Geophysical Research Abstracts, Vol. 8, 02555, 2006
SRef-ID: 1607-7962/gra/EGU06-A-02555

Implications of enhanced persistence of atmospheric circulation over Europe for the occurrence and severity of temperature extremes

J. Kysely
Institute of Atmospheric Physics AS CR, Prague, Czech Republic (email: kysely@ufa.cas.cz)

A relationship between persistent atmospheric circulation patterns over Europe and surface air temperature anomalies is studied over the 20th century using the Hess-Brezowsky catalogue of circulation types and temperature data from European stations with long-term measurements. Circulation types significantly conducive to heat and cold waves are detected. It is demonstrated that the persistence of the circulation patterns is linked to surface air temperature anomalies and the occurrence and severity of temperature extremes that may become more pronounced under a more persistent circulation. The consequences vary for warm and cold extremes and among sites, depending on features related to the atmospheric dynamics (e.g. air-mass advection and atmospheric fronts); over most of Europe, the intensification due to the higher persistence of circulation patterns would likely be more important for warm than cold temperature extremes. The recently observed increases in the frequency and severity of heat waves over Europe are likely related to the enhanced persistence of the atmospheric circulation, and impacts of the expected climate change on the occurrence and severity of temperature extremes may be exacerbated by more persistent circulation patterns over European mid-latitudes. The study is supported by the Czech Science Foundation under grant project 205/06/1535.