

CONSTITUTION AND PROMOTION OF AN EUROREGIONAL DATABASE ON ATMOSPHERIC PARTICULATE MATTER

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INTRODUCTION

EXPER/PF european project (« *Exposition des populations de l'Euro Région aux polluants atmosphériques : le cas des particules fines* » - Population Exposure in Euroregion to Atmospheric Pollutants: case of Fine Particles) was launched in January 2002, within the framework of Interreg III program. Project's Objective is to develop and promote a cross-border (North of France-Flanders) database on atmospheric Particulate Matter, usable by the professionals involved in Public Health, Environment and Regional Planning.

The project proceeds over 3 years (2002 to 2004) and is divided into 3 main objectives:

- Objective 1 : constitution of the french-flemish database on atmospheric pollution
- Objective 2 : Field measurement and case study around the Lille urban area
- Objective 3 : Informing society and project promotion

The present paper is focused on the first and third objectives.

PROJECT PARTNERS

The project brings together seven French and Flemish partners, including three air quality monitoring associations (table 1). The project leader is ADRINORD association.

ADRINORD Association for the Development of Research and Innovation in the Nord-Pas de Calais	Project leader
APPA Association for Prevention of Atmospheric Pollution	Communication (France)
AREMA Lille Métropole Air Quality Network for the zone of Lille	Measurements & database feeding
HYGEOS Hydrogeology, Space Observation, Environment	Construction of the data base
OPAL'AIR Air Quality Network for the zones of Boulogne, Calais, Dunkerque and Saint-Omer	Measurements & database feeding
VLIZ Vlaamse voor de Zee vzw Coordination & information of maritim research in Flanders	Communication (Flanders)
V.M.M. Vlaamse Milieumaatschappij Environmental flemish Agency	Measurements & database feeding

Table 1. EXPER/PF project partners

DATA BASE CONTENTS

The EXPER/PF data base contains three types of data :

- routine in-situ pollutants measurements, provided by the fixed stations of the 3 air quality networks which are project partners,
- results of measurements campaigns carried out by one or more air quality networks in partnership,
- space distribution of atmospheric particles on all the study area , resulting from the processing of satellite imagery.

The EXPER/PF area study is showed fig. 1.

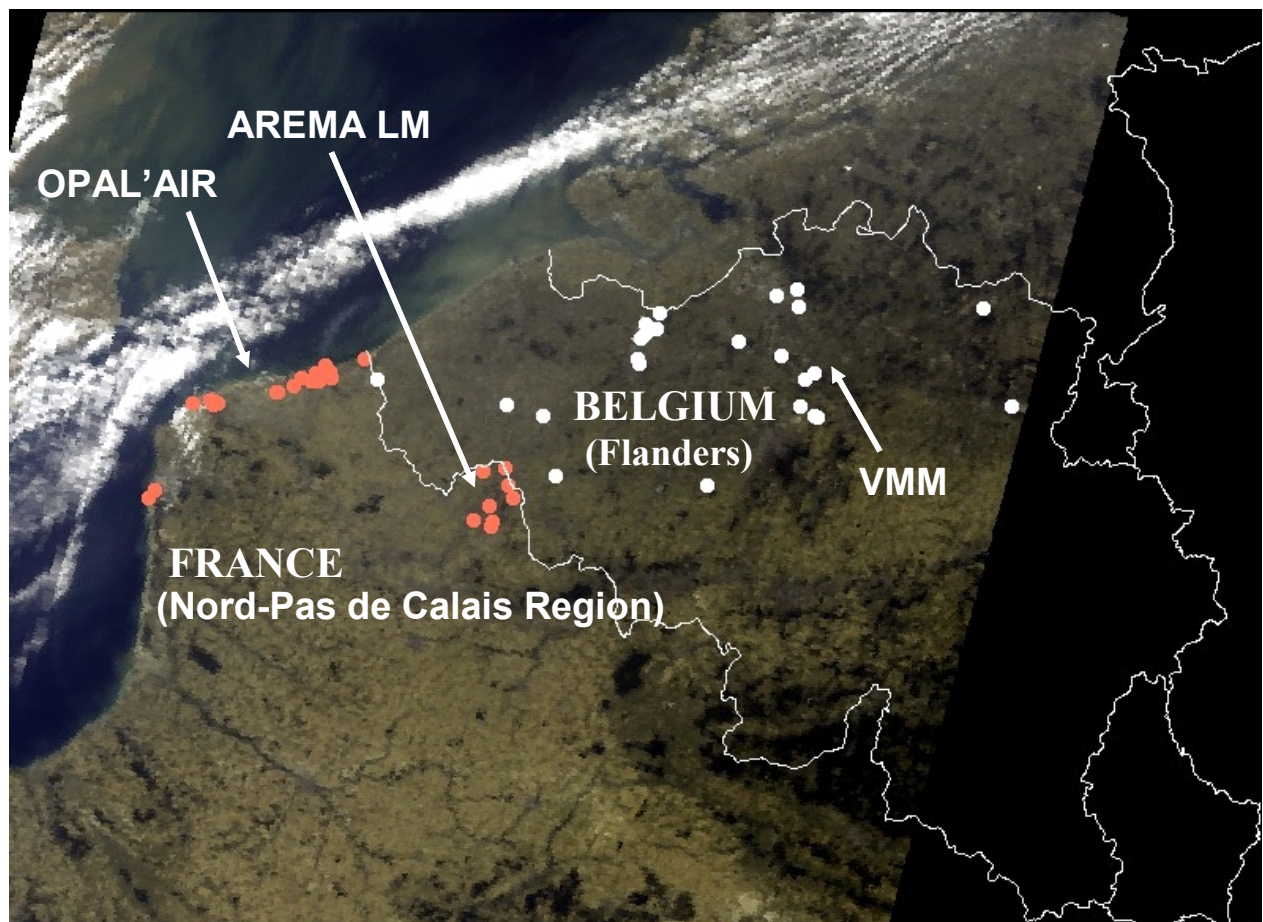


Fig. 1. EXPER/PF zone, with PM monitoring stations of the three monitoring networks

1. Routine in-situ measurements

Three air quality networks take part in the development of this data base: AREMA LM, OPAL'AIR and VMM. The measurements data will be supplied on a one hour basis. The base will be fed by the following data:

- time measurements of PM_{10} et $PM_{2.5}$
- time measurements of gas compounds (CO , SO_2 , NO_x , $O_3...$), complementary of PM measurements.
- meteorological data : wind speed, atmospheric pressure, relative humidity, ...

2. Satellite data

Aerosol remote sensing can be an innovating complement to in-situ monitoring of PM_{10} and $PM_{2.5}$ carried out by air quality networks, in order to have an idea of the PM background above the areas which are not supervised permanently. The work undertaken within the framework of EXPER/PF is based on a long expertise present at the Coast of Opal Littoral University and transferred at ADRINORD and HYGEOS within the framework of activities from Research and Development, mainly at the request of the European Space Agency.

A satellite sensor observes from space the part of the solar radiation reflected by the ground-atmosphere-ocean system. The measured optical parameters can be associated with PM_{10} and $PM_{2.5}$ concentrations, by means of several assumptions relating to the nature of the aerosols.

Maps of $PM_{2.5}$ et PM_{10} above the area of interest for the EXPER/PF project are integrated in the database. They are obtained by mathematical treatment of the satellite images acquired by the American sensor SeaWiFS. In order to be able to visualize the quality of the images in term of cloud cover, a « false colour » image of the zone will also be available. In the longer term, the images of European sensor MERIS embarked on ENVISAT platform will also be integrated in the database. Each sensor provides at least an image per day above the area of interest.

DATA BASE REQUESTS

The Web site of EXPER/PF project is built by several levels of accessibility (fig. 2):

- **General public:** description of the EXPER/PF project & partners, documentation on the data base for PM and its health impact, partners contact details for any question relating to the project
- **Data base users:** for the professionals of public health, regional planning, and researchers ... restricted access on agreement of the partners
- **Project partners:** database feeding, case studies

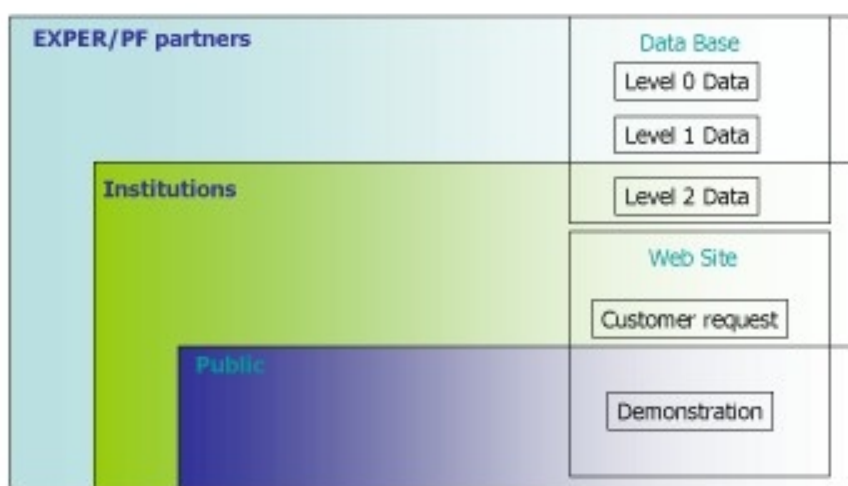


Fig. 2. EXPER/PF project website: levels of accessibility to the data base

The user will formulate in stage his interrogation of the data base. Three principal types of requests are available:

- interrogation of air quality measurements,

- interrogation of satellites images,
- combined interrogation of PM ground measurements and satellite data.

Two types of interrogation are proposed (fig. 3). The first one makes it possible simultaneously to visualize the temporal variation of a pollutant on several stations. The second one allows the user to study possible correlations between two pollutants or two stations for the same pollutant. Request's result is a graph, it will be also possible to download a file in format csv (easily read under Excel) containing the whole of the graph values and some statistical results. The correct value mentioned in fig. 3 applies to the particles, they required modifying measurements by a specific factor of correction to each Member State.

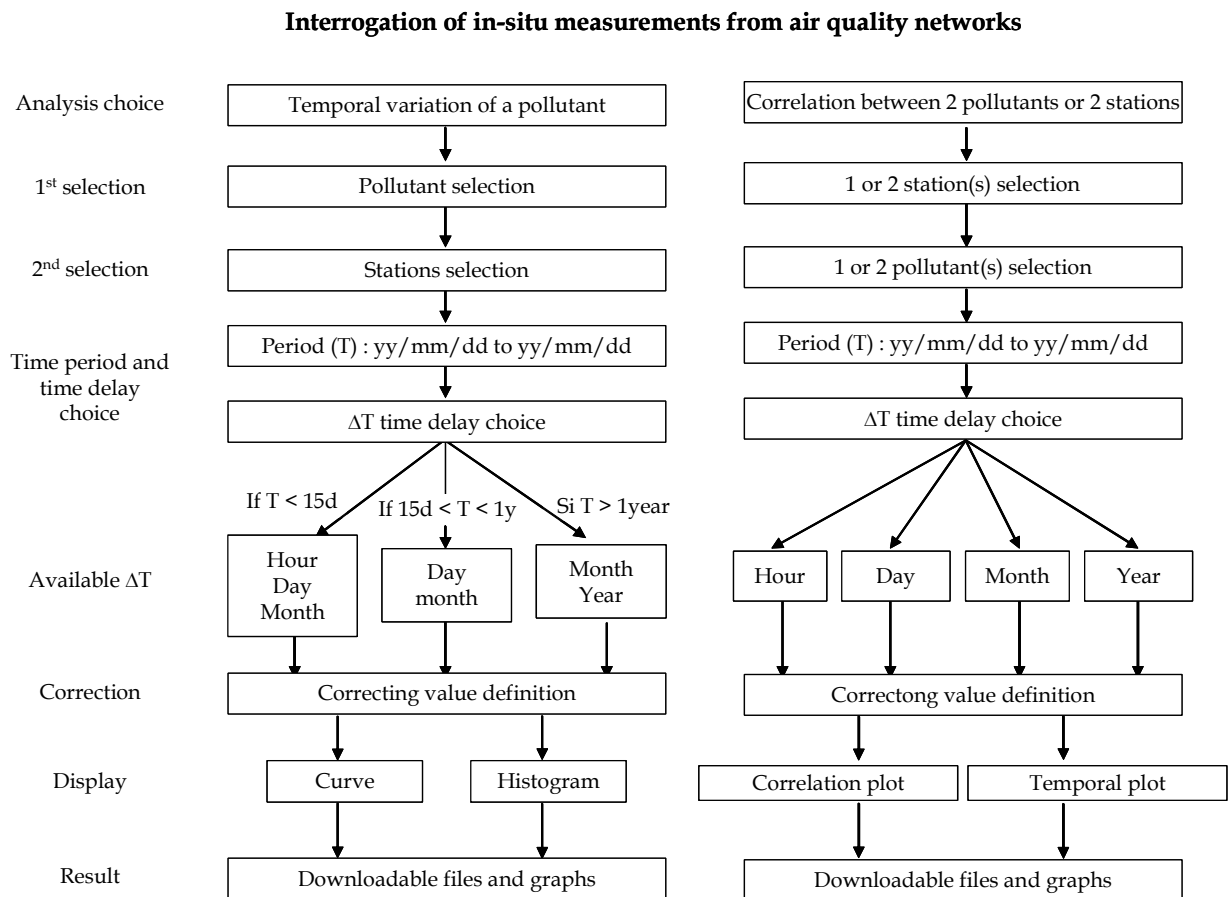


Fig. 3. Air quality measurements request

PROMOTION OF THE DATABASE

Fisrt year of the project was devoted to data collect and first definition of the database. During the second year, a first version of the database was built by Hygeos, with the collaboration of the project's partners. This version (type of data, requests, ...) was presented to a user's sampler (regional planers, epidemiologists, ...), during a french-flemish seminar, at the end of 2003.

This first version is now evaluated by some selected users. Their feedback will be used for improve the database (available requests, ...). Final version will be put online on the end of 2004. A « general public » website has been built in order to promote the database (particularly for Public Health professionnels purpose), and provides documentation on case studies carried on in the framework of the project. It's actually hosted by APPA : <http://www.appanpc-asso.org/experpf/>.

PERSPECTIVES

A geographical extension is programmed to Kent, east Sussex and other AASQA (French air quality monitoring association) in an other Interreg program (ATTMA). The geographical area of PM data available is going to be largest to include other countries and more people. A technical extension with weather data, data analysis and more satellite data is programmed.