

Volcanic Aerosol Optical Depths during the Post-Pinatubo Era, 1996-2018

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About once per year, on average, the moon is totally eclipsed; the moon is then illuminated by sunlight refracted into the umbra, primarily by the stratosphere. Stratospheric aerosols can affect the brightness of the eclipsed moon, and climatically significant, visible-band, global aerosol optical depth (AOD) can be directly measured from the difference between observed and predicted brightness.

Successful observations of the total lunar eclipse of 31 January 2018 (the first eclipse in over two years) by the author and others reveal that the global volcanic AOD remains at very low levels. A 22+ year period of a relatively clear stratosphere therefore continues, and is the longest such stretch since 1837-1862. The stratospheric impacts of several climatically-insignificant volcanoes during 1996-2018 are identified. There is no trend in AOD over this period, ruling out volcanoes as a contributor to the stable global temperatures during 1998-2015. Compared to the volcanically active period 1980-1995 (el Chichon and Pinatubo), the clear stratosphere since 1995 has contributed an increase of radiative climate forcing equal to that due to increasing greenhouse gases.

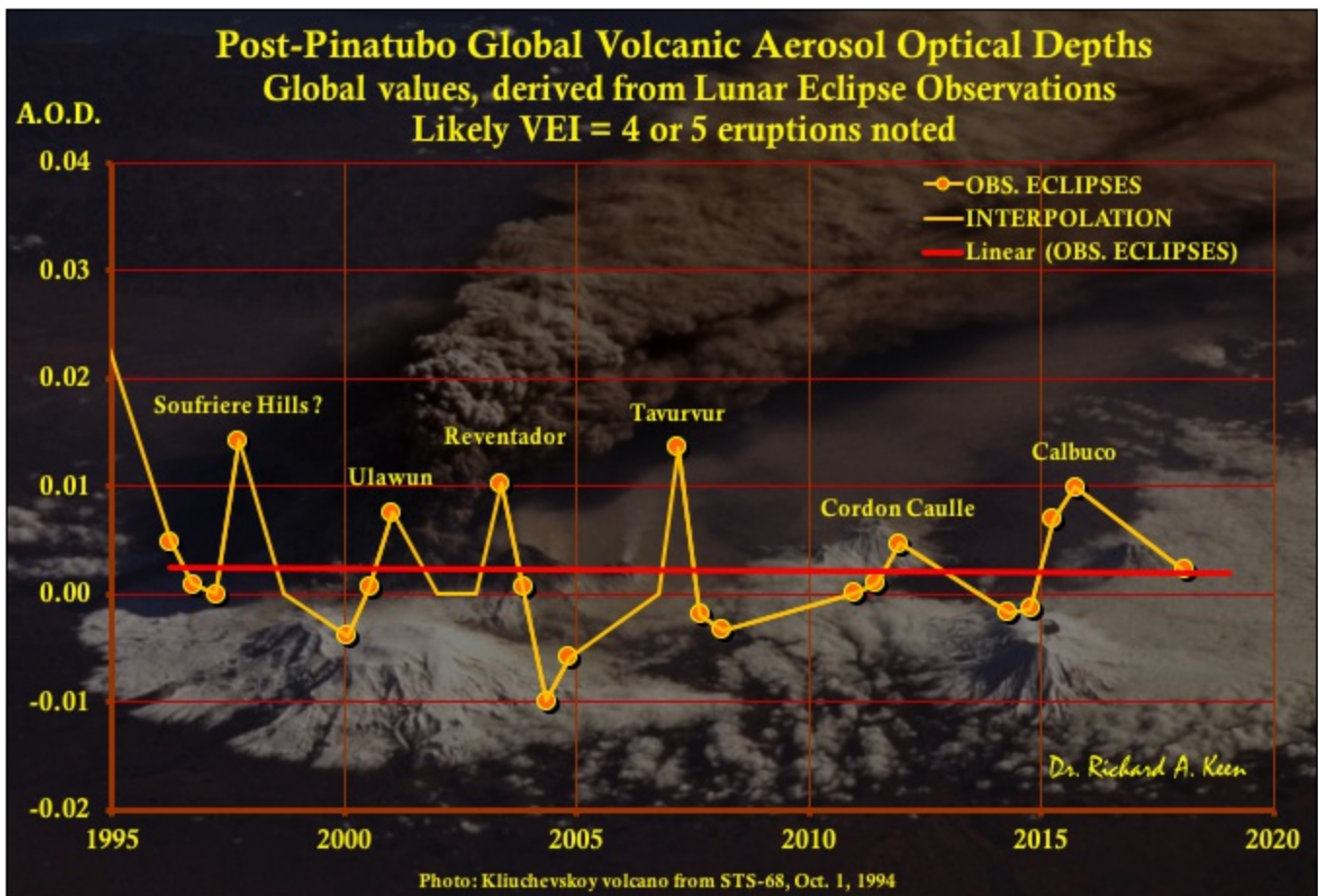


Figure 1. Global Volcanic Aerosol climate forcing during the post-Pinatubo era, 1996-2018.