

Estimation of the Volcanic Radiative Forcing for the Last 400 years

N G Andronova (Climate Research Group, Department of Atmospheric Sciences, University of Illinois at Urbana-Champaign, 105 S. Gregory Street, Urbana, IL 61801, USA; ph. 217-333-3819; fax 217-244-4393; e-mail: natasha@atmos.uiuc.edu); M E Schlesinger (Climate Research Group, Department of Atmospheric Sciences, University of Illinois at Urbana-Champaign, 105 S. Gregory Street, Urbana, IL 61801, USA; ph. 217-333-2192; fax 217-244-4393; e-mail: schlesin@atmos.uiuc.edu)

Based on our previous work (Andronova et al., 1999) and the recent reconstruction of the volcanic optical depth (Robertson et al., 2001), we estimate the instantaneous and adjusted volcanic radiative forcing for the last 400 years. As before, we use a representation of the zonal mean of the volcanic radiative forcing in terms of the zonal mean optical depth of volcanic aerosol, the solar insolation, the effective emitting temperature, the daylight fraction of a day, and the planetary albedo in the absence of the aerosol. For our estimation we use the reconstructed data of the solar insolation variation (Lean et al., 1999), while keeping other parameters at their present values. We compare the resulting volcanic radiative forcing with our earlier estimation for the industrial era (1850 - 1994) made with and without the variable sun, which was based on the reconstruction of volcanic aerosol optical depth by Sato et al. (1993).