Geophysical Research Abstracts
Vol. 15, EGU2013-10466, 2013
EGU General Assembly 2013

Global and regional precipitation anomalies following the 1991 Pinatubo eruption: Observations and ECHAM6 simulations

Angela Meyer, Ulrike Lohmann, and Thomas Peter
IAC, ETH Zurich, Switzerland (angela.meyer@env.ethz.ch)

We are assessing the performance of the general circulation model ECHAM6 in capturing global and regional precipitation responses to the 1991 eruption of Mount Pinatubo. With sea-surface temperatures prescribed according to observations, we find that the magnitude of precipitation anomalies is well captured regionally, but not globally. The sign of the simulated precipitation anomalies matches well the observed anomalies in the tropics and over North and South America, whereas the match is rather poor over Europe and Southern Africa. At horizontal resolution T31, our simulations do not show a significant post-eruptive decrease in global mean precipitation, as is distinctly found in global precipitation records. In comparison with observational records, the model at resolution T31 underestimates global land precipitation (by about 15 %, 4-yr average), whereas total precipitation and precipitation over the oceans are overestimated (by 8 % and 11 %, respectively). Further, the simulated total precipitation is significantly more variable than observed, while the simulated precipitation over land and over the oceans each are less variable than observed. Besides the often used parameterization of stratospheric aerosols by Stenchikov et al. (1998), we are assessing how a new set of aerosols based on an improved SAGE II extinction retrieval algorithm (Arfeuille et al., 2012) affects the match between simulated and observed precipitation anomalies. We will further present results from simulations of post-Pinatubo precipitation anomalies performed with the aerosol-climate model ECHAM6-HAM2 (Zhang et al., 2012).

Arfeuille, F. et al., 2012: Uncertainties in modelling the stratospheric warming following Mt. Pinatubo eruption, Atmos. Chem. Phys. Discuss., submitted.
Stenchikov, G. et al., 1998: Radiative forcing from the 1991 Mount Pinatubo volcanic eruption, J. Geophys. Res., 103(D12), 13837–13857.
Zhang, K. et al. 2012: The global aerosol-climate model ECHAM-HAM, version 2: sensitivity to improvements in process representations, Atmos. Chem. Phys., 12, 8911-8949.