



Impact of the atmospheric climate modes on wave climate in the North Atlantic

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This study establishes the relationships between the mean modes of atmospheric variability in the North Atlantic and present wave climate. The modes considered, namely the North Atlantic Oscillation (NAO), the East Atlantic pattern (EA), the East Atlantic Western Russian pattern (EA/WR) and the Scandinavian pattern (SCAN), are obtained from the NOAA Climate Prediction Centre. The wave data sets used consist of buoy records and two high-resolution simulations of significant wave height (SWH), mean wave period (MWP) and mean wave direction (MWD) forced with ERA-40 (1958-2002) and ERA-INTERIM (1989-2008) wind fields. The results show the winter impact of each mode on wave parameters which are discussed regionally. The NAO and EA pattern increase winter SWH up to 1 m per unit index at the Scottish and Spanish coasts, respectively, during their positive phase; while EA pattern causes clockwise changes of winter MWD up to more than 60 degrees per unit index at the Bay of Biscay during its negative phase. EA/WR and SCAN patterns have a weaker impact.