	298	31.5	1315	298	31.5	1315	298	31.5
250	674	248	32.1	731	243	32.1	842	247	31.1	963	259	****	1034	274	31.1	1281	294	31.4	1332	298	31.7	1332	298	31.7	1332	298	31.7
300	728	251	31.5	733	246	31.7	885	252	30.7	951	264	****	1120	276	30.7	1371	295	31.0	1302	298	31.3	1302	298	31.3	1302	298	31.3
350	753	251	30.9	717	248	31.2	909	253	30.4	972	266	****	1123	277	30.4	1362	294	30.6	1242	298	30.9	1242	298	30.9	1242	298	30.9
400	762	252	30.5	700	252	30.8	990	259	30.1	999	268	****	1136	280	30.4	1226	296	30.3	1236	298	30.6	1236	298	30.6	1236	298	30.6
450	731	252	30.1	712	258	30.4	940	262	29.7	918	269	****	1128	280	30.4	1264	294	29.9	1195	300	30.1	1195	300	30.1	1195	300	30.1
500	735	250	29.5	705	260	30.0	906	264	29.0	934	272	****	1092	281	30.4	1124	296	29.5	1205	301	29.6	1205	301	29.6	1205	301	29.6
550	709	250	29.1	705	261	29.5	917	266	28.5	962	274	****	1095	282	30.4	1204	295	29.2	1249	302	29.1	1249	302	29.1	1249	302	29.1
600	737	252	28.6	716	264	29.0	864	269	28.3	978	275	****	1724	276	30.4	1048	297	28.8	1297	302	28.6	1297	302	28.6	1297	302	28.6
650	732	253	28.1	754	264	28.5	835	271	27.9	943	276	****	992	296	30.4	1046	298	28.4	1206	303	28.2	1206	303	28.2	1206	303	28.2
700	754	253	27.6	711	267	28.0	875	272	27.4	955	276	****	1026	283	30.4	1080	298	27.9	1175	302	27.7	1175	302	27.7	1175	302	27.7
750	740	254	27.0	736	268	27.6	830	276	27.1	903	278	****	1043	283	30.4	947	301	27.5	1109	302	27.1	1109	302	27.1	1109	302	27.1
800	740	255	26.6	770	271	27.2	931	276	26.6	857	279	****	1043	284	30.4	965	300	27.0	1176	302	26.7	1176	302	26.7	1176	302	26.7
850	717	261	26.1	688	276	26.7	886	282	26.0	892	279	****	1052	283	30.4	1276	295	26.6	1000	306	26.2	1000	306	26.2	1000	306	26.2
900	737	266	25.6	759	275	26.3	912	283	25.6	****	****	****	953	283	30.4	707	301	26.1	916	307	25.7	916	307	25.7	916	307	25.7
950	716	269	25.1	704	282	25.8	1071	280	24.5	****	****	****	902	282	30.4	580	299	25.3	895	302	25.3	895	302	25.3	895	302	25.3
1000	697	270	24.6	738	284	25.3	910	286	24.5	****	****	****	936	281	30.4	878	293	24.8	808	300	24.8	808	300	24.8	808	300	24.8
1050	739	269	24.1	753	286	24.9	836	290	23.9	****	****	****	839	282	30.4	697	294	24.3	761	303	24.2	761	303	24.2	761	303	24.2
1100	705	270	23.6	803	288	24.4	1026	285	23.5	****	****	****	908	280	30.4	919	290	23.7	953	302	23.8	953	302	23.8	953	302	23.8
1150	681	275	23.1	859	291	24.0	770	297	23.0	****	****	****	903	279	30.4	634	298	23.1	737	305	23.3	737	305	23.3	737	305	23.3
1200	744	277	22.6	922	291	23.6	849	295	22.2	****	****	****	875	280	30.4	953	290	22.6	800	315	22.8	800	315	22.8	800	315	22.8
1250	747	279	22.2	896	293	23.0	930	291	21.8	****	****	****	826	281	30.4	856	290	22.2	737	298	22.3	737	298	22.3	737	298	22.3
1300	760	280	21.7	967	292	22.6	821	298	21.3	****	****	****	834	281	30.4	691	295	21.7	910	298	21.8	910	298	21.8	910	298	21.8
1350	664	286	21.2	928	295	22.1	843	297	20.6	****	****	****	960	279	30.4	793	295	21.2	915	300	21.4	915	300	21.4	915	300	21.4
1400	749	284	20.7	994	294	21.6	924	297	20.1	****	****	****	736	232	30.4	****	****	****	****	****	****	****	****	****	****	****	****
1450	742	286	20.2	946	299	21.1	1065	294	19.6	****	****	****	805	232	30.4	****	****	****	****	****	****	****	****	****	****	****	****
1500	865	285	19.9	995	299	20.6	1130	292	19.2	****	****	****	852	232	30.4	****	****	****	****	****	****	****	****	****	****	****	****
1550	737	294	19.3	1105	297	20.1	1159	292	18.7	****	****	****	634	287	30.4	****	****	****	****	****	****	****	****	****	****	****	****
1600	760	296	18.8	931	307	19.7	718	310	18.1	****	****	****	822	285	30.4	****	****	****	****	****	****	****	****	****	****	****	****
1650	923	292	18.3	892	309	19.1	948	298	17.7	****	****	****	841	286	30.4	****	****	****	****	****	****	****	****	****	****	****	****
1700	835	303	17.8	910	309	18.6	1031	293	17.2	****	****	****	731	289	30.4	****	****	****	****	****	****	****	****	****	****	****	****
1750	995	299	17.4	961	308	18.0	817	311	16.7	****	****	****	657	292	30.4	****	****	****	****	****	****	****	****	****	****	****	****
1800	947	301	16.9	1092	306	17.6	837	316	16.0	****	****	****	820	289	30.4	****	****	****	****	****	****	****	****	****	****	****	****
1850	963	303	16.5	****	****	****	930	309	15.3	****	****	****	710	302	30.4	****	****	****	****	****	****	****	****	****	****	****	****
1900	1022	301	15.9	****	****	****	850	315	15.1	****	****	****	707	295	30.4	****	****	****	****	****	****	****	****	****	****	****	****
1950	998	303	15.5	****	****	****	****	****	****	****	****	****	629	296	30.4	****	****	****	****	****	****	****	****	****	****	****	****
2000	854	309	14.8	****	****	****	****	****	****	****	****	****	602	301	30.4	****	****	****	****	****	****	****	****	****	****	****	****
SURF.																											
GEOS.	463	282		472	290		514	286		672	287		652	288		600	285		396	301							
TEMP.																											
CORR.			-0.4			0.3			-0.8			****			-1.6			-1.0			0.2						

	JLN DAY 207 1828 CST			JLN DAY 207 1906 CST			JLN DAY 207 2003 CST			JLN DAY 207 2108 CST			JLN DAY 207 2156 CST			JLN DAY 207 2257 CST			JLN DAY 208 0005 CST		
	WIND			WIND			WIND			WIND			WIND			WIND			WIND		
Z	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T	SPEED	DIR	T
(H)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)	(CM/S)	(DEG)	(C)
30	414	74	28.1	450	75	27.7	723	91	****	575	116	****	568	154	23.2	768	156	****	866	162	****
50	478	74	28.2	533	76	28.1	803	93	****	756	122	****	725	153	24.7	968	158	****	998	161	****
75	559	74	27.9	659	75	28.0	907	96	****	798	128	****	921	153	25.8	1108	159	****	1162	160	****
100	626	74	28.0	721	76	28.1	926	98	****	806	130	****	1075	152	26.4	1152	159	****	1160	160	****
150	618	75	27.6	707	77	27.8	947	98	****	909	135	****	1157	156	27.0	1125	157	****	1096	162	26.3
200	601	75	27.8	718	78	27.4	934	99	****	1054	140	****	1056	159	26.8	1168	157	****	1039	161	25.9
250	589	78	26.6	740	84	27.0	989	100	****	1123	141	****	1064	161	26.4	1152	157	****	1010	162	25.5
300	584	81	26.7	729	90	26.7	880	102	****	1072	140	****	998	161	26.0	1033	157	****	1033	160	25.2
350	563	88	26.5	685	95	26.2	894	105	****	1012	140	****	996	162	25.5	1011	159	****	941	157	24.8
400	538	94	26.2	658	97	25.8	891	109	****	953	142	****	1137	162	25.1	998	161	****	956	158	24.4
450	510	99	26.0	606	101	25.4	863	112	****	948	142	****	960	162	24.6	975	159	****	917	159	24.0
500	501	102	25.4	594	108	25.1	809	114	****	976	143	****	1077	161	24.2	930	159	****	858	160	23.5
550	502	107	25.0	610	113	24.8	801	116	****	911	143	****	1017	158	23.3	895	160	****	820	162	23.2
600	499	115	24.9	600	115	24.4	707	122	****	801	145	****	967	157	23.4	865	160	****	660	163	22.7
650	525	116	24.2	618	116	23.9	750	123	****	740	145	****	998	156	22.9	821	160	****	658	168	22.4
700	533	118	23.2	540	122	23.5	744	128	****	615	145	****	929	155	22.5	756	158	****	792	170	22.0
750	525	120	23.3	516	125	23.0	773	123	****	759	146	****	894	154	22.0	741	159	****	738	172	21.7
800	518	121	22.7	491	128	22.6	716	132	****	776	147	****	904	153	21.6	421	160	****	615	177	21.3
850	510	127	22.4	555	128	22.2	788	133	****	938	148	****	873	152	21.2	477	166	****	548	180	21.0
900	560	132	21.8	573	132	21.9	835	133	****	982	150	****	897	154	20.7	711	169	****	490	185	20.6
950	555	139	21.9	554	142	21.5	779	136	****	782	154	****	807	153	20.3	468	178	****	455	192	20.3
1000	585	143	21.3	617	144	21.1	735	138	****	714	159	****	678	152	19.9	439	181	****	430	198	19.9
1050	651	141	20.9	663	146	20.7	866	134	****	797	160	****	643	153	19.5	384	185	****	459	202	19.5
1100	588	151	20.5	633	153	20.4	808	139	****	652	163	****	718	156	19.1	279	198	****	449	214	19.1
1150	587	155	20.2	615	160	20.0	742	147	****	670	167	****	533	157	18.7	328	205	****	503	227	18.8
1200	677	151	19.8	640	160	19.6	711	154	****	734	169	****	210	160	18.2	385	208	****	599	238	18.6
1250	638	159	****	662	159	19.2	700	159	****	678	173	****	632	164	17.7	432	237	****	664	245	18.3
1300	593	166	19.2	680	162	18.9	698	162	****	685	175	****	676	168	17.4	575	250	****	673	259	17.9
1350	637	166	18.7	703	166	18.5	709	165	****	588	180	****	389	181	17.1	675	258	****	712	266	17.4
1400	603	176	18.1	714	171	18.2	677	170	****	692	177	****	473	181	16.7	765	266	****	795	268	17.4
1450	603	185	17.7	685	178	17.8	598	189	****	548	189	****	333	213	16.4	802	270	****	871	271	17.5
1500	623	187	17.3	639	184	17.4	633	193	****	554	191	****	391	223	16.1	770	247	****	****	****	****
1550	656	186	17.1	654	182	16.9	652	192	****	543	198	****	416	249	16.1	603	266	****	****	****	****
1600	656	194	16.7	654	189	16.5	630	216	****	487	207	****	446	262	16.4	476	237	****	****	****	****
1650	660	195	16.6	648	199	16.0	629	208	****	487	212	****	351	256	17.5	376	252	****	****	****	****
1700	638	197	16.8	646	203	15.5	657	206	****	427	239	****	284	249	18.9	392	261	****	****	****	****
1750	596	219	****	635	206	15.1	627	222	****	477	233	****	357	232	19.1	364	254	****	****	****	****
1800	****	****	****	601	208	14.8	667	223	****	432	269	****	411	233	18.9	389	250	****	****	****	****
1850	****	****	****	563	229	14.5	686	238	****	282	267	****	428	229	18.8	365	262	****	****	****	****
1900	****	****	****	466	233	14.4	564	257	****	226	294	****	431	226	18.6	299	254	****	****	****	****
1950	****	****	****	327	244	15.6	312	255	****	245	212	****	422	229	18.3	278	239	****	****	****	****
2000	****	****	****	165	264	16.2	207	223	****	193	255	****	430	223	17.9	240	257	****	****	****	****
SURF.																					
GEOS.	552	134		533	138		544	152		516	157		440	165		446	175		490	173	
TEMP.																					
CORR.			0.1			0.6			****			****			-1.5			****			1.3

JLN DAY 208 1815 CST				JLN DAY 208 1902 CST				JLN DAY 208 2002 CST			
Z	SPEED	DIR	T	Z	SPEED	DIR	T	Z	SPEED	DIR	T
(M)	(CM/S)	(DEG)	(C)	(M)	(CM/S)	(DEG)	(C)	(M)	(CM/S)	(DEG)	(C)
30	366	140	31.7	632	340	****	376	50	25.7		
50	360	141	32.0	623	345	****	456	52	26.2		
75	353	142	32.0	616	351	****	489	52	26.4		
100	345	146	31.8	611	356	****	528	56	26.3		
150	305	162	31.7	663	359	****	727	66	26.7		
200	324	172	31.5	603	0	****	790	67	28.0		
250	339	175	31.0	678	4	****	669	68	27.9		
300	365	180	30.6	701	14	****	531	65	28.1		
350	353	183	30.2	698	24	****	393	71	28.6		
400	363	186	29.7	658	36	****	319	76	28.6		
450	355	188	29.3	516	45	****	269	81	28.4		
500	346	194	28.9	288	70	****	214	97	28.3		
550	326	204	28.4	222	114	****	189	126	28.0		
600	337	208	28.0	203	133	****	180	158	28.0		
650	354	210	27.6	155	140	****	203	179	27.8		
700	349	214	27.2	171	168	****	233	189	27.5		
750	317	218	26.8	187	179	****	249	193	27.1		
800	291	230	26.4	148	181	****	267	201	26.8		
850	299	242	26.0	135	191	****	311	207	26.5		
900	321	250	25.5	135	200	****	359	209	26.1		
950	337	263	25.1	123	215	****	346	219	25.7		
1000	387	272	24.7	123	238	****	339	227	25.4		
1050	408	278	24.3	138	249	****	295	227	25.0		
1100	416	283	23.9	134	262	****	313	228	24.6		
1150	437	283	23.5	142	280	****	306	241	24.2		
1200	470	294	23.1	160	293	****	318	254	23.9		
1250	504	293	22.6	181	300	****	338	269	23.6		
1300	557	299	22.2	201	301	****	411	278	23.3		
1350	616	307	21.8	231	292	****	481	290	23.0		
1400	660	311	21.5	280	283	****	****	****	****		
1450	694	314	21.1	353	275	****	****	****	****		
1500	722	316	20.7	425	268	****	****	****	****		
1550	736	315	20.3	503	264	****	****	****	****		
1600	780	314	19.8	597	265	****	****	****	****		
1650	824	313	19.4	602	268	****	****	****	****		
1700	812	314	19.0	562	271	****	****	****	****		
1750	816	308	18.5	542	278	****	****	****	****		
1800	813	305	18.0	608	275	****	****	****	****		
1850	807	305	17.5	628	278	****	****	****	****		
1900	813	304	17.1	****	****	****	****	****	****		
1950	793	306	16.6	****	****	****	****	****	****		
2000	786	306	16.1	****	****	****	****	****	****		
SURF.											
GEOS.	354	165		320	180		292	224			
TEMP.											
CORR.			-0.3			****			-0.6		

	JLN DAY 211 1808 CST			JLN DAY 211 1906 CST			JLN DAY 211 2001 CST			JLN DAY 211 2059 CST			JLN DAY 211 2211 CST			JLN DAY 211 2306 CST			
	WIND			WIND			WIND			WIND			WIND			WIND			
Z (M)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	SPEED (CH/S)	DIR (DEG)	T (C)	
30	I 336	55	27.2	I 513	75	****	I 570	83	25.3	I 392	99	****	I 459	88	21.4	I 353	?	101	20.4
50	I 383	45	27.4	I 541	75	****	I 626	85	25.9	I 546	93	****	I 602	94	21.5	I 516	?	103	21.1
75	I 413	43	27.3	I 576	75	****	I 636	86	25.9	I 689	92	****	I 716	97	21.7	I 673	?	106	21.8
100	I 450	45	27.0	I 556	76	****	I 639	85	25.7	I 729	93	****	I 826	101	21.8	I 754	?	110	22.1
150	I 490	45	26.5	I 552	77	****	I 656	86	25.4	I 717	98	****	I 891	105	21.8	I 437	?	126	22.3
200	I 496	44	26.1	I 533	79	****	I 648	84	24.9	I 667	102	****	I 801	105	22.0	I 663	?	110	22.3
250	I 505	41	25.6	I 496	81	****	I 636	82	24.6	I 599	106	****	I 682	103	21.9	I 691	?	112	22.3
300	I 526	42	25.1	I 451	78	****	I 576	85	24.3	I 529	109	****	I 642	105	21.7	I 619	?	114	22.1
350	I 531	41	24.6	I 437	73	****	I 555	90	23.8	I 466	110	****	I 485	104	21.6	I 470	?	121	21.9
400	I 503	39	24.1	I 422	71	****	I 491	92	23.5	I 396	116	****	I 434	111	21.1	I 423	?	125	21.5
450	I 471	39	23.5	I 408	67	****	I 418	91	23.3	I 359	116	****	I 338	114	22.6	I 337	?	134	21.4
500	I 462	34	23.2	I 379	65	****	I 377	86	22.9	I 314	112	****	I 296	115	22.9	I 278	?	137	21.2
550	I 506	30	22.7	I 365	64	****	I 292	79	22.4	I 253	108	****	I 138	112	22.9	I 189	?	141	21.1
600	I 486	28	22.2	I 366	65	****	I 261	71	22.3	I 223	101	****	I 75	62	22.9	I 109	?	163	21.1
650	I 499	25	21.9	I 326	65	****	I 233	63	22.2	I 226	93	****	I 66	77	23.4	I 59	?	203	20.8
700	I 484	24	21.4	I 246	63	****	I 220	54	22.1	I 222	91	****	I 66	77	23.4	I 42	?	295	20.6
750	I 472	25	20.9	I 201	47	****	I 203	35	21.9	I 195	94	****	I 60	333	23.0	I 101	?	316	20.6
800	I 453	22	20.5	I 143	15	****	I 203	35	21.9	I 170	97	****	I 93	320	22.3	I 130	?	314	20.9
850	I 474	18	20.0	I 184	345	****	I 203	35	21.9	I 123	101	****	I 135	318	21.8	I 149	?	318	20.5
900	I 404	11	19.5	I 243	329	****	I 203	35	21.9	I 37	338	****	I 238	292	21.0	I 189	?	316	19.8
950	I 391	5	19.2	I 301	322	****	I 242	340	20.7	I 37	338	****	I 300	282	20.5	I 244	?	307	19.1
1000	I 391	5	19.2	I 301	322	****	I 228	333	20.5	I 95	321	****	I 368	287	20.1	I 338	?	298	18.7
1050	I 391	5	18.8	I 337	321	****	I 240	321	20.3	I 155	303	****	I 402	293	19.8	I 433	?	299	18.5
1100	I 518	340	18.5	I 324	313	****	I 268	308	20.1	I 188	292	****	I 406	294	19.6	I 518	?	301	18.1
1150	I 553	337	18.4	I 304	316	****	I 258	306	19.8	I 225	277	****	I 451	292	19.1	I 543	?	302	17.7
1200	I 531	334	18.1	I 314	310	****	I 218	302	19.7	I 279	263	****	I 477	294	18.6	I 602	?	298	17.7
1250	I 627	328	17.6	I 321	304	****	I 224	304	19.8	I 247	262	****	I 478	292	18.2	I 626	?	300	17.7
1300	I 628	327	17.4	I 323	314	****	I 292	308	20.0	I 271	268	****	I 471	285	18.1	I 646	?	306	17.7
1350	I 652	331	17.2	I 345	308	****	I 336	317	20.1	I 223	328	****	I 427	280	18.5	I 600	?	312	17.7
1400	I 603	327	17.2	I 408	309	****	I 385	336	20.0	I 263	347	****	I 318	295	18.5	I 600	?	312	17.7
1450	I 629	325	17.4	I 452	305	****	I 337	345	20.0	I 264	346	****	I 255	318	18.5	I 600	?	312	17.7
1500	I 676	325	17.2	I 457	301	****	I 284	358	19.7	I 210	359	****	I 256	335	18.5	I 600	?	312	17.7
1550	I 633	319	17.0	I 411	322	****	I 261	13	19.1	I 175	20	****	I 266	342	18.5	I 600	?	312	17.7
1600	I 580	324	17.3	I 335	342	****	I 328	21	18.6	I 156	36	****	I 203	339	18.5	I 600	?	312	17.7
1650	I 549	326	17.1	I 303	7	****	I 301	12	18.3	I 131	9	****	I 140	342	18.5	I 600	?	312	17.7
1700	I 486	316	17.0	I 398	22	****	I 265	12	17.8	I 309	354	****	I 146	345	18.5	I 600	?	312	17.7
1750	I 447	345	17.3	I 339	30	****	I 289	4	17.5	I 428	350	****	I 196	352	18.5	I 600	?	312	17.7
1800	I 683	?	16.9	I 292	32	****	I 289	4	17.5	I 500	356	****	I 261	358	18.5	I 600	?	312	17.7
1850	I 697	?	16.7	I 292	32	****	I 289	4	17.5	I 543	351	****	I 350	4	18.5	I 600	?	312	17.7
1900	I 455	19	16.3	I 292	32	****	I 289	4	17.5	I 615	347	****	I 399	7	18.5	I 600	?	312	17.7
1950	I 490	19	15.8	I 292	32	****	I 289	4	17.5	I 582	350	****	I 309	10	18.5	I 600	?	312	17.7
2000	I 469	18	15.2	I 292	32	****	I 289	4	17.5	I 585	358	****	I 309	10	18.5	I 600	?	312	17.7
SURF.	I 486	135		I 399	156		I 310	158		I 355	139		I 340	130		I 340	?	129	
GEOS.	I 486	135		I 399	156		I 310	158		I 355	139		I 340	130		I 340	?	129	
TEMP.	I 486	135		I 399	156		I 310	158		I 355	139		I 340	130		I 340	?	129	
CORR.	I 486	135	0.7	I 399	156	****	I 310	158	-0.5	I 355	139	****	I 340	130	0.4	I 340	?	129	-1.0

JLN DAY 212 0104 CST				JLN DAY 212 0258 CST				JLN DAY 212 0405 CST				JLN DAY 212 0505 CST				JLN DAY 212 0622 CST			
WIND				WIND				WIND				WIND				WIND			
Z (H)	SPEED (CM/S)	DIR (DEG)	T (C)	SPEED (CM/S)	DIR (DEG)	T (C)		SPEED (CM/S)	DIR (DEG)	T (C)		SPEED (CM/S)	DIR (DEG)	T (C)		SPEED (CM/S)	DIR (DEG)	T (C)	
30	375	85	****	419	106	19.9	I	560	126	****	I	465	136	19.2	I	455	153	20.3	I
50	526	93	****	576	113	20.5	I	653	131	****	I	615	139	20.1	I	513	154	20.3	I
75	640	103	****	760	120	21.7	I	772	135	****	I	803	141	21.5	I	537	156	20.4	I
100	658	111	****	737	121	22.5	I	768	136	****	I	741	146	21.7	I	562	160	21.2	I
150	674	119	****	628	122	22.8	I	729	139	****	I	554	153	21.5	I	305	179	22.8	I
200	615	119	****	629	127	22.3	I	526	142	****	I	307	160	22.5	I	250	217	23.6	I
250	537	120	****	557	131	22.1	I	292	154	****	I	214	205	23.2	I	307	227	23.8	I
300	493	130	****	377	137	22.3	I	198	216	****	I	292	238	23.4	I	399	229	23.8	I
350	492	141	****	233	162	22.5	I	310	234	****	I	352	245	23.2	I	453	230	23.5	I
400	483	153	****	267	217	22.5	I	365	231	****	I	369	247	23.0	I	457	234	23.1	I
450	480	158	****	328	225	23.2	I	389	230	****	I	392	243	22.6	I	487	234	22.9	I
500	457	159	****	235	223	22.8	I	414	230	****	I	442	240	22.2	I	507	241	22.7	I
550	403	162	****	237	227	22.3	I	413	234	****	I	531	240	21.9	I	516	245	22.5	I
600	317	163	****	217	236	21.9	I	399	233	****	I	525	240	21.5	I	569	249	22.1	I
650	226	163	****	216	254	21.8	I	384	235	****	I	525	243	21.1	I	586	254	21.7	I
700	116	186	****	183	256	21.3	I	339	236	****	I	545	247	20.8	I	597	258	21.2	I
750	105	243	****	145	275	20.8	I	411	235	****	I	538	253	20.5	I	630	259	20.8	I
800	103	273	****	163	308	20.4	I	395	238	****	I	500	262	20.3	I	675	260	20.4	I
850	123	311	****	168	289	20.0	I	389	239	****	I	470	267	19.9	I	697	265	20.0	I
900	210	335	****	176	272	19.5	I	388	244	****	I	483	266	19.4	I	697	270	19.7	I
950	251	338	****	198	267	19.1	I	407	242	****	I	514	269	19.0	I	728	272	19.4	I
1000	254	323	****	265	259	18.7	I	427	245	****	I	531	273	18.5	I	741	276	19.2	I
1050	249	297	****	339	258	18.4	I	469	248	****	I	538	273	18.0	I	704	284	18.9	I
1100	309	282	****	388	278	18.0	I	503	255	****	I	549	274	17.6	I	696	283	18.5	I
1150	404	289	****	400	294	17.4	I	522	261	****	I	579	282	17.3	I	732	292	18.3	I
1200	460	296	****	418	299	16.7	I	543	267	****	I	649	276	17.5	I	733	301	18.3	I
1250	448	311	****	457	296	16.0	I	578	270	****	I	720	303	17.5	I	782	309	18.3	I
1300	347	312	****	602	307	15.7	I	571	274	****	I	723	307	17.2	I	816	314	18.0	I
1350	235	312	****	****	****	****	I	552	279	****	I	****	****	****	I	916	315	17.8	I
1400	****	****	****	****	****	****	I	563	287	****	I	****	****	****	I	1030	315	17.6	I
1450	****	****	****	****	****	****	I	613	300	****	I	****	****	****	I	1100	318	17.4	I
1500	****	****	****	****	****	****	I	673	307	****	I	****	****	****	I	1132	319	17.2	I
1550	****	****	****	****	****	****	I	840	307	****	I	****	****	****	I	1168	323	16.8	I
1600	****	****	****	****	****	****	I	986	316	****	I	****	****	****	I	1203	325	16.3	I
1650	****	****	****	****	****	****	I	1070	315	****	I	****	****	****	I	****	****	****	I
1700	****	****	****	****	****	****	I	1134	321	****	I	****	****	****	I	****	****	****	I
1750	****	****	****	****	****	****	I	1199	320	****	I	****	****	****	I	****	****	****	I
1800	****	****	****	****	****	****	I	1122	323	****	I	****	****	****	I	****	****	****	I
1850	****	****	****	****	****	****	I	1069	313	****	I	****	****	****	I	****	****	****	I
1900	****	****	****	****	****	****	I	****	****	****	I	****	****	****	I	****	****	****	I
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2000	****	****	****	****	****	****	I	****	****	****	I	****	****	****	I	****	****	****	I
SURF.	****	****	****	****	****	****	I	****	****	****	I	****	****	****	I	****	****	****	I
GEOS.	329	136	****	349	150	****	I	389	139	****	I	271	151	****	I	694	205	****	I
TEMP.	****	****	****	****	****	****	I	****	****	****	I	****	****	****	I	****	****	****	I
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Appendix B2 Part (b). Tethered Kytoon Data.

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I JLN DAY 200 1751 CST I				I JLN DAY 200 1851 CST I			
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	WIND				WIND		
Z	SPEED	DIR	T	Z	SPEED	DIR	T
(M)	(CM/S)	(DEG)	(C)	(M)	(CM/S)	(DEG)	(C)
10	336	176	27.66	10	260	132	25.42
20	462	157	27.59	20	344	134	26.20
30	499	156	27.53	30	403	130	26.56
50	499	150	27.37	50	469	133	26.69
75	498	145	27.20	75	468	132	26.53
100	495	149	26.85	100	471	134	26.30
125	506	146	26.55	125	476	133	26.14
150	490	142	26.36	150	472	136	25.91
175	511	141	26.10	175	467	136	25.71
200	473	136	25.94	200	****	****	*****
225	****	****	*****	225	****	****	*****

I JLN DAY 201 1744 CST I				I JLN DAY 201 1847 CST I				I JLN DAY 201 1948 CST I				I JLN DAY 201 2053 CST I			
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I JLN DAY 202 1904 CST I				I JLN DAY 202 1948 CST I			
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	WIND				WIND		
Z	SPEED	DIR	T	Z	SPEED	DIR	T
(H)	(CM/S)	(DEG)	(C)	(H)	(CM/S)	(DEG)	(C)
10	329	236	27.37	10	349	171	26.67
20	476	234	28.15	20	497	173	27.16
30	576	212	28.80	30	570	201	27.35
50	815	219	29.71	50	775	200	27.75
75	846	219	29.55	75	835	201	27.88
100	832	212	29.45	100	1035	205	28.01
125	919	211	29.19	125	1165	204	27.75
150	942	208	29.03	150	****	****	*****
175	848	210	28.70	175	****	****	*****
200	924	215	28.96	200	****	****	*****
225	929	219	28.86	225	****	****	*****

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I JLN DAY 205 1744 CST I				I JLN DAY 205 1844 CST I				I JLN DAY 205 1946 CST I				I JLN DAY 205 2049 CST I					
I				I				I				I					
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Z	WIND			T	Z	WIND			T	Z	WIND			T			
(M)	SPEED	DIR	(C)	I	(M)	SPEED	DIR	(C)	I	(M)	SPEED	DIR	(C)	I			
I	(CM/S)	(DEG)	I	I	I	(CM/S)	(DEG)	I	I	I	(CM/S)	(DEG)	I	I			
10	336	246	32.47	I	282	238	31.54	I	I	365	243	*****	I	384	242	25.63	I
20	423	242	33.18	I	399	216	32.39	I	I	493	240	*****	I	554	239	27.91	I
30	499	255	33.57	I	511	238	32.84	I	I	537	230	*****	I	653	242	30.61	I
50	560	255	33.85	I	536	242	32.97	I	I	695	244	*****	I	819	243	31.78	I
75	618	251	33.73	I	638	247	32.97	I	I	788	245	*****	I	830	248	32.64	I
100	664	250	33.54	I	677	250	32.84	I	I	837	245	*****	I	955	256	33.17	I
125	669	250	33.25	I	715	246	32.71	I	I	868	246	*****	I	956	251	32.05	I
150	666	252	33.02	I	743	245	32.45	I	I	890	248	*****	I	927	250	32.62	I
175	655	250	32.73	I	753	246	32.22	I	I	870	249	*****	I	927	251	32.33	I
200	644	252	32.50	I	772	246	32.09	I	I	853	252	*****	I	940	252	32.10	I
225	****	****	*****	I	****	****	*****	I	I	****	****	*****	I	****	****	*****	I

I JLN DAY 205 2149 CST I				I JLN DAY 205 2256 CST I				I JLN DAY 205 2347 CST I						
I				I				I						
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I				I				I						
Z	WIND			T	Z	WIND			T	Z	WIND			T
(M)	SPEED	DIR	(C)	I	(M)	SPEED	DIR	(C)	I	(M)	SPEED	DIR	(C)	I
I	(CM/S)	(DEG)	I	I	I	(CM/S)	(DEG)	I	I	I	(CM/S)	(DEG)	I	I
10	446	233	24.50	I	302	252	*****	I	I	357	266	21.11	I	I
20	620	219	26.83	I	391	260	*****	I	I	515	266	24.23	I	I
30	717	222	28.03	I	531	268	*****	I	I	626	272	25.99	I	I
50	922	242	29.10	I	753	271	*****	I	I	779	279	28.20	I	I
75	1015	222	29.65	I	869	280	*****	I	I	890	283	28.10	I	I
100	1030	246	30.12	I	936	283	*****	I	I	1003	294	28.82	I	I
125	1039	266	31.28	I	973	292	*****	I	I	1073	299	30.56	I	I
150	1023	275	31.47	I	977	294	*****	I	I	1188	302	31.32	I	I
175	1015	274	31.51	I	1015	292	*****	I	I	1236	306	31.48	I	I
200	1021	274	31.67	I	1117	295	*****	I	I	*****	****	*****	I	I
225	****	****	*****	I	****	****	*****	I	I	****	****	*****	I	I

I JLN DAY 206 1837 CST				I JLN DAY 206 1943 CST				I JLN DAY 206 2053 CST			
Z	WIND		T	Z	WIND		T	Z	WIND		T
(M)	SPEED	DIR	(C)	(M)	SPEED	DIR	(C)	(M)	SPEED	DIR	(C)
	(CM/S)	(DEG)			(CM/S)	(DEG)			(CM/S)	(DEG)	
10	313	80	27.35	10	242	32	21.04	10	219	45	19.74
20	515	37	27.32	20	442	47	23.61	20	328	54	21.56
30	533	44	27.35	30	590	46	25.20	30	480	53	22.92
50	671	43	27.81	50	764	45	26.46	50	617	58	24.35
75	766	47	27.87	75	824	45	27.18	75	728	62	25.42
100	797	46	27.77	100	****	****	*****	100	850	63	26.43
125	848	46	27.64	125	****	****	*****	125	1021	68	26.85
150	832	45	27.51	150	****	****	*****	150	****	****	*****
175	874	45	27.25	175	****	****	*****	175	****	****	*****
200	****	****	*****	200	****	****	*****	200	****	****	*****
225	****	****	*****	225	****	****	*****	225	****	****	*****

I JLN DAY 206 2150 CST				I JLN DAY 206 2245 CST				I JLN DAY 206 2340 CST			
Z	WIND		T	Z	WIND		T	Z	WIND		T
(M)	SPEED	DIR	(C)	(M)	SPEED	DIR	(C)	(M)	SPEED	DIR	(C)
	(CM/S)	(DEG)			(CM/S)	(DEG)			(CM/S)	(DEG)	
10	255	93	17.54	10	253	86	17.21	10	230	78	15.83
20	412	77	20.69	20	414	84	19.36	20	349	85	17.09
30	543	74	22.54	30	545	73	21.27	30	436	78	20.05
50	698	76	23.81	50	703	82	22.38	50	673	86	22.32
75	847	82	25.27	75	859	89	23.81	75	876	84	24.05
100	997	85	25.82	100	1030	90	24.59	100	1063	90	24.63
125	1131	85	26.03	125	1156	92	25.01	125	1162	93	24.99
150	1234	85	25.99	150	****	****	*****	150	****	****	*****
175	****	****	*****	175	****	****	*****	175	****	****	*****
200	****	****	*****	200	****	****	*****	200	****	****	*****
225	****	****	*****	225	****	****	*****	225	****	****	*****

I JLN DAY 207 1808 CST				I JLN DAY 207 1845 CST				I JLN DAY 207 1942 CST				I JLN DAY 207 2048 CST			
I				I				I				I			
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JLN DAY 212 0050 CST				JLN DAY 212 0215 CST				JLN DAY 212 0350 CST			
Z	WIND	T		Z	WIND	T		Z	WIND	T	
(M)	SPEED (CM/S) DIR (DEG)	(C)		(M)	SPEED (CM/S) DIR (DEG)	(C)		(M)	SPEED (CM/S) DIR (DEG)	(C)	
10	184 58	21.56		10	202 113	18.79		10	199 94	18.77	
20	293 90	21.50		20	290 98	19.09		20	332 140	19.36	
30	387 94	21.76		30	408 111	19.38		30	454 135	19.88	
50	499 100	21.96		50	644 129	20.29		50	676 139	20.72	
75	615 111	22.09		75	779 129	21.17		75	794 141	21.89	
100	659 114	22.38		100	843 131	21.49		100	803 142	21.96	
125	656 120	22.44		125	766 127	21.82		125	784 145	21.86	
150	709 122	22.51		150	673 126	21.85		150	783 146	21.73	
175	685 119	22.64		175	****	****		175	715 138	21.73	
200	****	****		200	****	****		200	****	****	
225	****	****		225	****	****		225	****	****	

JLN DAY 212 0444 CST				JLN DAY 212 0547 CST			
Z	WIND	T		Z	WIND	T	
(M)	SPEED (CM/S) DIR (DEG)	(C)		(M)	SPEED (CM/S) DIR (DEG)	(C)	
10	195 154	18.77		10	192 59	*****	
20	301 160	19.16		20	334 144	*****	
30	368 142	19.39		30	377 142	*****	
50	524 151	20.07		50	576 157	*****	
75	752 154	21.40		75	801 163	*****	
100	783 155	21.53		100	766 164	*****	
125	741 158	21.47		125	653 164	*****	
150	719 159	21.47		150	****	****	
175	660 159	21.69		175	****	****	
200	****	****		200	****	****	
225	****	****		225	****	****	

Appendix B2 Part (c). Plotted Kytoon Profiles

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Appendix B3. Micrometeorological Data.

JULY 16 1976 JULIAN DAY 198										
CST	R	RN	H	U(A)	U(B)	U	DD	TO	TA	TH
	---M/SQ. M---			-----CH/S-----			(DEG)	---DEGREES C---		
1600	512					600	360		24.4	18.4
1630	512					550	340		24.4	18.4
1700	465					550	350		24.4	18.2
1730	326					600	350		23.9	17.6
1800	233					500	350		23.3	17.2
1830	140					450	360		22.8	17.0
1900	47	-51				250	360		21.1	16.2
1930	0					100	340		18.3	14.8
2000	0	-52				50	290		16.1	13.6
2030	0					0			14.4	12.7
2100	0	-54				0			13.9	12.5
2130	0					0			12.8	11.5
2200	0	-50				0			12.8	11.7
2230	0					0			12.2	11.1
2300	0	-50				0			12.2	11.2
2330	0					0			11.7	10.7
2400	0					0			11.7	10.8

JULY 17 1976 JULIAN DAY 199										
CST	R	RN	H	U(A)	U(B)	U	DD	TO	TA	TH
	---M/SQ. M---			-----CH/S-----			(DEG)	---DEGREES C---		
1600	651					200	350		26.1	18.7
1630	512					200	340		26.1	18.7
1700	465					200	320		26.1	18.7
1730	326					100	100		26.7	18.9
1800	233					50	80		26.1	18.8
1830	140					50	70		23.5	18.2
1900	0	-36				100	100		21.7	17.0
1930	0					100	130		19.4	16.2
2000	0	-46				100	130		17.2	14.9
2030	0					50	140		16.1	14.2
2100	0	-41				20	150		14.4	12.9
2130	0					20	200		13.9	12.4
2200	0	-39				0			13.3	12.0
2230	0					0			12.8	11.6
2300	0	-39				0			12.8	11.7
2330	0					0			12.8	11.8
2400	0	-41				100	220		12.2	11.3

JULY 18 1976 JULIAN DAY 200										
CST	R	RN	H	U(A)	U(B)	U	DD	TO	TA	TH
	---M/SQ. M---			-----CH/S-----			(DEG)	---DEGREES C---		
1600	651					350	170		28.3	20.8
1630	558					300	170		28.3	20.8
1700	465					300	160		27.8	20.2
1730	326					250	160		27.2	19.9
1800	233	36				200	150		26.7	19.5
1830	93					100	140		25.6	19.2
1900	47					50	140		23.9	18.7
1930	0					100	130		20.6	17.0
2000	0	-50				150	130		18.9	15.9
2030	0					100	130		18.3	15.8
2100	0	-50				100	130		17.2	14.8
2130	0					150	150		16.7	14.3
2200	0	-54				200	160		16.7	14.4
2230	0					250	170		16.1	13.9
2300	0	-54				200	180		16.1	14.0
2330	0					200	180		15.6	13.5
2400	0	-50				200	190		15.6	13.4

JULY 19 1976 JULIAN DAY 201										
CST	R	RN	H	U(A)	U(B)	U	DD	TO	TA	TH
	---M/SQ. M---			-----CH/S-----			(DEG)	---DEGREES C---		
1600										
1630										
1700										
1730										
1800	0	0			32.8					
1830										
1900	0				21.3					
1930	0									
2000	0				35.7	400	190		23.3	20.0
2030	0					450	190		23.3	20.0
2100	0				37.1	450	190		22.8	19.6
2130	0					450	190		22.2	19.3
2200	0	-43			46.1	500	190		22.2	19.4
2230	0					550	190		22.2	19.4
2300	0	-41				600	190		21.7	18.7
2330	0					550	190		21.1	18.5
2400	0	-41			41.9	550	190		20.6	18.1

JULY 20 1976 JULIAN DAY 202											
CST	R	RH	H	U*(A)	U*(B)	U	DD	TO	TA	TH	
	W/SQ. M				CM/S		(DEG)		DEGREES C		
1600	605					600	250		33.3	26.4	
1630	465					550	250		33.3	26.2	
1700	419					600	250		32.8	25.7	
1730	279					450	240		32.2	25.2	
1800	140	10	-108		32.8	350	220		31.1	25.0	
1830	47					200	220		28.9	24.2	
1900	0		-55		21.3	200	220		26.1	22.4	
1930	0					400	210		26.7	23.0	
2000	0		-107		35.7	400	200		26.7	23.0	
2030	0					250	210		25.6	22.1	
2100	0		-85		37.1	250	210		25.0	21.8	
2130	0					400	220		25.6	22.5	
2200	0		-115		46.1	400	220		25.6	22.5	
2230	0					500	230		26.1	23.0	
2300	0					600	280		26.1	23.1	
2330	0					500	330		26.7	23.1	
2400	0		-96		41.9	650	40		25.0	21.8	

JULY 22 1976 JULIAN DAY 204											
CST	R	RH	H	U*(A)	U*(B)	U	DD	TO	TA	TH	
	W/SQ. M				CM/S		(DEG)		DEGREES C		
1600	558					450	250		32.2	27.7	
1630	512					350	250		32.2	27.5	
1700	419					200	240		32.2	27.7	
1730	372					200	230		32.2	27.9	
1800	233					150	220		31.7	27.9	
1830	93					100	210		29.4	26.1	
1900	47					100	210		27.2	24.3	
1930	0					100	210		25.0	22.7	
2000	0					150	210		23.9	22.1	
2030	0					150	220		23.3	21.7	
2100	0					150	220	15.6	22.8	21.3	
2130	0					100	230		21.7	20.2	
2200	0					150	230	30.2	21.7	20.4	
2230	0					150	230		21.7	20.4	
2300	0					250	240		21.7	20.2	
2330	0					300	240		22.2	20.7	
2400	0					350	250		23.3	21.1	

JULY 23 1976 JULIAN DAY 205											
CST	R	RH	H	U*(A)	U*(B)	U	DD	TO	TA	TH	
	W/SQ. M				CM/S		(DEG)		DEGREES C		
1600	605					400	260		33.9	27.0	
1630	465					350	270		33.9	27.2	
1700	419					300	260		33.3	26.7	
1730	233					250	260		33.3	26.9	
1800	186					200	250		32.2	26.5	
1830	93					100	240		31.1	26.7	
1900	0					100	230		27.8	24.7	
1930	0					100	220		25.0	22.7	
2000	0					100	220		23.9	22.0	
2030	0					150	220		23.3	21.6	
2100	0		-38		15.6	100	220		23.3	21.7	
2130	0					150	210		23.3	21.7	
2200	0		-65		30.2	200	220		23.3	21.6	
2230	0					100	240		22.8	21.2	
2300	0					50	220		22.2	20.8	
2330	0					100	230		21.7	20.4	
2400	0					100	260		21.7	20.5	

JULY 24 1976 JULIAN DAY 206											
CST	R	RH	H	U*(A)	U*(B)	U	DD	TO	TA	TH	
	W/SQ. M				CM/S		(DEG)		DEGREES C		
1600	605					600	40		30.0	25.0	
1630	465					600	40		29.4	24.5	
1700	372					550	50		28.9	24.5	
1730	279					500	50		28.3	23.5	
1800	186					450	50		27.8	23.5	
1830	93					350	70		26.7	22.8	
1900	0					250	70		24.4	21.3	
1930	0					100	50		21.7	19.4	
2000	0					100	50		20.6	18.9	
2030	0					50	50		19.4	18.1	
2100	0					50	50		18.9	17.8	
2130	0					50	50		17.8	16.7	
2200	0					100	60		17.8	16.7	
2230	0					100	60		17.2	16.1	
2300	0					100	50		17.2	16.3	
2330	0					50	50		16.1	15.2	
2400	0					50	60		15.6	15.2	

JULY 25 1976 JULIAN DAY 207										
CST	R	RN	H	U(A)	U(B)	U	DD	TO	TA	TH
	W/SQ. H			CH/S			(DEG)	DEGREES C		
1600	558					350	110		30.0	24.4
1630	512					400	100		29.4	24.0
1700	372					350	100		29.4	24.0
1730	279					300	90		28.9	23.7
1800	140					200	90		28.3	23.7
1830	47					200	100		26.7	22.6
1900	0					200	100		25.0	21.7
1930	0					200	100		22.8	20.2
2000	0					200	110		22.2	19.8
2030	0					150	120		21.1	18.9
2100	0					100	150		20.0	17.9
2130	0					50	170		18.9	17.2
2200	0					50	170		18.3	16.8
2230	0					100	170		18.3	17.0
2300	0					150	180		18.3	17.0
2330	0					200	190		18.3	17.0
2400	0					200	200		17.8	16.5

JULY 26 1976 JULIAN DAY 208										
CST	R	RN	H	U(A)	U(B)	U	DD	TO	TA	TH
	W/SQ. H			CH/S			(DEG)	DEGREES C		
1600	326					50	320		33.9	28.0
1630	279					0			33.9	28.5
1700	133					0			32.8	28.6
1730	140					50	160		21.7	28.0
1800	93					50	150		30.0	26.6
1830	0					300	90		28.3	25.5
1900	0					350	30		27.2	24.2
1930	0					150	80		25.6	22.9
2000	0					50	50		23.9	21.6
2030	0					100	80		23.3	21.5
2100	0					100	100		22.2	20.4
2130	0					50	150		22.2	20.5
2200	0					0			21.7	20.1
2230	0					200	250		22.8	21.1
2300	0					150	240		23.3	21.3
2330	0					200	230		22.8	20.9
2400	0					200	220		23.3	21.5

JULY 29 1976 JULIAN DAY 211										
CST	R	RN	H	U(A)	U(B)	U	DD	TO	TA	TH
	W/SQ. H			CH/S			(DEG)	DEGREES C		
1600						250	350			
1630						250	350			
1700						250	360			
1730						250	20			
1800	127	42		17.6		200	20			
1830						200	40			
1900	15	-25				100	80			
1930	0					150	90			
2000	0	-31				100	100			
2030	0					100	120			
2100	0	-29				50	130			
2130	0					50	50			
2200	0	-17				50	30			
2230	0					50	40			
2300	0	-4				0				
2330	0					0				
2400	0	-2				50	360			

JULY 30 1976 JULIAN DAY 212										
CST	R	RN	H	U(A)	U(B)	U	DD	TO	TA	TH
	W/SQ. H			CH/S			(DEG)	DEGREES C		
0030	0					50	360			
0100	0	0				0				
0130	0					0				
0200	0	0				50	100			
0230	0					100	100			
0300	0	2				50	90			
0330	0					50	90			
0400	0	4				100	120			
0430	0					50	130			
0500	0	4				50	120			
0530						50	120			
0600	80	42		15.2		200	120			
0630										
0700										
0730										
0800										
0830										

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Appendix B4. Sodar Records

DAY 206-76

DAY 207-76

HOUR (CST)

B-60

B-62

Appendix C

Special Symbols

Listed below are brief explanations of symbols and abbreviations used in the Appendices. In some cases, a further description is given in the text.

In Appendices A1 and B1:

Meteorological information are reproduced similar to the National Weather Service format and listed as follows: sky cover estimates, visibility (miles), wind direction/wind speed (ms^{-1}), and temperature (C). All times are CST; sky cover and cloud type symbols are listed below.

<u>Sky Cover</u>		<u>Cloud Type</u>	
O	clear	cu	cumulus
⊙	ceiling obscured	st cu	strato cumulus
⊖	scattered	alto cu	altocumulus
-⊖	thin broken	alto st	alto stratus
⊕	broken	ci	cirrus
-⊕	thin overcast	ci st	cirrostratus
⊗	overcast	cb	cumulonimbus

Miscellaneous

B cloud base measured by balloon
 E estimated cloud base
 F fog
 GF ground fog
 H haze

In Appendices A2 and B2 part (a):

?	wind data departing more than 25 percent from the mean of neighboring values.
SURF GEOS	surface geostrophic wind.
DELTA GEOS	thermal wind.
TEMP FLUX	absolute temperature correction applied to radiosonde profiles using micrometeorological data.
TEMP MATCH	absolute temperature correction applied to radiosonde profiles by matching values measured aloft.
TEMP CORR	absolute temperature correction to radiosonde profiles by matching with kytoon profiles or by matching values measured aloft.

In Appendices A3 and B3:

DD	surface wind direction	T_A	dry bulb temperature
H	heat flux	T_O	surface temperature
R	insolation	T_w	wet bulb temperature
R_n	net radiation	U	surface wind speed
$u_*(A)$	estimates of spatially averaged friction velocities from direct measurements over one crop.		
$u_*(B)$	estimates of spatially averaged friction velocities from bulk measurements over one or both crops.		

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