Session: C12 Poster: M42B

Object based evaluation of GCM-simulated clouds and radiation for the 1998 El Niño-La Niña transition

Gerald Potter[†]; Derek Poselt; Chuan-Yuan Hsu
[†] University of Michigan, USA
Leading author: glpotter@umich.edu

The ability to explore and predict the state of the physical climate via model simulation has become increasingly important in recent decades. In so doing, it is essential that the model demonstrate fidelity in simulations of the present climate. Though reproduction of climatological circulation features and radiative forcing is important, if a model is to be used to predict the future state of the climate, it must properly represent the process level interaction between components of the climate system. The El Niño Southern Oscillation serves as a convenient test of models as it involves an intimate coupling not only between ocean and atmosphere, but between clouds, radiation, and the large-scale overturning (Walker) circulation. In this paper we examine the extent to which convective cloud objects observed by NASA's CERES (Clouds and Earth's Radiant Energy System) instrument aboard the Tropical Rainfall Measuring Mission (TRMM) Spacecraft are properly represented in the NASA Goddard Earth Observing System (GEOS-5) model. We first examine the consistency between observed clouds and model output when it is used in the context of NASA's Modern Era Retrospective-analysis for Research and Application (MERRA). We then extend the comparison to free-running GCM simulations driven with observed sea surface temperature. In both comparisons, we exploit the fact that the convection and large scale circulation should exhibit a close relationship. This enables us to compare cloud objects with simulated clouds regardless of whether cloud systems were reproduced at the exact time and place they occurred.