



Assessing the Impact of El Niño and La Niña on Brazilian wind-power generation with reanalysis based simulated time series

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Brazil's hydropower generation, which makes up the majority of electricity generation, is subject to significant inter-annual variability. In order to reduce risks in the system and to increase power generation due to growing demand, it has become necessary to promote other generation technologies, in particular from renewable resources. Wind power has high potential, especially in the North-East region of Brazil. To assess if the El Niño and La Niña cycles have an influence on wind power generation, a model for the long-term simulation of wind power generation (i.e. 1980-2016) in Brazil has been developed. The model is based on MERRA-2 reanalysis wind speed data and corrected with wind speeds measured by the National Meteorological Institute (INMET) and with wind power generation data from the homepage of the National Electrical System Operator of Brazil (ONS), and is spatially disaggregated to the level of states. Different methods of interpolation, data cleaning, and bias-correction were tested, to find the best procedure for the simulation of wind power generation. Finally, impacts of El Niño and La Niña on annual wind power generation are assessed. Results show that applying bias-correction, using wind power generation data, substantially improves the quality of the simulated time series. In contrast, bias-correction with wind speed data did not improve results very much. In most tested settings, the best results are obtained when Nearest Neighbour Interpolation is used with wind power bias correction. Results are, however, differing significantly between single states. First preliminary results with El Niño and La Niña indices are not conclusive yet.