

MAUNA LOA OBSERVATORY LIDAR MEASUREMENTS OF EL CHICHON AND Mt. PINATUBO AEROSOLS

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ABSTRACT

A Ruby lidar has been operated at the Mauna Loa Observatory since late 1974. It has been used to measure aerosols in the 10 to 30 km range and has recorded the effect on stratospheric aerosols from numerous volcanic eruptions including El Chichon and Mount Pinatubo. Since 1980 soundings have been made on an average of once per week. The observatory is located at 19.6 degrees latitude and 155.6 degrees longitude. The observatory can be influenced by both equatorial and mid-latitude air masses depending on the time year and the weather patterns.

In this paper comparisons are made between the major eruptions of El Chichon and Mount Pinatubo. The observatory lay directly in the path of El Chichon and was located more on the edge on the Mt. Pinatubo plume. During the first few months following the eruptions the discrete passes of both clouds were seen as they circled the globe. The general decay ($1/e$) of the aerosol backscatter immediately following the eruption was 10.5 months for El Chichon and 18.5 months for Mt. Pinatubo. The decay following this initial phase, towards stratospheric background conditions, was 10.7 months for El Chichon and 10.3 months for Mt. Pinatubo. Specific changes of the aerosol loading (occurring over a few weeks) are related to changes in the upper level winds. Seasonal and quasi-biennial oscillation (QBO) cycles are examined for their effect on these upper level winds and on the transport of aerosols.

