Operational Procedure for Emission Reduction Assessment

The PREVEST/Atmo~rhenA System : air quality model and assessment in Alsace

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Outlines :

AQ Decisional structure

Upper Rhine area and air quality

- Geographical situation
- Air pollution context

System of Emission Models

- Tools for management of Regional Emission Inventories and computation of Emission Cadaster and Scenarios

System of Atmospheric Models : PREVEST/Atmo~rhenA

- Daily transboundary and transregional air quality forecasting
- Simulation of theoritical scenarios
- Simulation of short term scenarios (local emergency measures)
- Simulation of long term scenarios (european long term policies)

Provisions for AQ in France and Alsace

- 1996 Law on Air and Rational Use of Energy

Decisions/actions in case of emergency
Police and regional Commissioners

In charge :

Air quality monitoring

Population information

Approved but independent Air Quality Monitoring Associations

Ingenior experts | **Environmental associations**

Local authorities | **State services** | **Manufacturers**

Air quality objectives

Atmosphere protection plans >250 000 inhabitants

Urban transport plans >100 000 inhabitants

Regional coordination :

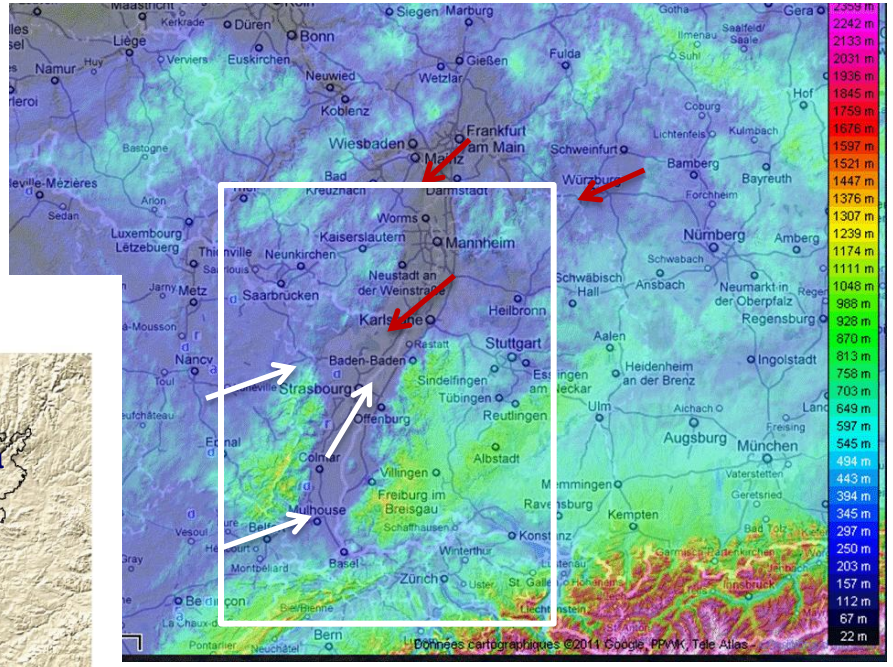
Regional air quality Programs
Regional Scheme for Climate, Air quality, and Energy (SRCAE)

Upper Rhine Area
Geographical situation

Alsace between the Vosges and the Black Forest.

South and West winds induce south winds in the valley.

East winds induce North wind in the valley.



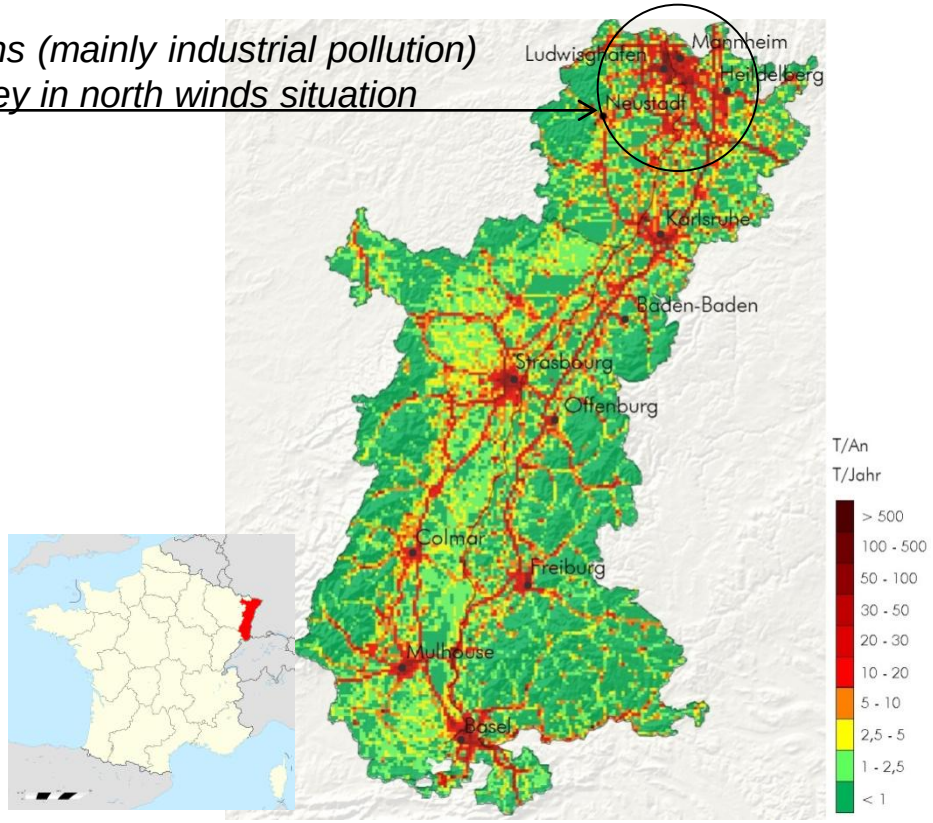
Air pollution context

High source of emissions (mainly industrial pollution)
Influencing the valley in north winds situation

Dense populated area
with several cities along the valley.

Several industrial sites.

High traffic (with heavy trucks coming from all over Europe).

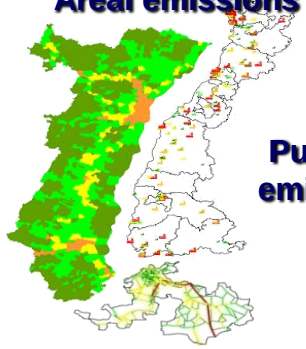


NOx Annual emissions

AQ Assessment tools : From annual inventory to hourly emission cadaster

EMISS'AIR

Areal emissions



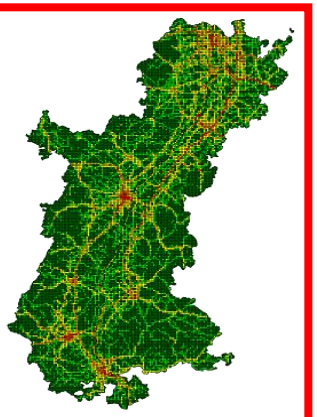
Punctual emissions

Linear emissions

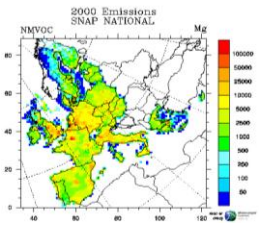
Speciation and aggregation COVNM and PM (CITEPA/IER/ASPA)

Abatement reductions for scenarios

MANAG'AIR

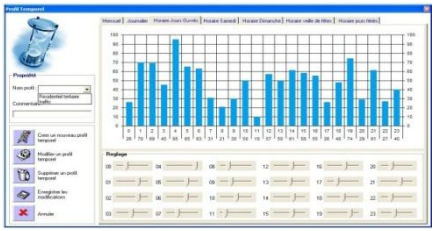


Hourly emissions cadaster with speciation



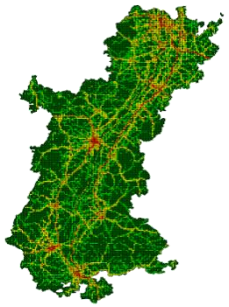
Emissions limit areas (EMEP)

Spatial distribution (CLC)



Temporal distribution (CITEPA/IER/ASPA)

AQ Assessment tool : Atmo~rhenA system



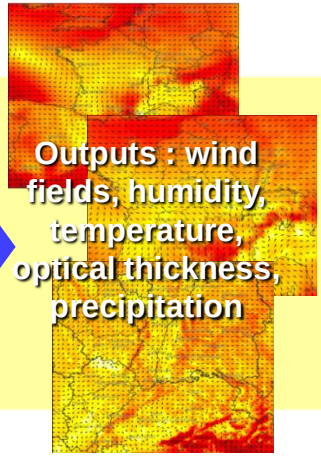
Meteorological boundary conditions : NCEP analysis or GFS forecast

Chemical boundary conditions (climatology)

Hourly emissions cadaster with speciation

Landuse and topography

WRF

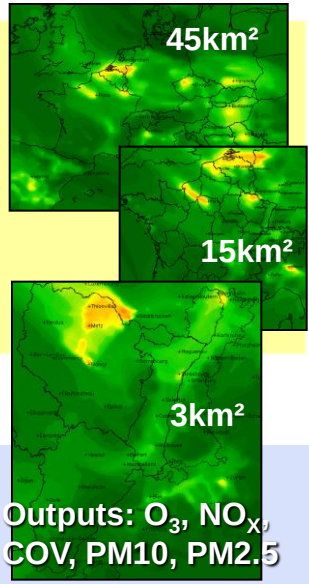


Outputs : wind fields, humidity, temperature, optical thickness, precipitation

Chimere

Institut Pierre Simon Laplace

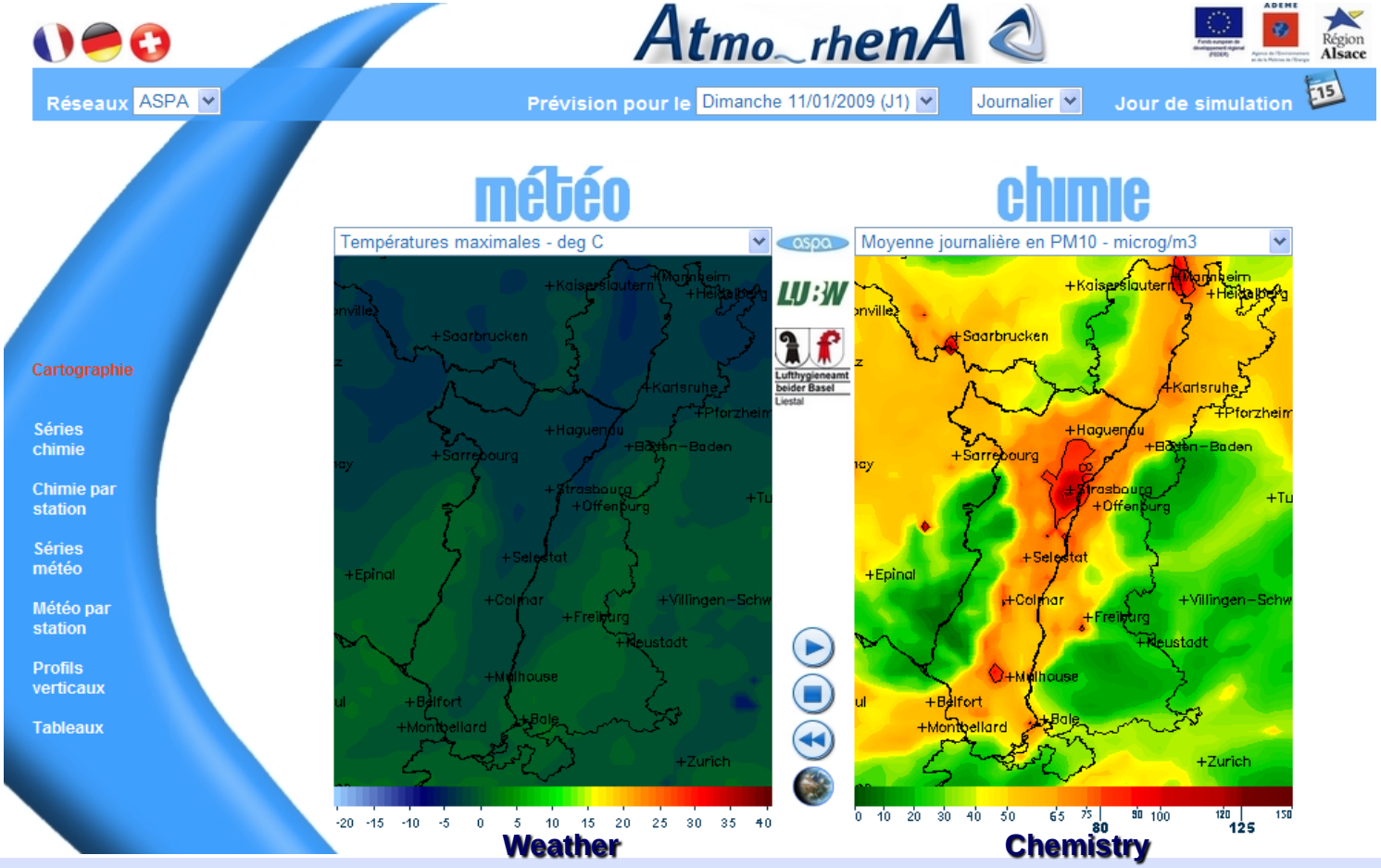
Image Ville Environnement



Outputs: O_3, NO_x, COV, PM10, PM2.5

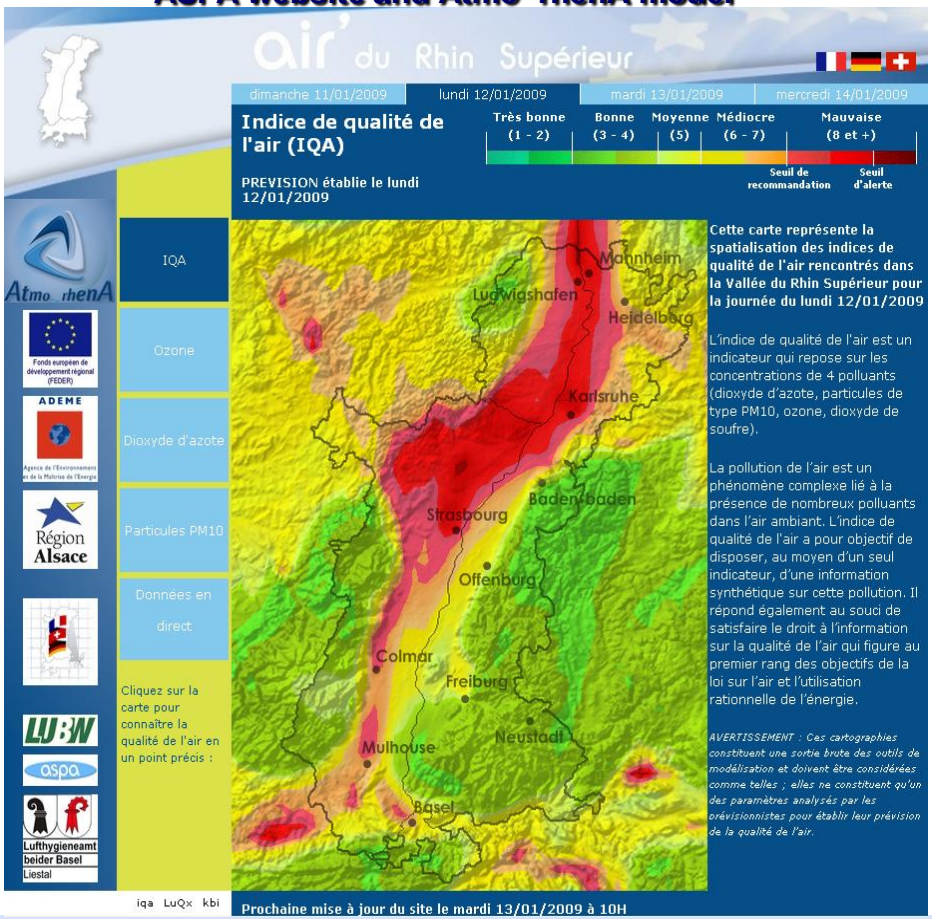
Atmo~rhenA

Expert websites to view forecasts

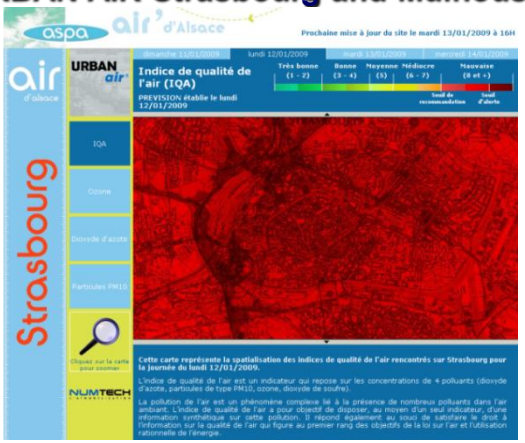


Public website and supply an urban model

ASPA website and Atmo~rhenA model

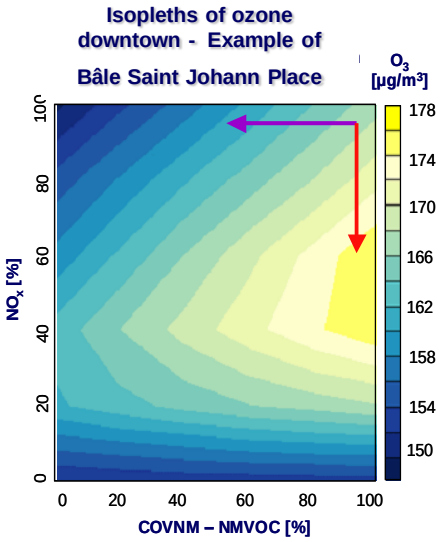


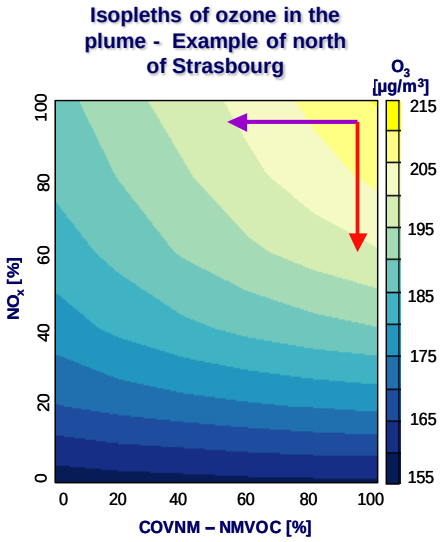
URBAN'AIR Strasbourg and Mulhouse



Influence of local emissions on AQI in Upper Rhine

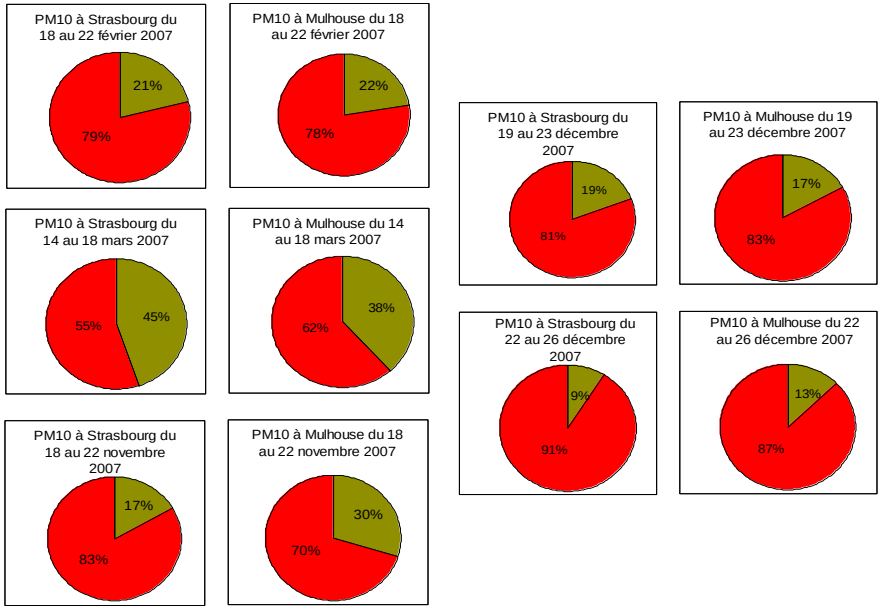
Case of ozone daily maxima :





Ozone isopleths for 12 june 2003

Case of PM daily means :

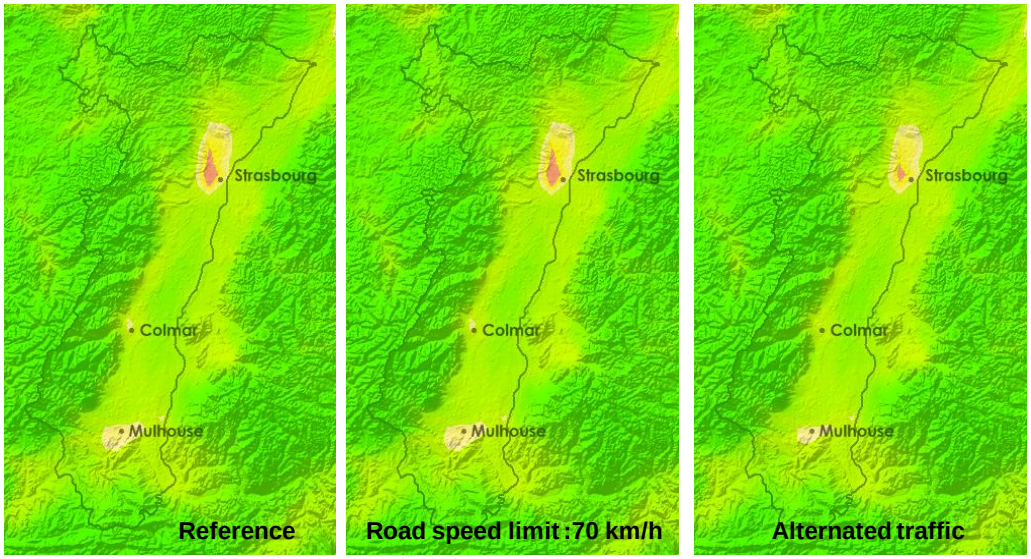


Red : PM10 from local emissions
Yellow : PM10 from boundaries

Realistic scenarios for short term concerning pollutant NO_2

- « Emergency measures » project (2008)

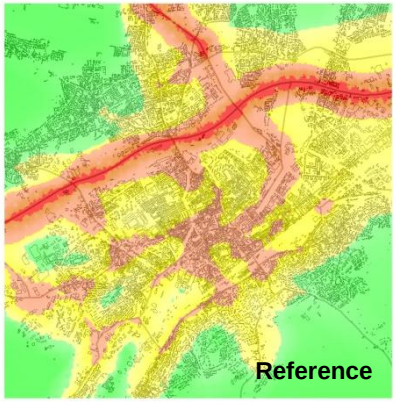
→ Scenarios road maximal speed limit, alternated traffic, combination of both measures

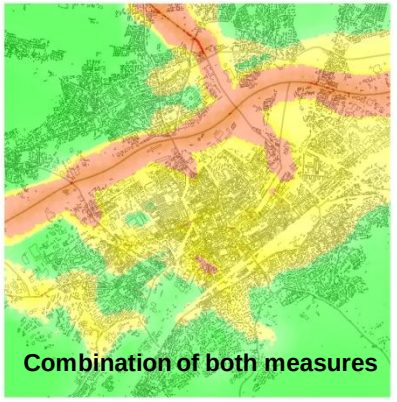


inférieure à 110µg/m³ | de 110 à 135µg/m³ | de 135 à 200µg/m³ | supérieure à 200µg/m³

→ **Regional scale**

→ **Urban scale (Example of Mulhouse)**



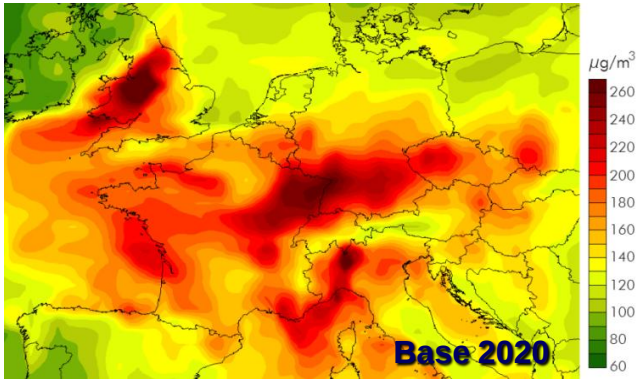


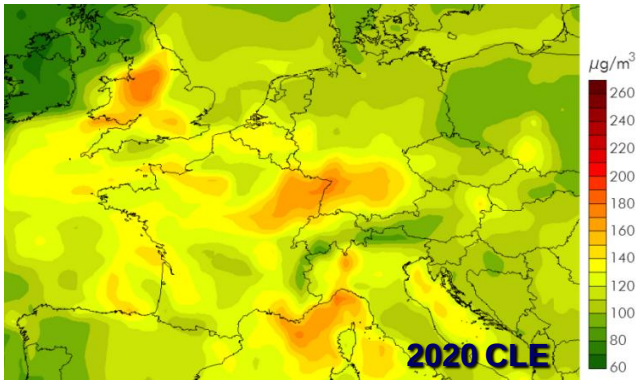
Long term scenario concerning pollutant O_3

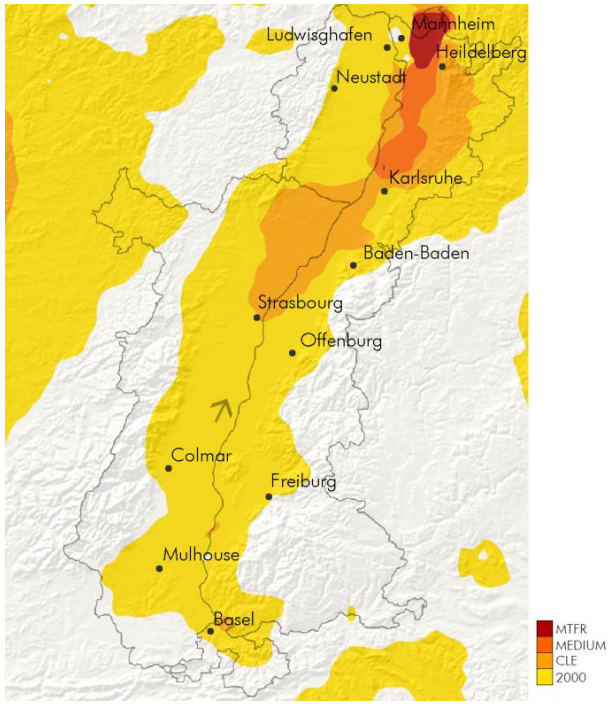
- **INTERREG III project (2006) – Scenarios 2020 :**

→ CLE, MEDIUM, MTFR

Application to boundary conditions (LISA)







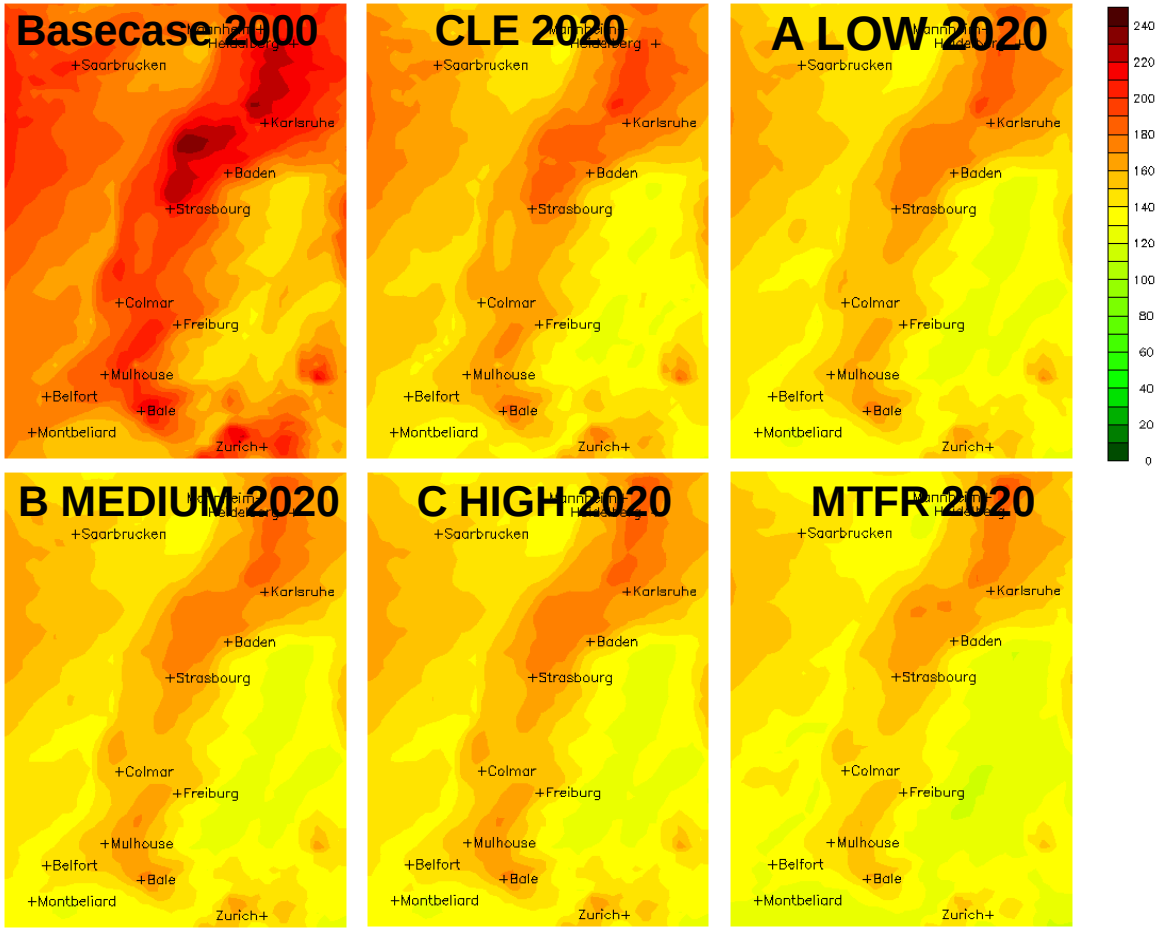
Areas exceeded the threshold of population exposure (180 µg/m³) June 12, 2003

Long term scenario concerning pollutant O_3

Respective influence of reductions in boundary or local emissions on ozone in Upper Rhine (1/2)

Impact of several long term European scenarios on ozone maxima (ug/m^3) : case of 12 June 2003

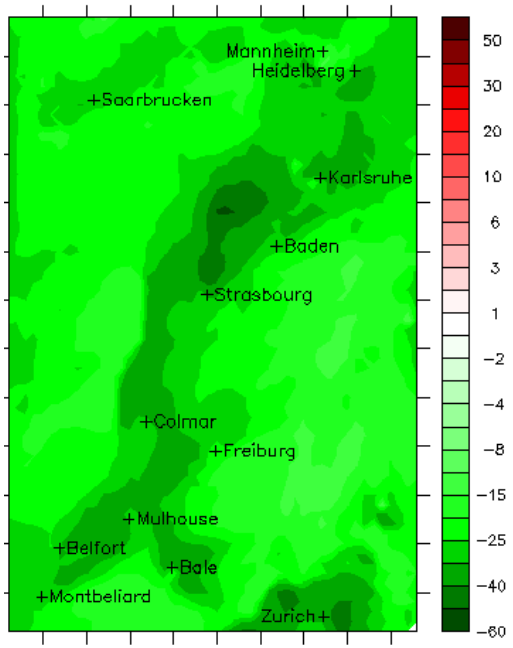
→ Emission reductions are applied to Europe and Upper Rhine.

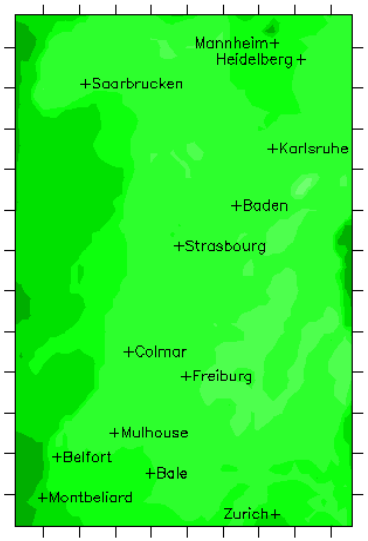


Long term scenario concerning pollutant O_3

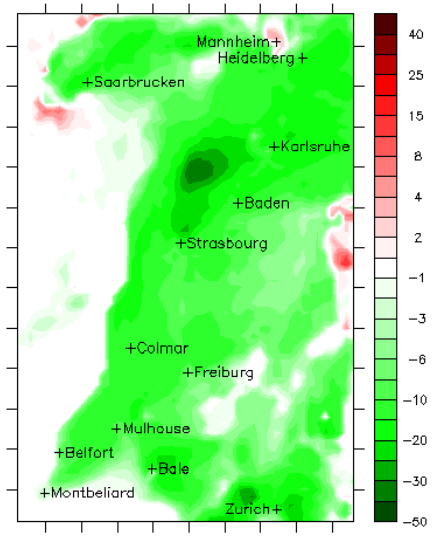
Respective influence of reductions in boundary or local emissions on ozone in Upper Rhine (2/2)

CLE2020 - Basecase2000





CLE2020 only on boundaries



CLE2020 only in the domain

Same order of differences : application of emission reduction to the boundaries (or not) has a great impact

End

Thank you for your attention