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PARALLEL SESSION C : IMPACTS AND APPLICATIONS
C3: REGIONAL SCALE HYDROCLIMATE: FROM OBSERVATIONS TO MODELLING TO APPLICATIONS

Evaluation of Two Land Surface Schemes (BATS1se vs CLM4.5) in the simulation of the Southeast Asia Precipitation using RegCM4

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The performances of the ICTP Regional Climate Model Version 4 (RegCM4) in simulating the precipitation over the Southeast Asia with two land-surface schemes namely the Biosphere-Atmosphere Transfer Scheme version 1e (BATS1e) and Community Land Model version 4.5 (CLM4.5) were evaluated. The domain was that of the CORDEX Southeast Asia (i.e. 89.4891 E to 146.511 E, 14.8144 S to 26.9569 N) with the horizontal resolution of 25 km and 18 sigma vertical levels. Both simulations were forced with ERA interim and other identical physical parameterizations include the Holtslag Planetary Boundary Layer scheme, Emanuel cumulus pamaterization scheme over both land and ocean, SUBEX moisture scheme and Zeng scheme for ocean flux parameterization, in which the surface roughness length is assumed as a function of friction velocity and viscosity. The simulations were carried out for a period from 1 January 1989 to 31 December 2007 with the first year used as model spin-up. Precipitation from four gridded products (TRMM, ARPHRODITE, CRU and GCPC) were used as observed data. Generally, the BATS1e simulation systematically overestimated the precipitation amount throughout the domain compared with the CLM4 scheme which shows lower biases. This overestimation was clearly indicated in the annual cycles of precipitation of 20 sub-regions, although both schemes performed reasonably well in simulating the cycles. The year-to-year coefficient of variance of the precipitation for both the simulations was found to be similar and closely resembled that of the observations. The ratios of convective precipitation amount to total precipitation for both simulations are found to be similar but notably different from that of observation. This result suggests that shortcoming in the simulation may largely due to convective parameterization but not the land surface scheme. The simulation results of surface air temperature also indicate that both schemes produced cold biases with CLM tended to produce larger magnitude of cold biases compared with the BATS1e. However, both schemes reproduced the annual cycles of the surface tempearture of the 20 sub-regions reasonably well. Overall, the results show modest improvements have been achieved by using CLM4.5. However, further diagnostics are still needed in identifying major deficiencies in the simulation.

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