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Regional climate simulations over Africa using WRF Model: Sensitivity to the dynamical downscaling methods.

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The main objective of the CORDEX program (COordinated Regional climate Downscaling Experiment) [1] is the production of regional climate change scenarios at a global scale, creating a contribution to the IPCC (Intergovernmental Panel on Climate Change) AR5 (5th Assessment Report). Inside this project, Africa is the key region due to the lack of data at this moment.
In this work, a sensitivity study is performed over the CORDEX-AFRICA domain with the same physical parameterizations and using five different WRF configurations: a long-term continuous run, a monthly re-initialized run, a monthly re-initialized run with soil variables fixed, a long-term continuous run with analysis nudging over the planet boundary layer (PBL) and a long-term continuous run with analysis nudging at the whole atmospheric column. These simulations, driven by ERA-Interim data [2] as initial and lateral boundary conditions and with a 50 km spatial resolution, were performed over the 5-year period between December 1990 and December 1995.
In order to assess theperformance of the simulations several statistics, such as correlation coefficient (r), bias, root mean square (RMS) and a defined skill score (SS), based on the difference between areas of the probability density functions (PDFs) associated to study parameters [3], were applied using ERA-Interim, CRU-TS 3.1 and University of Delaware database as validation data for some variables, such as near-surface temperature, precipitation and moisture fluxes.

References
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