

## Atmospheric Pollutants In Taranto, One Of The Most Industrialized City In South Italy

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Fifty years since industrialization developed in Italy and Taranto, located in the south part of the country, became one of the most industrialized cities of Italy. The industrial district includes the largest iron and steel integrated complex in Europe (ILVA), one of the largest oil refinery in Italy (AGIP), a large cement factory (CEMENTIR) and several small and medium-sized enterprises.

Industrialization positive effect was the process of modernization and mass production of most goods, but effects on human health and environment caused by pollution were so ravaging that in 1990 Taranto have been declared at a high risk of environmental crisis.

Specific initiatives have been undertaken during the past fifteen years and numerous environmental investigations have provided a good basis for planning land reclamation. Within these surveys our group conducted a field study on specific air pollutants with known or suspected harmful effects on human health and the environment both in downtown and surrounding towns, where a huge pollutants fallout is expected.

An extensive investigation has been carried out during 2004.

On the basis of meteorological studies at ground and upper air, three stations were chosen to monitor pollutants. The first one (Palagiano) was considered a background area; the second and densely populated area (Tamburi), was located in downtown, in the old part of the city and close to the steel complex; the last one (Statte) was 8 km North of Taranto and downstream of the prevailing winds.

Two seasonal field-campaigns were performed, the first one in February and the second one in July.

The study was aimed in particular at evaluating toxic contaminants such as PM<sub>10</sub>, PM<sub>2.5</sub>, PAHs, nitro-PAHs, VOC including Benzene.

In this paper we report the preliminary results of PM<sub>10</sub> and their PAH, nitro-PAH and n-alkane content, in order to identify the major source of fine particle organic compound mass.

Pollution levels at Tamburi largely exceeded those recorded at the other sites for all toxic compounds monitored, although Palagiano showed concentration levels higher than those expected in a background area, suggesting a pollutant dispersion throughout the territory.

High agreement is observed at all of the three stations investigated, when comparing diagnostic ratios between the air contaminants, indicating petroleum related combustion processes as a shared source of pollution.

This assumption is confirmed by the following findings. First of all the high molecular weight PAHs were found to be more abundant than the low molecular weight ones; 1-nitropyrene and 7-nitrobenzo(a)anthracene showed to be the higher nitro-PAHs and 2-nitrofluoranthene/1-nitropyrene ratio was always lower than 0.3 at the three sites; at last the figures of Carbon Preference Index (CPI) were about 1, for Tamburi and Statte.

Conversely CPI value was higher than 4 at Palagiano, showing a more evident biogenic source than at the other stations.

The comparison between summer and winter results revealed that organic compound content in fine particles were

higher in the cold season at the three sites, as expected. In winter, n-alkane concentration profile fits with a threemodal distribution with maxima centered at C17, C23 and C29 both at Tamburi and Statte; at Palagiano, n-alkane distribution pattern showed a saw-tooth distribution with a preferential presence of odd carbon numbered congeners and absolute maximum centered at C29. The very same distribution was observed at the three sites in summer.

The present preliminary results reveal the predominant pollution source was related to combustion processes at the three sites. It emerged that Tamburi, sited nearby the industrial district, was the most polluted area, but the contaminants spread throughout the territory to a considerable extent.