Validation of WRF and BRAMS for one way downscaling of precipitation in Portugal

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Portugal is affected by rainfall spatio-temporal variability, including severe drought episodes and heavy precipitation events. This variability has dramatic impacts on socio-ecological systems: these extreme events are linked with natural disasters such as landslides and forest fires, with obvious effects on wildlife, human economic activities and even human lives. To prevent and mitigate the impact of such events, a weather forecast and climatic advice web system was implemented, based on simulations provided by the Advanced Weather Research and Forecasting numerical model (WRF-ARW) and the Brazilian Developments on the Regional Atmospheric Modelling System (BRAMS). The performance of these models was evaluated using two sets of different physical parameterizations schemes for WRF and one for BRAMS, and one-way dynamical downscaling technique trough simulating for 3 day period every day of January and July 2016. The parametrizations set differs on the lower layers of the atmosphere, short- and long-wave radiation, and cumulus schemes. The models were forced by ERA - Interim reanalysis and GFS forecast data over a downscaling spacing resolution of 27 km for Iberian Peninsula and 9 km for Portugal. Daily and hourly simulations were compared with available daily precipitation measurements in official Portuguese weather stations using statistical metrics. The study was able to parametrize reliable physic configurations schemes for the WRF and BRAMS models. Obtained results confirm the usefulness of these models to provide accurate weather forecasts for the general public and especially to predict extreme events with impacts on agroforestry systems.