



## Issues related to observation sites

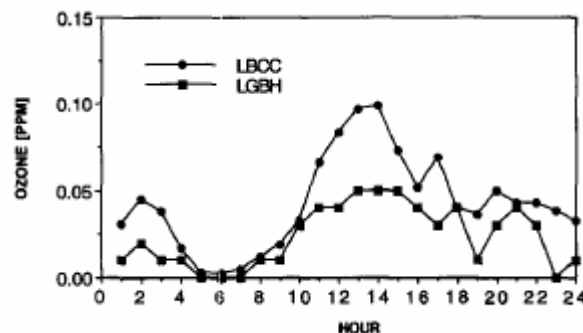
- 3D air quality models: Evolution of averaged pollutant concentrations over the volume of grid cells
- Observations from fixed measurement sites (local data, influenced by local processes)

How do the measurements reflect the surrounding AQ?

- Spatial representativeness of an observation site:
  - Characteristics of the site: topography, proximity to emissions...
  - Pollutant
- Choosing the “right” observation sites for model evaluation depends on:
  - Model geometry
  - The purpose of the evaluation (Schmidt et al., 2001):
    - Operational forecast vs. Scientific evaluation

## Some evidences of the problem (1/2)

- Comparison of sites located close to one another



McNair et al., 1996

- «Data withholding method»: comparison (Normalized Gross Error) of observed and interpolated values:

- In Los Angeles, R=25km (McNair et al., 1996):
  - CO: 45%; NO<sub>2</sub>: 42%; O<sub>3</sub>: 27%
- PM<sub>2.5</sub> (R~100km): 13% in Atlanta ; 20-30% in the US (Park, 2005)
- PM<sub>2.5</sub> species: 30-59% in Atlanta; 28-84% in the US (Park, 2005)

- Estimate of observation errors

Type of sites	Whole day	04 - 05	14 - 15
All	169/27	155/25	135/15
P	156/25	122/20	148/16
N	180/20	195/22	109/9

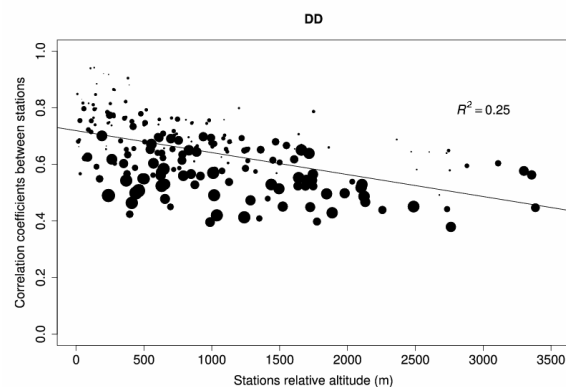
Ozone, 360 sites in Germany,  
May-Sept 1999

Tilmes et al., 2001

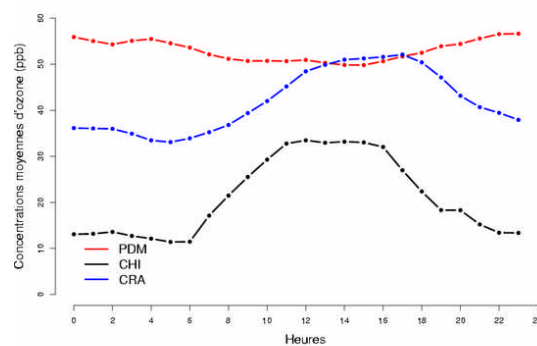


## Some evidences of the problem (2/2)

- Direct comparison of model outputs and observations (Tilmes et al.2002)
- Impact of altitude



Ozone daily mean  
Sites between 115m and 3500m  
Swiss and France



13/06-7/07/2005  
PDM 2875m  
CHI 1000m, 4km  
CRA 650m, 28km

Chevalier et al., 2006; Gheusi et al., 2006

# Classification of sites in EuroAirnet

- According to the following criteria:
  - Station: Traffic / Industrial / Background
  - Zone: Urban, Suburban, Rural
  - Characterisation: Residential / Commercial / Industrial / ...
- Background stations: Requirements in term of main distance to emissions
- Area of representativeness:

Station class	Radius of area
Traffic stations	*)
Industrial stations	10-100 m
Background stations:	
- Urban background stations	100m-1 km
- Near-city background stations	1-5 km
- Regional stations	25-150 km
- Remote stations	200-500 km

EEA, 1999



## From the PREV'AIR experience...

- Survey by the French monitoring networks about ozone observation sites:
  - All background sites but one (!)
  - Additional industrial sites included
- Model evaluation
  - Comparison of observations with the first model layer outputs
  - Sites treated separately

Ozone, summer 2005

