

Abstract for AGU Chapman conference on Volcanism and the Atmosphere, Selfoss, Iceland, 11-15 June 2012

Title:

The chemical and dynamical responses of ozone and nitrogen dioxide to the eruption of Mt. Pinatubo.

Authors:

V. Aquila, L. D. Oman, R. Stolarski, A. R. Douglass

Abstract:

Observations have shown that the concentration of nitrogen dioxide decreased in both hemispheres in the years following the eruption of Mt. Pinatubo. In contrast, the observed ozone response was largely asymmetrical with respect to the equator, with a decrease in the northern hemisphere and little or no change in the southern hemisphere. Simulations including enhanced heterogeneous chemistry due to the presence of the volcanic aerosol reproduce a decrease of ozone in the northern hemisphere, but also produce a comparable ozone decrease in the southern hemisphere contrary to observations. Our simulations show that the heating due to the volcanic aerosol enhanced both the tropical upwelling and the extratropical downwelling. The enhanced extratropical downwelling, combined with the time of the eruption relative to the seasonal phase of the Brewer-Dobson circulation, increased the ozone in the southern hemisphere and counteracted the ozone depletion due to heterogeneous chemistry on volcanic aerosol.