

Development of the regional climate model version RegCM4 and tests over multiple CORDEX domains

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A new version of the RegCM4 regional climate modeling system, RegCM4, has been recently developed and made available for community use. Compared to previous versions, RegCM4 includes new land surface, planetary boundary layer and air-sea flux schemes, a mixed convection and tropical band configuration, modifications to the pre-existing radiative transfer and boundary layer schemes and a full upgrade of the model code towards improved flexibility, portability and user friendliness. The model can be interactively coupled to a 1D lake model, a simplified aerosol scheme (including OC, BC, SO₄, dust and sea spray) and a gas phase chemistry module (CBM-Z). The paper presents a general description of the model along with a series of test experiments over multiple domains prescribed under the CORDEX framework (Africa, Europe, East Asia, West Asia, South America, Central America) to provide illustrative example of the model behavior and sensitivities under different climatic regimes. These experiments indicate that, overall, RegCM4 shows an improved performance in several respects compared to previous versions, although further testing by the user community is needed to fully explore its sensitivities and range of applications. It is planned to use RegCM4 to conduct the suite of regional climate simulations planned under the CORDEX framework.