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Hindcast experiments of ensemble streamflow forecasting for the Paraopeba river (Brazil)

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Streamflow forecasts are routinely produced and used in Brazil to predict inflow to major hydropower reservoirs . In this field of application quantitative precipitation forecasts are becoming increasingly used to extend the range and increase the skill of streamflow forecasts. Forecasting systems designed to provide flood alert, on the other side, are relatively rare in Brazil, and are often based on simplified river routing models. However, a number of recent floods with significant loss of lives and economical impact is now motivating the creation of a new governmental institution dedicated to natural disaster and flood forecasting. This will further motivate the incorporation of numerical weather predictions (NWP) as input data to hydrological flood forecasting models, with the aim of increasing forecast lead time. In this context ensemble meteorological forecasts will be increasingly useful, since it is expected that ensembles can give some idea of the confidence level of the forecasts, and that extremes can be better captured by a high number of NWP runs with different initial conditions, or with different meteorological models. Silva Dias and Moreira (2006) organized a grand ensemble including several different models and model members for South America. We used forecasts of individual models of this grand ensemble to run a series of streamflow hindcast experiments (in forecast mode), using the MGB-IPH hydrological model. These tests were conducted in the Paraopeba river basin, which is a tributary of the São Francisco river, located in Minas Gerais State, in a Tropical region in the range from 21 S to 19 S. Results of 72 hour streamflow forecasts were compared to hourly observed discharge at Porto Mesquita gauging station, were the drainage area is 10280 square kilometers, during the Austral Summer of 2011. Results were assessed by visual inspection of hydrographs and by the analysis of a number of summary statistics. These preliminary results suggest that the ensemble spread generally includes the observed streamflow, even during floods. Results also suggest that a very simple combination of the individual forecasts obtained by averaging the forecasting hydrographs is a better predictor of future river discharge than any other individual run. In future work this analysis will be extended to a wider area, with other river gauging stations, and to a time range of several years.