Simultaneous verification of monthly ensemble low-flow and snow resources forecasts in Swiss Alpine regions

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The ECMWF VarEPS 5-member ensemble reforecast is a useful tool to test the forecast skills of hydrometeorological models for various applications. The 18 years of this reforecast allow generating time series of daily runoff forecasts with lead-times of up to 32 days. Thus, seasonal variations, such as snow accumulation and snowmelt are shown under different conditions. Within this period the focus of the verification of the obtained forecasts lies on low stream flows and the derived indices duration, severity and magnitude.

Ensemble runoff predictions with the Precipitation-Runoff-EVApotranspiration Hydrotope model (PRE-VAH) are verified for different initial conditions. The verification focuses on the runoff and snow component in different catchments. While runoff is verified against observed data at the catchment outlet, snow water equivalent is verified for different elevation bands. As an observed benchmark we adopt a daily spatial reanalysis of snow water equivalent that is obtained by combining snow depth and snow density observations.

Results suggest that a good quality of the runoff initialisation contributes to forecast skill of the runoff during low flow conditions in the longer range.