Analysis of statistical correlation between the indices of the most determinant ocean-atmospheric patterns in the climatology of the North Atlantic-Western Europe (NA-WE)

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South situations or days in which the South Wind (SE-S-SW) constitutes the predominant wind direction (mode) and one of the factors more determinants of the climatic conditions in terms of temperature and relative humidity in the autumn-winter period of the geographical region of southwestern Europe around the central territorial axis of the Bay of Biscay-Gascony.

According to our conclusions on the official data analyzed in thirteen meteorological stations in this region of southwestern Europe, for the 1961-2010 annual series, more than 43% of the autumn-winter days with prevailing winds from the South, or South Wind, register average temperature values (T) higher than their respective autumn-winter average. Likewise, in eleven of the thirteen stations analyzed, for the same annual series, the average relative humidity (H) record corresponding to the set of autumn-winter days with predominant South Wind is lower than the respective mid autumn-winter and in the other two seasons both records are equal.

In the stations of the coastal region, such as Bilbao and Gijón, for the 1961-71 annual series, with an atmospheric circulation characterized, in all autumn-winter periods, by negative mean values of the North Atlantic Oscillation index (NAO), the percentage frequency of South Wind situations is higher than that corresponding to the coastal stations of San Sebastián, Santander and Biarritz in the 1971-2010 annual series, as well as with respect to the percentage frequency for any other station and in both series.

The climatic and environmental conditions of this region of southwestern Europe are strongly affected by the tempering influence of the South Atlantic winds, following a process of orographic condensation-desiccation to windward and subsidence, adiabatic compression and rapid movement along the slopes, downwind of the Cantabrian-Pyrenean mountain range (Foehn effect).

Thus, the general atmospheric circulation over the region favors, especially in the autumn-winter period, the advections of humid and unstable air masses (storms and fronts) coming from the middle and subtropical latitudes of the North Atlantic, which generate anabatic south winds on the Iberian Peninsula, heading towards the Western Cantabrian-Pyrenean region and through it towards the continental Atlantic façade, but already more tempered and parched.
These southern situations are generated under conditions of atmospheric circulation and synoptic configuration defined by the interrelation between multiple oceanic and atmospheric patterns (in addition to solar, orographic factors...) that also largely determine the climatology of the entire oceanic and continental North Atlantic región.

As a great diversity of studies carried out have been collecting and demonstrating, the ocean-atmospheric patterns, both planetary and regional (ENSO, AMO, NAO, WeMO...) and the teleconnection between events or climatic phenomena generated by they and even in a very distant between them, constitute fundamental factors to define the atmospheric circulation and the climatology of the North Atlantic-Western Europe region (NAWE).

The empirical vision of the teleconnection between these ocean-atmospheric patterns requires the analysis of the significant statistical correlation coefficients between the indices of such factors or patterns, for which we will use the integrated program or set of programs "R".