Mapping of climate to flood extremes in the European Alps: a multidisciplinary approach

EGU24-4014, updated on 21 Apr 2024
https://doi.org/10.5194/egusphere-egu24-4014
EGU General Assembly 2024

Mapping of climate to flood extremes in the European Alps: a multidisciplinary approach

Alberto Viglione[1], Enrico Arnone[2], Susanna Corti[3], Olivia Ferguglia[2], Ignazio Giuntoli[3], Jost von Hardenberg[1], Luca Lombardo[1], Paola Mazzoglio[1], and Elisa Palazzi[2]

[1]Politecnico di Torino, Dipartimento di Ingegneria dell'Ambiente, del Territorio e delle Infrastrutture, Torino, Italy (alberto.viglione@polito.it)

[2]Università degli studi di Torino, Dipartimento di Fisica, Torino, Italy

[3]Consiglio Nazionale delle Ricerche, Istituto di Scienze dell'Atmosfera e del Clima, Bologna, Italy

As our climate system climbs through its current warming path, temperature and precipitation are greatly affected also in their extremes and there is a general concern about the effects on river floods. While a wide body of literature on the detection of flood changes is available, the identification of their underlying causes (i.e. flood change attribution) is still debated. In this work, we aim at better understanding how floods of different kind are related to climate extremes (of precipitation and temperature) and how these extremes are related to large scale predictors (e.g. climate oscillations, teleconnections). The study area is the Greater Alpine Region, which is an ideal laboratory for analysing complex effects of climate on floods because of the interplay of heavy precipitation and snow processes in controlling flood generation, and also because the European Alps divide the Mediterranean and Continental Europe with different responses to climate oscillations. Through a novel integrated modeling chain, we aim at identifying the climate extreme indices that better relate to river floods, the large-scale climate phenomena controlling their dynamics, their expected modifications due to climate change and the associated uncertainties. The research plan of a multidisciplinary team of climatologists and hydrologists will be presented together with preliminary results. We believe that this research will strengthen our knowledge on flood risk in the future and contribute to improve existing methods for disaster risk assessment and management.