



Detection of a climate change signal in winter precipitation over France

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We present a formal detection of a climate change signal in observed winter precipitation over France.

This study is based upon an homogenized precipitation dataset covering the XXth century, and upon climate scenario simulations, performed with a variable resolution regional climate model (ARPEGE-Climat). We consider the 30-year trends of total rainfall and snowfall over December-January-February. In the building of the detection variable, the trends are spatially centered implying that only the spatial distributions at the sub-regional scale are accounted for. The study highlights a significant change in winter precipitation at the end of the analysis period, which is consistent with the simulated climate change signal.

We investigate the possible attribution of this change to the variability of the occurrence frequencies of the main large scale weather regimes. The dataset of weather regimes frequencies provided by the EMULATE project partners serve as a base for this study. We demonstrate that the detected signal cannot be only explained by the changes in large scale dynamics. In particular, this conclusion holds for the NAO variability, which is represented by two of the four weather regimes considered.