

Validation and Projections for Solar Radiation up to 2100: HadGEM2-AO Global Circulation Model

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Abstract : The objective of this work is to evaluate the results of solar radiation projections between 2006 and 2013 for the state of Rio Grande do Sul, Brazil. The projections are provided by the General Circulation Models (MCGs) belonging to the Coupled Model Intercomparison Phase 5 (CMIP5). In all, the results of the simulation of six models are evaluated, compared to monthly data, measured by a network of thirteen meteorological stations of the National Meteorological Institute (INMET). The performance of the models is evaluated by the Nash coefficient and the Bias. The results are presented in the form of tables, graphs and spatialization maps. The ACCESS1-0 RCP 4.5 model presented the best results for the solar radiation simulations, for the most optimistic scenario, in much of the state. The efficiency coefficients (CEF) were between 0.95 and 0.98. In the most pessimistic scenario, HADGen2-AO RCP 8.5 had the best accuracy among the analyzed models, presenting coefficients of efficiency between 0.94 and 0.98. From this validation, solar radiation projection maps were elaborated, indicating a seasonal increase of this climatic variable in some regions of the Brazilian territory, mainly in the spring.

Keywords : climate change, projections, solar radiation, validation

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