

Westerly Index: A new quasi-instrumental climatic index for the North Atlantic westerlies (1685-2008)

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The English Channel is a key zone to characterize the variability of the westerlies in the Northern Hemisphere in pre-instrumental times. Wind direction in this area provides a direct measure of mid-latitude atmospheric circulation. During pre-instrumental period, the analysis of historical weather reports is the only method that improves our knowledge of climate impacts due to westerlies variability without using proxies. Ship's Logbooks have proved to be one of the most effective sources to realize this task. There are a large number of logbooks containing wind direction measures over the English Channel because was one of the areas with most maritime activity.

For these reasons, a new quasi-instrumental index measuring the directionality of the westerly wind in the English Channel for the period 1685-2008 is presented. This index is obtained by merging data from the National Archives at Kew (UK), with ICOADS and CLIWOC data.

In this work is shown that the Westerly Index (WI) signature in precipitation and temperature is akin to NAO but with a stronger annual signal, even the summer season. The long record of the WI allows analyze particular events as the European cold periods at the end of the Little Ice Age or the Dalton Minimum. However, the analysis of the WI and the comparison with several NAO reconstructions suggest a non-stationary relation between the North Atlantic atmospheric circulation and the local climate in parts of Europe for several periods previous to the 20th century. Currently modelling work is underway to obtain further knowledge about the Westerly Index.