

A Comparison of Tropical Convective Processes in the CAM and the Super-Parameterized CAM

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Abstract: Accurate representation of large scale tropical intraseasonal variability, such as the Madden-Julian Oscillation (MJO), has proven to be very difficult for many global climate models (GCMs). Recently, an AMIP-style run of the Community Atmosphere Model (CAM) v3.0 and the Super-Parameterized CAM (SP-CAM as described in Khairoutdinov and Randall 2001) was performed at Pacific Northwest National Laboratories. While the CAM shows very little MJO activity, the SP-CAM produces a very large and vigorous MJO disturbance. This study looks at the models' representation of several processes which are necessary for the operation of the Discharge-Recharge cycle as proposed by Bladé and Hartman (1993). This includes the vertical transport of moisture and destabilization of the free troposphere during the recharge phase, as well as the intense drying and re-stabilization of the column by downdrafts and westerly wind-bursts during the Discharge phase. It is proposed that these heating and drying processes are basic necessities for the generation of an MJO within a model.