



Dynamical simulation of local ozone anomalies formation, evolution and decay

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The present study is aimed at investigation of the dynamical structure and formation mechanisms of local ozone anomalies, which constitute an important short-term component of the stratospheric ozone variability and are usually defined as synoptic-scale deviations in the total ozone column field with a characteristic lifetime of about a week or a few days.

On the basis of observational and reanalysis data we select several prominent cases of both negative and positive anomalies over the territory of Europe during the last two decades. The cases of deepest negative ozone anomalies, such as the 1997-1998 ozone mini-hole responsible for the minimal total ozone column value ever observed over Belarus (about 160 DU), and of springtime and summertime ozone mini-holes, when sufficiently low total ozone column values coincide in time with intense solar irradiation, are of special interest.

Furthermore, we study formation, evolution and decay for each of the selected cases of anomalies, focusing on the underlying dynamical processes. For that purpose we combine observational data, global (ECMWF OpenIFS model) and regional mesoscale (WRF) simulations with Lagrangian trajectory analysis. Also, we analyse the connections of stratospheric local ozone anomalies with surface weather processes and their predictability and discuss the role of local ozone anomalies in the broad context of stratosphere-troposphere interactions research.