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Long-term trends in the frequency of atmospheric circulation types in European regions

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We have analyzed long-term linear trends in the seasonal frequency of circulation types in the period 1957–2002 using 73 circulation classifications arising from the COST733 Action: 65 objective catalogues in Europe and 11 European regions, and 8 subjective and "objectivized" catalogues in Central Europe. The objective catalogues are based on the same gridded climatic data (ECMWF ERA40), but they differ in the classification method used and in the number of circulation types.

In the objective catalogues the proportion of days that belong to circulation types with significant trends in seasonal frequency is mostly very low except for Central and Eastern Europe in winter and the Mediterranean in winter and summer. Generally, the magnitude of trends is the highest in winter. In the Mediterranean in summer the types with significant trends in frequency are the prevailing ones, whereas in other seasons and regions there is no such preference for the total occurrence of the circulation type to have a significant trend.

In the subjective catalogues there is a substantial proportion of circulation types with significant trends in frequency in all seasons. The magnitude of trends is also very similar within the four seasons. Whether these long-term trends in the subjective catalogues reflect real climatic changes or result from manual data evaluation is still an open question.

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