Geophysical Research Abstracts, Vol. 8, 01352, 2006
SRef-ID: 1607-7962/gra/EGU06-A-01352

Improvements in global models based on new prognostic cloud and precipitation parameterizations

S. Iacobellis, **R. Somerville**

Scripps Institution of Oceanography, University of California, San Diego, USA
(rsomerville@ucsd.edu / Phone: +1-858-534-4644)

The goal of this work is to improve the realism of GCM treatments of key climate feedbacks, especially cloud-radiation feedbacks. We have used two state-of-the-art global atmospheric models to test the effects of newly developed prognostic cloud and precipitation parameterizations based on detailed treatments of cloud microphysics. The new schemes were first developed and evaluated against field program observations from the Atmospheric Radiation Measurement (ARM) program using a single-column model (SCM). They were next transplanted to a version of the NCAR Community Atmospheric Model (CAM) component of the Community Climate System Model (CCSM). They were also transplanted to a version of the NOAA/NCEP operational numerical weather prediction (NWP) Global Spectral Model (GSM). In the SCM, the new schemes produced much more realistic simulations of fields such as cloud fraction, downwelling surface shortwave radiation, and outgoing longwave radiation, relative to the GSM schemes when compared to measurements at ARM sites. In both global models, the new parameterizations also resulted in clear improvements in model realism. Global distributions of cloud water path and cloud amount were notably better modeled with the new schemes relative to the control versions of the CAM and GSM.