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The influence of synoptic patterns on wild plant phenology in the mountaineous areas of Central Europe

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Annual changes of land surface / atmosphere interface determine the start of plant development in spring. Evaluation of the phenological development reflects the impact of changing meteorological parameters on the nature. These parameters are determined by the synoptic situation and global air flow. This work considers the possibility to forecast the start of some phenological phases at selected wild plants. The data from 18 phenological and climatic stations from the territory of Czech and Slovak Republics were processed for the period 1996-2008 as the methodology of phenological observations were unified since 1996. Selected phenological stations cover the altitude from 157 to 770 m a.s.l. and the horizontal distance over the line of about 800 km from west to east. The investigated plants belong to the group producing pollen allergens – hazel, birch, meadow foxtail and orchard grass.

The analysis was done in two stages. The relationship of the beginning of different phenological phases was investigated together with the sums of cumulative temperatures at the first stage followed by the analyses of the relation and influence of the synoptic situation on the plant development. From the total of 36 standardized synoptic situations we have evaluated the influence of both cyclonal and anti-cyclonal periods. Changing synoptic situation has appeared as a component determining both the onset and the rate of phenological development. The correlative patterns of physical atmospheric component and biological phenomenon show clear influence on plant development though the reaction of the plants varies in the response time as well as in the subsequent development of the particular phenological phase.