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Assessment of Snow-Water Equivalent Change in Regional Climate Simulations Coupled with Different Land Surface Models

Barış Önol and Merve Acar

Istanbul Technical University, Aeronautics and Astronautics Faculty, Meteorological Engineering, Istanbul, Turkey (onolba@itu.edu.tr, +90 0212 2852926)

In this study, ICTP-RegCM4 simulations coupled with two land surface models, BATS (Biosphere Atmosphere Transfer Scheme) and CLM (Community Land Model), have been evaluated for present (1971-2000) and future period (2005-2100) over the Med-CORDEX domain. HaDGEM2 simulations forced by RCP8.5 have been used for lateral forcing to produce 50-km RCM simulation. In addition, we have also tested model results, driven by ERA-Interim, with observations to define deficiency of the model. Precipitation simulation biases are positive for nearly all over Anatolian mountains range (>1000m) in winter. The diverse bias pattern in precipitation is also calculated over lower regions of Alps and Turkey (<500m). Snow-water equivalent changes in future climate simulations are evaluated for two land surface models, BATS and CLM. Snow-water equivalent (SWE) has been analyzed considering snow-melt timing in spring season. In terms of SWE over Balkans, CLM simulation in April is not produced snow after the year of 2040. The dramatic decrease in SWE has been also determined for the highland of Turkey (>1500) in last three decades of the 21st century for both CLM and BATS simulations. After 2050's, SWE in CLM simulaton is less than 5 mm for the areas over Turkey where the elevation is lower than 1000 m. The decrease in BATS simulation is strengthened in the second half of century over the Alpine region (>1000m) and SWE change between the first and the second half of the century is 47% (67 mm). Especially, precipitation minus evaporation changes are diverse for both CLM and BATS driven simulations. The results based on daily and monthly time scales have been evaluated to assess hydrological impact in scenario simulations and snow-melt season shift for both simulations have been investigated over Med_CORDEX domain.