



Seasonal modes of dryness and wetness variability over Europe and their connections with large scale atmospheric circulation and global sea surface temperature

Monica Ionita (1), Constanta Boroneant (2), and Silvia Chelcea (3)

(1) Alfred Wegener Institute Helmholtz Center for Polar and Marine Research, Paleoclimate Dynamics, Bremerhaven, Germany (monica.ionita@awi.de), (2) Center for Climate Change, Geography Department, University Rovira I Virgili, Tortosa, Spain, (3) National Institute of Hydrology and Water Management, Bucharest, Romania

The relationship between the seasonal modes of interannual variability of a multiscalar drought index over Europe and the large-scale atmospheric circulation and sea surface temperature (SST) anomaly fields is investigated through statistical analysis of observed and reanalysis data. It is shown that the seasonal modes of dryness and wetness variability over Europe and their relationship with the large-scale atmospheric circulation and global sea surface temperature anomaly fields differ from one season to another. During winter, the dominant modes of dryness and wetness variability are influenced by the Arctic Oscillation (AO)/North Atlantic Oscillation (NAO), the Scandinavian pattern (SCA), the East Atlantic pattern (EA) and the East Atlantic/Western Russia (EAWR) pattern. The spring dryness/wetness modes are influenced mainly by the Arctic Oscillation (AO), Polar/Eurasian patterns (POL) and the Atlantic Multidecadal Oscillation (AMO) conditions. The phases (positive or negative) and the superposition of these large scale variability modes play a significant role in modulating the drought conditions over Europe. During summer, the atmospheric blocking is one of the main drivers of dryness and wetness conditions, while during autumn dryness/wetness conditions variability can be related to the NAO or with a wave train like pattern in the geopotential height at 850mb, which develops over the Atlantic Ocean and extends up to Siberia. It is also found that the response of the dryness and wetness conditions to global SST is more regional in summer, compared to the other seasons, when local processes may play a more important role.