

# Requirements on emission data for forecasting applications CCA-WG2: Forecasting

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**INERIS**

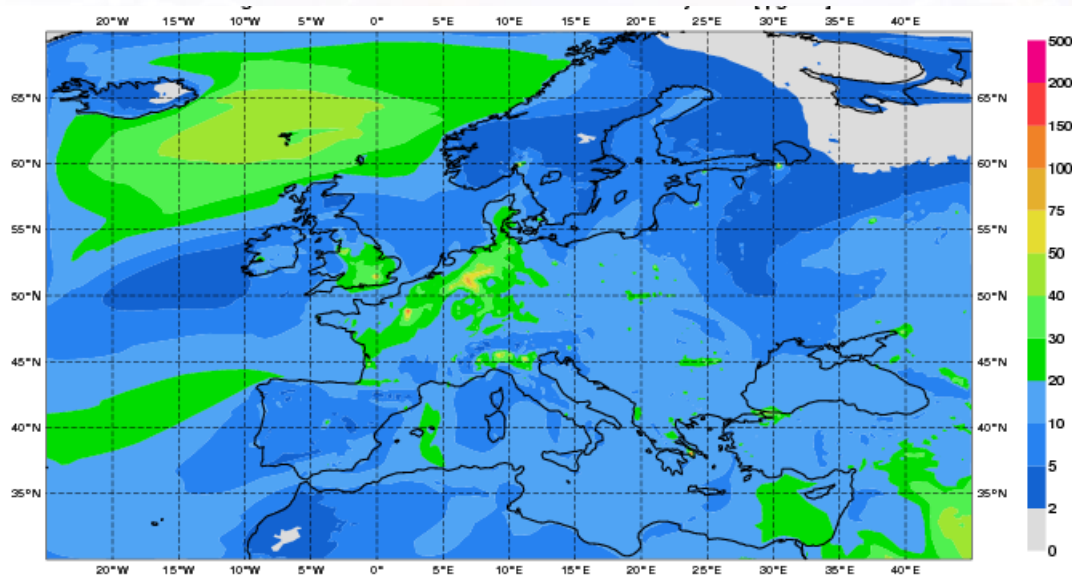
maîtriser le risque |  
pour un développement durable |

# INTRODUCTION

- Air quality platforms produce daily forecasts for the D+0, D+1 and D+2 (and D+3).
  - provide every day information related to the air quality levels
  - targetted pollutants: O<sub>3</sub>,NO<sub>2</sub>,PM<sub>10</sub>,PM<sub>2.5</sub>
  - In case of pollution episode:
    - Support to policy users
      - Provide recommendations to the public
      - to identify the likely causes
      - to assess population exposure
      - to set-up efficient measures (short term action plans)

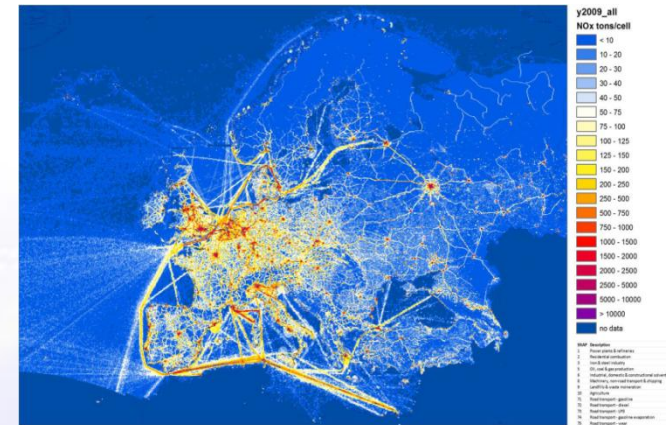


- MACC-II regional services produce daily air quality forecasts allowing to inform up to four days ahead about the ambient concentrations of ozone, nitrogen dioxide and particulate matter (PM10 and PM2.5) for the whole of Europe.



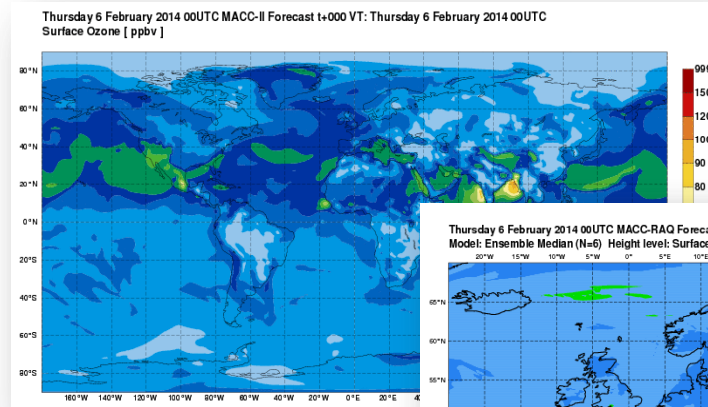
# Input data for air quality forecasting

- Emissions:
  - Anthropogenic emissions inventories:
    - European EI TNO (7x7 km<sup>2</sup>)
  - Natural emissions calculated on-line by the chemical transport model (Biogenic emissions, dust emissions ...)
  - Support from the satellite observations to get near real time emissions (biomass burning)

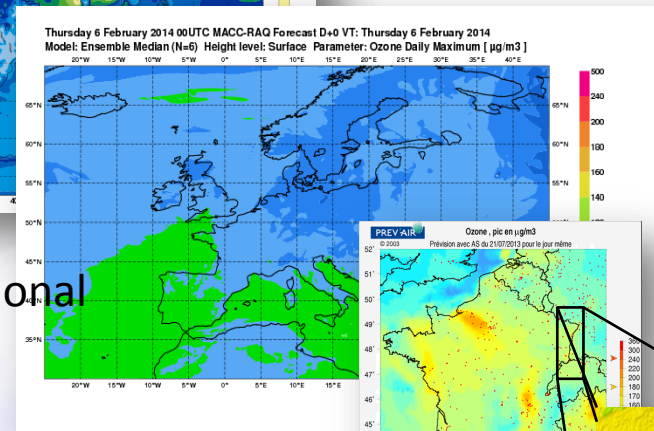


# Cascade of air quality forecasts at various scale

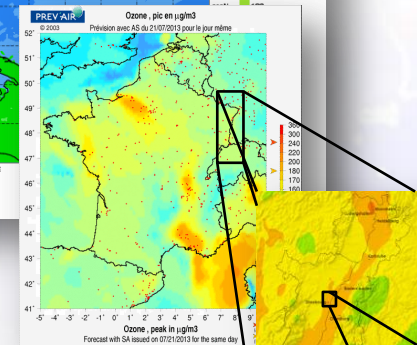
Global



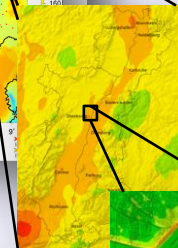
Europe/regional



National



Local



Urban



- AQ platform = Cascade of model means cascade of emission inventories, mixing approaches top-down and bottom-up

=> consistency of such system ?

# Interactive emissions

- The emissions are based on annual total emission on which are applied fixed temporal profile to provide hourly emissions
  - It leads to constant emissions for almost all the emission sectors for one month (without changes from day to day)
  - Static emissions not allowed to take into account the role of anthropogenic emission variability on the pollutant concentrations
- Dynamic emissions mean to forecast the impact of meteorological conditions (forecasts) on emission intensity and variability (temporal)
  - Effort has been done successfully to modulate the emission of the domestic sector (SNAP2)
    - Significant improvement of the PM10 forecasts during wintertime

# Interactive emissions

- For others emission sectors, it would need to extent such approach:
  - SNAP6: solvant emissions dependant of the temperature
  - SNAP10: Agricultural emissions (NH3)
  - SNAP7: Traffic emissions
- Injection height is also most of the time considered as constant in the forecasting model but actually very dependent of the meteorological conditions
  - This could have an effect on the quality of the forecasts in urban & industrialised area
    - Vertical resolutions increase in AQ and meteorological forecasts

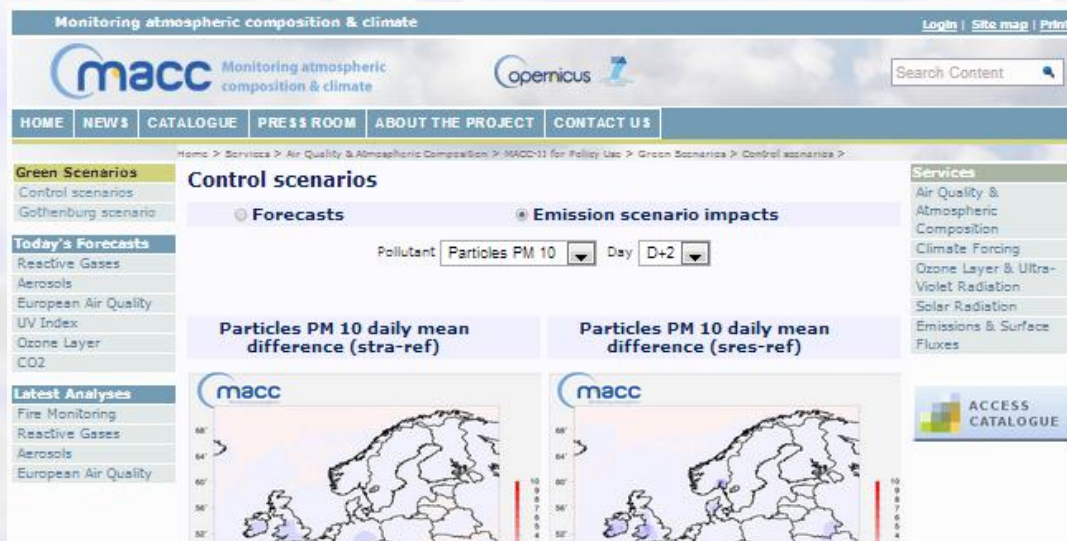
# Interactive emissions

- The process of re-suspension by the traffic of material dust is not taken into account for most of the models:
  - Dependent of the traffic and of the meteorological conditions
  - Critic emissions in mountains area where road management using sand and salt is practiced



# Requirements for scenarios – interactive emissions

- Models are also used in forecasting mode to assess the impact of emission reductions (short term measures)
  - Theoretical reductions (30 % reduction in SNAP7, SNAP2, SNAP10 ...)



# Requirements for scenarios – interactive emissions

- Refined SNAP descriptions to set-up the emission reductions really linked to the measures
  - SNAP level 1 -> level 2
- Get relevant information on the impact in terms of emission reduction of complex measure (How transcript the reduction of the speed limit on emissions, incitation to use bus instead of personal car ...)
  - Develop a tool for the transcription of policy measure in emission reduction

# Year of reference of emission inventory

- Regional forecasting applications relies on previous emission inventory with a gap of 2-3 years with the current situation:
  - Interim update would give more confidence on the forecasts
    - Using proxy like GDP, data activity ...

# Conclusions

- Consistency between emission inventories over various scales
- Modulation of the emissions (interactive emissions):
  - Meteorological conditions
  - Short term mitigation plans
- Interim update of EI