



The influence of the North Atlantic Oscillation on mean air temperature at different spatial scales

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The North Atlantic Oscillation (NAO) is the best known circulation index over the Northern Hemisphere and plays a dominant role in the determination of air temperature over Europe. This study utilized temperature data at different spatial scales to make a particularly detailed analysis of the role of NAO on European temperature variability. Mean monthly temperature data were obtained for all of Europe, including Poland and the Carpathians from NCEP/NCAR database as well as Polish Meteorological Service. Data on the NAO obtained from the University of East Anglia for the period 1951-2005. The relationship between the NAO and temperature was examined by computing correlation coefficients. It was confirmed that the strongest correlation between NAO and temperature occurs during winter, particularly in January when R exceeds 0.7 in west-central Europe. Much lower correlation coefficients were observed in the Mediterranean Basin, with an opposite relationship (correlation coefficient below -0.7) observed over the northeast Atlantic. The results obtained for mountainous areas, especially the Carpathians, were of particular interest. The relationship between the NAO and temperature decreases with increasing altitude, with correlation coefficients below 0.5 observed at higher elevations in the mountains. These findings demonstrate that mountainous areas have their own local climatic features which modulate the effect of macroscale circulation variability, such as that associated with the NAO.