

## **Mt. Pinatubo Stratospheric Aerosols in the Tropics: Comparison of SAGE II and Lidars**

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Retrieving aerosol extinction profiles after the June 15, 1991 Mount Pinatubo eruption was a challenge for the SAGE II instrument. One of the reasons is that parameterizations in the retrieval algorithm correspond to near background stratospheric aerosol conditions. Another reason is the so-called "saturation," caused by the SAGE II sensor not being sensitive enough to measure the small amount sunlight transmitted through the aerosol cloud in the limb scanning geometry. Because of saturation, a large number of SAGE II profiles contained gaps in the tropical region during the period following the eruption. Here we present a comparison of SAGE II aerosol extinction profiles measured after Mount Pinatubo eruption with lidar-derived extinction profiles from a set of three tropical lidars located in the 20°-30°N latitude band, from Mauna Loa, US (19.5°N, 155.6°E), Camagüey, Cuba (21.4°N, 77.9°E), and Hefei, China (31.3°N, 117.2°E). Comparisons at 0.532  $\mu\text{m}$  show a good agreement in general for the three stations, but at 1.02  $\mu\text{m}$  the differences increase for Camagüey and Hefei, because of the backscattering to extinction conversion to that wavelength from the original one of 0.532  $\mu\text{m}$  at both stations. Our results confirm the robustness of the SAGE II retrievals in such extreme conditions. After filling the SAGE II gaps with lidar information we produced an integrated SAGE II-lidar dataset of extinction profiles which provides detailed information of the aerosol cloud in the tropics. Such improved information will be useful for more detailed and precise simulations of the Mt. Pinatubo climatic effect. Nevertheless, better backscattering-to-extinction conversion coefficients for the tropics after major volcanic eruptions are necessary for improving the extinction retrievals from lidars. In addition, our results show that several more lidars should be operating in the tropical

belt at the time of the next eruption to collect information for studying its features and climate impacts.