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Air temperature induced uncertainty in real time flood forecasting over alpine basins

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Coupling meteorological and hydrological models is recognized by scientific community as a necessary way to forecast extreme hydrological phenomena, in order to active useful mitigation measurements and alert systems in advance.
In order to quantify uncertainty of flood prediction, the hydrological community is increasingly looking at the use of Ensemble Prediction System (EPS) that produce a suite of predictions in contrast to a single forecast of traditional deterministic modelling techniques. Due to an increase in computation power and data transmission rates we are now in a position to use ensemble predictions effectively also for operational flood forecasting, but accurate reliability analysis should be performed.
The goal of this work is to evaluate how the uncertainty of EPS meteorological forecasts influences the performance of hydrological predictions in terms of Quantitative Discharge Forecast (QDF) over alpine basins, focusing the attention on precipitation and air temperature. We show that air temperature is a crucial feature in determining the partitioning of precipitation in solid (snow) and liquid phase (rainfall) and snow melting, therefore having possibility to significantly affect river discharge prediction in autumn and spring seasons even if good accuracy of precipitation forecast was reached.