1. Context

Water resource forecasting (water levels, river flow and water temperature) is an important need of the electricity sector, as it impacts two essential components of the system : hydropower production and thermal plants cooling. The annual and interannual variability of water resource is high. Hence, accurate forecasts are necessary from hours (security and flood alerts) to one year ahead (optimal management of the reservoirs).

Local precipitations forecasts at the scale of the basin are necessary to allow optimal operation of hydraulic power plants and reservoirs. The actual operational process provides precipitation forecasts up to 7 days. The goal, here, is to extend this period to the upcoming 32 days. We used ECMWF monthly forecasts from October 2004 to October 2009 (262 forecasts, each consisting in 50 member ensemble forecasts).

3. Results : Analog Vs Raw Forecasts

Change in RMSE :

(+) RMSE(clim) > RMSE(analog forecasts)
(-) RMSE(clim) < RMSE(analog forecasts)

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4. Application

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5. Conclusions

- The electricity sector is one of the most important users of weather, water and climate data and forecasts. Downscaling techniques can help in adapting the gridded model forecasts to the relevant user’s space and time scales. The continuity and linkages between decision processes at different time scales clearly ask for seamless approaches in weather and climate forecasting for the energy sector.

- Analog approach is attractive in practical applications for water resource management and advanced flood warning systems. This method presents significant performances, is cheap and quick.

- Moreover, we have identified ways to further improve the model by:
  - testing of different similarity criterions between two patterns
  - optimizing the choice of predictors used to characterise weather conditions.

- The analog predictions were used to forecast monthly cumulated inflows at Serre-Ponçon reservoir. Analog forecasts do a much better job than the classical approach, especially in very cold conditions.

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