



Application of circulation classifications from the COST733 collection to the detection of solar and geomagnetic effects on tropospheric circulation over Europe in winter

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Many studies of circulation classifications are biased by the fact that they are based on a single classification only; that is, their results are affected by the properties of a particular classification to an unknown extent. A large number of circulation classifications produced and collected in the COST733 database allows such a bias to be removed. As an example, we examine effects of solar activity variations on the frequency of circulation types, making use of more than sixty objective classifications for each of 12 domains, defined over Europe. To determine the solar effects, winter months (December to March) are divided into three classes according to the mean monthly solar activity, within which the frequencies of occurrence of circulation types are calculated. Circulation types coming from any classification with significant differences in frequency between high and low solar activity are identified. Current results generally confirm results of a previous study based on a single classification only (subjective Hess-Brezowsky) that (a) westerly types are more frequent under high than low solar activity; (b) northerly types are more frequent under low than high activity, and (iii) easterly and anticyclonic types are more frequent under low than moderate solar activity; the opposite holds for cyclonic types. The research is supported by the Ministry of Education, Youth, and Sports of the Czech Republic under contract OC115 and the Grant Agency of the Czech Academy of Sciences, project A300420805.