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Probabilistic quantitative precipitation forecast from a short-range and high resolution model over a region of Argentina

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This work examines the relationship between the forecasted precipitation amount and the occurrence of precipitation over a region of La Plata Basin in Argentina, and analyses the predictive capability of this relationship through probabilistic quantitative precipitation forecasts (PQPF) approach. This analysis is based on the outputs of a single model where uncertainty associated with precipitation features position is addressed by spatially shifting the forecasted precipitation fields. Given the highly unpredictable character of the mesoscale features of precipitation fields, the continuous increase in model resolution poses an extra challenge to the probabilistic quantitative precipitation forecasts (PQPF) as well as for the quantitative precipitation forecast (QPF). To explore the relationship between the QPF and the PQPF, 6-12 hours high resolution accumulated precipitation forecasts generated by the Brazilian Regional Atmospheric Modeling System, version 4.2 (BRAMS, Freitas et al 2009) are used. The experimental period is one month long during the Austral warm season. Since November 2010 the BRAMS model is part of an experimental high-resolution forecast carried out at the National Meteorological Service of Argentina. Forecasts are initialized once a day with an horizontal resolution of 2 km. The model is integrated up to 24 hours to produce night time precipitation forecasts. The night time period is selected because this is the period of greatest convective activity over the selected domain. However future plans contemplates an increase in the number of initialization in order to capture day time convection as well. Logistic regression methodology and the Climate Prediction Center morphing technique (CMORPH) estimates are used to calibrate PQPF. In the region under study results show a strong relationship between the observed and forecasted precipitation. Calibrated PQPF derived from BRAMS forecasts are reliable and provides a useful guidance for the forecast of precipitation occurrence, moreover at short forecast lead times the skill of the PQPF forecast is similar to that obtained with short range ensemble systems. The use of CMORPH data could introduce a slight degradation in the resulting PQPF due to the presence of systematic biases in this precipitation estimates. However there is no other precipitation data available over the domain with the required temporal and spatial resolution.