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Performance measures for probabilistic hydrologic forecasts used at BC Hydro and Hydro-Québec

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Hydroelectric utilities like BC Hydro and Hydro-Québec optimise reservoir operations using reservoir inflow forecasts. Considerable effort is made to provide accurate seasonal hydrologic forecasts using probabilistic techniques. However, it is a big challenge to adequately assess and communicate a sense of forecast skill.

In this presentation, we use statistical verification measures and skill scores to analyze the quality of probabilistic hydrologic forecasts. Verification statistics of a snowmelt-dominated basin in British Columbia are presented. The results show that deterministic ensemble mean residual forecasts issued early in the season are skillful and from mid-season onwards are highly skillful. However, probability distributions of residual water supply issued early in the season are only as good as climatological ensembles, while from mid-season onwards probability distributions are skillful. It is shown that the skill of the ensemble distribution lies in forecasting the snowmelt-dominated months, which bear heavy weight on the seasonal runoff volume and effectively offset the inaccuracies of the other forecast months. It is concluded, that deterministic mean ensemble forecasts are more skillful than the forecast ensemble distribution due to an under-representation of forecast uncertainty.