



***Sensitivity of simulated tropical-cyclone-like vortices over the western North Pacific and boundary layer clouds over the Southeast Pacific to the choice of cumulus parameterization scheme in WRF-ARW***

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The simulated tropical-cyclone-like vortices (TCLVs) and tropical cyclones are very sensitive to the choice of cumulus parameterization (CP) schemes in the WRF-ARW model. The possible relationship between the TCLVs and environmental conditions unique to each CP scheme is explored. In particular, the link of the environmental conditions to convective self-aggregation is investigated. We used moisture-sorted analysis, especially the moisture-sorted streamfunction, to assess the processes and features that have been found in studies of self-aggregation and have been shown to be important in controlling self-aggregation.

Two versions of Tiedtke CP schemes have been implemented into the WRF-ARW model to improve the representation of marine boundary layer (MBL) over the southeast Pacific (SEP). The simulations with other CP schemes failed to reproduce the geographical distribution of cloud fraction and the observed cloud regime transition, and displayed an MBL too shallow compared to observations. The improved simulations with the Tiedtke schemes can be attributed to a more active parameterized shallow convection with the Tiedtke CP schemes than with the other CP schemes tested. This played a critical role in lifting the inversion base and the low cloud layer. Results from additional sensitivity experiments employing different planetary boundary layer (PBL) parameterization schemes demonstrated that the basic feature of the MBL structure and low clouds over the SEP were not particularly sensitive to the choice of the PBL scheme. However, the newly implemented E- $\epsilon$  PBL scheme can improve the geographical distribution of the cloud fraction over SEP.

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**Thursday, 12 January 2017, 3:30 PM**  
Refreshments 3:15 PM  
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Bldg. 2, Main Auditorium, Room 1022