



The European Climate-change Oscillation (ECO)

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We identify a latitudinal/seasonal oscillation in the 21st century climate change pattern over Europe (the European Climate-change Oscillation, or ECO) from the CMIP3 ensemble of simulations. The ECO is found in the temperature and precipitation mean and interannual variability change fields, suggesting that it might be a fundamental feature of European climate change. It consists of a seasonal and latitudinal migration of 1) an area of maximum warming; 2) a dipolar pattern of precipitation change (positive to the north and negative to the south); 3) a dipolar pattern of temperature variability change (negative to the north and positive to the south); 4) an area of maximum increase in precipitation variability. The ECO is also associated with a north-south see-saw in the location of an area of increased anticyclonic circulation over the northeastern Atlantic, which induces a seasonally varying northward displacement of the Atlantic storm track. We also define two ECO Indices to measure the ECO based on latitudinal and seasonal climate change gradients. The ECO carries important information on the characteristics of Mediterranean and, more generally, European climate change. It can also be used for regional climate change detection and attribution purposes and in this regard we find indications of ECO behavior in the temperature change pattern for the latest decades of the twentieth century.