

# **A cluster analysis of different trajectory data sets for a study of tropospheric ozone concentrations**

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Tropospheric ozone episodes in Slovenia are mainly due to the local traffic sources and the long-range transport of ozone and its precursors. In our research a trajectory cluster analysis for Nova Gorica station in western Slovenia at the border with Italy was performed and differences in mean ozone concentrations across clusters were tested. Nova Gorica was selected because of high measured ozone concentrations.

Different air-mass back trajectory data sets were used and for each data set clusters of trajectories with a similar speed and direction were found. Results obtained with the classification of different trajectory data sets were then compared from the ozone and from the cluster trajectory structure point of view.

Trajectory classifications were obtained with an ensemble of randomly initialized runs of nonhierarchical clustering algorithm (k-means). The solutions with a minimum value of the total squared distance from cluster centres were then selected and analysed.

Results show that cluster analysis is an effective way of grouping air mass trajectories with similar curvature and direction. The analysis of similar trajectories in different clusters helps to discriminate different tropospheric ozone concentrations.