

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 ActionNs



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

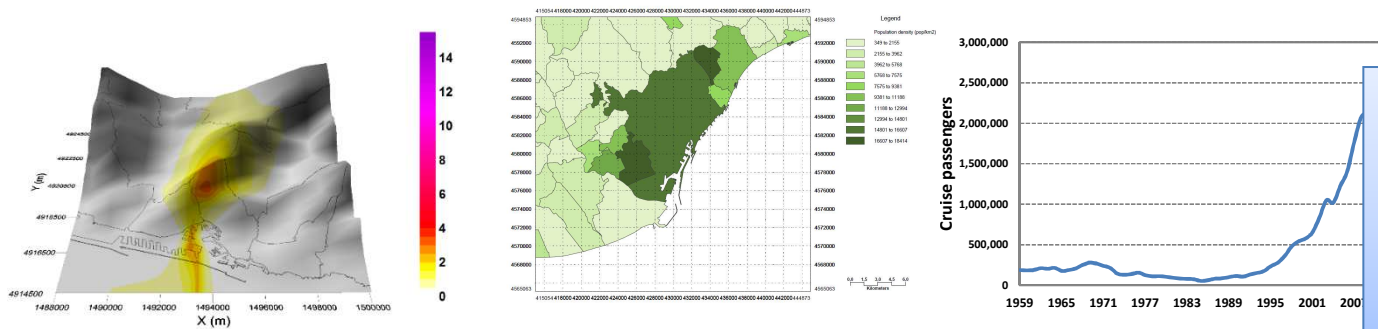


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CAIMANs' approach

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)



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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.



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The project area of Genoa

<http://www.labfisa.ge.infn.it>



A touristic
harbour in the
heart of the city

Medieval
town



Passenger ship traffic:

- 63% Ro-pax vessels
- 37% Cruise vessels

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



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)



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The project area of Barcelona

idæa

UNIVERSIDAD DE MURCIA



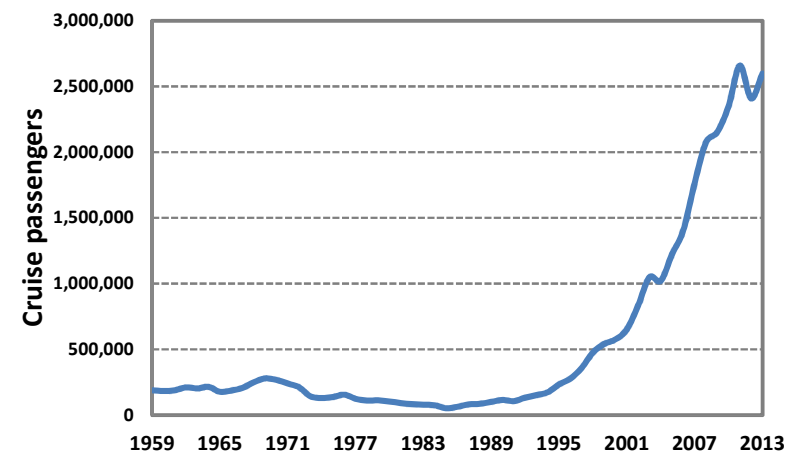
Surface area: 828,9 ha

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



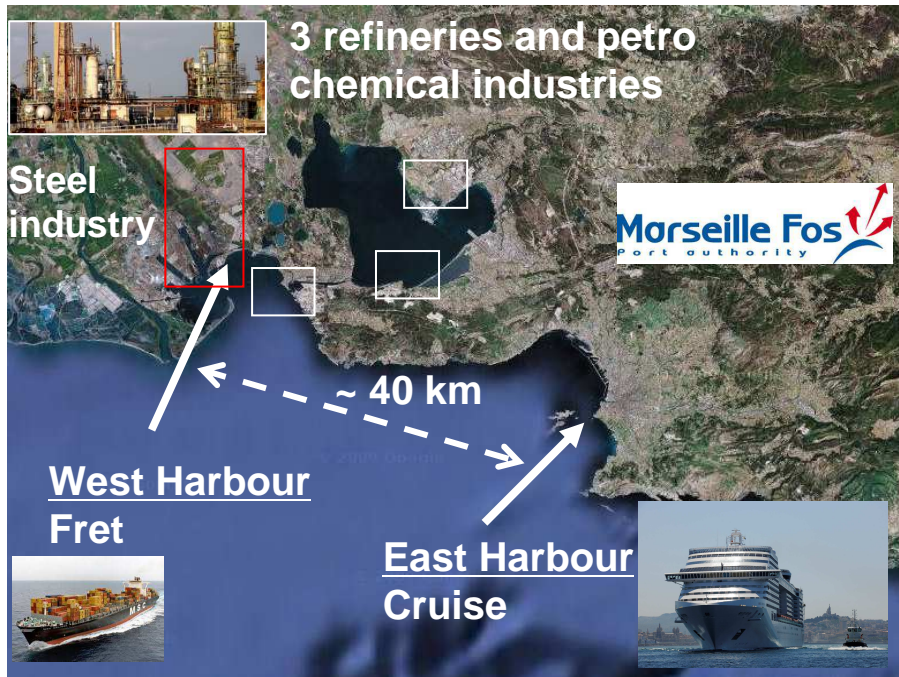
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The project area of Marseilles



2nde city in France
1.6 million of inhabitants

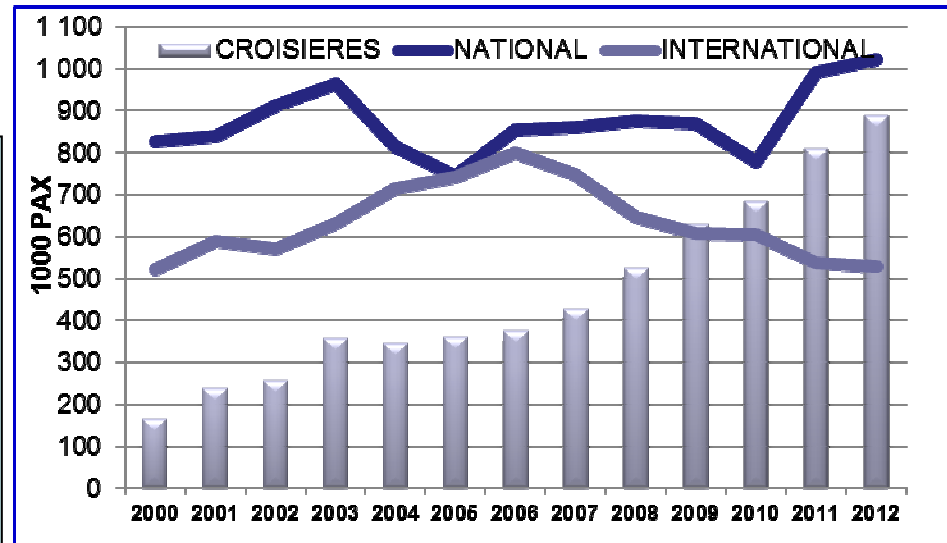
www.airpaca.org



- **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 + 65 %
2013 : 1 165 000

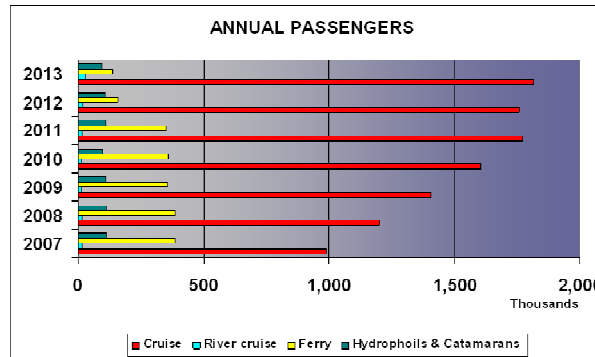


Air PACA: Air Quality observatory authorised by French government to survey and assess air quality in the Provence-Alpes-Côte d'Azur region (Law 1996)
Expertise: Monitoring, Modeling, Info and raise awareness, accompany, evaluate, improving knowledge
Other partnerships in MED: Valencia, Tripoli, Aqaba 
www.gouvairance.eu
Other partnerships in ALCOTRA: Torino, Aosta, Genoa, Lyon
www.aera-alcotra.eu ; www.partaera.eu 



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The project area of Venice



<https://www.port.venice.it/en/the-port-in-figures.html>



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.

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).

www.arpa.veneto.it

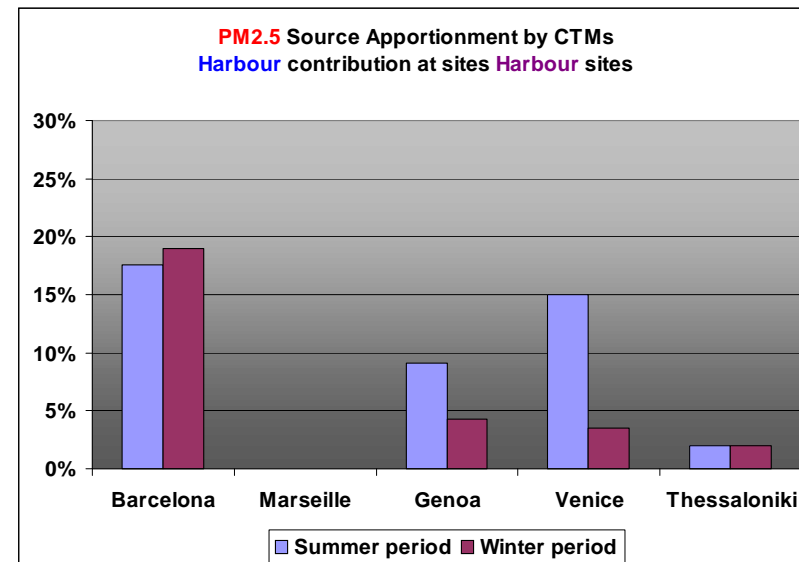
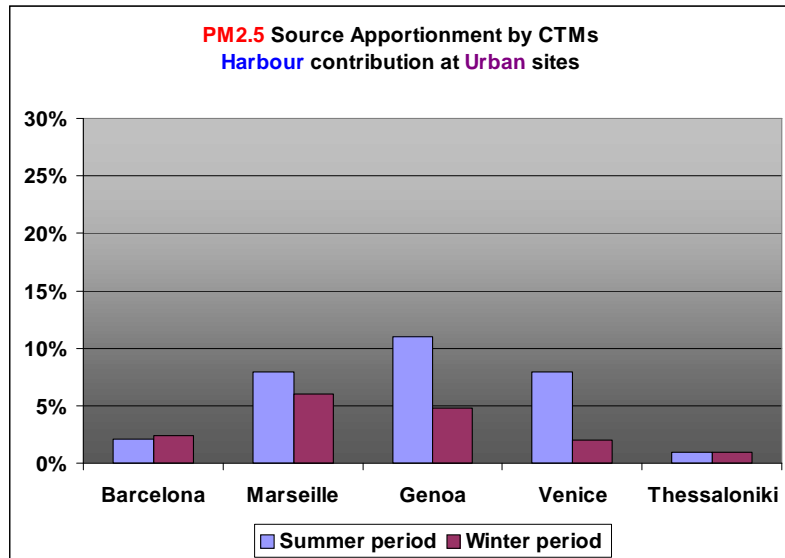


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Common Mediterranean strategy and local practical **A**ctions for the mitigation of **P**ort, **I**ndustries and **C**ities **E**missions



Source Apportionment by Chemical Transport Models



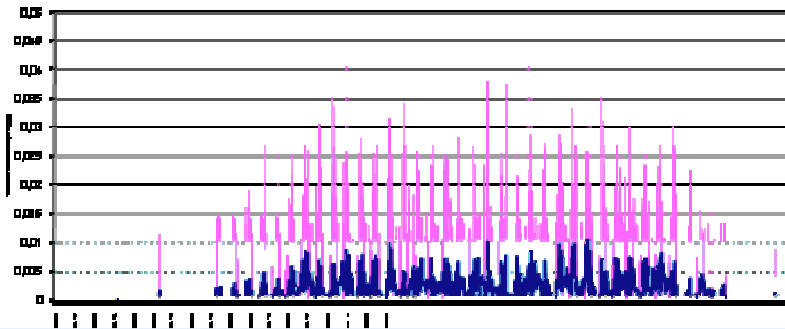
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CAIMANS' TOOL: an adaptive tool to tackle the challenges of sustainable port developments in regards to air pollution

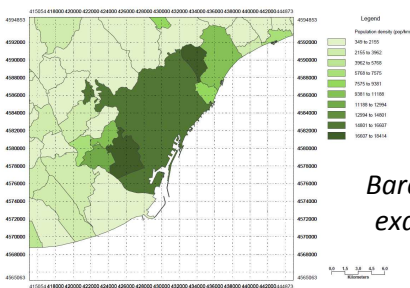
1. DB harbour (passenger) traffic → Macro and micro pollutant emissions estimations for present and future scenarios with or without mitigations

[ARPAV code EMEP/EEA, 2013]

Emissioni Crociere e Traghetto (PM)
Piano di monitoraggio e mitorivista
dal 1° gennaio 2013



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



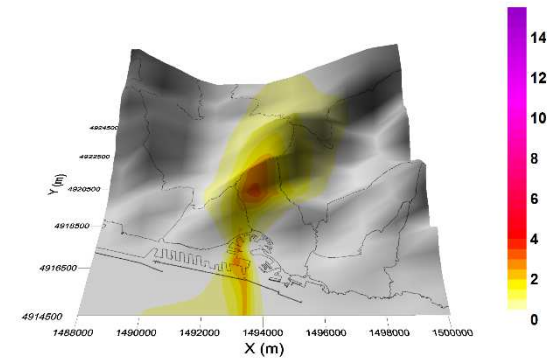
Barcelona example



Venice example

2. Docks and routes localisation

Genoa example



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

5. Population exposure maps

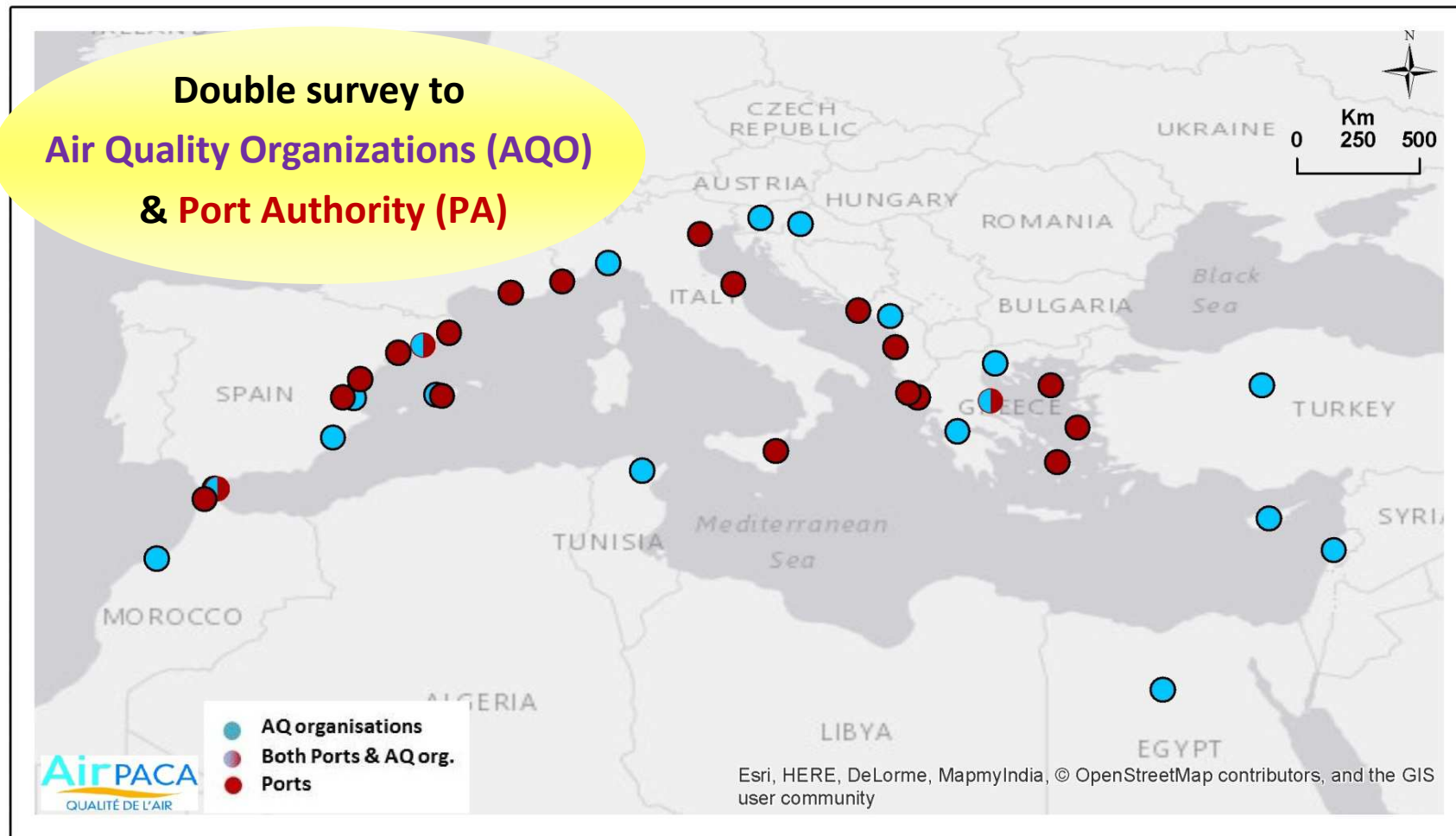


Programme cofinancé par le Fonds Européen de Développement Régional
Programme cofinanced by the European Regional Development Fund



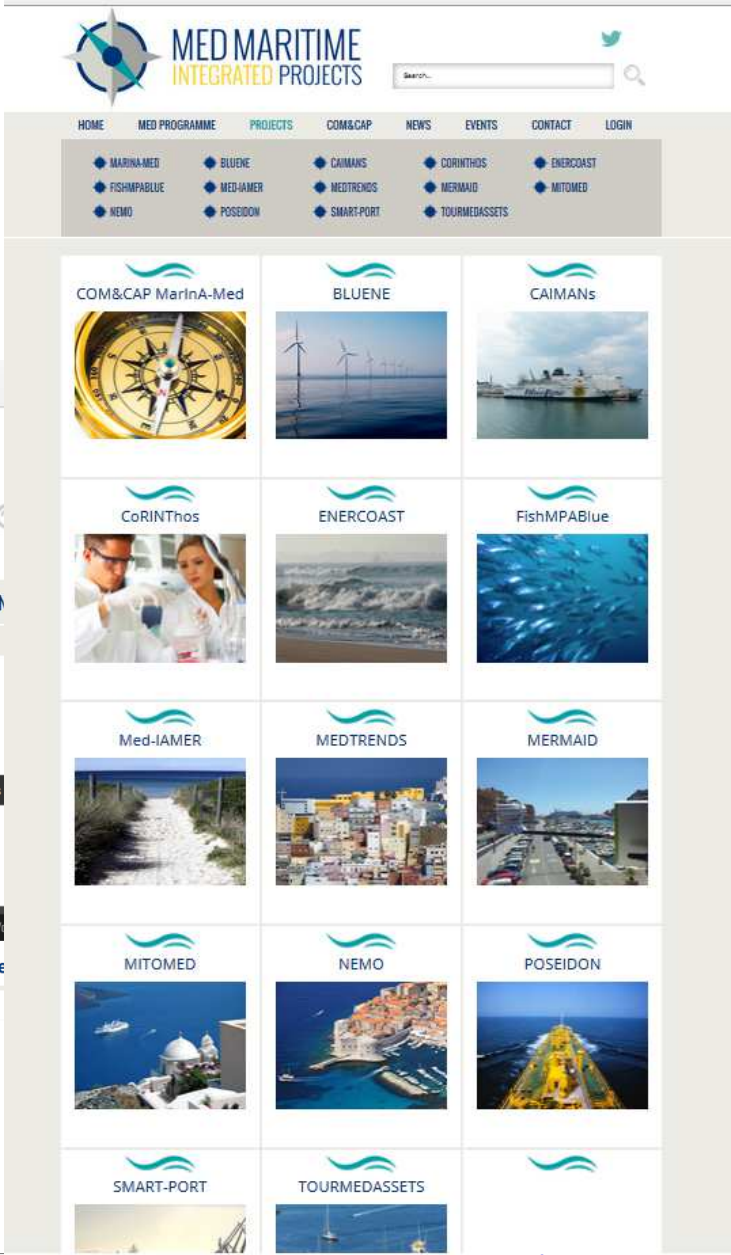
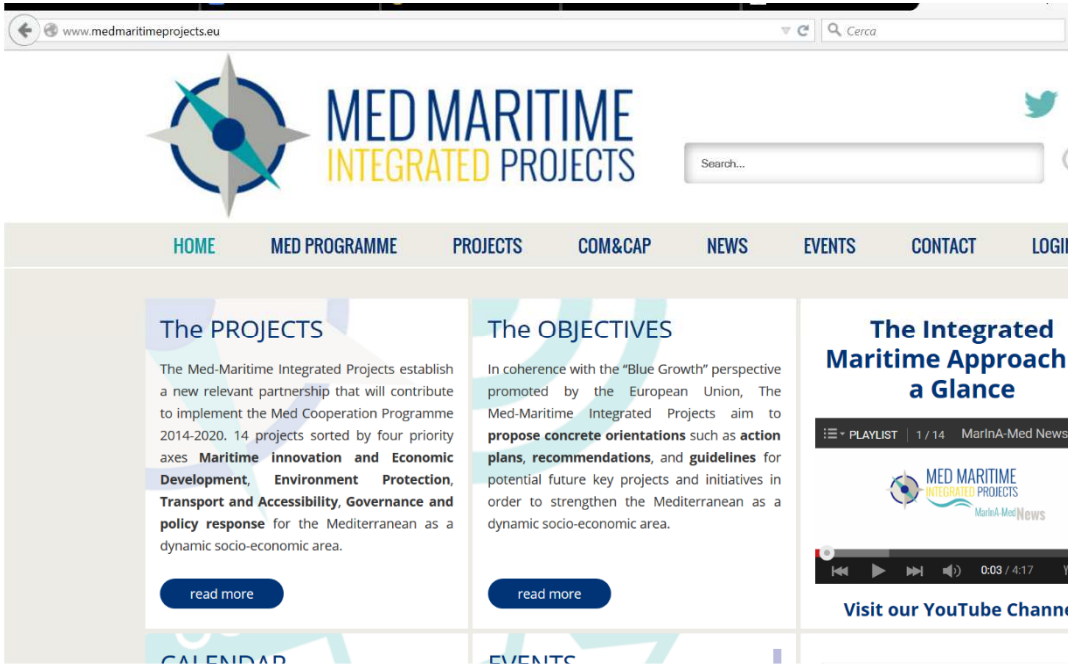
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CAIMAN'S CONSULTATION TOWARDS PORTS ALL OVER THE MEDITERRANEAN (both EU and non-EU countries)



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The Policy paper by the Integrated Maritime Projects



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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/>



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