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Atmospheric modes influence on coastal upwelling along the west coast of the Iberian Peninsula

M. Gomez-Gesteira (1), M. deCastro (1), I. Alvarez (1), N. Lorenzo (1), A.J.C. Crespo (1) and J.L.G. Gesteira (1)

(1) University of Vigo [mggesteira@uvigo.es]

Nighttime weekly sea surface temperature (SST) was used to analyze the influence of the most representative patterns of atmospheric variation in the Northern Hemisphere on coastal upwelling at the west coast of the Iberian Peninsula from 1985 to 2005. The annual and seasonal variability of coastal upwelling was also analyzed from 1985 to 2005. The upwelling index (UI) was calculated as the difference between coastal SST (20km) and oceanic SST (500km). The entire west Iberian coast is affected by upwelling with an upwelling season coinciding with summer time (JAS). Stronger values of UI were detected in August and September at latitudes close to 42žN. At latitudes between 37žN and 39žN some persistence in upwelling events was detected during autumn. The main variability of the upwelling index averaged meridionally (UIAM) is explained by means of EA atmospheric pattern when any lag or one month lag in UIAM are considered. This may be due to the locations of the action centres of the north-south EA dipoles. EA is observed to be the most prominent atmospheric pattern affecting coastal UI with a correlation coefficient of 0.52 and a significance level of 99%. The correlation between EA and the upwelling index anomaly (UIA) is stronger at latitudes between 39žN and 41žN. Any influence was detected between the other atmospheric patterns and coastal upwelling for the period of time under study.