Maritime Integrated Approach in the Mediterranean Area
CAIMANs
Cruise and passenger ship Air quality Impact Mitigation ActioNs

L’impatto dei porti sulla qualità dell’aria:
Metodi e strumenti implementati in CAIMANs

Salvatore Patti, ARPAV LP
UNIGE, AUTH, Air PACA, IDAEA

Mitigazione dell’inquinamento atmosferico in alcune città portuali del Mediterraneo.
I risultati del progetto CAIMANs
Venezia, 12 Giugno 2015
CAIMANs
Cruise and passenger ship
Air quality Impact Mitigation ActioNs

paving the way towards a joint policy response on the air pollution impact due to the tourist sector of cruise and passenger ships in the MED basin

Mitigazione dell’inquinamento atmosferico in alcune città portuali del Mediterraneo.
I risultati del progetto CAIMANs
Venezia 12 Giugno 2015
CAIMANs’ approach

Scientific insight
High resolution air dispersion modelling of passenger ship plumes and assessment of population exposure

Present and future scenarios with/without mitigation actions

Barcelona, Mareilles, Genoa, Venice, Thessaloniki

Involvement of the South Mediterranean Ports in order to identify critical points/gaps and possible solutions to be addressed at transnational level

Hints, suggestions and proposals for the soon coming new European programming period 2014-2020 (not only MED)
The project area of Thessaloniki

- A European port and a natural gateway for the economic activities of the inland markets beyond Greece.

- Serving the growing needs of countries for the import and export of raw material, consumer products and capital equipment.

- Vital element of the country’s economy AND Substantial role in the effort of Northern Greece and Thessaloniki to be established as the economic centre of the Eastern Mediterranean.

- Privileged position being located at the crossroad of different transportation networks.

http://www.thpa.gr/en/

AUTH has expertise on emission inventories, meteo & air quality studies, modeling at urban and regional scale. AUTH has been active in the fields of environmental Physics & has been involved in many EU & ESA funded projects.
The project area of Genoa

A touristic harbour in the heart of the city

The Laboratory of Environmental Physics collects modellers and experimentalist researchers who develop methodologies and approaches to several environmental issues:

- atmospheric modelling (pollutant dispersion, meteorological and marine forecasting)
- air quality monitoring (high level and complete analysis of atmospheric particulate matter)

Passenger ship traffic:
- 63% Ro-pax vessels
- 37% Cruise vessels

Most traffic during summer period (75% ro-pax and 55% cruises)

Mitigazione dell’inquinamento atmosferico in alcune città portuali del Mediterraneo.
I risultati del progetto CAIMANs
Venezia 12 Giugno 2015
The project area of Barcelona

Surface area: 828.9 ha
Docks/piers: 20.3 km
7 international passenger terminals

Passenger traffic in 2013:
- Total passengers > 3,500,000
- Cruise ships > 2,600,000
- Regular ferry lines > 1,000,000

**IDAEA-CSIC:** Spanish National Research Council - Institute of Environmental Assessment and Water Research - Atmospheric pollution and Air Quality
**University of Murcia:** Physics department – Atmospheric and Climate Modelling

Mitigazione dell’inquinamento atmosferico in alcune città portuali del Mediterraneo.
I risultati del progetto CAIMANs
Venezia 12 Giugno 2015
The project area of Marseilles

Air PACA: Air Quality observatory authorised by French government to survey and assess air quality in the Provence-Alpes-Côte d’Azur region (Law 1996)

Expertise: Monitoring, Modeling, Info and raise awareness, accompany, evaluate, improving knowledge

Other partnerships in MED: Valencia, Tripoli, Aqaba

Other partnerships in ALCOTRA: Torino, Aosta, Genoa, Lyon

www.gouvairnanse.eu

www.aera-aalcotra.eu ; www.partaera.eu

Air PACA:

3 refineries and petro chemical industries

Steel industry

West Harbour Fret

East Harbour Cruise

~ 40 km

2nd city in France

1.6 million of inhabitants

www.airpaca.org

➢ East basin: mainly Passenger and cruise activities

➢ West basin: mainly container and liquid bulk activities

3rd harbour in the world for Crude oil and oil products

Cruise Passengers:

2007 : 400 000

2013 : 1 165 000

+ 65 %

Mitigazione dell’inquinamento atmosferico in alcune città portuali del Mediterraneo.

I risultati del progetto CAIMANs

Venezia 12 Giugno 2015
The project area of Venice

8 passenger terminals
passenger terminals cater to cruise ships and fast ships

26 cargo terminals
7 commercial terminals and 19 privately-owned terminals

Sea Terminal in Fusina
Linked to the rail network, with its own logistics platform and able to serve up to 1,200 ferries. Equipped with 4 quays to berth simultaneously up to 4 ships. It will serve rolling stock traffic, i.e. ferries transporting trucks or their trailers (Ro-Ro) and ferries carrying cars and passengers (Ro-Pax).

[Graph showing annual passengers]

ARPAV: public agency in charge of monitoring & assessment of pollution trends for all environmental compartments and variables (air, water, soil, waste, noise, etc.). ARPAV supports Veneto Region and Local Administrations in planning activities and in drafting, implementing and monitoring the local Action Plans, as well as Strategic Environmental Assessments. Moreover it conducts regional, national and European projects of applied researches in all environmental fields.

www.arpa.veneto.it


Mitigazione dell’inquinamento atmosferico in alcune città portuali del Mediterraneo.
I risultati del progetto CAIMANs
Venezia 12 Giugno 2015
Common Mediterranean strategy and local practical Actions for the mitigation of Port, Industries and Cities Emissions

Source Apportionment by Chemical Transport Models
CAIMANs’ TOOL: an adaptive tool to tackle the challenges of sustainable port developments in regards to air pollution

1. DB harbour (passenger) traffic → Macro and micro pollutant emissions estimations for present and future scenarios with or without mitigations
   [ARPAV code EMEP/EEA, 2013]

2. Docks and routes localisation

3. Parametrisation of plume emissions in hotelling, manoeuvring and cruise phases

4. High resolution air dispersion modelling [CALPUFF (Ve, Tsk, Bcn), ADMS (Ge, Ms)]

5. Population exposure maps

Mitigazione dell’inquinamento atmosferico in alcune città portuali del Mediterraneo.
I risultati del progetto CAIMANs
Venezia 12 Giugno 2015
CAIMAN’S CONSULTATION TOWARDS PORTS ALL OVER THE MEDITERRANEAN
(both EU and non-EU countries)

Double survey to
Air Quality Organizations (AQO)
& Port Authority (PA)

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

Mitigazione dell’inquinamento atmosferico in alcune città portuali del Mediterraneo.
I risultati del progetto CAIMANs
Venezia 12 Giugno 2015
Mitigazione dell’inquinamento atmosferico in alcune città portuali del Mediterraneo.
I risultati del progetto CAIMANs
Venezia 12 Giugno 2015
CAIMANs
Cruise and passenger ship Air quality Impact Mitigation Action

Priority axis 2 Environment
Objective 3: Prevention of maritime risks and strengthening of maritime safety

http://www.medmaritimeprojects.eu/section/caimans

Lead Partner: Environmental Protection Agency of Veneto Region ARPAV – Padoa (IT) www.arpa.veneto.it

Partners:
University of Genoa, Department of Physics (IT) www.labfisa.ge.infn.it
Aristotle University of Thessaloniki (GR) http://lap.physics.auth.gr
AIR PACA – Air quality observatory (FR) http://airpaca.org/
Spanish Research Council - Institute of Environmental Assessment & Water Research IDAEA (ES) http://www.idaea.csic.es/