



Hydro-CH2018 – new transient hydrological scenarios for Switzerland

Regula Mülchi (1), Ole Rössler (1), Jan Schwanbeck (1), Harry Zekollari (2,3), Matthias Huss (2,4), Rolf Weingartner (1), and Olivia Martius (1)

(1) Oeschger Centre for Climate Change Research, University of Bern, Bern, Switzerland (regula.muelchi@giub.unibe.ch), (2) Laboratory of Hydraulics, Hydrology and Glaciology, ETH Zurich, Zurich, Switzerland, (3) Swiss Federal Institute for Forest, Snow and Landscape Research (WSL), Birmensdorf, Switzerland, (4) Department of Geosciences, University of Fribourg, Fribourg, Switzerland

Future changes in runoff regimes will affect many different sectors such as agriculture, energy production, or water management. Therefore, assessing future changes in runoff is very crucial for adaptation planners and decision-making authorities. Under the comprehensive framework Hydro-CH2018 (coordinated by the Swiss Federal Office for the Environment), we are simulating future runoff for the period 1981-2099 in Switzerland. The study uses the new transient Swiss climate change scenarios CH2018 (published by end of 2018; <http://www.ch2018.ch/>) with three different emission pathways (RCP2.6, RCP4.5 and RCP8.5) as input for the hydrological model. The hydrological simulations are run with the deterministic semi-distributed hydrological modelling system PREVAH and changes in glacier extents are simulated with a dynamic coupled ice flow-surface mass balance model. Over 180 regionalized meso-scale catchments distributed over Switzerland covering a wide range of different catchment characteristics are simulated and analyzed. The project determines potential runoff regime shifts and their seasonality under climate change. The transient property of the climate change scenarios allows for the first time to focus on the time of emergence of regime shifts and of changes in other hydrological indices. Further, analyzing trends in low flow (e.g. Q347) and high flow (e.g. flood frequency) indices provides a comprehensive perspective on the hydrological responses to climate change in Switzerland.