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Estimating future changes in Alpine flash floods using CP-RCM projections

Frederiek Sperna Weiland¹, Pety Viguurs^{1,2}, Marjanne Zander^{1,2}, and Albrecht Weerts^{1,2}

¹Deltares, Delft, The Netherlands

²Wageningen University and Research- Environmental Sciences Group, Hydrology and Quantitative Watermanagement (chair group), The Netherlands

Flash floods are a significant natural hazard in the Alpine region (FOEN, 2010). With changing rainfall regimes and decreased snow accumulation due to climate change, the risk of flash flood occurrence and timing thereof could change as well (Etchevers et al., 2002).

In this study the frequency and occurrence of flash floods in the Alpine region is estimated for current and future climate (RCP8.5) using state-of-the-art high-resolution convection permitting climate models (CP-RCMs). For the historical period and far future (2100), data from an ensemble of convection permitting climate models (Ban et al., submitted 2019) was used to drive a high-resolution distributed hydrological model, i.e. the wflow_sbm model (Imhoff et al., 2019, Verseveld et al., 2020). The model domains cover the mountainous parts of the Danube, Rhone, Rhine and Po located in the Alps. The CP-RCM time-series available are of limited length due to computational constraints. At the same time the locations of flash floods vary per year therefore a regional scale analysis is made to assess whether in general the severity, frequency and timing of flash floods in the Alps will likely change under changing climate conditions.

This research is embedded in the EU H2020 project EUCP (European Climate Prediction system) (<https://www.eucp-project.eu/>), which aims to support climate adaptation and mitigation decisions for the coming decades by developing a regional climate prediction and projection system based on high-resolution climate models for Europe.

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