

INTERNATIONAL GLOBAL ATMOSPHERIC CHEMISTRY PROGRAMME
GLOBAL EMISSIONS INVENTORY ACTIVITY

SULFUR EMISSIONS FROM VOLCANOES
CURRENT STATUS

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Global Emissions Inventory Activity

Sulfur Emissions From Volcanoes

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Carmen Benkovitz, Brookhaven National Laboratory, Upton, NY, USA heads the work addressing the estimation of sulfur emissions from volcanoes.

Emissions of Sulfur from Volcanoes for 1985 and 1990.

Sulfur emissions from volcanoes are located in areas of volcanic activity, are extremely variable in time, and can be released anywhere from ground level to the stratosphere. Previous estimates of global sulfur emissions from all sources by various authors have included estimates for emissions from volcanic activity; for example, see Cullis and Hirschler (1980), Möller (1984), Bates et al. (1992), and Spiro et al. (1992). In general, these global estimates of sulfur emissions from volcanoes are given as global totals for an "average" year, except in the Spiro et al. inventory, where the data reflect the year 1980.

A project has been initiated at Brookhaven National Laboratory to compile inventories of sulfur emissions from volcanoes. In order to complement the GEIA inventories of anthropogenic sulfur emissions, which represent conditions circa specific years, sulfur emissions from volcanoes are being estimated for the years 1985 and 1990.

The basic information on volcanoes such as the location and summit height was taken from the computerized data file of Simkin et al. (1981). All volcanoes listed as D1 (last known eruption took place after January 1, 1964) were included. The monthly bulletins of the Scientific Event Alert Network (SEAN) which report seismic, volcanic and other such events were used to select the volcanoes which were active in 1985 and 1990. Information on volcanic activity such as height of the ash/gas column, SO₂ emission rates, start and stop date and emission type, were taken from the SEAN bulletins and from the literature; examples of the later include Caltabiano (1994), Casadevall (1994), Andres (1991), Allard (1994), and Spiro (1992).

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The TOMS estimates of the sulfur emissions from major volcanic activity in 1985 and 1990 were received from G. Bluth (personal communication, 1994). These data have been discussed in Bluth et al. (1993), Krueger et al. (1990), Shannon and Bluth (1994), and Schnetzler et al. (1994). The algorithms used to retrieve the volcanic emissions information from satellite measurements are currently under review.

Preliminary results indicate that sulfur emissions from volcanoes in the two years selected are very different. Current estimates are 2.8 Tg S for 1985 and 7.3 Tg S for 1990. A major part of the difference between the two years are the eruptions of Etna and Redoubt. Work on this project continues. The on-going literature search is expected to provide estimates of the SO₂ emissions from all volcanic activity for these two years. Other data sources being consulted include the Smithsonian Institution Global Volcanism Program and World Data center A for Solid Physics in Boulder, CO.

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