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Comparison of weather regimes over the North Atlantic in two millennium coupled simulations (IPSLCM4 and MIROCC)

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We have performed two millennium climate simulation of the IPSLCM4 and MIROC coupled models, with solar variability, volcanic eruption (MIROC), greenhouse gas and insolation forcings. The response of the simulated surface temperature to the solar forcing is linear on a global to continental scale.
This paper investigates the response of North Atlantic weather regimes to the solar forcing in this simulation. We use the daily data of geopotential height at 500mb and focus on the winter and summer seasons, and decompose them with EOF/PC and a classification analysis.
Then we show the sensitivity of this atmospheric variability when solar activity is remarkably low (i.e. during the Maunder or Spörer minima) or high. We investigate the persistence of the weather regimes and examine the likeliness of prolonged phases of the North Atlantic Oscillation in the simulation.
We also aim at presenting a useful statistical framework to describe and compare modes of atmospheric variability from model simulations and observations.