



## The asymmetries of day-to-day temperature changes distribution

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The day-to-day temperature changes are not normally distributed in winter nor summer period. We hypothesize that the asymmetries of distributions are caused by (i) passages of atmospheric fronts (cold in the summer period and warm during the winter season) and (ii) radiation balance under the anticyclonic circulation conditions. We check this hypothesis for maximum (for summer) and minimum temperature (for winter season) observed at the Prague - Karlov station. For identifying the anticyclonic circulation over Central Europe, the Hess-Brezowsky catalogue and the classification of the Czech Hydrometeorological Institute are used as subjective classifications of synoptic situations. In addition, 5 objective classifications from the COST733 database are utilized.

Distributions of observed day-to-day temperature changes have two sources of asymmetries in summer as well as in winter. More numerous strong coolings (over 5 °C) than strong warmings in summer is possible to connect with passages of cold fronts. In winter, the frequency of strong warmings is higher than strong coolings and the influence of warm fronts passages has been proven. The other source of asymmetry is a higher frequency of small warmings (up to 3 °C) than small coolings in summer; we demonstrate that it is significantly linked with positive radiation balance under anticyclonic circulations and in situations with the advection of warm air from south and southeast. In winter, the higher frequency of small coolings (up to 3 °C) than small warmings is connected with the advection of cold air from north and northeast. The influence of negative radiation balance under anticyclonic circulation is not statistically significant. The statistical significance was tested by the Monte Carlo test.

The described findings may be used e.g. as a verification method for climate model outputs.