Geophysical Research Abstracts
Vol. 20, EGU2018-12887, 2018
EGU General Assembly 2018

A multi-model view of twenty-first century hydroclimatic extremes in high elevation regions of the world

Enrico Arnone, Elisa Palazzi, and Jost von Hardenberg
Institute of Atmospheric Sciences and Climate (CNR-ISAC), Torino, Italy (e.arnone@isac.cnr.it)

Extremes in the climate and hydrological system are of major concern as drivers of natural hazards but also for the possible provision of early insight in a changing climate. Because of their orography and delicate equilibrium, high-elevation regions can further show early and enhanced signs of change. In this study, we investigate hydroclimatic extremes in high-elevation regions through a series of indices calculated on XXI century projections from an ensemble of earth-system and climate models. We consider both a hydroclimatic intensity index (defined as the product of precipitation intensity and dry spell length) and a selection of indices from the ETCCDI project describing dry and wet spells, as well as the distribution and frequency of intense precipitation events. High elevation regions were defined both selecting global model data above various elevation thresholds and through the identification of specific mountain regions such as, e.g., the Tibetan Plateau, the Mongolian Plateau, the Greater Alpine Region, the U.S. Rockies, the Andes. Our results show a consistent change of the strength of the hydroclimatic extremes in future projections when Representative Concentration Pathway scenarios with increasing anthropogenic forcing are adopted (from RCP2.6 to RCP8.5), and this response can be further amplified in high elevation regions. Despite this general tendency, results are largely affected by the peculiarities of individual high-elevation regions and by the capability of the adopted model to resolve the local orography at its spatial resolution. Indices and regions showing the largest and most consistent response are identified and discussed.