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- towards climate change services

Performance of tropical channel simulations using the WRF model: Ethiopian rainfall responses to microphysical and cumulus parameterization schemes

D. Korecha (1), T. M. Lunde (2,3,4), M. d. S. Mesquita (2), and A. Sorteberg (3)

(1) National Meterological Agency, Addis Abeba, Ethiopia (diriba.korecha@gmail.com), (2) Bjerknes Centre for Climate Research, Regional Modeling, Bergen, Norway , (3) Geophysical Institute, University of Bergen, Bergen, Norway, (4) Centre for International Health, University of Bergen, Bergen, Norway

There are three distinct seasons in Ethiopia: the dry season (October-January), the short rainy season (February-May) and the major rainy season (June-September). The major rainy season is mostly characterized as the south-west monsoon-type. It is largely modulated by: a) synoptic-scale systems; b) the presence of El Niño Southern Oscillation (ENSO) events, along with the formation of the Indian Ocean Dipole (IOD); and c) the Interconvergence Zone (ITCZ), which plays a substantial role in controlling the spatial and temporal rainfall coverage throughout the year.

We have used the Weather Research & Forecasting model (WRF) 3.2 to assess how the major rainy season is represented for Ethiopia. A tropical channel, covering an area from 45S to 45N at a 50 km resolution, was set up. It was driven by ERA Interim Reanalysis data at the north and south boundaries. In the initial phase, we focused on six different experiments where we combine three microphysical, and two cumulus parameterization schemes. Namely, Hong-Dudhia-Chan's 3-class scheme, Hong-Lin's 6-class, and Milbrandt-Yau's double-moment 7-class scheme, combined with Kain-Fritsch and Betts-Miller-Janjic cumulus parameterization schemes.

Evaluation is done in two stages. The set of six two-years runs will be evaluated based on the performance related to Ethiopian spatial and temporal rainfall patterns. These results will be used in a longer climatological run which will let us assess to what extent the model simulate station-based rainfall climatologies.

Results will be shown with respect to space-time variability of Ethiopian rainfall.