



Regional climate model simulations of interannual and subseasonal variations of East Asian summer monsoon

Ren-Yow Tzeng, P.-L. Lin, and K.-H. Lu

Dept. of Atmospheric Sciences, National Central University, Chungli City 32054, Taiwan
(ren@atm.ncu.edu.tw)

The NCAR/PSU MM5 was used to perform the down-scale regional climate simulations of East Asian summer monsoon (5/18/31) for 1990~2001. The initial and lateral boundary conditions of the regional climate model (RCM, i.e., MM5) were extracted from the ERA-40 with 2.5°X 2.5° horizontal resolution and 12-hr time interval. There are two (nested) domains in the RCM with horizontal resolutions at 45 km x 45 km and 15 km x 15 km, respectively. Every simulation started at 00Z of 1 May and continuously integrated for four months (until 31 August). The output data were analyzed to investigate the short-term climate predictability, intra-seasonal oscillations, and interannual variations of East Asian summer monsoon.

The results show that the dynamical down-scale simulation can significantly intensify the synoptic-scale perturbations, particularly over lands, due to more detailed features of topography and vegetation. The model can not simulate well a strong meso-scale system (such as a tropical cyclone), if the system develops inside the model domain rather than migrates from the lateral boundary into the domain. Intra-seasonal oscillations near the lateral boundaries are well simulated by the model. However, the model can only capture the phase and amplitude of the first cycle of an intra-seasonal oscillation over the center of the model domain. In other words, the initial condition can affect the model simulation up to one month. Finally, the multi-year simulations show that the regional climate model can capture the annual variation, the quasi-biennial oscillation and the decadal oscillation of the East Asian summer monsoon.

Acknowledgements. This work was supported by the National Science Council of Taiwan, NSC projects (NSC 93-2111-M-008-020-AP4) and (NSC 94-2111-M-008-023-AP4).