



Cold and heat waves in the near future in relation with electricity demand

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In France, because of an important share of electrical heating, electricity demand is highly linked to temperature, especially in winter, but more and more in summer too due to a growing cooling demand during heat waves. A temperature indicator has thus been developed based on a weighted average of observed temperature of 32 stations in France. Cold and heat waves mean high electricity demand which needs to be correctly anticipated. This study aims at better understanding how the main characteristics of cold and heat waves may evolve in the near future in the climate change context. To do so, these events are defined as consecutive days with weighted average temperature below or above fixed low and high thresholds, and their main characteristics (frequency of occurrence, duration and intensity) are analysed for the recent past (years 1980-2009). Then, CMIP5 climate simulations with RCP8.5 are used to infer how these characteristics may change in the near future, defined as the period 2010-2039. In order to investigate the respective roles of climate change and climate variability, a single simulation taken from 23 climate models has been considered on the one hand, and ten simulations with one climate model on the other hand. The changes in the near future as projected by the climate models show trends due to the warming climate, which leads to less cold waves and more heat waves, but variability seems to have different impacts for cold waves than for heat waves. Whereas climate variability only modulates the warming in summer, it may counteract it in winter, so that as cold waves as in the recent past can still occur, although less frequently.