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Testing the robustness of diagnostics of extremes over the North Atlantic in ensemble simulations

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The Extreme Value Theory (EVT) is an important tool for the study of climate extreme events, such as heat or cold episodes. Its diagnostics can be performed with nonstationary Peak over Thresholds (POT) models, which describe the scale and frequency of extreme events in a self consistent framework. Such a theory provides natural confidence intervals on the statistical parameters of the models. Within such intervals, trends of parameters of extremes have been identified in the NCEP reanalysis dataset of temperature for the last 50 years. In this work, we test the sensitivity of the parameters of extremes and their trends in an ensemble of 12 simulations with natural and anthropogenic forcings (including volcanoes, solar variability, land surface use and greenhouse gases) over the last 50 years. Those simulations were performed with the Hadam3 forced with observed SST over the 1949-2002 period. We focussed on the temperature extremes over the North Atlantic region. Although the frequencies of weather regimes are different from one simulation to the other, we find that, overall, the statistics of temperature extremes are similar between the simulations when the forcings are identical and comparable to those of the NCEP reanalysis. This suggests that the differences in extremes can hence be explained by the forcings themselves. Those results show the general robustness of the trends of extremes over the North Atlantic.