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Distribution characteristics of wintertime teleconnections in the Euro-Atlantic area

M. A. Pastor (1), M. J. Casado (1) and F. J. Doblas-Reyes (2)

(1) Instituto Nacional de Meteorología, Madrid, Spain (a.pastor@inm.es), (2) European Centre for Medium-Range Weather Forecasting, Reading ,UK

This study mainly focuses on the analysis of the probability density functions (PDF) of the leading mid-tropospheric teleconnection indices in the ERA40 (European Centre for Medium-Range Weather Forecasts) Re-analysis dataset over the Euro-Atlantic area for the winter (DJFM) period (1961-1990).

Principal Component Analysis (PCA) on daily 500-hPa geopotential height data followed by a Varimax rotation has been applied to obtain the teleconnection indices. Later, a non-parametric Gaussian kernel estimator of the PDF has been used on the four normalised rotated principal components identified as the East-Atlantic/West Russia (EA/WR) pattern, the North Atlantic (NAO) pattern, the East-Atlantic (EA) pattern, and the Scandinavian (SCAN) pattern. Three statistics for summarizing the main characteristics of the PDF, namely: the median, inter-quantile range, and Yule-Kendall skewness have been used.

Some sort of bimodality is observed in the SCAN pattern. The skewness of the indices is slightly negative, with the largest values detected for NAO and EA/WR. Kurtosis (b_2-3) is also negative, the small values correspond to NAO and the large values are found for EA.