



The summer NAO and northwest European climate

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The summer North Atlantic Oscillation (SNAO) was recently defined for northern hemisphere high summer (July-August) as the leading EOF in sea level pressure for the North Atlantic/Europe region. It consists of a pressure dipole with nodes over Greenland and the UK/Scandinavia. By analogy with the winter NAO, SNAO is characterized by a more northerly location and smaller spatial scale than its winter counterpart. It is believed to exert a strong influence on Northwest European climate through changes in the position of the North Atlantic storm track, and the influence needs to be quantitatively addressed with considerable accuracy.

The association between the mean sea level pressure (MSLP) in European-North Atlantic region in high summer and simultaneous land surface temperature and precipitation are studied with a coupled manifold technique and SVD analysis. We find that summer climate in northwest Europe is strongly influenced by SNAO. Considering European land, we estimate that 45% (27%) of the summer temperature (precipitation) variance is forced by MSLP; while in northwest Europe, the variance of temperature (precipitation) forced by MSLP is around 65% (32%). The positive phase of SNAO forces a positive temperature anomaly in northwest Europe centering the Baltic Sea, and a very weak negative anomaly in southeast Europe. A similar precipitation pattern was forced by SNAO, while the negative phase forced by positive SNAO is much larger and extended to the west Mediterranean.