



Tropical cyclones in an ensemble of regional climate change projections with RegCM4 for the CORDEX Central America domain

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The characteristics of tropical cyclones (TCs) over the Central America CORDEX domain is examined for present and future climate conditions using an ensemble of RegCM4 projections nested in two CMIP5 global models.

The regional climate model is first tested in a 22 year (1982-2003) simulation with lateral and surface boundary forcing from the ERA-Interim reanalysis, showing a generally good performance in reproducing the observed TC climatology.

Four scenario simulation (1970-2100, RCP8.5) are generated using two model configuration (CLM-EMAN and BATS-Grell) and two driving GCMs (HadGEM2-ES and MPI-ESM).

The simulations employing the Grell scheme produced too low TC counts, while those using the Emanuel scheme reproduced the observed climatology, especially when driven by the MPI-ESM model.

The simulation of TCs was thus sensitive to both the model convections scheme and forcing GCM. Comparison of future and present day TC climatologies indicates that the frequency of future TCs decreases over the tropical Atlantic and the eastern Pacific coastal areas while it increases over the Central Pacific and the northern part of the Atlantic.

We also find a consistent increase in the frequency of intense TCs and a northward shift of TC tracks over the Atlantis. These findings are generally consistent with previous global and regional modeling studies and are suggestive of important effects of global warming on the characteristics of TCs in the tropical Atlantic and Pacific basins.