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Improving Modeling of the Summer Climate of Semi-Arid Regions

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Presented is a study on the importance of certain land surface processes in accurately simulating the summertime climate of Southwest Asia. A nearly 4 degree C bias is simulated in summertime temperatures, by standard Regional Climate Model version 3 (RegCM3). Biases are also found in surface albedo, shortwave incident, and surface vapor pressure. Using satellite data, (Earth Radiation Budget Experiment-ERBE) modifications are introduced to match simulated surface albedo to the ERBE data. In addition, by incorporating RegCM3's dust module with sub-grid variability, surface shortwave incident biases are reduced. Lastly, representing the irrigation and marshlands of Mesopotamia reduces vapor pressure deficits in the region. All of these factors combined, along with errors in observational datasets, account for the 4 degree C warm bias in RegCM3 simulations. We conclude that accurate representations of albedo, irrigation, and dust emissions are important processes to be included for accurate summertime climate modeling in semi-arid regions around the world.