



A case study of Ozone advection in the Northern Adriatic area

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Acute episodes of tropospheric Ozone (O_3) are mainly related with anthropic activities, especially in urban areas because of its formation is a consequence of the reaction among nitrogen oxides (NO_x), carbon monoxide (CO) and volatile organic compounds ($VOCs$), in presence of solar radiation. Besides this aspect, air advection plays an important role in the occurrence of short time increases of O_3 concentration over rural areas.

Here we present the multidisciplinary study of an anomalous increase of O_3 in an Alpine area facing the Adriatic sea southward. Increase rate of about $10 \mu g m^{-3} h^{-1}$ lasting for several hours has pushed the Ozone concentration up to $130 \mu g m^{-3}$.

Analysis of the air quality measurements time series recorded in the Alpine region and across the plain up to the shore line reveal that the advection mechanism is a very likely explanation for the episode, according to the wind data field derived from weather station and radiosounding information.

With the aim of adding elements to analysis, an high resolution ($2 km$) run of the Weather Research and Forecasting model (WRF) has been performed and the back trajectories ending to the location of acute episode have been computed.

The study of the trajectories and the time of fly of the air masses, together with the amount of solar radiation available along the path, show that the originating area of the advected pollutant is located in the open sea, some hundred of kilometers far from the station that recorded the O_3 sudden increase. The quality and the uncertainty of the trajectories simulated by WRF have been evaluated and they are presented as corollary.