

Relationships between persistence of atmospheric circulation over Europe and extreme surface air temperature anomalies

R. Huth, J. Kysely

Institute of Atmospheric Physics, Prague, Czech Republic (email: huth@ufa.cas.cz)

Recent studies have pointed out that persistence of the atmospheric circulation over the European mid-latitudes, as measured by mean residence times of circulation types, has increased since the early 1980s, in both winter and summer seasons and for most groups of types. It has also been hypothesized that the enhanced persistence of circulation patterns may affect the occurrence of surface climatic anomalies, particularly heat and cold waves and precipitation extremes. In this paper, a relationship between persistent patterns over Europe and surface air temperature anomalies is studied over the 20th century using the Hess-Brezowsky catalogue of circulation types and long enough temperature series at stations distributed over the entire European continent. It is demonstrated that the persistence of the circulation patterns is related to surface air temperature anomalies, and that more persistent circulation may enhance the severity of temperature extremes. The intensification due to a higher circulation persistence seems to be more important for warm than cold anomalies. The effects of the future climate change on the occurrence and severity of temperature extremes may be exacerbated by more persistent circulation patterns over Europe.