In June 1991, the eruption of Mount Pinatubo (Philippines) injected about 20 Mt of sulfur dioxide into the stratosphere. The rapid conversion of sulfur dioxide into sulfuric acid ($H_2SO_4$) droplets caused a significant extinction, both in the visible and infrared. Here, we present a method to retrieve the Pinatubo aerosol optical depth at three infrared wavelengths (4.0 µm, 8.3 µm, and 11.1 µm) from HIRS-2 measurements onboard NOAA-10 and NOAA-12 and collocated radiosonde measurements. No assumption on aerosol size distribution or refractive index is used, which is a major advantage of our method.

1. Signature of Pinatubo aerosol on CM-3 and CM-12 time series

2. Simulation of the impact of volcanic aerosol on observations

3. Retrieval of aerosol optical depth

Conclusions:
Covering the time period July 1987 - September 1995, this analysis of differences between HIRS-2 measurements and collocated temperature and water vapor radiosonde profiles clearly reveals the signature of Mount Pinatubo aerosols. Simulations of their effect on brightness temperature using the climatological data base TIGR shows that, for a given channel, it depends on the atmospheric situation and linearly on the aerosol optical depth, and not on their microphysical properties. 3- or 12-month running mean aerosol optical depth at 4 µm, 8.3 µm and 11.1 µm are retrieved from channels 18, 10, and 8 measurements, for three latitude zones. Validation with lidar measurements and comparison with ISAMS measurements show good agreements.