Measures of extremity in meteorology

Abstract

This work deals with the methods of extremity quantification of meteorological variables and weather events. The first part is dedicated to the expression of variables by generalized extreme value distribution (GEV) and presents various computation methods of distribution parameters. The second part is dedicated to the extremity of wind storms, heat waves, droughts and heavy precipitation. The third part contains the application of the method based on the order of values and GEV distribution. We evaluate the extremity and abnormality of high daily mean temperatures at the station Milešovka and in the reanalysis ERA-40 and NCEP/NCAR for the grid point representing the Czech Republic. It is shown that the days with positive abnormality of temperature occur more frequently in the warm half-year. The method based on the order of values underestimates the return period of temperature extremes in most cases in comparison with the method based on the GEV distribution. The method based on the GEV distribution is sensitive to various input data. The design values for the station Milešovka increase with the return period more rapidly than reanalysis design values.

Keywords: extremity, GEV function, Milešovka, reanalysis, temperature extreme, return period