



Newsletter

Contribution of Emission Sources on the Air quality of the Port-cities in Greece and Italy

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Newsletter II

June 2013

Introduction

The 2nd Newsletter of the project «CESAPO - Contribution of Emission Sources on the Air quality of the Port-cities in Greece and Italy» aims to present the progress of the project's actions in the period that followed the first Newsletter until today.

The project is implemented in the frames of the European program INTERREG "European Territorial Cooperation Programme Greece - Italy 2007-2013, has a budget of 816.250 €, duration of 24 months and is funded by the European Union - European Regional Development Fund (ERDF) and National Funds of Greece and Italy.



Information & publicity

In the frames of the project a threefold brochure was created in English and Italian language and a multipaged booklet is expected in Greek, in which project details, reasons that led to implementation, objectives and the methodology followed, are presented. In addition, a progress meeting and addressing project development was held in Brindisi on 26/11/2012 followed by a press conference and a press release. Also, an important reference to the project, took place during the 8th ISPRA report on Urban Environment and the scientific seminar in Lecce, Italy was successfully conducted on May 15th 2013. Regarding Greek and Italian press, many references have been published regarding the importance of the project with last [reference taking place on Enet.gr](#) of Eleftherotypia newspaper.



University of Patras



Western Greece Region

REGION OF WESTERN GREECE
Full of contrast!



University of Salento



Institute of Atmospheric Sciences and Climate



Regional Environmental Prevention & Protection Agency of Apulia



The Project is co-funded by the European Union -European Regional Development Fund (ERDF) and by National Funds of Greece and Italy



Measuring equipment - Preliminary air emission inventory

In Brindisi, due to the high activity of its' busy port, air quality measuring instruments have been placed in the past, particularly in the port area. This led to the creation of an initial database for emissions of gaseous pollutants generated from activities within the harbor, for the years 2005 and 2007. In the framework of the project CESAPO, this database is being enriched with continuous measurements, collected during a five month period (June-October 2012, Intensive Observation Period - IOP) with advanced technological instruments from twelve different sites. Ten measuring sites are the same as those that were selected for the earlier measurements at regional level where in this case were managed by ARPA Puglia, while the two new sites, were specifically selected for the project and were managed by ISAC -CNR (figure 1).



Figure 1. Maps of the studied area showing the monitoring sites of the regional network (ARPA Puglia, in red), and the two additional sites installed by ISAC-CNR (blue marks).

Ten measuring sites are the same as those that were selected for the earlier measurements at regional level where in this case were managed by ARPA Puglia, while the

two new sites, were specifically selected for the project and were managed by ISAC-CNR (figure 1).

Regarding the first new site, the equipment used included two sequential low-volume samplers the Zambelli Explorer and the FH95SEQ Thermo ESM Andersen for PM_{2.5} and two high - volume samplers of total suspended particles (TSP), Analitica Strumenti and Tisch Environment, for the determination of PAH concentrations. For the second new site, the Mobile Laboratory of ISAC - CNR was placed in the passenger terminal of the harbor just 30 meters from the docking of tourist ships.

This site was devoted to high temporal resolution measurements of particles concentrations (sizes 0.01 μm, 1μm and PM_{2.5}) as well as remote-sensing measurements with a DOAS system for nitrogen dioxide and sulphur dioxide (figure 2).

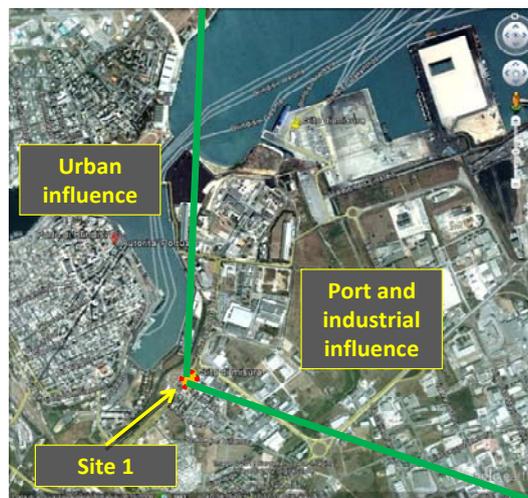


Figure 2. Left: Photo showing the samplers installed on a building roof. Right: Map showing the first of the new sites for the PAH wind-select sampling

The selection of sites and the simultaneous sampling was designed in such a way, so as to improve the probability of pollution sources separation affecting the region. The main objective is to use the collected data into mathematical models and simulations for continuous air pollution control, taking into account the wind direction and the ships traffic in the harbour, through the use of infrared videocamera and evaluate the contribution of activities, such as ship traffic and maneuvering and vehicle traffic for embarkment / disembarkment of the ships.



Figure 3. Left: Photo showing the Mobile Laboratory ISAC – CNR located at the passenger terminal., Right: Photo of the sensors installed on the roof of the Mobile Laboratory

In the case of Patras, modern equipment will be installed at key points of the port in order to perform continuous measurements and complete an updated database (there are measurements from the years 2007 and 2009). Measurements will be carried out in two periods, spring and winter of 2013.

The emission inventory for Patras area, includes the following sectors of human activity: Industries, Central Heating, Use of solvents and other products, Extraction and distribution of fossil fuels and geothermal energy, Road transport, Other mobile sources and machinery (except maritime shipping / activities), Shipping / activities, Waste Treatment and Agriculture.

Emissions data for these categories are based on the emissions database of the Netherlands Organisation TNO (Kuenen et al., 2011) available for the 2007, except for the category of maritime shipping / activities where emissions were estimated quantitatively using methodologies and emission factors (Cooper and Gustafsson, 2004; EEA 2006). Using the MOSESS emission model (coMputer mOdel for the conStRuction of model-rEady emiSsion inventories) (Markakis et al., 2013), the emissions of pollutants CO, NO_x, SO₂, NH₃, NMVOC, PM10 and PM2.5 were calculated on a grid with a spatial resolution of 2km and analyzed over time. For the category of maritime shipping / activities emissions are estimated using the most recent available data concerning activities of 2010. Emissions from natural sources (dust from the ground, sea salt and biogenic) are calculated using the NEMO emission model (Natural Emission Model) (Markakis et al., 2009; Poupkou et al., 2010).

Image 1 and Table 1 present indicative results on pollutant emissions in the region of Patras.

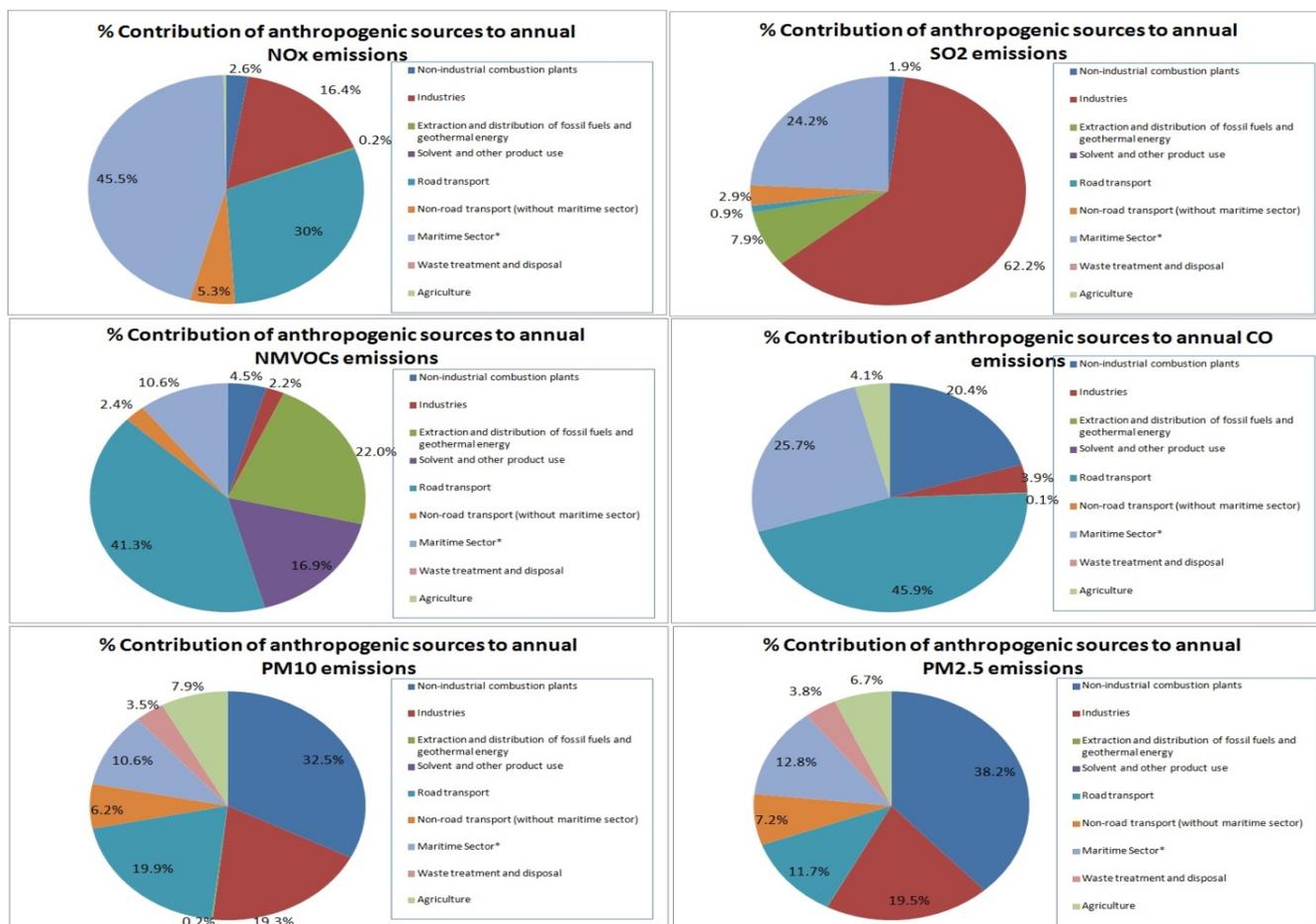


Image 1. Contribution of anthropogenic sources in pollutant emissions in Patras

	NOx	CO	SO2	NMVOCs	NH ₃	PM10	PM2.5
Passenger ships	5078.89	6126.93	1775.07	1253.41	1.16	218.09	218.09
Cargo ships	232.80	283.48	72.50	67.71	0.04	13.27	13.27
Yachts	302.47	111.29		39.80	0.10	31.52	29.68
Fishing boats	1357.52	127.15	47.63	23.10	0.52	23.24	23.24
Tugboats	0.29	0.06	0.01	0.01	0.00	0.01	0.01
Activities within the port	-	-	-	-	-	0.98	0.19

Table 1. Gas Emissions (tn / year) from individual sources of maritime transport and activities in the area of Patras (reference year 2010)

The combination of previous data as a point of reference, and newer that will be collected, will be used in mathematical models and simulations, similar to the ones of Brindisi, in order to achieve comparison of the atmospheric pollution of both port-cities and reach valuable conclusions on air quality. These conclusions will lead to the creation of a supportive base for decision making on sustainable development policies and hence will produce a Best Practices Guide. Moreover, they will promote strategic partnerships between the port authorities and the environmental policy authorities with aim to apply rational practices, in coherence with other European port-cities that face similar environmental problems from incoming ships.

Project Meetings

Project CESAPO will be coordinated through four Steering Committee meetings in which all project partners are represented. Project schedule includes two meetings in Patras and one in Brindisi and Lecce.

The second project meeting was held on Monday, November 26, 2012 in Brindisi, Italy. Organized by ARPA Puglia and took place in the port of Brindisi. Lead partner conducted a review of the actions of the project until the time of the meeting and responsible partners presented the progress of their work. Furthermore, an analysis was conducted, regarding the scientific methods used by project partners to carry out measurements and analysis of air quality in their area of responsibility. The overall assessment for the development of the project was positive and reconfirmed the excellent cooperation and commitment to the project goals and program.



Figure 4. Left: Photo showing the meeting for the progress of the project in Brindisi. Right: Photo showing the press conference in Brindisi.

References

1. Cooper, DA., Gustafsson, T., 2004. Methodology for calculating emissions from ships: 1. Update of emission factors, Report series SMED and SMED & SLU 4.
2. EEA (European Environment Agency), 2006. EMEP/CORINAIR Emission Inventory Guidebook 2006. (EEA Technical Report no.30). Available at http://reports.eea.europa.eu/EMEP_CORINAIR4.
3. Kuenen, J., van der Gon, H. D., Visschedijk, A., van der Brugh, H., van Gijlswijk, R., 2011. MACC European Emission Inventory Database for the years 2003-2007, TNO-060-UT- 2011-00588.
4. Markakis, K., Giannaros, T., Poupkou, A., Liora, N., Melas, D., Sofiev, M. and Soares, J., 2009. Evaluating the impact of particle emissions from natural sources in the Balkan region, European Aerosol Conference 2009, 6-9 September 2009, Karlsruhe, Germany.
5. Markakis, K., Katragkou, E., Poupkou, A., Melas, D., 2013. MOSESS: A new emission model for the compilation of model-ready emission inventories. Application in a coal mining area in Northern Greece, Environmental Modeling & Assessment (accepted).
6. Poupkou, A, Giannaros, T., Markakis, K., Kioutsioukis, I., Curci, G., Melas, D. and Zerefos, C., 2010. Development of a model for the calculation of biogenic NMVOCs emissions in Europe, Environmental Modeling and Software, 25, 1845-1856.