Geophysical Research Abstracts
Vol. 19, EGU2017-11300, 2017
EGU General Assembly 2017

Midsummer Drought Pattern simulated by a coupled regional climate model

Benjamin Martinez-Lopez (1), William David Cabos Narvaez (2), Dmitry Sein (3), and Arturo Quintanar (1)

(1) Center for Atmospheric Sciences, Universidad Nacional Autonoma de Mexico, Mexico City, Mexico (benmar@atmosfera.unam.mx), (2) Department of Physics and Mathematics, Universidad de Alcala de Henares, Madrid, Spain (william.cabos@uah.es), (3) Department of Climate Dynamics,Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research, Bremerhaven, Germany (dmitry.sein@awi.de)

In this work, a regional climate model of limited area, in both atmospheric and coupled mode, is used to simulate the historical period over a domain including Mexico and Central America. In the atmospheric mode, the REMO atmosphere model is used, while in the coupled simulation, REMO is coupled to the MPI-OM ocean model. In all simulations, REMO is driven at the open boundaries by reanalysis data from ERA-40. Several numerical experiments are performed using three different spatial resolutions (100 km, 50 km, and 25 km). Taylor diagrams of some meteorological and oceanic variables are used to get a quantitative idea of model performance. Additionally, the observed patterns of the Midsummer Drought are compared with the simulated ones. Among the results, it is noted that the coupled model with the highest resolution has the best performance to simulate the observed pattern of the Midsummer Drought. Over the eastern Pacific warm pool region, the coupled simulation generate fields of sea surface temperature, wind, and sea level pressure gradients more consistent with independent observations that those simulated in the atmospheric mode. In particular, the wind strengthened observed in July is well reproduced in the coupled simulation, which lead to higher values of vertically integrated water vapour transport coming from both the eastern tropical Pacific and the Caribbean. Despite the increased atmospheric humidity available above this region, the simulated fluxes are divergent and therefore the precipitation is reduced in July, in agreement with the observations. This July divergence in the vertically integrated water vapour transport is not present in the atmospheric mode.