The Links between Circulation Variability Modes and European Temperature and Precipitation : Time Variations and Their Causes

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The circulation variability modes are identified in monthly mean 500 hPa heights by rotated principal component analysis. Modes are defined on the data over the whole Northern Hemisphere (north of 20˚N), and only the modes over the Euro-Atlantic sector are considered. The time variations of the relationships between the atmospheric modes and temperature and precipitation at more than a hundred of European stations are examined separately in individual seasons (DJF, MAM, etc.) for the period 1958-1998. The time variations are quantified in terms of running correlations with a 15-year window. At the majority of stations, the correlations with circulation modes vary considerably in time both for temperature and precipitation. The time changes of the running correlations are evaluated by statistical tests. The causes of the nonstationarity are found in the time variations in the position and intensity of the action centres of the modes. The support from the Grant Agency of the Czech Academy of Sciences (project A300420506) is acknowledged.