

Climate Forcing Since 1960: What Does the Moon Have to Say?

Richard A. Keen [richard.keen@colorado.edu], University of Colorado, Dept. of Atmospheric and Oceanic Sciences, Boulder.

About once per year, on average, the moon is eclipsed as it passes into the Earth's shadow; at these times the moon can be used as a remote sensor of the global average optical depth of stratospheric aerosols of volcanic origin. The moon is visible during a total lunar eclipse due to sunlight refracted into the shadow (umbra) by the Earth's atmosphere (primarily by the stratosphere). Stratospheric aerosols can affect the observed brightness of the eclipsed moon, and the optical thickness of the aerosol layer can be determined from the difference between observed and predicted brightness of a lunar eclipse.

Eclipse data from 1960 to 2007 and from 1880 to 1888 suggest that the Pinatubo eruption in 1991 perturbed the stratospheric aerosol layer at least as much as that of Krakatau in 1883. The aerosol veil from Pinatubo disappeared between 1993 and 1996. Since 1997, stratospheric aerosols have been at or near background levels; this is the longest period with a clear stratosphere since before 1960.