



European  
Commission



## Joint Research Centre

the European Commission's  
in-house science service



Joint  
Research  
Centre

## Fairmode Technical meeting

Spatial inter-comparison of  
emission inventories and its  
importance for air quality  
modelling activities

**M. Trombetti, P. Thunis**

Athens

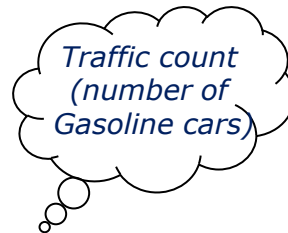
**19-22 May 2017**

# Assessment of the robustness

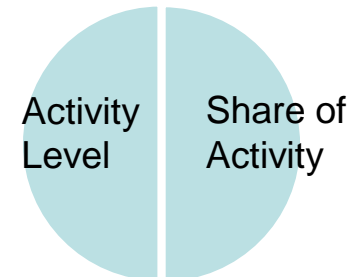
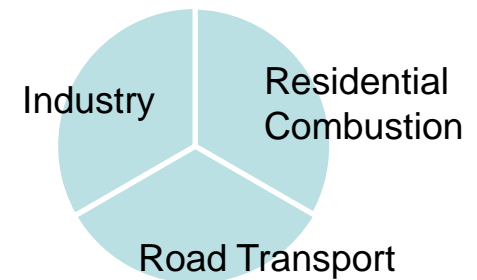
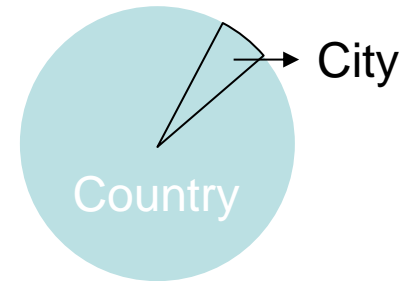
→ **Focus on Regional dimension**

Compare regional allocation (normalized values)  
→ Line chart

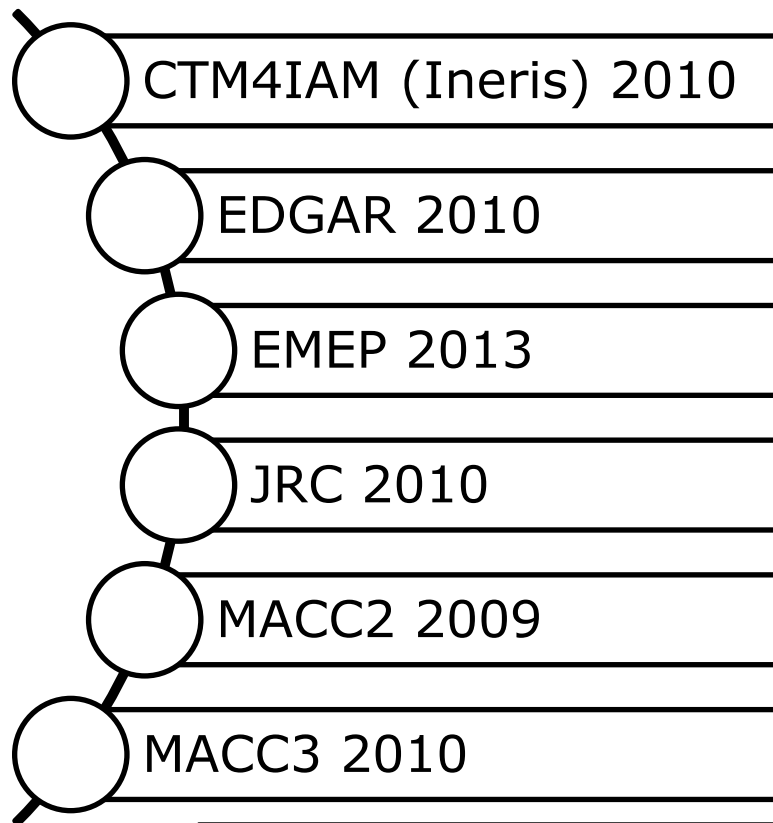
Compare sectoral allocation  
→ Pie chart



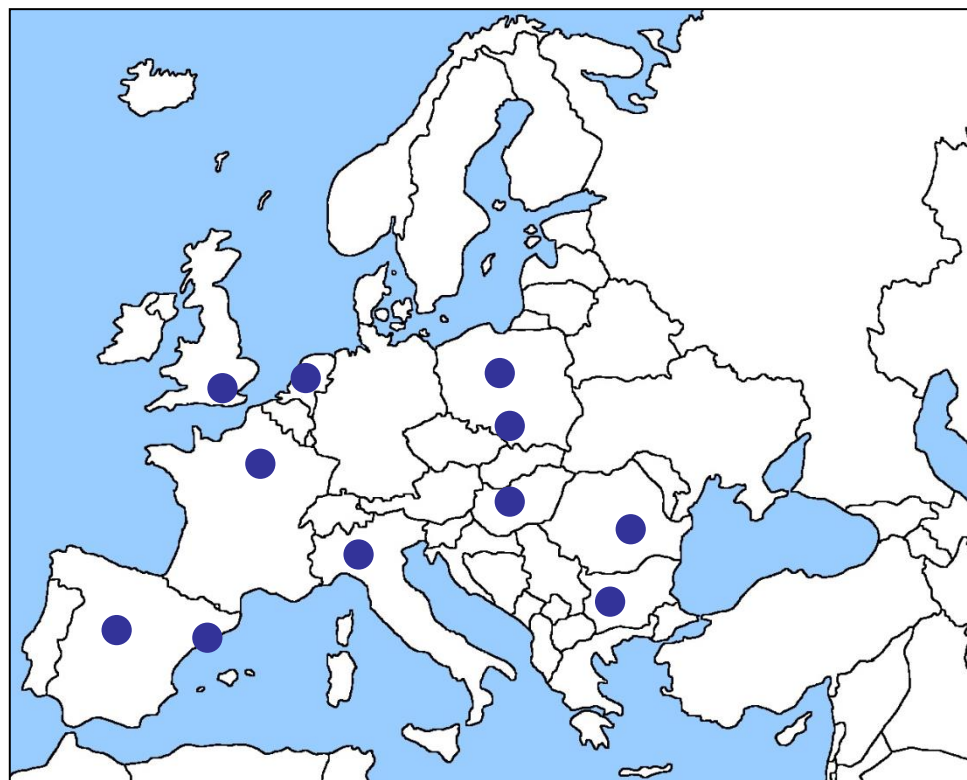
Nature of error: activity level or share of activity  
→ diamond



## Inventories



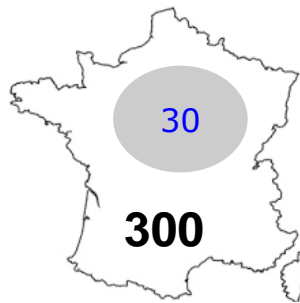
## Regions [ $\sim 1200\text{Km}^2$ ]



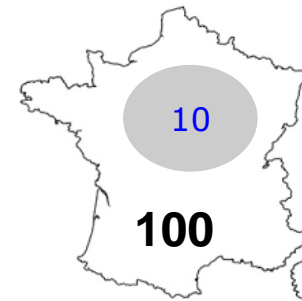
## MacroSectors:

MS2 (Residential Combustion)  
MS34 (Industry)  
MS7 (Road Transport)

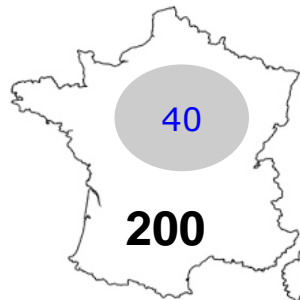
## Spatial Assessment: Normalization to country totals



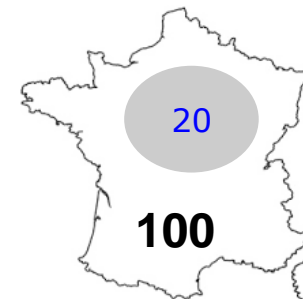
Inventory 1



Inventory 1-norm



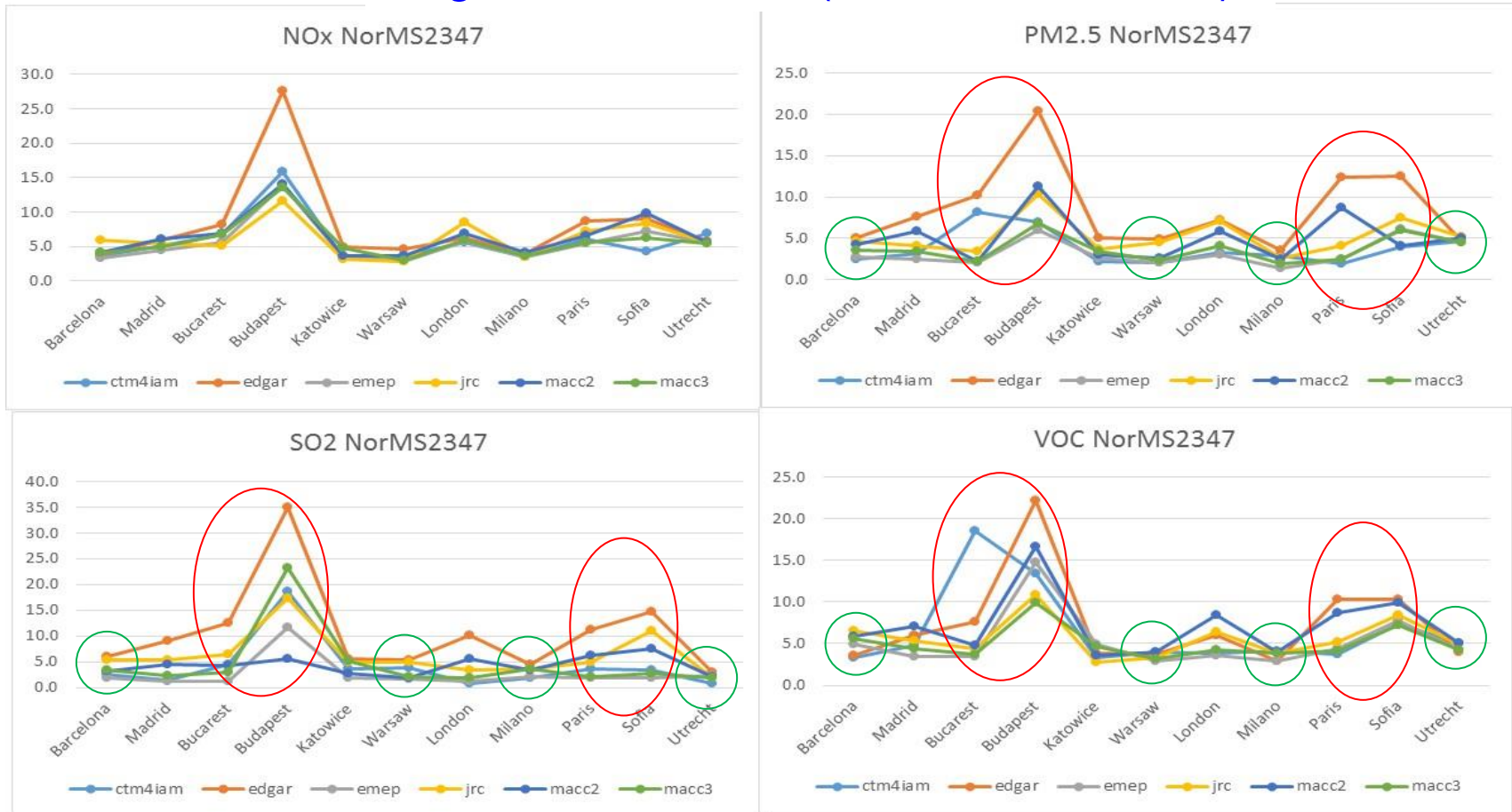
Inventory 2



Inventory 2-norm



## Regional allocation (total of all sectors)



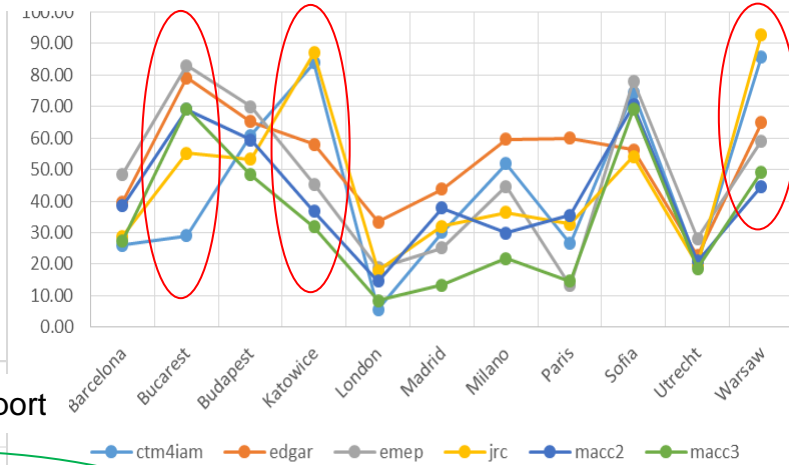
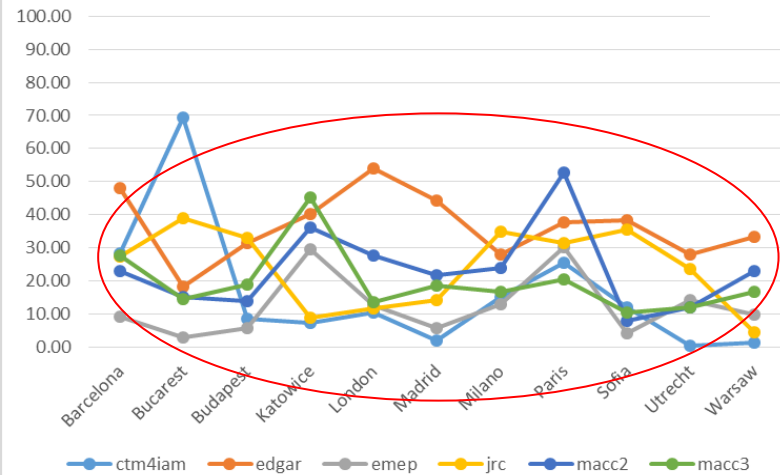
Spatial Proxies not complex enough to reflect differences for each city (land use/population/etc...)



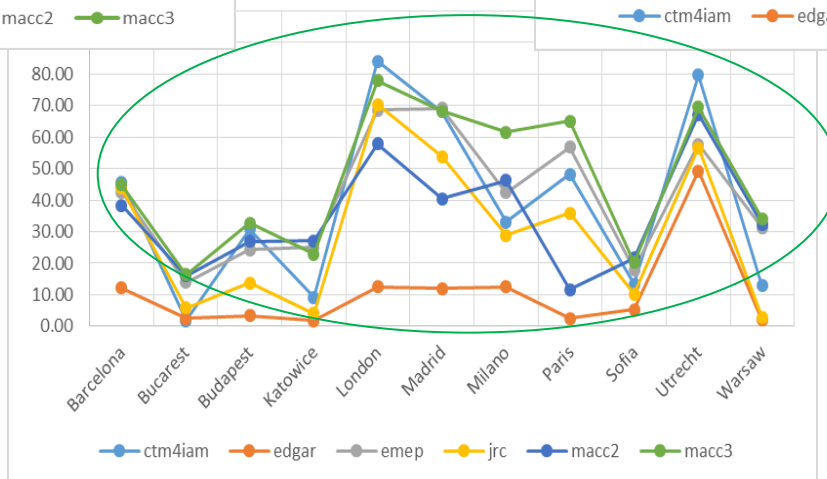
PM2.5 - Industry

## Sectoral allocation

PM2.5 – Residential combustion

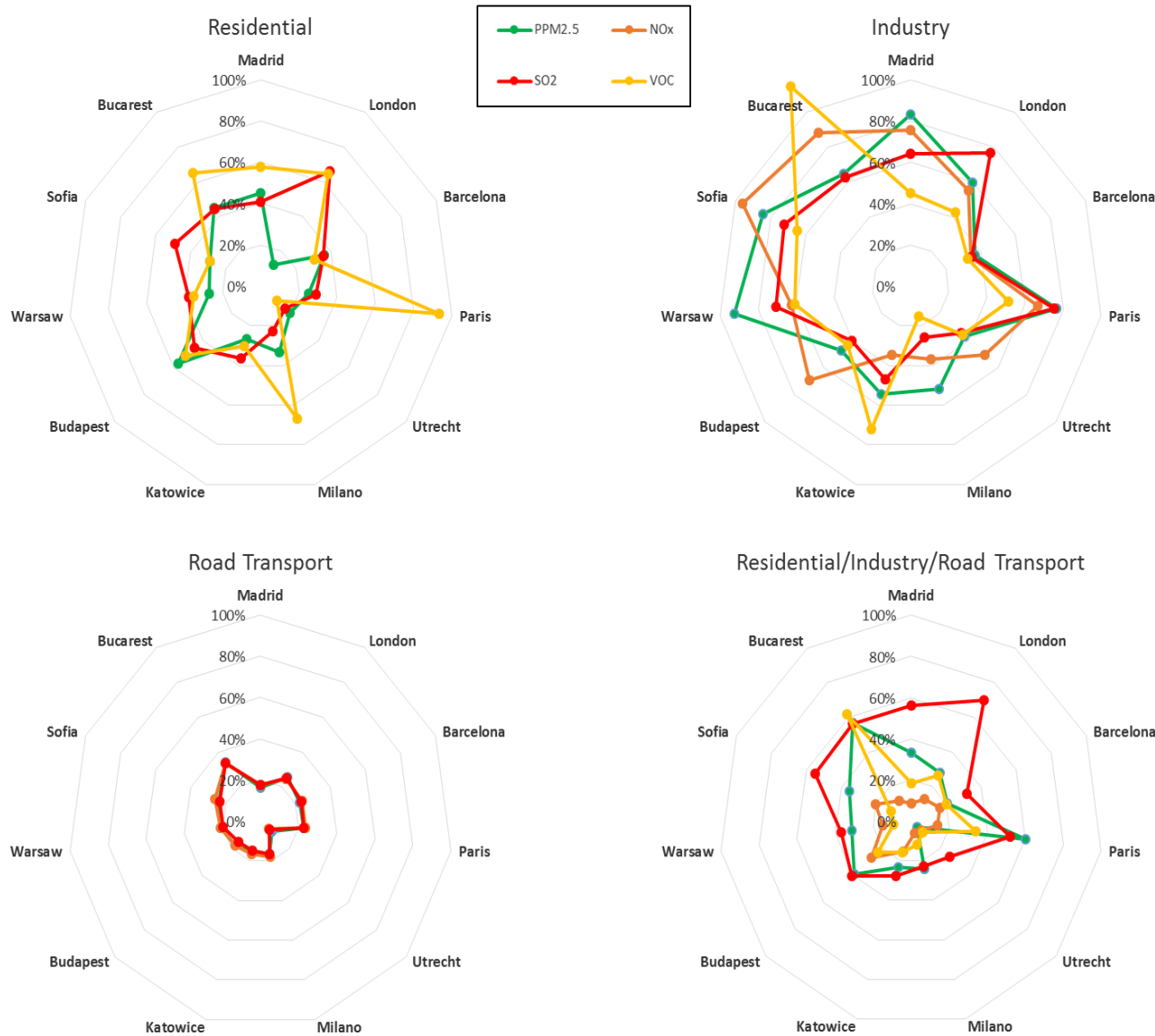


PM2.5 – Road Transport



Residential Sector: Important differences for PM2.5 (Bucarest, Katowice, Warsaw)

# Uncertainty of emissions at urban scale



Transport:  
25% Uncertainty

Residential/Industry:  
Up to 100%  
Uncertainty

Combination of all  
sectors:  
uncertainties reduced  
compensation effect

# Discussion and general recommendations



- Largest inconsistencies arise in the industry and residential sectors, especially for Eastern cities/regions
- Need to harmonize proxies and methodologies for the industrial Sector
- Inconsistencies in the residential sector are mostly related to activity levels: necessity of calibrating the country-specific patterns of emissions from wood-burning, using BoU estimates
- **The large differences in terms of emission totals and sectoral shares that are seen at the urban scale are city- and pollutant-specific and can therefore not be treated systematically**
- **There is an urgent need to harmonize spatialization approaches! Inter-comparison exercises are very useful to support the process.**
- **A significant impact on air quality plan strategies is very likely**