

Upskilling - Uncertainty reduction and representation in seasonal forecasting

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Abstract: Forecasting streamflow over the next month, season and multiple seasons is a challenging task, because the predictability of climate over these forecast horizons is low. On the other hand, initial conditions of soil moisture, groundwater and other water stores in a catchment can have some relatively predictable effects on streamflow in the months ahead. State-of-the-art streamflow forecasting methods aim to (1) quantitatively capture, as much as possible, both sources of streamflow predictability and (2) statistically represent the remaining predictive uncertainty in a reliable manner.

In this talk, we will present learnings from research work undertaken over a number of years in CSIRO, in collaboration with the Bureau of Meteorology, on improving forecast skill and statistical reliability. Research to be highlighted includes: the development of the Bayesian joint probability (BJP) method, which is the operational forecasting model used by the Bureau of Meteorology; model selection and combination; incorporating dynamical model outputs into the BJP model; merging statistical and dynamical forecasts; methods for improving climate forecasts, in particular, the calibration, bridging and merging (CBaM) method for post-processing climate model forecasts; and a dynamical model for generating forecast guided stochastic scenarios (FoGSS) of monthly streamflow time series out to 12 months. We will close the talk by giving a brief view of current and future work.

Keywords: *Ensemble forecasting, Seasonal forecasting; Streamflow; Climate; Skill; Reliability*