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PARALLEL SESSION A : BENEFITS OF DOWNSCALING
A2: MODELS OF THE COUPLED REGIONAL CLIMATE SYSTEM

The role of internal and external variability in the simulated Caribbean climate

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The geographical location of the Caribbean Sea makes it a crossroads to different climate signals that contribute to shape its mean state and variability, adding to its own regional factors. The roles of internal and external forcings in the Caribbean climate is pursued in this study by means of simulations with the regional coupled atmosphere-ocean model ROM. The model includes a global ocean with regionally high horizontal resolution, which is coupled to an atmospheric regional model and global terrestrial hydrology model. The coupling is only effective within a selected domain, where the ocean and the atmosphere are interacting. Outside this domain, the ocean model is uncoupled, driven by prescribed atmospheric forcing, thus running in a so-called stand-alone mode. Therefore, selecting a specific area for the regional atmosphere implies that the ocean- atmosphere system can develop 'freely', but for boundary conditions, in that area, whereas for the rest of the global ocean, the circulation is driven by prescribed atmospheric forcing without any feedbacks. Simulations with various coupled domains, centered on the region of interest and including different neighboring areas with a possible impact on the Caribbean climate, allow to identify what that influence amounts to and how the internal variability is affected by diverse elements. Four different coupled setups are chosen for ensemble simulations. The choice of the coupled domains was done to estimate the influences of the Subtropical Atlantic, Tropical Atlantic and Tropical Pacific regions on the Caribbean climate. Our simulations show that the regional coupled ocean atmosphere model is sensitive to the choice of the modeled area. The different model configurations reproduce differently both the mean climate and its variability. The mechanisms explaining such differences are diagnosed, and the key processes for a realistic simulation of the Caribbean climate are pointed out. Attention is given to the representation in our runs of relevant players in the climate fluctuations of the region, such as the Caribbean Low Level Jet.

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