CLIMATE – POSTER #15

Evaluation of the performance of regional climate simulations using the teleconnections between the El Niño-Southern Oscillation and western United States precipitation and temperature

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In global climate modeling, regional climate models are often used to create higher resolution simulations than global climate models can provide. These high resolution simulations are important, as they provide regional and local predictions to be used in managing future resources, ecosystems, and hazards. Therefore, to correctly simulate climate in the western US, it is important that the regional climate models are properly transferring the signals from interannual climate variability, such as El Nino/Southern Oscillation (ENSO), through the lateral and bottom boundaries of the model. In order to evaluate the performance of seven RCMs, we analyze the transfer of teleconnections from ENSO, through the boundaries of the RCMs, resulting in Western U.S. precipitation and temperature patterns. The RCMs include six members of the North American Regional Climate Change Assessment Program and the Desert Research Institute's RCM. Using regression and principal component analysis, the temperature and precipitation outputs of each RCM are compared with three ENSO indices: (1) the Multivariate ENSO Index; (2) the Eastern Pacific Index; and (3) the Central Pacific Index. Each index was calculated from the global climate model (GCM) used to initialize the RCMs. The results of comparisons to observations show that the RCMs are simulating interannual variability due to ENSO well. The patterns are well replicated regardless of the boundary chosen. However, there are some marked differences in both the extent and magnitude of the correlations. Furthermore, the RCM correlation analyses adequately represent regression patterns across three different ENSO indices, indicating that patterns related to each type of ENSO are being transferred to the RCMs through the boundaries. Additionally, both the NARCCAP participants and the DRI-RCM provide added value to the predictions, especially in the regions of complex terrain in the Western U.S.