Geophysical Research Abstracts
Vol. 18, EGU2016-2766, 2016
EGU General Assembly 2016

Estimation of cold extremes and the identical distribution assumption

Sylvie Parey
EDF, R&D, CHATOU, France (sylvie.parey@edf.fr)

Extreme, generally not observed, values of meteorological (or other) hazards are estimated by use of observed time series and application of the statistical extreme value theory. This theory is based on the essential assumption that the events are independent and identically distributed. This assumption is generally not verified for meteorological hazards, firstly because these phenomena are seasonal, and secondly because climate change may induce temporal trends. These issues can be dealt with, by selecting the season of occurrence or handling trends in the extreme distribution parameters for example. When recently updating extreme cold temperatures, we faced different rather new difficulties: the threshold choice, when applying the Peak Over Threshold (POT) approach happened to be exceptionally difficult, and when applying block maxima, different block sizes could lead to significantly different return levels. A more detailed analysis of the exceedances of different cold thresholds showed that when the threshold becomes more extreme, the exceedances are not identically distributed across the years. This behaviour could have been related to the preferred phase of the North Atlantic Oscillation (NAO) during each winter, and the return level estimation has then been based on a sub-sampling between negative and positive NAO winters. The approach and the return level estimation from the sub-samples will be illustrated with an example.