



## **A simple framework to order global seasonal hydro-climatology**

Wouter Berghuijs and Ross Woods

University of Bristol, Bristol, United Kingdom (wb14708@bristol.ac.uk)

Simple frameworks, using primary controls of hydrologic response, can bring order to diverse hydrological regimes, and provide a powerful scientific summary of the similarities and differences of places. At the mean-annual timescale, a catchment's water balance is primarily controlled by catchment aridity; this relationship is constituted in the Budyko Framework. Regional studies suggest that seasonal water balance conditions are still primarily controlled by climate rather than landscape. However, parsimonious similarity frameworks that order the global diversity of hydrological response based on hydrologic controls have not been developed for seasonal water balance conditions. In this study we first expose how a distinct repetitive pattern of monthly climate signals allows the use of simple analytical functions to describe a location's monthly precipitation, potential evaporation and temperature. This characterization provides a parsimonious way to describe the full time series of monthly conditions and their relative occurrence. Based upon this description we develop a framework to order the global climatic diversity of seasonal water balance conditions describing climatic controls. Using global gridded water balance data we expose the framework's ability to bring order to seasonal water balance diversity.