



An analysis of the synoptic and climatological applicability of circulation type classifications for Ireland

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Circulation type classifications (CTCs) compiled as part of the COST733 Action, entitled 'Harmonisation and Application of Weather Type Classifications for European Regions', are examined for their synoptic and climatological applicability to Ireland based on their ability to characterise surface temperature and precipitation. In all 16 different objective classification schemes, representative of four different methodological approaches to circulation typing (optimization algorithms, threshold based methods, eigenvector techniques and leader algorithms) are considered. Several statistical metrics which variously quantify the ability of CTCs to discretize daily data into well-defined homogeneous groups are used to evaluate and compare different approaches to synoptic typing.

The records from 14 meteorological stations located across the island of Ireland are used in the study. The results indicate that while it was not possible to identify a single optimum classification or approach to circulation typing - conditional on the location and surface variables considered - a number of general assertions regarding the performance of different schemes can be made. The findings for surface temperature indicate that those classifications based on predefined thresholds (e.g. Litynski, GrossWetterTypes and original Lamb Weather Type) perform well, as do the Kruizinga and Lund classification schemes. Similarly for precipitation predefined type classifications return high skill scores, as do those classifications derived using some optimization procedure (e.g. SANDRA, Self Organizing Maps and K-Means clustering). For both temperature and precipitation the results generally indicate that the classifications perform best for the winter season - reflecting the closer coupling between large-scale circulation and surface conditions during this period. In contrast to the findings for temperature, spatial patterns in the performance of classifications were more evident for precipitation. In the case of this variable those more westerly synoptic stations open to zonal airflow and less influenced by regional scale forcings generally exhibited a stronger link with large-scale circulation.