Effects of different cloud overlapping parameters on simulated total cloud fraction over the globe and East Asian region

Haibo Wang

The cloud overlapping parameter (vertical decorrelation length, Lcf) from CloudSat/CALIPSO is implemented in BCC_AGCM2.0 to reduce the uncertainly in radiation field. Comparing the results obtained by using the constant Lcf of 2 km with those using the above retrieved Lcf, it is found that the total cloud fraction simulation has been obviously improved by using the satellite-based Lcf. The error of global mean total cloud fraction between simulations and CERES is decreased by 1.6% in both the winter and summer, of which the positive deviation of total cloud amount at tropical convection area and the negative deviation in subtropical region both are significantly reduced. In East Asia, using the satellite-based Lcf can decrease the error of average total cloud fraction by 1.8% (1.4%) in the winter (summer). Overall, using Lcf from CloudSat/CALIPSO satellite data can improve the simulation of total cloud fraction and thus obtain more accurate simulation of radiation field.