



## **The impact of the NAO and AO on the Iberian water resources**

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The Iberian Peninsula precipitation and river flow regimes are characterised by large values of inter-annual variability, with large disparities between wet and dry years, especially in southern Iberia. This situation portrays a major problem for water resources management, in general, and production of hydroelectricity, in particular (Trigo et al., 2004). A wealth of recently available data, provided by the Portuguese main Electrical supply company, has allowed a better assessment on the impact of both the North Atlantic Oscillation (NAO) and the Antarctic Oscillation (AO). Monthly values of precipitation, Potential Evapo-transpiration (PET) and river flow (measured at 20 different dams) for the largest international river basins (Portugal-Spain) were used for this purpose. Results show that the large inter-annual variability of southern Iberia rivers flow is largely modulated by the NAO while the river flow in the northern basins is better associated with the AO index. Previous works have shown that this control was essentially driven by the significant NAO-precipitation negative correlation values (Trigo et al., 2004). Here we show that the impact of these large-scale atmospheric circulation modes on Iberian water resources is also the consequence of their control on the variability of both the precipitation and the PET fields. Interestingly, many of these relationships are not stationary in time and can change significantly. In particular, the correlation between AODJF and FlowJFM values for the period 1956-1977 are consistently higher than those obtained for the period 1978-2000. The inverse happens when we correlate NAODJF and FlowJFM, a result compatible with that for precipitation (Goodess and Jones, 2002). Another important aspect is the increased value of correlation between NAO and river flow as we move from dams located near the

border between Portugal and Spain to those dams located closer to the river mouth. The full exploration of these results and of its implications may have profound impact throughout the Mediterranean basin, as the NAO/AO modes also play an important role in controlling the Precipitation and the PET fields.

Goodess CM, Jones PD. 2002. Links between circulation and changes in the characteristics of Iberian rainfall. *International Journal of Climatology*. 22: 1593-1615.

Trigo R.M., Pozo-Vazquez D., Osborn T.J, Castro-Diez Y., Gámis-Fortis S., Esteban-Parra M.J. (2004) "North Atlantic Oscillation influence on precipitation, river flow and water resources in the Iberian Peninsula". *International Journal of Climatology*. 24, 925-944