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ANALYSIS OF SUB SEASONAL STREAMFLOW FORECASTS FOR HPPs RESERVOIRS AT SOUTH AMERICA BASED ON ECMWF AND GEFS MODELS DATA

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The flow forecast is used in several sectors of society, bringing benefits in relation to the mitigation of possible impacts in flood events and it is information of great value for the economic sectors associated with agriculture and energy generation. In South America, climate and meteorological variability directly impact these economic sectors. In Brazil, for example, the production of electricity is predominantly hydroelectric generation, which currently represents about 63% of the installed power in the country, in addition to the complementarity between different hydrographic basins and the other sources that make up the Brazilian energy matrix.

The Brazilian electricity sector relies on flow forecasts for different time scales, which are used to optimize the available water resources and for the energy commercialization. The National Electric System Operator (ONS) is responsible for coordinating the operation of 153 Hydroelectric Power Plants (HPPs) and uses different hydrological models for flow forecasting. For the 14-day horizon (short term) it's used the deterministic rain-flow model called SMAP. For the horizon of 15 to 45 days (sub seasonal) it's used the PREVIVAZ, a univariate stochastic model.

This work presents the evaluation of the performance of the SMAP model for forecasting in a sub seasonal horizon for 6 reservoirs in the Iguaçu River basin, associated with HPPs with a total installed capacity of 7,024 MW, located in the southern region of Brazil. Streamflow forecasts were evaluated using the European Center for Medium-Range Weather Forecasts (ECMWF) sub seasonal forecast, with lead time up to 46 days, from the Subseasonal-to-Seasonal (S2S) project database, and using the Global Ensemble Forecast System (GEFS) sub seasonal forecast, with lead time up to 35 days, from the National Centers for Environmental Prediction (NCEP) of the National Oceanic and Atmospheric Administration (NOAA).

The results showed that the flow forecasts for the sub seasonal horizon present good performance for the initial forecast horizon, with degradation in the quality of the results after this horizon. There was also evidence of gain associated with forecasts for the ensemble over the entire horizon. The use of the SMAP model combined with precipitation forecasts in the sub

seasonal horizon proved to be superior to the PREVIVAZ model, currently in use at the National Electric System Operator (ONS), with a significant improvement being observed, evidencing the usefulness of flow forecasts based on numerical models of precipitation prediction for the sub seasonal horizon.

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