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Title: Skill of an ensemble forecast of discharges in the Madeira's Basin

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Abstract:

We evaluated the accuracy of seasonal prognostic of discharges in the Madeira<92>s Basin, in the Amazon. The Madeira River is the most important Amazonian tributary, with a drainage area of about 1420000 km² across Bolivia (51%), Brazil (42%) and Peru (7%) and a mean discharge at its mouth in the Amazon of about 31.704 m³ s⁻¹. Brazilian government is driving investments for the construction of two major dams for hydroelectric power production in the basin: UHE Santo Antonio (firm energy capacity of 3,150 MW, net head of 19 m) and UHE Jirau (3,750 MW and a net head of 15.1 m).

Accurate forecast of inflows to reservoirs are useful to apply successful operational policies in the dam. The main difficulty in forecasting discharge, by applying atmospheric forecasts to hydrological models, is based in the high non-linearity and complexity of the climate system and in the uncertainties associated to the simulation of convective processes. This issue has been assessed through the use of ensemble forecasts technics, where the uncertainties in atmospheric forecasts are translated to discharge forecast using hydrologic models.

We applied the Eta/CPTEC model seasonal forecast to feed the Distributed Hydrological Model of the National Institute for Space Research (MHD-INPE). Eta/CPTEC seasonal ensemble forecast is carried out in integrations of four month, with a resolution of 15 km and five members. Hydrological integrations are carried out in a daily time-step. Initial conditions for the hydrological model are obtained from simulations using observed data. The skill of the ensemble forecast generated is evaluated using measured discharges at gauge-stations in the basin. Results show the potential of Eta/CPTEC forecast to obtain useful inflows forecast in the Madeira<92>s Basin.

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