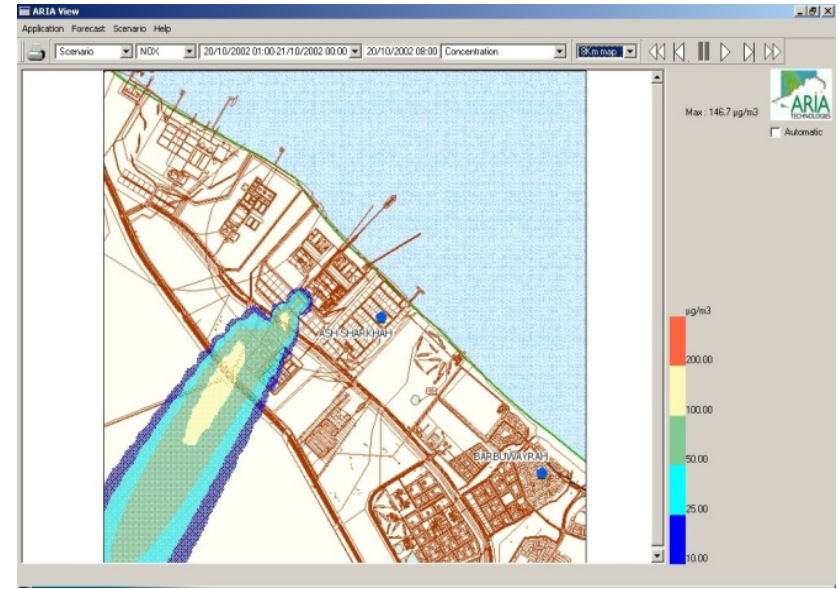
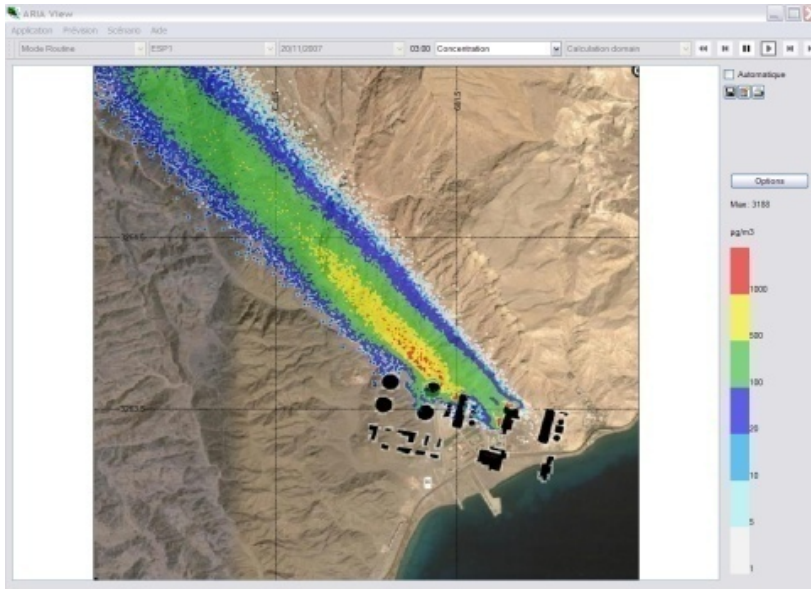


# Atmospheric Impact Assessment



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**ARIA Technologies SA**

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 Telephone: +33 (0)1 46 08 68 60 – Fax: +33 (0)1 41 41 93 17  
 E-mail: [info@aria.fr](mailto:info@aria.fr) – <http://www.aria.fr>

# ARIA Technologies

ARIA Technologies was founded in 1990 by a group of researchers from the R&D department of EDF, the French electricity board.

It is now an independent company in its field in Europe. Its headquarters are located near Paris, with offices in France and a sister company, ARIANET, in Milan, Italy.

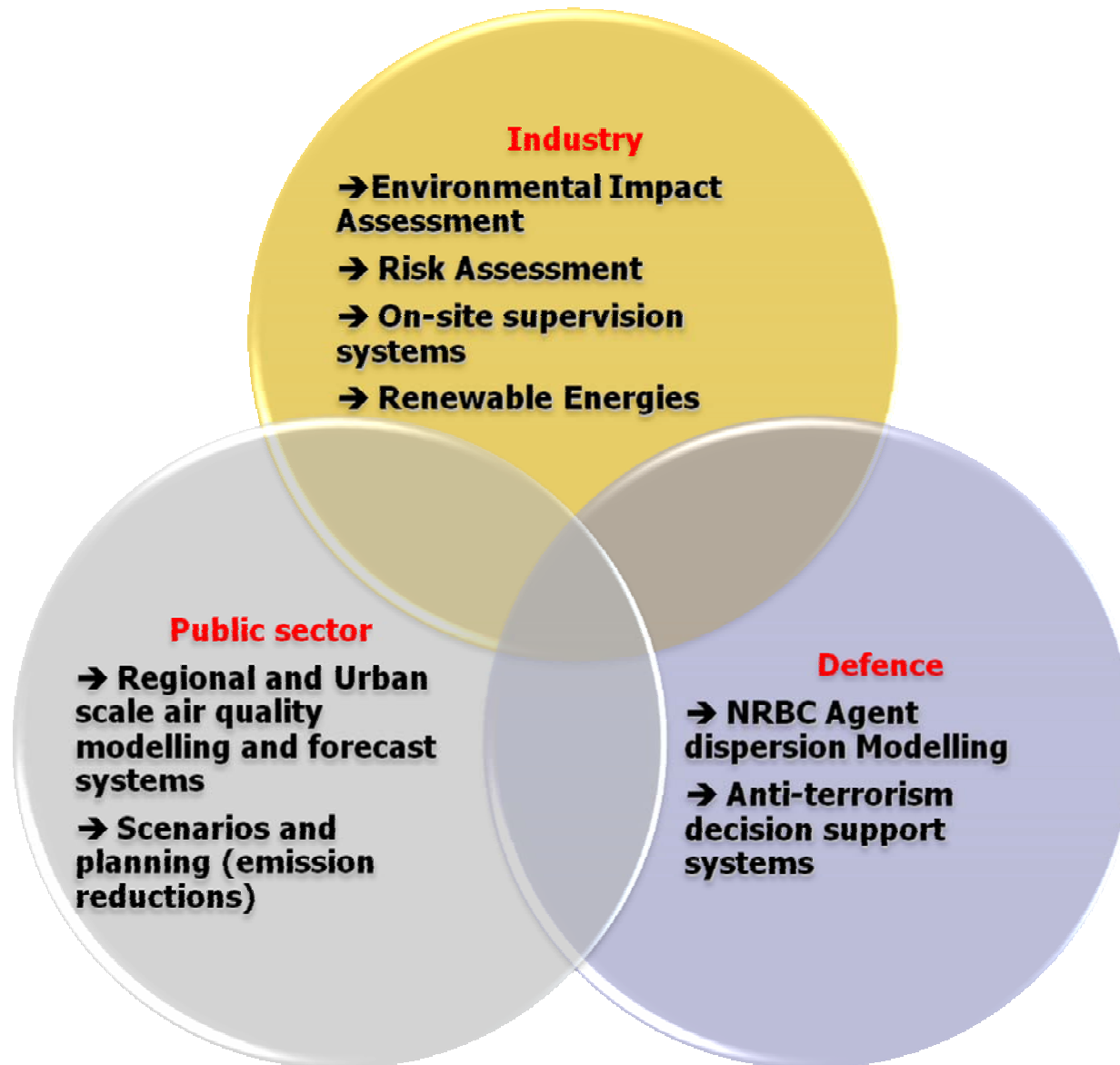


# One focus: modeling the atmospheric environment

- from building scale to continental scale
- from simple screening models to full-blown CFD solutions
- keeping consulting, software, systems and training tightly linked
- with an international and open approach, close to top R&D centres.

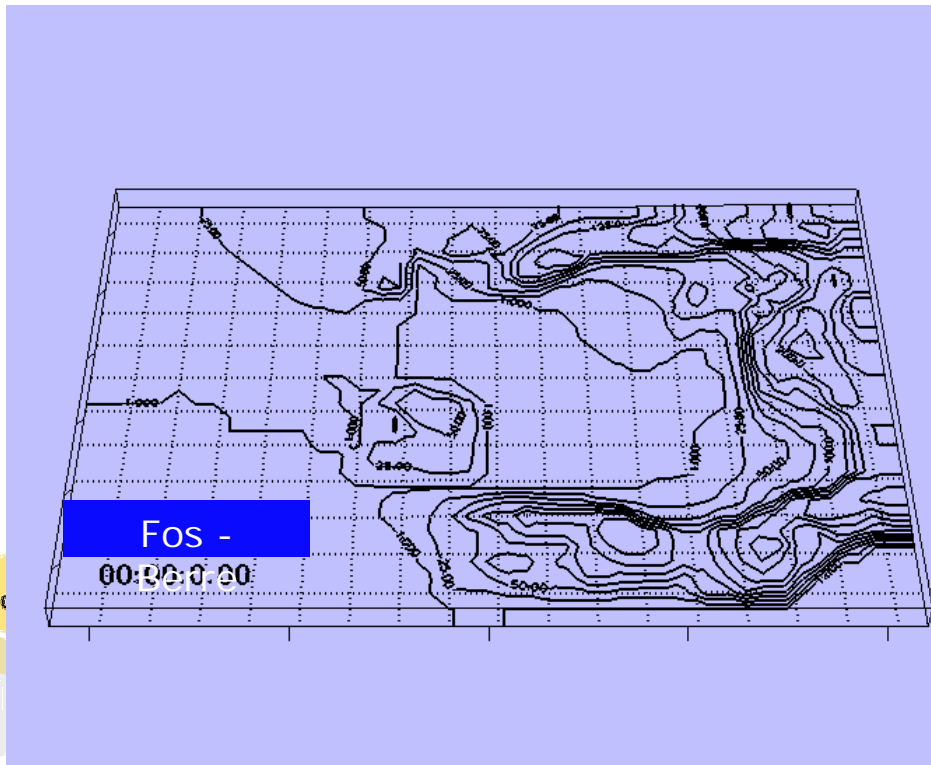


# Application domains



# Environmental Impact Assessment

Since 1998, ARIA Technologies has taken part in over one hundred air pollution dispersion studies related to industrial sites Power plants, incinerators, Waste Treatment facilities.

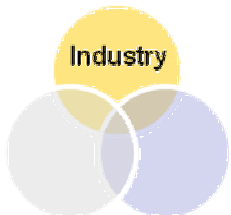
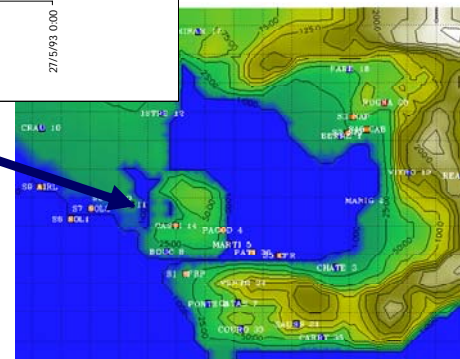
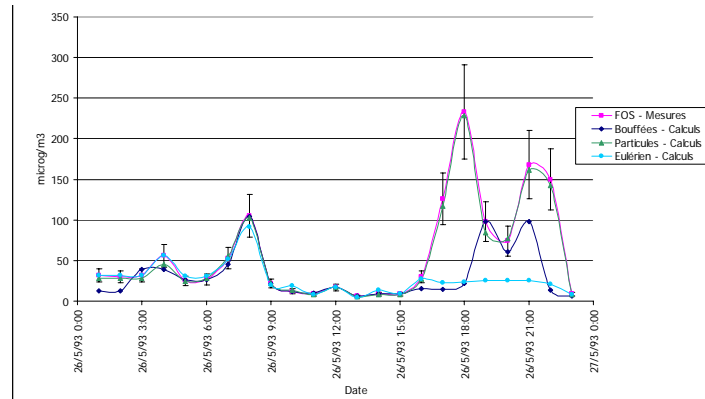
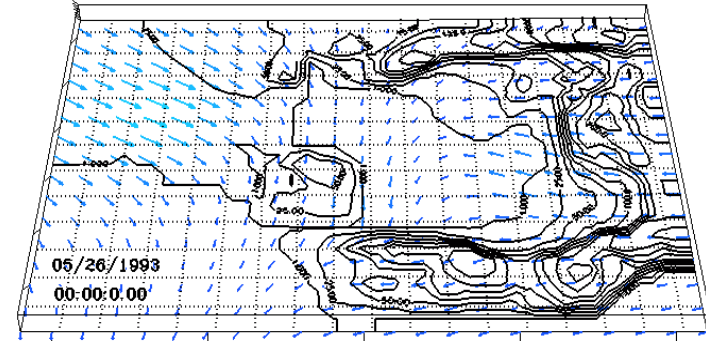
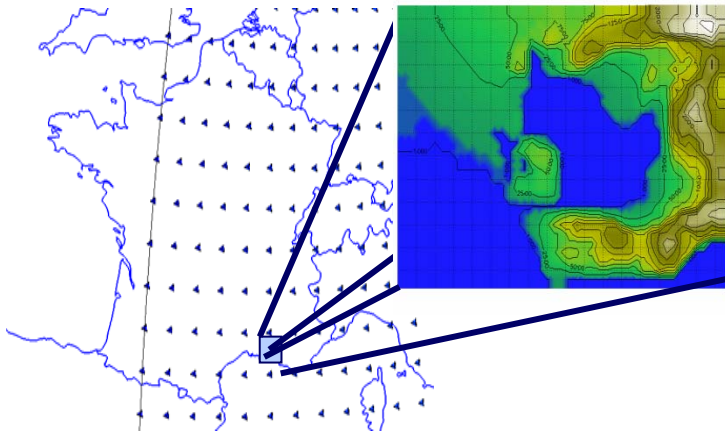


- ➔ Air quality and ground deposition
- ➔ Odors
- ➔ Health Risk Assessment.

# Environmental Impact Assessment

Site

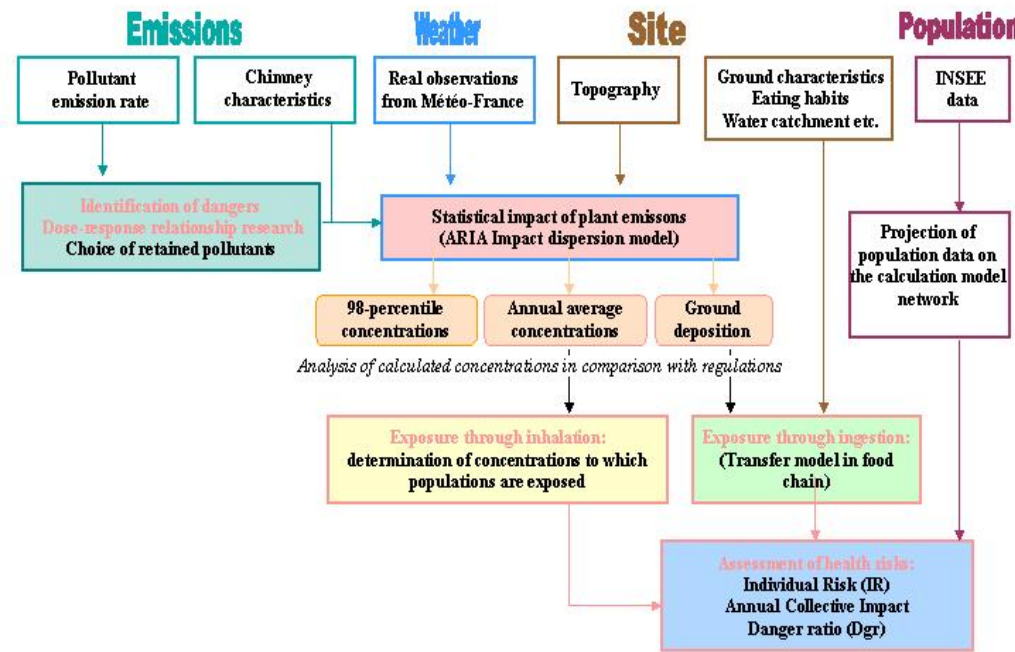
3D meteorological fields.



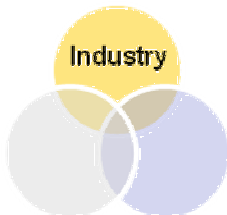
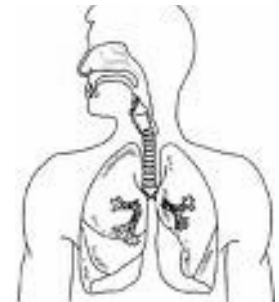
Validation vs.  
experimental data  
➔ 3 different models

# Environmental Impact Assessment

## Health Risk Assessment



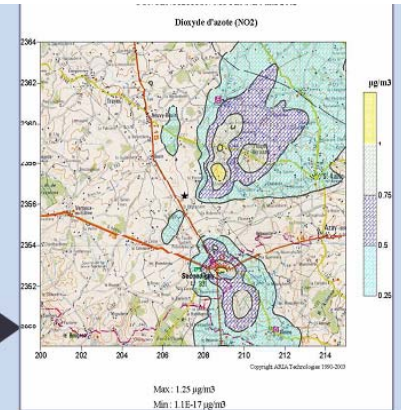
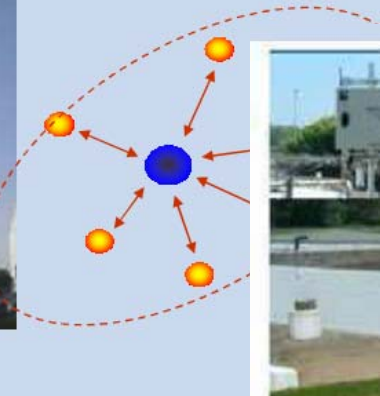
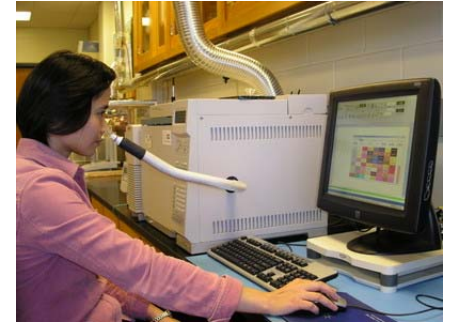
- **Identification of dangers:**
  - chronic toxicity
  - carcinogenic risk
- **Dose-response relationship analysis:**
  - threshold toxicants known as "systemic toxics"
  - non-threshold toxicants such as carcinogenic pollutants
- **Calculation of exposure:**
  - inhalation
  - ingestion
- **Assessment of health risk:**
  - Threshold toxicants: danger ratio
  - Non-threshold toxicants: probability of developing a cancer



# Environmental Impact Assessment

## Odors

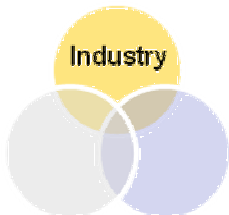
**Odors & VOC on line emissions monitoring**  
Electronic noses analyzers constellation



RQ BOX constellation



Data access on central monitoring center

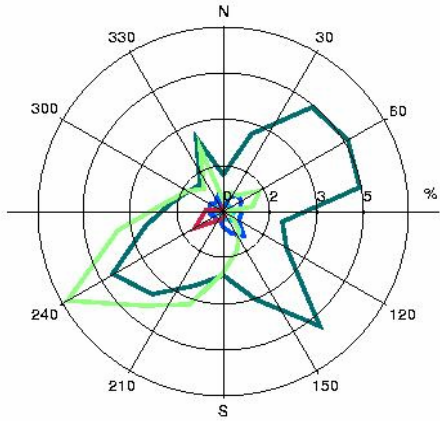




# On-site modelling system : **ARIA**

## View®

Meteorological data  
(site station - forecast)



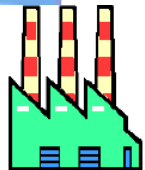
Maps of results (Web compatible)

- Concentrations, depositions
- Odours
- Tracking critical points
- Backwards trajectories

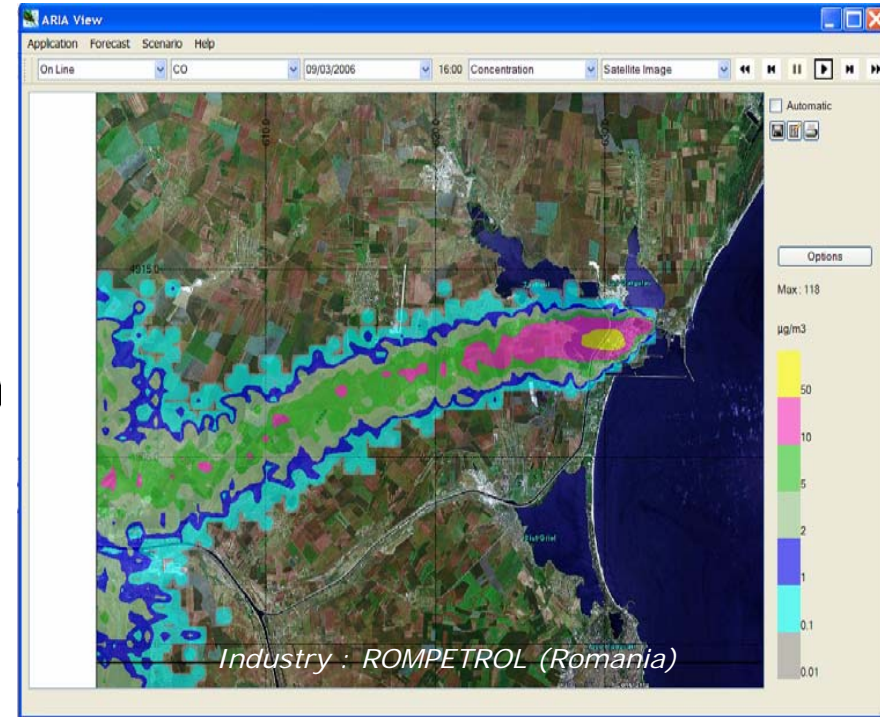
Data collection,  
model runs



Emission data,  
computed /  
measured



	kg/j			
	SO <sub>2</sub>	CO	PS	Pb
J1	264	30	48	0,6
J2	222	25	40	0,5
J3	342	39	62	0,8
J4	350	40	64	0,8
...				
J28	425	48	77	1,0
J29	369	42	67	0,9
J30	201	23	36	0,5



- Manage exposure and risk
- Broadcast results
- Evaluate health risks

# Regulatory constraints

## ■ Collective air pollution control in an industrial basin

- ✓ Share the responsibility and the investments on air concentration bases and not only on total year emissions
- ✓ Ambient air monitoring networks are generally not enough dense to cover the whole area

## ■ Individual air control for some industries

- ✓ Example of a domestic waste incinerator : Monitoring the impact in the vicinity of the installation (Art 30 et 31 of the law 20 September 2002 concerning burning installation of hazardous and non-hazardous waste) :
  - *Initial diagnostic : before the installation opening*
  - *Between 3 and 6 months : after the installation running*
  - *Routine update : at least annually*

# Need of an on-line Supervision tool

## ■ A global tool to :

- ✓ Optimize the atmospheric environment supervision
- ✓ Improve internal and external communication (HQ and quick adaptability): neighborhood , Local authorities, routine reporting, nongovernmental association...
- ✓ Analyze, understand and explain the impact of their own releases

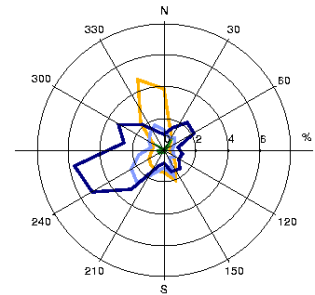
## ■ How ?

- ✓ **On-line concentration and deposition of main pollutants (NO<sub>2</sub>, dioxines, heavy metals...) considering real emissions and actual meteorological data**
  - *Comprehensive Maps*
  - *Help to design measurement campaign*
  - *Ready to run in case of accidental / exceptional releases*

**➔ A detailed knowledge of the impact of their own installations**

# Need of an on-line Supervision tool

- Editing results every 3 hours:
  - concentration and deposition maps
  - summary table of values
- Continuous update of computational values on key points:
  - daily,
  - Monthly
  - Annually (main statistics as centils)
- Time series of meteorological data and emission
- Data base backup for all data and results (Yearly base)
- Detailed run on request (peak, accidental or exceptional release)
- Optimization (measurement, day-to-day reporting,...) of the supervision



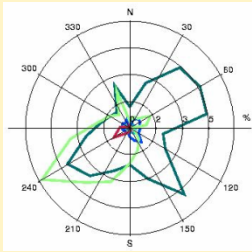
# Where are the difficulties ?

- **Numerical geographical data → OK**
  - ✓ Topography and land use largely available world wide now and especially in Europe
  - ✓ GIS are widely used
- **Meteorological data → OK**
  - ✓ Better sensors and denser network
  - ✓ Numerical forecast and analyses better quality
  - ✓ Progress on Meso-scale modeling
- **Emissions → OK ?**
  - ✓ Better understanding using 'universal' classification like SNAP and emission factors
  - ✓ Self-monitoring emission CEMS or PEMS
- **Computational and numerical network → OK**
  - ✓ Power increased on low cost computer
  - ✓ Internet / intranet / ADSL communication
- **Numerical techniques become central**

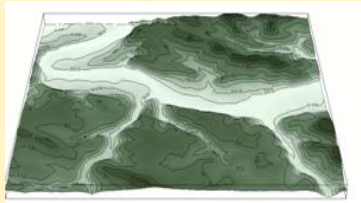
# General flowchart

## Meteo data

Wind, temperature, rain



## Site



## Emission monitoring

Specific analyses as heavy metals and dioxins...

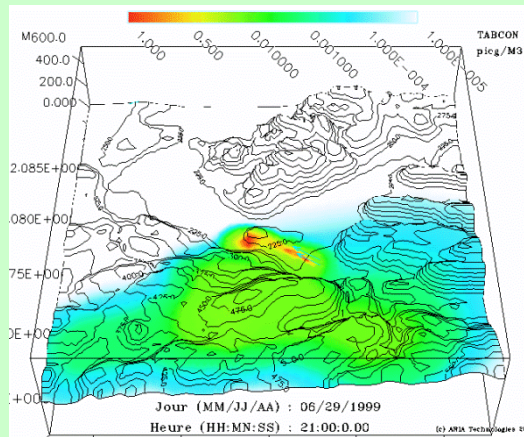
Sampling program



Self control continuous measurements:

HCl, CO, CO<sub>2</sub>, SO<sub>2</sub>, NO<sub>x</sub>, COT, NH<sub>3</sub>, H<sub>2</sub>O, O<sub>2</sub>, N<sub>2</sub>O, flowrate and temperature

## Database consolidation Automatic impact model run

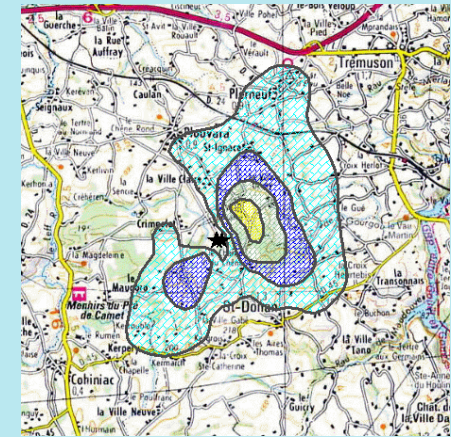


Data acquisition system and Automatic report editing

Daily report		ZIMEX JOCM 1.1 - 1.2 - 29 February 2000		North Oxis		Station n°1	
Installation references : Labo Pissy				Validity criteria : 80%			
date	01h	02h	03h	04h	05h	06h	07h
01/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
02/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
03/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
04/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
05/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
07/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
08/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
09/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30/02/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
01/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
02/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
03/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
04/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
05/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
07/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
08/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
09/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31/03/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



## Results



- Air Concentration data
  - Maximum : Localization and values
  - Editing values on a list of key points
- Monthly and annual synthesis
- Maps of concentrations et deposition (dry and with rain)
- Detailed peak episode on request
- Automatic and exhaustive data backup and archives

# Thiverval-Grignon Incinerator Plant (France)



Stack seen from the roof



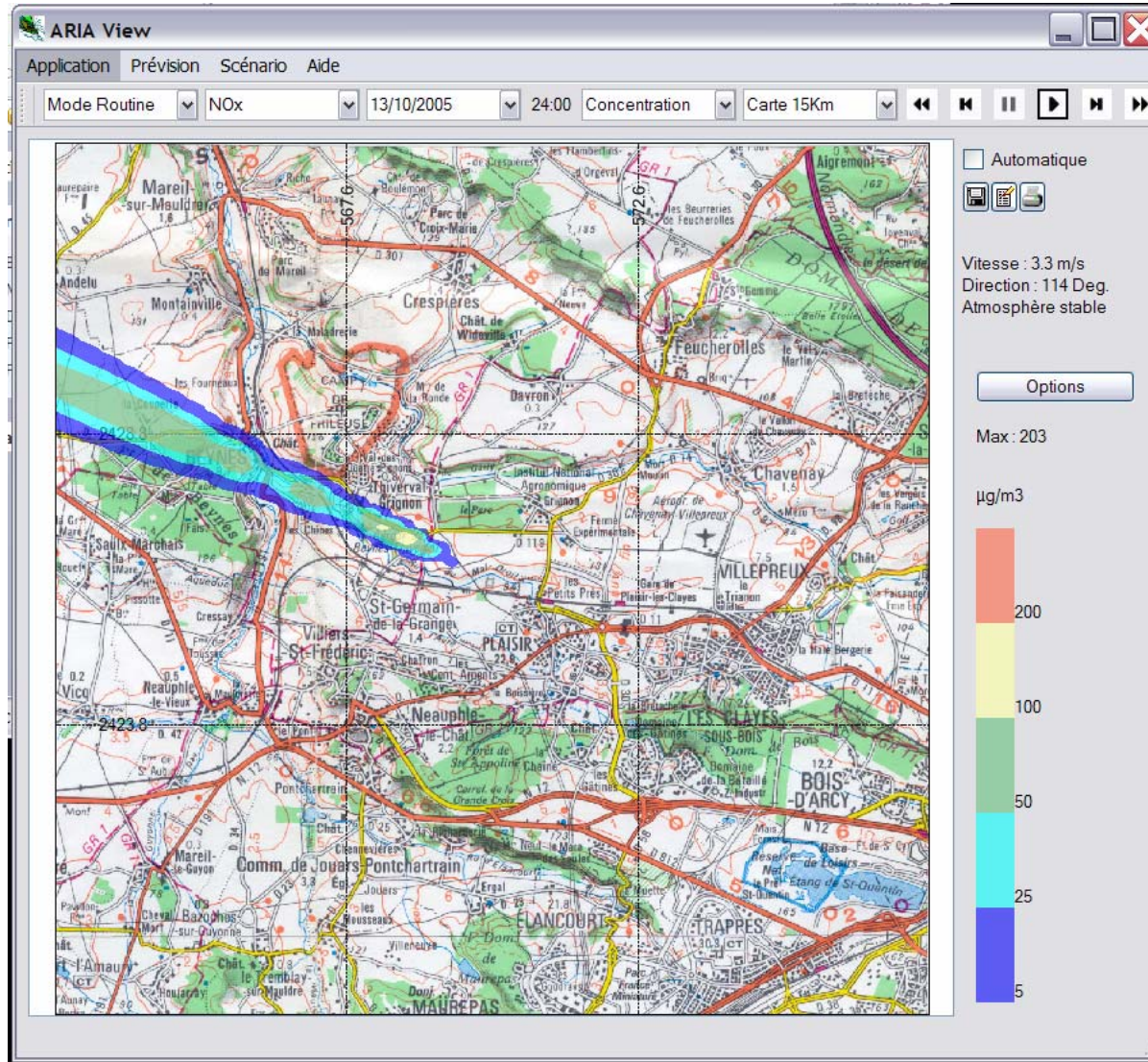
Site surroundings

## Site features:

- ✓ Isolated plant
- ✓ Gently rolling terrain
- ✓ Single stack
- ✓ CEMS system in place (ESA)
- ✓ Dedicated meteorological station

# Thiverval-Grignon Incinerator plant (France)

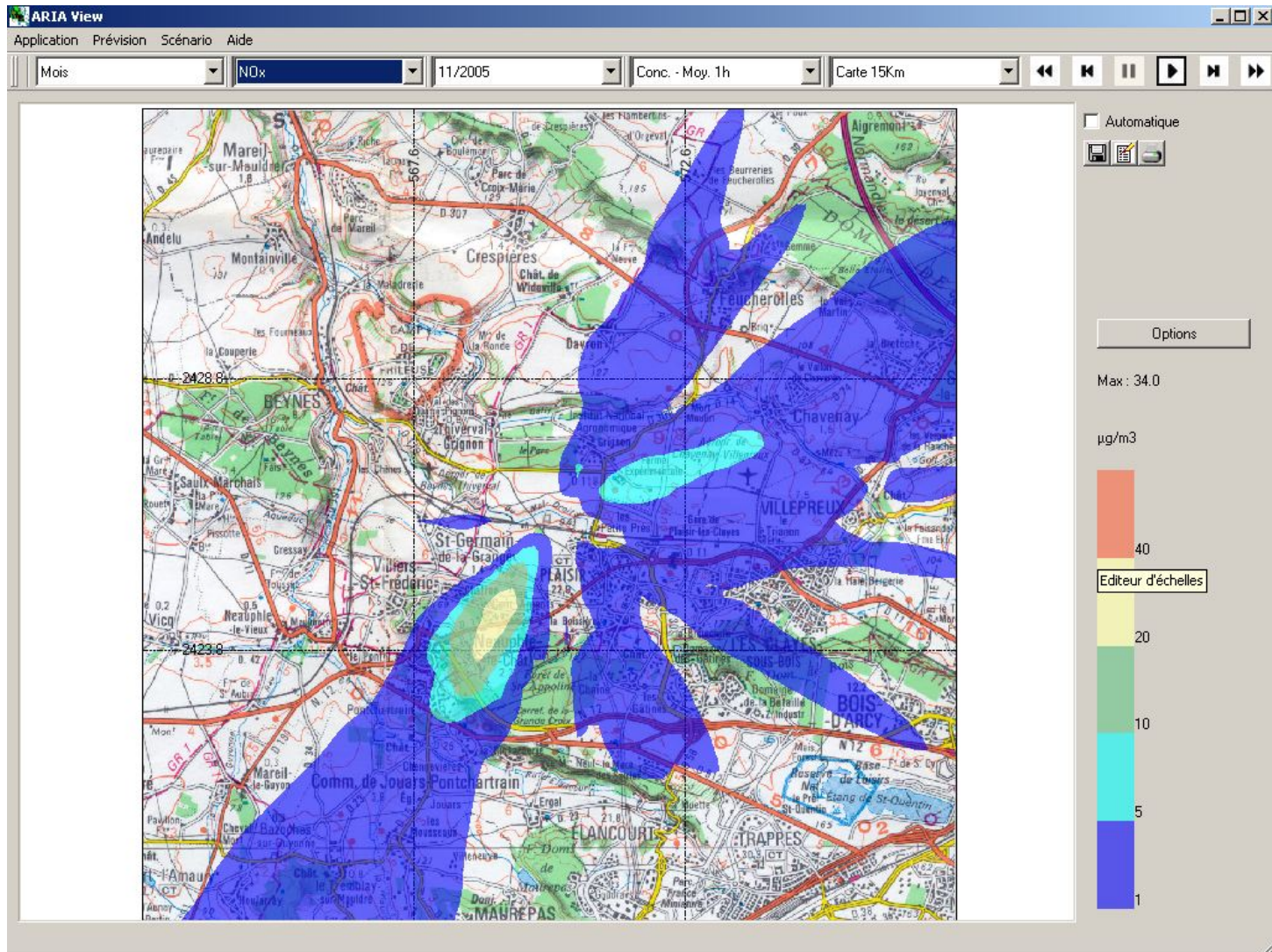
ARIA View : instantaneous plume every 30 minutes



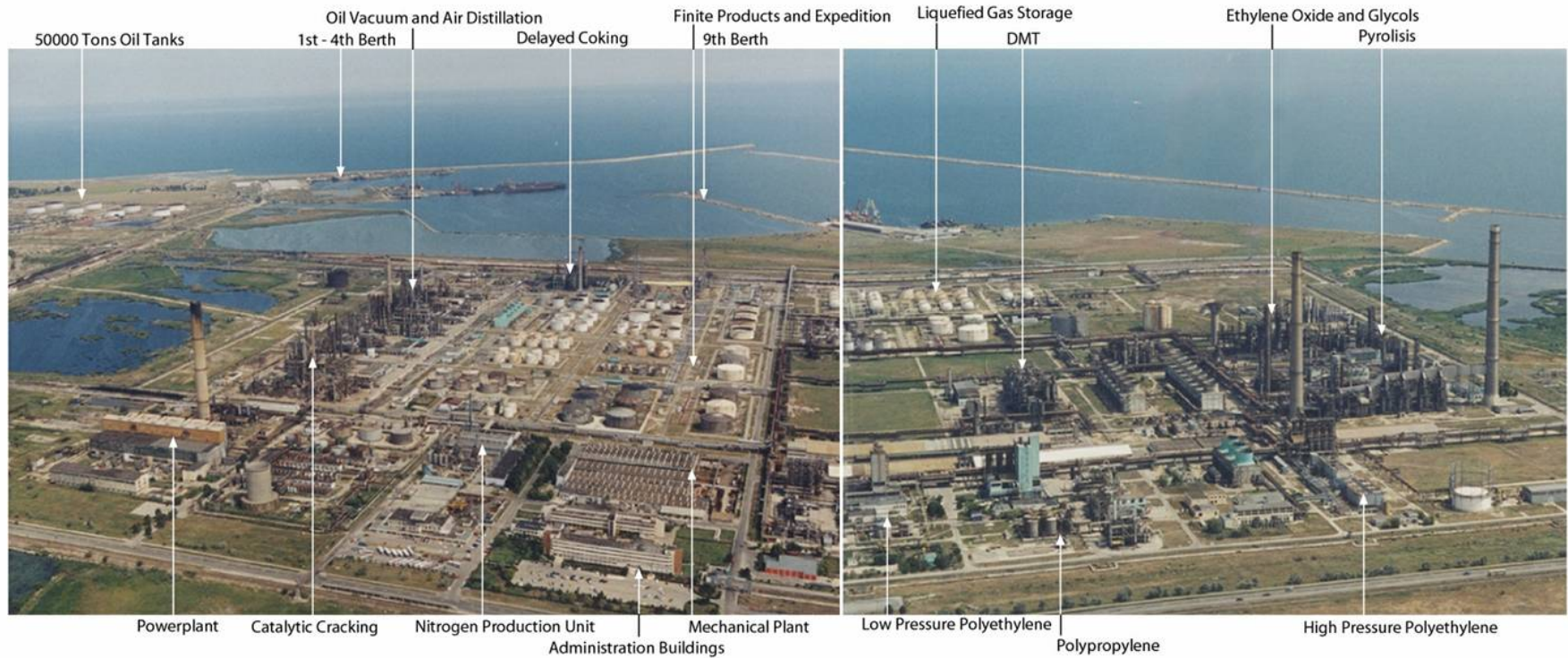


# Thiverval-Grignon Incinerator Plant (France)

ARIA View : monthly averaged ground impact



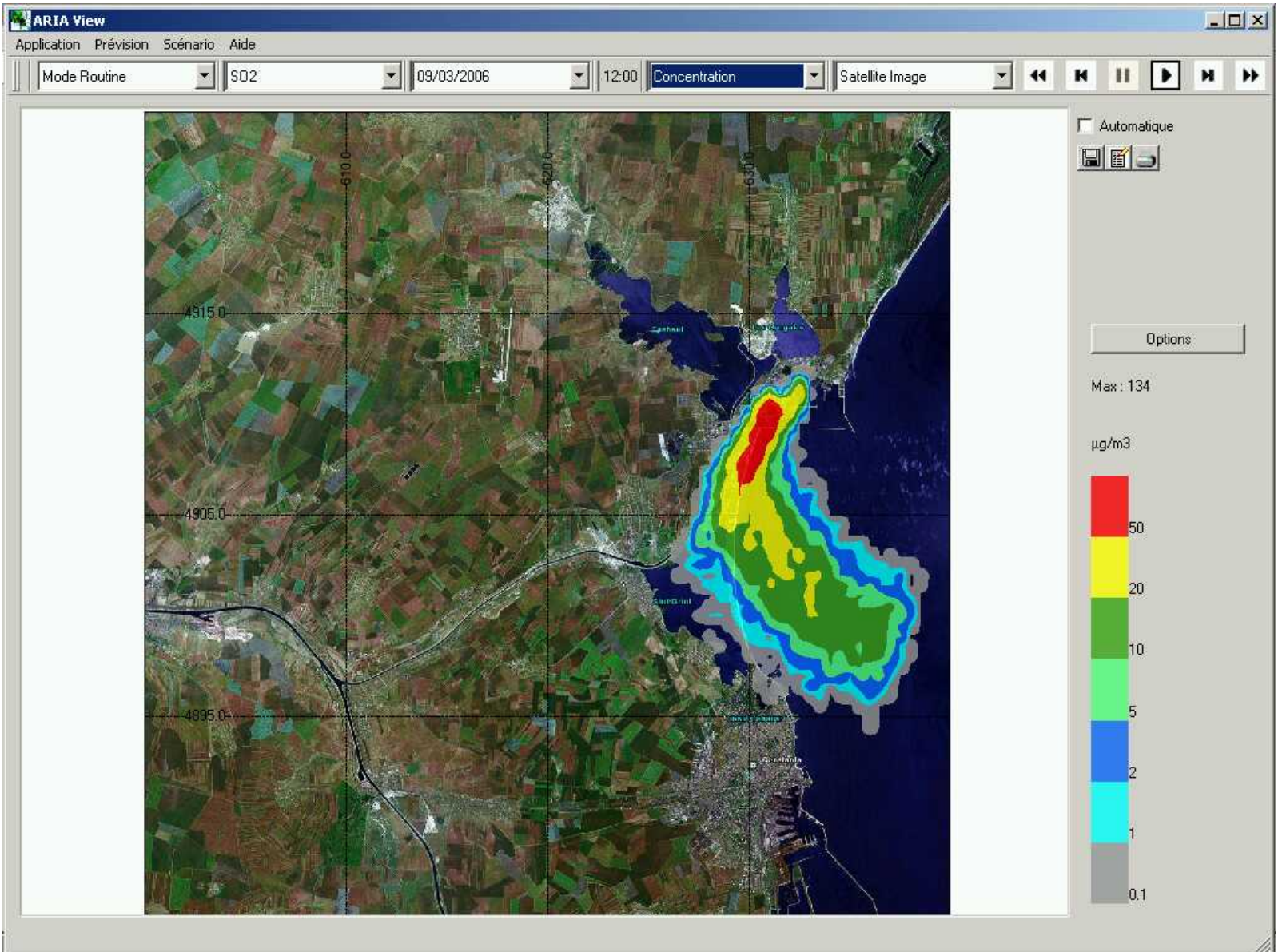
# ROMPETROL Refinery (Romania)



## ■ Site features :

- ✓ Large petro-chemical platform on the Black Sea shore (Costantza)
- ✓ CEMS in place (ENVIRONNEMENT SA)
- ✓ Dedicated meteorological station

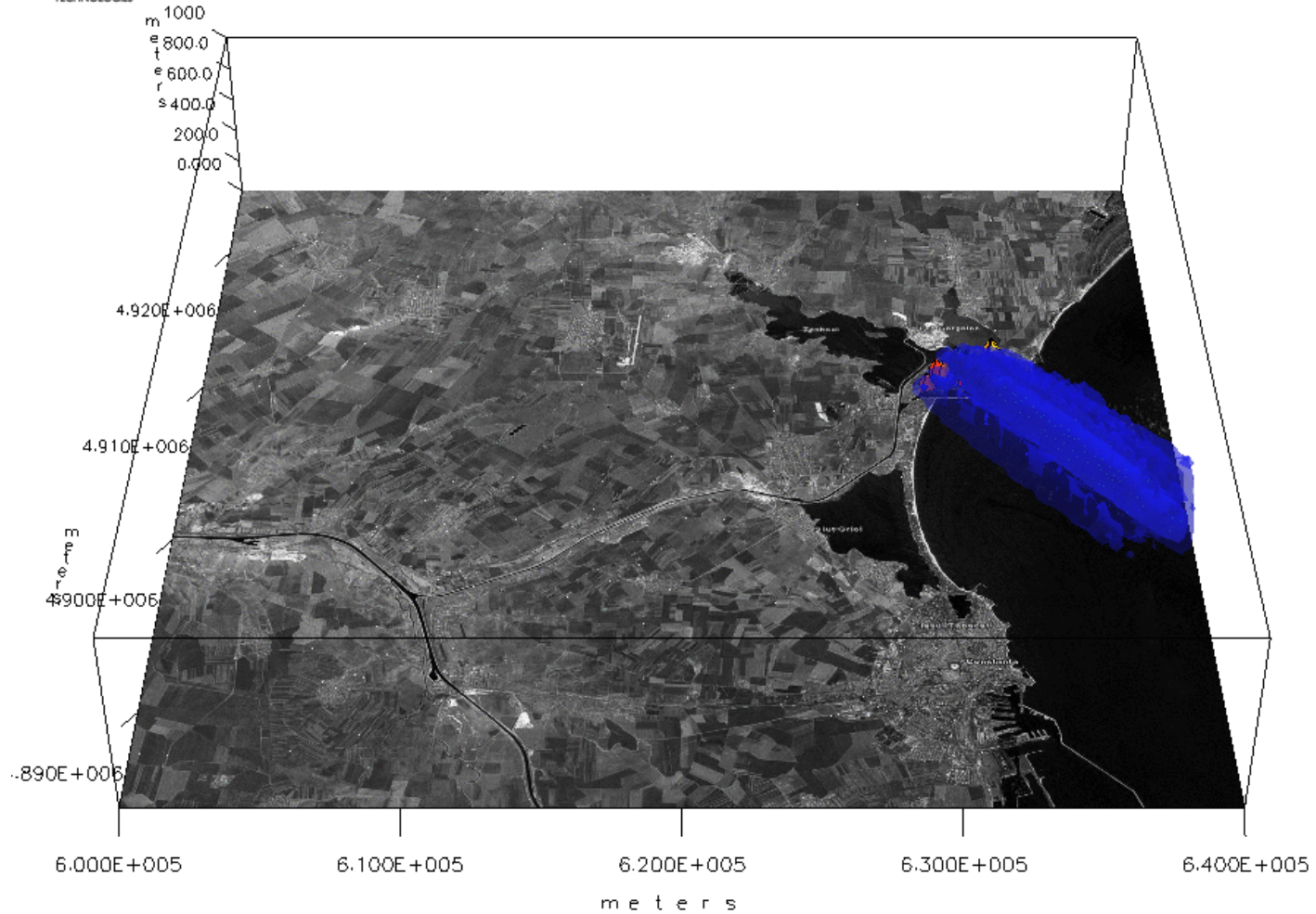
# ROMPETROL Refinery (Romania)



# ROMPETROL Refinery (Romania)



CO Iso 1 and 10 mcg/m<sup>3</sup>

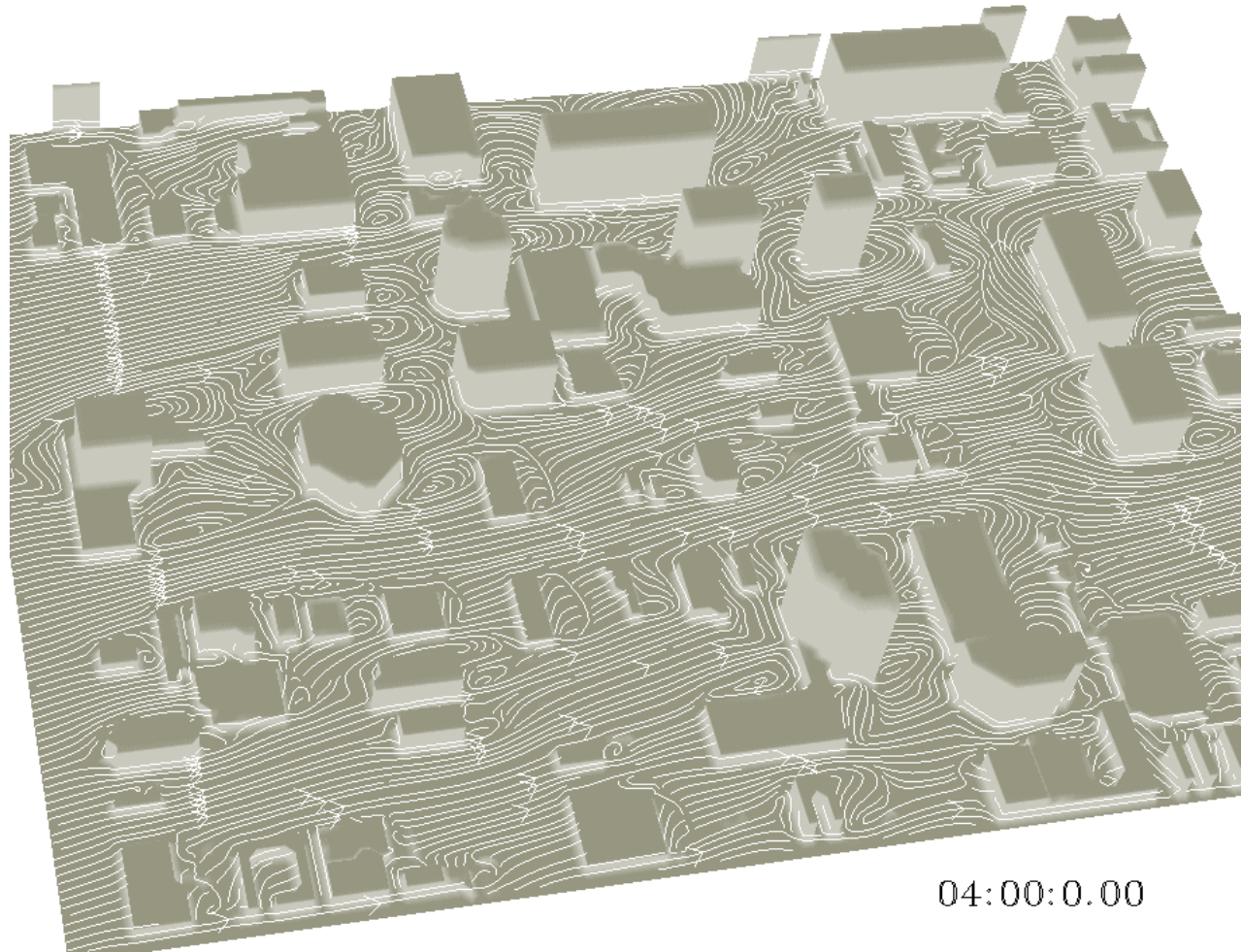


03/09/2006 at 00:30:0.00

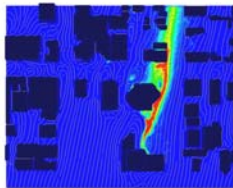
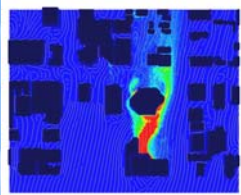
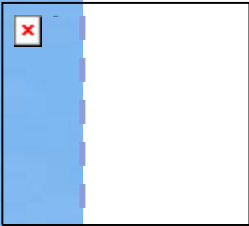
# What next : real time for local scale

## MSS : Urban Dispersion with obstacles

MSS Urban Dispersion Simulation



04:00:0.00



# Questions ?

Now

or

[aalbergel@aria.fr](mailto:aalbergel@aria.fr)