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Trends in extreme high temperatures in France: statistical approach and results.

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A trend during the 20^{th} century in air temperatures averaged over the globe is now admitted. In a climatic change context, and after the extreme meteorological events happened in France (storms in 1999, heat wave in 2003, floodings, for examples), Electricité de France created a project untitled « EDF and climatic change ». One objective of this project is to obtain a map of temperature risk by estimating the 100 year-return period values. Reference daily series of maximum temperature observed by Météo-France are used to extract the extreme values (values above a threshold) and test the significance of the trend. When the trend is statistically significant, the Peak Over Threshold method, used for very large or extreme values of stationary stochastic processes, is extended to the non-stationary case and define a new return-period value. Extrapolated observed temperatures in a non-stationary climate are then compared with temperatures simulated in A2 and B2 IPCC scenarios, with Météo-France and IPSL models in the frame of a GICC project called IMFREX coordinated by Météo-France. Most of the 55 reference daily series studied indicate a quadratic evolution of the Poisson process intensity and a stationary Pareto scale parameter from 1960-1970 to 2002, indicating most frequent exceedances at the end of the 20^{th} century. Extrapolation of the significant current trends allow to reach the low level of centennial temperatures simulated by the atmospheric models for the end of 21st century.