**Extreme flow analysis under a changing climate using a scenario-neutral approach**

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This study provides updated information on potential future changes to the magnitude and timing of hydrological extremes: low and high flows using a scenario-neutral approach. Using a hydrological model, the study analyses the sensitivity of Finnish catchments to changes in climate through the impact response surface method (IRS). A key benefit of the IRS method is that it systematically analyzes the sensitivity of modeled impacts to changes in the variables being tested and provides impact estimates across a wide range of conditions. Annual maximum flood and 7-day low flow (2, 10, 50, and 100-year return period events) were used as hydrological variables to study the sensitivity of the watershed response to changes in precipitation and temperature. The study's hydrological modeling was carried out using a new, more physically based version of the WSFS (Finnish Environment Institute’s Watershed Simulation and Forecasting System) hydrological model. This version includes an energy-balance-based snow model, a rainfall-runoff model with a two-layer soil moisture model, and lower groundwater storage and evapotranspiration and lake evaporation models. Other sub-models in the WSFS include a precipitation model and models for lake and river routing. We applied this approach to a case study catchment in the coastal area of Finland (Lapväärtinjoki) to analyze changes in extreme flows and critical climate conditions in the catchment. Results suggest in Lapväärtinjoki colder temperatures will cause more floods in springtime and warmer temperatures will shift the floods to winter.