Session: C1 Poster: M237B

The Asian-Australian Monsoon:The Western North Pacific summer monsoon simulated by GAMIL 1.0 :Influences of the parameterization of wind gustiness

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The performance of GAMIL 1.0, a grid atmospheric model developed by the State Key Laboratory of Numerical Modeling for Atmospheric Sciences and Geophysical Fluid Dynamics, in simulating the western North Pacific summer monsoon (WNPSM) is investigated. Influence of wind gustiness parameterization on the simulation is discussed. Results show that major features of both the mean state and interannual variability of WNPSM are reasonably reproduced in GAMIL1.0 simulation without wind gustiness parameterization, but the strength is underestimated. After the inclusion of wind gustiness parameterization, improvements are evident and mainly displayed as follows: the regional-mean precipitation increases from 5.71mm/d to 8.35mm/d, which is more close to the observation; the correlation coefficient between the simulated and observed monsoon indices rises from 0.66 to 0.82; the amplitude of interannual variability becomes larger; more important, the simulated "ENSO-monsoon" relationship is almost the same as the observation. Futher analysis indicates that the improvement in the mean state of rainfall should be attributed to the enhancement of surface latent heat flux over the western North Pacific, which is contributed by the increase of surface wind due to inclusion of wind gustiness parameterization. The better mean state favors the model responding more correctly to El Niño-type SST forcing and results in the improvement of interannual variability.