Investigating hydrological change using the Global Streamflow Indices and Metadata (GSIM) archive

Lukas Gudmundsson (1), Sonia I. Seneviratne (1), Hong Do (2), Seth Westra (2), and Michael Leonard (2)

(1) ETH Zürich, Institute for Atmospheric and Climate Science, Zürich, Switzerland (lukas.gudmundsson@env.ethz.ch), (2) The University of Adelaide, School of Civil, Environmental & Mining Engineering, Norwood, Australia

Both anthropogenic climate change as well as human land and water management are expected to impact the world's freshwater resources. However, model projections are uncertain, and it is to-date not known to which extent the effects of both human-induced climate change and on-the-ground human interventions are already detectable in the observed record. To address this limitation, we analyse hydrological change using the recently established Global Streamflow Indices and Metadata (GSIM) archive (Do et al., in review, Gudmundsson et al., in review). The GSIM archive contains time series information from more than 30'000 gauging stations around the world. These time series are subject to automated quality control and are complemented with meta information including catchment boundaries and land cover specification. Daily data are aggregated into time series indices that allow for a targeted change assessment of specific features of hydrological variability. The indices are available at monthly, seasonal and annual resolution and include water balance indicators, high- and low flows as well as measures of the seasonal cycle. Here we conduct a change assessment of selected indices. Given the global extent together with the unparalleled spatial coverage of the GSIM archive, the presented analysis allows for an unprecedented view on past and present hydrological change around the world.

References:

Do, Gudmundsson, Leonard, Westra, Seneviratne (in review), Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2017-103, 2017.

Gudmundsson, Do, Leonard, Westra, Seneviratne (in review), Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2017-104, 2017.