Geophysical Research Abstracts
Vol. 20, EGU2018-15325, 2018
EGU General Assembly 2018

Regional downscaling of global multiyear predictions for Mexico

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In this work is presented a verification of a series of regional decadal prediction experiments for Central America. The global hindcast predictions are carried out using the low resolution (LR) MPIOM/ECHAM6 MiKlip decadal prediction system. Our downscaling approach uses a global ocean model, with regionally high horizontal resolution, coupled to both an atmospheric regional model and a global terrestrial hydrology model. Lateral atmospheric and upper oceanic boundary conditions outside of the coupled domain are prescribed using the MiKlip decadal prediction fields. We downscale three simulations from a set of 10-yr global hindcasts predictions, which were choosen for having the best, worst and mean skill in predicting the SST in the regional model domain.

Our results show that, in general, the best model performance is found over the Pacific coastal regions, from El Salvador to the North Pacific Watershed in Mexico. The model had particularly poor performance over northeastern Mexico, the northern coast of Honduras, and western Guatemala. In agreement with all available observations, the model predicts severe reductions of rainfall over southern Mexico after the mature warm phase of ENSO events in 1982/1983, 1997/1998, and 2014/2015. The model's performance simulating the last ENSO is striking, considering that these runs started on 1st of January 2013.