

Title: Catchment classification and PUB

Special Issue statement

The Predictions in Ungauged Basins (PUB) initiative is aimed at developing a range of strategies to quantify and reduce predictive uncertainty. One of the strategies adopted by PUB that is gaining increasing attention is the idea of catchment classification, which refers to a systematic organization of the vast number of catchments around the world into a small number of classes. Successful catchment classification represents a fundamental theoretical advance, which will assist us in making *a priori* assessments of catchment responses on the basis of generally available climate and landscape characteristics. Catchment classification can also help us to advance the building of parsimonious models, focusing on processes that dominate the predictions of interest, thus minimizing model structure and parameter uncertainty. From a data perspective, they will also help us to identify and access supplementary measurements or datasets in targeted ways so as to reduce predictive uncertainty.

Catchment classification arises from the notion of hydrologic similarity, which is based on a deeper understanding of the interactions between climatic inputs and landscape properties. Hydrologic responses at the catchment scale can be distilled into characteristic signatures which provide a window into the interactions between the climate inputs and landscape structure. A deep understanding of these characteristic signatures will lead to insights and theories that can benefit the classification system one wants to develop. This represents a form of data-model synthesis that will ultimately lead to new theories of hydrology at the catchment scale.

Original contributions are solicited that address the investigation of hydrologic similarity at hillslope, catchment and regional scales, contributing to the identification of catchment classification systems and to the synthesis between data and processes in hydrological models, that can underpin predictions in ungauged basins everywhere.

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