An Historic Global SO₂ Emissions Inventory for Climate Detection Studies FY97 Report to NOAA

Jane Dignon

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FY97 Report to NOAA**

**Jane Dignon
Atmospheric Sciences Division L-103
Lawrence Livermore National Laboratory
Livermore, CA 94551**

It has become apparent that anthropogenic aerosols exert radiative influence on the climate. This influence is comparable in magnitude but opposite in sign to that of greenhouse gases. The modeling effort here at LLNL has been designed to provide data and information for climate detection studies in order to help understand the role of anthropogenic aerosols over the interannual and decadal time scales.

In FY97, using our statistical emissions model, we have updated global annual emissions of SO₂ from fossil fuel combustion. These results are presented from 1950 through the year 1994 using the most recently published energy data (UN, 1996). These emissions are global in coverage, have a spatial resolution of 1 degree latitude by 1 degree longitude. We plan to present these results at the American Chemical Society meeting in Las Vegas, NV, September 8-11, 1997. This work along with an accompanying preprint will be included in the special session on the Global Sulfur Budget.

Work is also continuing to incorporate estimates for other industrial sources into the inventory. A notable result of this work is the significant change in the regional contributions of SO₂ emissions over the time period. The Figure illustrates the percentage of the global total from each geographical region. As it can be seen North America and Europe are contributing a smaller and smaller percentage whereas Asia's fractional contribution has grown by 6 fold. The observed changes in radiative forcing seen over the North Atlantic due to anthropogenic sulfate aerosols may soon be perceptible over the western Pacific.

Based on these results and a variety of prediction scenarios we will be including a projection for SO₂ emissions from fossil fuels for the year 2050 which will be included in the IPCC 1998 Assessment. This project will be a major contribution for advancing our understanding of the relationship between human society and the climate system.

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SO₂ Regional Percentage

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