



Evidence for Increased Persistence in Central European Circulation Types

Maurice F. Huguenin (1,2), Erich M. Fischer (1), Sven Kotlarski (2), Simon C. Scherrer (2), and Reto Knutti (1)

(1) Institute for Atmospheric and Climate Science, ETH Zurich, Zurich, Switzerland, (2) Federal Office of Meteorology and Climatology, MeteoSwiss, Zurich, Switzerland

In spring and summer 2018, Central Europe experienced a record-breaking drought and heat wave with extreme temperatures, wildfires in Northern Europe and a shortage of water supply over many parts of the continent. One of the main causes leading to this exceptionally hot weather was a weaker jet stream, which allowed a quasi-stationary high pressure system to persist for several weeks. Given the important consequences of such circulation characteristics, the question arises whether the frequency and/or intensity of these events will be affected by global climate change. Against this background, we investigate future changes in the frequency and persistence of Central European circulation types in large ensemble global general circulation models (GCMs) mostly originating from the CMIP5 project, and we validate our data against the ERA-40/-Interim reanalysis for the reference period 1980 – 2018. In accordance with previous works, we find indications for a significant future increase in the frequency of westerlies in winter, and several significant changes in the persistence of circulation types, most notably in summer (more persistent) and winter (less persistent). Our results help to understand future changes in synoptic-scale weather regimes over Europe and their implications in terms of extreme temperature and precipitation events.