Comparison of two airports emissions and pollutants dispersion in urban areas

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Since 2009, a collaboration between Ca' Foscari University of Venice, SAVE S.p.A., AerTre S.p.A. and Ente della Zona Industriale di Porto Marhera (EZI) has started to study the emissions of the "Marco Polo" and "A. Canova" airports. The sites are set near two big urban areas: respectively Venice and Treviso.

Despite the proximity (~28 km), the two sites are characterized by different environmental and atmospheric conditions and emission sources. In Venice, several studies have been conducted to estimate air pollutants dispersion and concentrations (Pecorari et al., 2013; Squizzato et al., 2012) mainly considering short time period of analysis. Otherwise, Treviso has not been studied yet and it is characterized by very high pollution phenomena.

Figure 1 shows the sampling sites location. The first is located inside the "Marco Polo" airport (45°30'40''N, 12°20'38''E – Tessera, Venice - Italy), on the border of the Venice Lagoon that is a complex and sensitive ecosystem. The second one is located near Treviso (45°41'03''N, 12°05'15''E – Treviso – Italy), one of the most important city in the Veneto Region.

Figure 1. 'Marco Polo' and 'Antonio Canova' airports location.

Both the sites are situated in the North-Eastern part of Italy between the Po Valley (that is recognized as one of the most polluted area in Europe) and the Adriatic Sea. In this area the two airports represent a strategic point from the touristic and the commercial point of view. Unfortunately, their location, near to several emission sources, can be sensitive respect to air pollution causing direct and indirect contributions.

In order to better assess airport contribution a parallel monitoring campaign has been developed in the two airports and a lagrangian model, SPRAY (Tinarelli et al., 1994), has been used to estimate aircraft pollutant dispersion area.

Results have been correlated to the meteorological conditions and to the local emission sources scenario that characterizes the two urban sites. Modelled data have been compared with measurements in order to check aircraft emission fall out in the area. All the data have been used to compare the two airports impact on the respective urban area.

In order to check Venice airport impact on local urban area a specific case have been studied in this site during 2009. An eulerian photochemical model have been applied in order to assess the interaction among the several emission sources and to check Marco Polo airport contribution. Predicted data showed good performance of the model for all the area and aircraft contribution appears scarce respect to the other sources. High level reached is strongly connected with the presence of a heavy-traffic road near the Venice airport. In this view, a road transport modellization have been conducted to compare traffic impact respect to airport emissions. The strong pollutant peaks seems to concur with traffic jams.

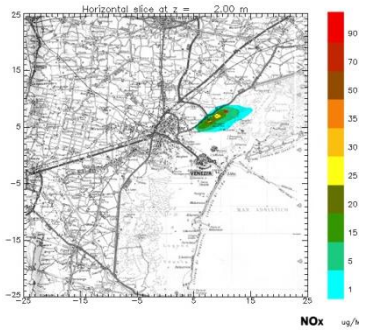

Figure 2. Road traffic dispersion near Treviso airport.

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