

## **The Long-Term Satellite Record of Volcanic Sulfur Dioxide Production**

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Sulfur dioxide in volcanic clouds was first measured with the Total Ozone Mapping Spectrometer (TOMS), an ultraviolet spectrometer on the Nimbus 7 satellite launched in 1978. The 14-year life of this instrument led to the first statistics on the volcanic sulfur budget for the large eruptions that can impact climate. We find that the standard deviation of annual totals is twice the size of the long-term annual average. This extreme interannual variability makes a long time series very important to climate prediction. Succeeding TOMS missions have extended this time series to over 22 years, albeit with an 18 month gap beginning January 1995. Earth Probe TOMS is continuing to produce data in its 6th year of operation, although of degraded quality. Unfortunately, the launch of a replacement TOMS instrument failed in September 2001. The EOS MODIS 8.5 micrometer IR radiance data can provide new coverage of SO<sub>2</sub> in thin volcanic clouds, while UV methods are more sensitive and can determine SO<sub>2</sub> and ash during all phases of the eruption. Thus, a continuing series of UV instruments is important to climate studies. The next instrument for launch, SCIAMACHI on Envisat, will provide partial coverage until OMI is launched on EOS/Aura in 2004. Finally, OMPS on the NPOESS series of operational satellites is expected to continue daily global coverage through the second decade of this Century. These new instruments will lower the threshold for SO<sub>2</sub> detection by an order of magnitude, thus enabling routine detection of passive emissions.