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The link between weather type classifications and large scale climate modes in the NH: Applications and Opportunities.

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The day-to day variability in circulation patterns is dominated by the passage of high and low-pressure systems in the midlatitudes while these patterns again determine regional climatic conditions. Hence, it is desirable for coupled global climate models to predict the circulation patterns and large-scale climate modes accurately. Several both subjective and objective methods for the classification of circulation patterns into categories have been developed over the past century. In this study, using the automated classification Jenkinson-Collison (JC) method, based on Mean Sea Level Pressure (MSLP), we finally obtain 8 directional, 2 vorticity and 1 unclassified categories. These circulation types are used to examine present and future trends in circulation patterns above Western and Central Europe. In first instance, the SLP-based directional circulation patterns from the coupled ECHAM5-MPI/OM model are evaluated with the weather types obtained from the ECMWF – ERA40 reanalysis dataset for the period 1961-2000. Secondly, the directional weather types are linked to large-scale features in the Northern Hemisphere, as e.g. the North Atlantic Index (NAO), Anticyclonic Blocking and Cyclone tracking.

As the use of specific circulation features as e.g. blocking techniques as a diagnostic tool is intrinsically limiting the research to some specific climate features in the North Atlantic sector, this research opt to use the Jenkinson Collison objective circulation classification method, which can identify various characteristics of the climate such as the position of cyclones and anticyclones (cyclone tracks and blocking phenomena),

strength and frequencies of zonal and meridional flow and transition between types. In this way, one can obtain consistent and robust results concerning differences and changes in circulation patterns on a synoptic time-scale.

Preliminary results show that this classification technique is able to detect and evaluate deficiencies in the ECHAM5-MPI/OM climate model in its development of anticyclonic blocking periods and severe cyclone development / tracks as they appear from the ERA40 reanalysis data. Furthermore, comparing NAO indices from both datasets promises to be a useful tool in evaluating climate models and their large-scale modes in the Northern Hemisphere.