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# MEGAPOLI: concept and current results of megacity multi-scale impacts on atmospheric composition and climate

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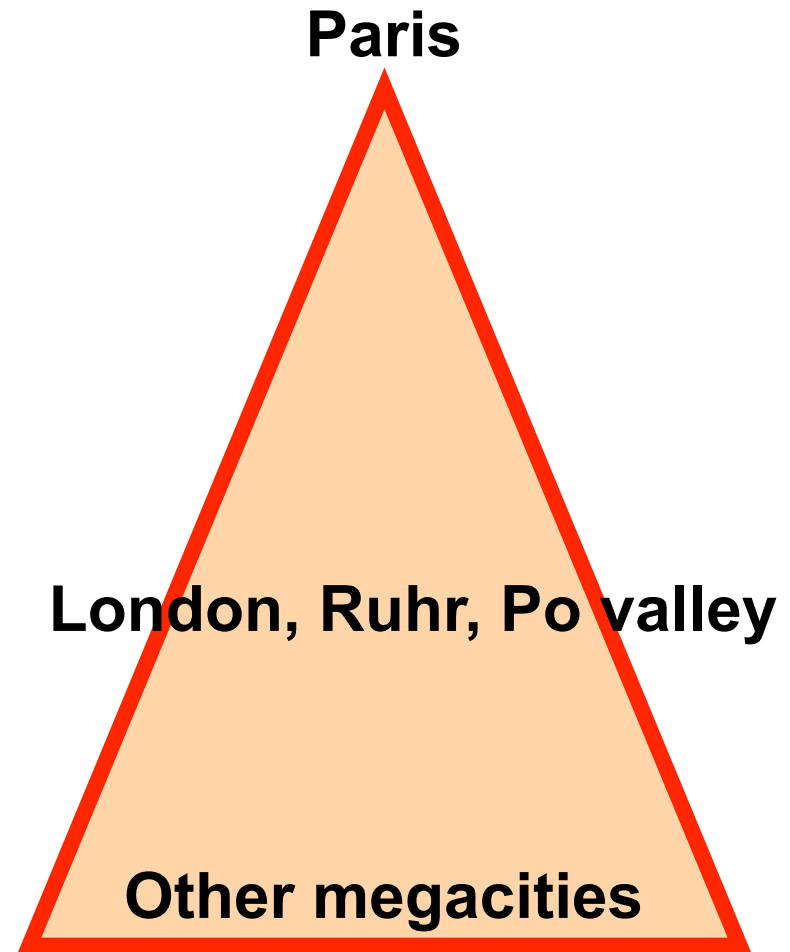
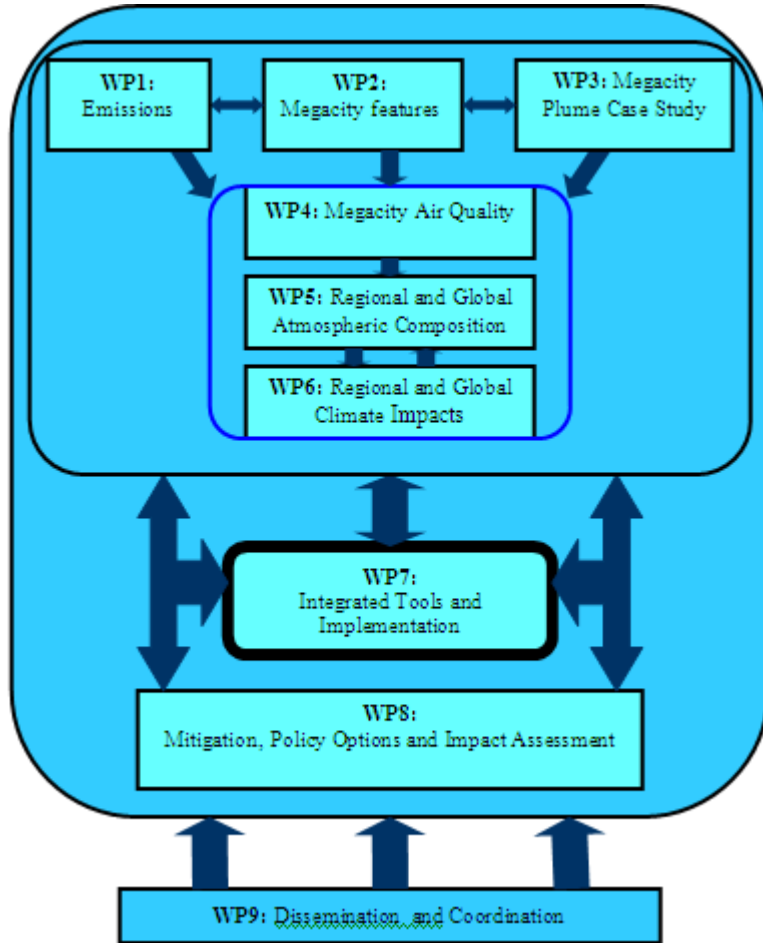
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# MEGAPOLI Objectives



- *to assess impacts of megacities and large air-pollution “hot-spots” on local, regional, and global air quality and climate*
- *to quantify feedbacks between megacity emissions, air quality, and climate;*
- *to develop and implement integrated tools to assess impacts of air pollution from megacities and to evaluate effectiveness of mitigation option.*

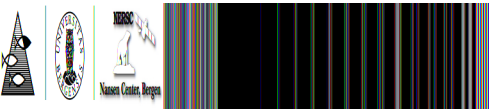
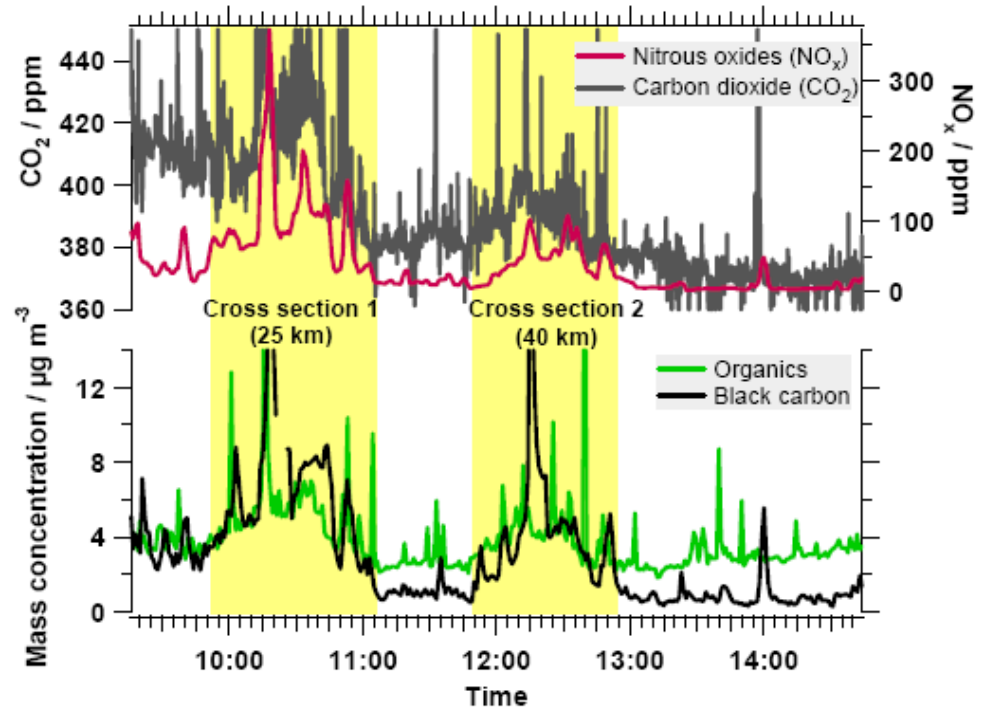
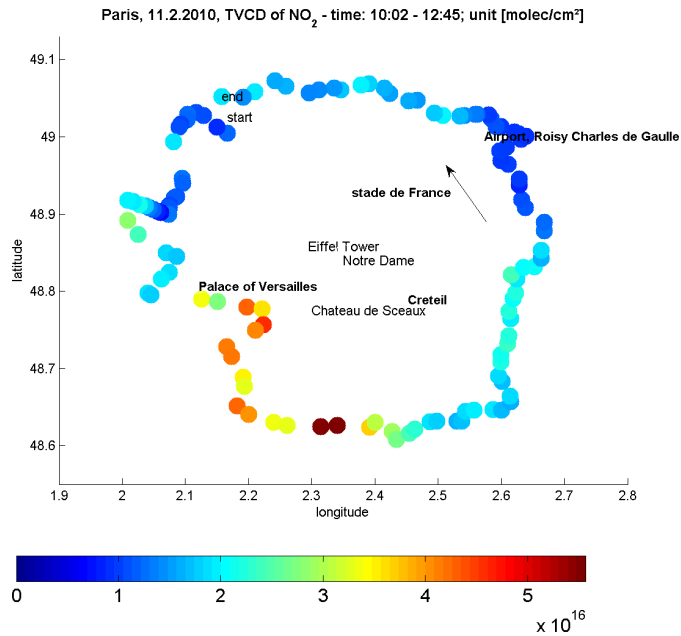
# MEGAPOLI + MEGAPOLIS Concept





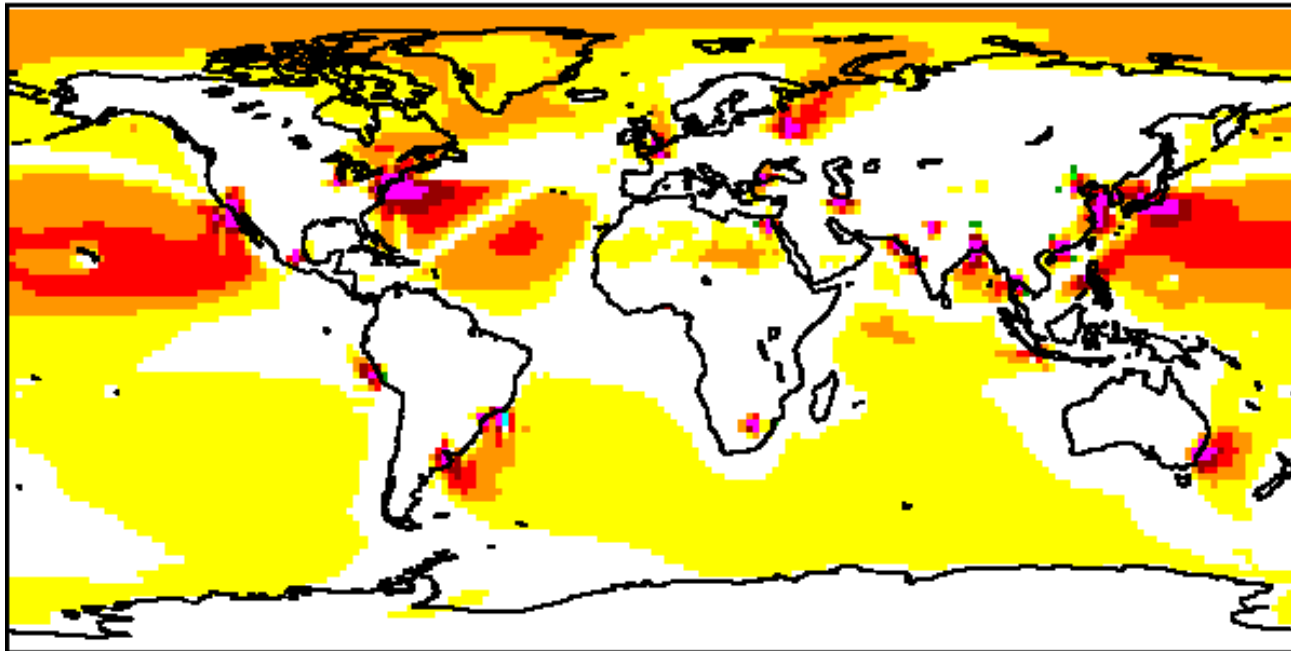


# MEGAPOLI Results: Field Campaign



# MEGAPOLI Results: Global Change

## NO<sub>x</sub> Change due to Megacities



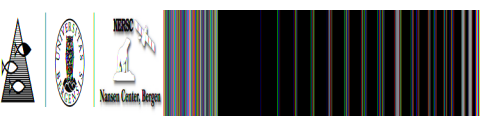
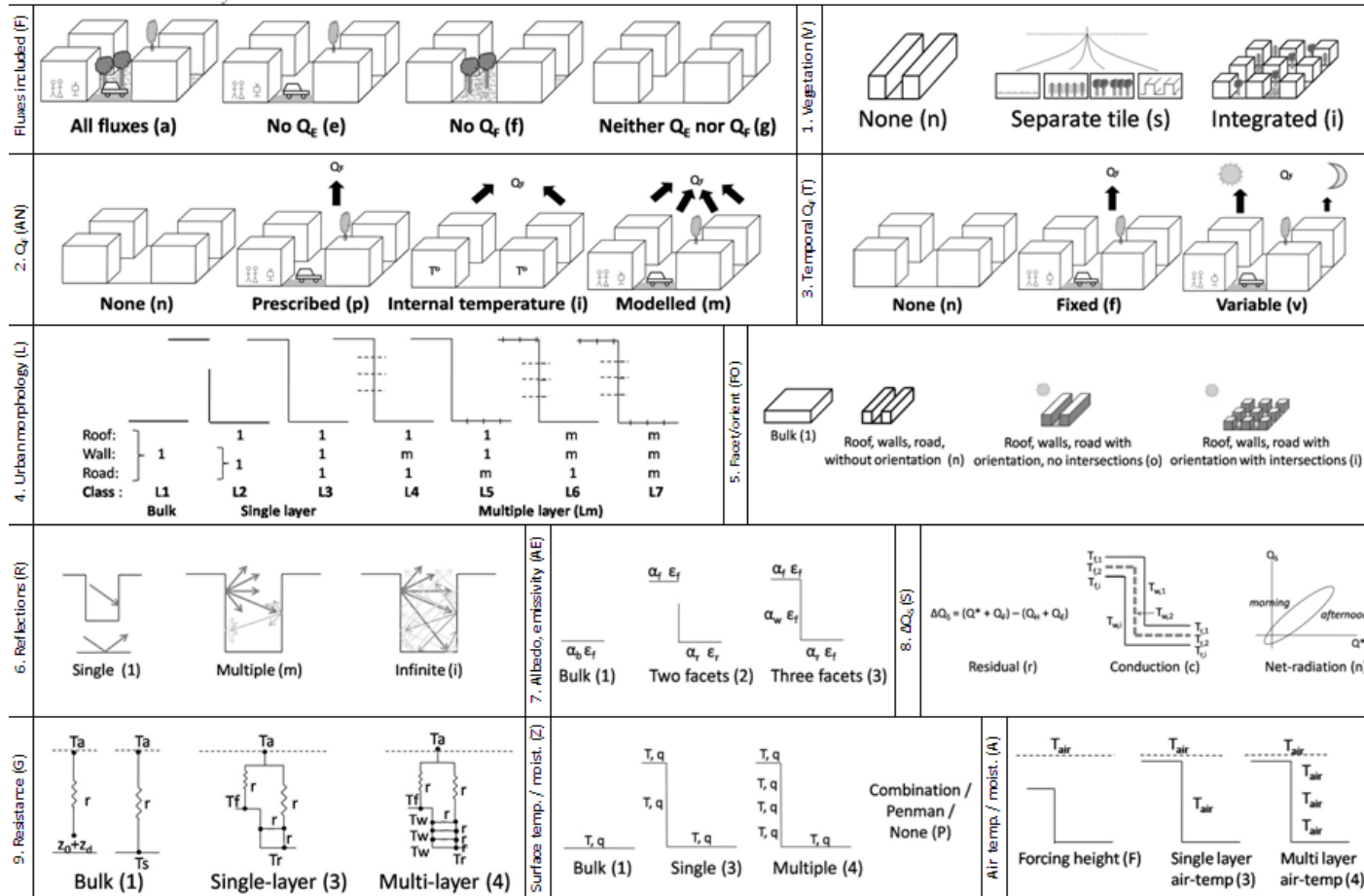
Percentage Change



-50   -20   -10   -5   -2   2   5   10   20   50

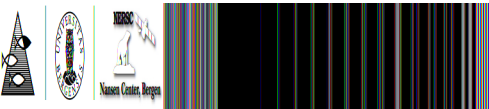
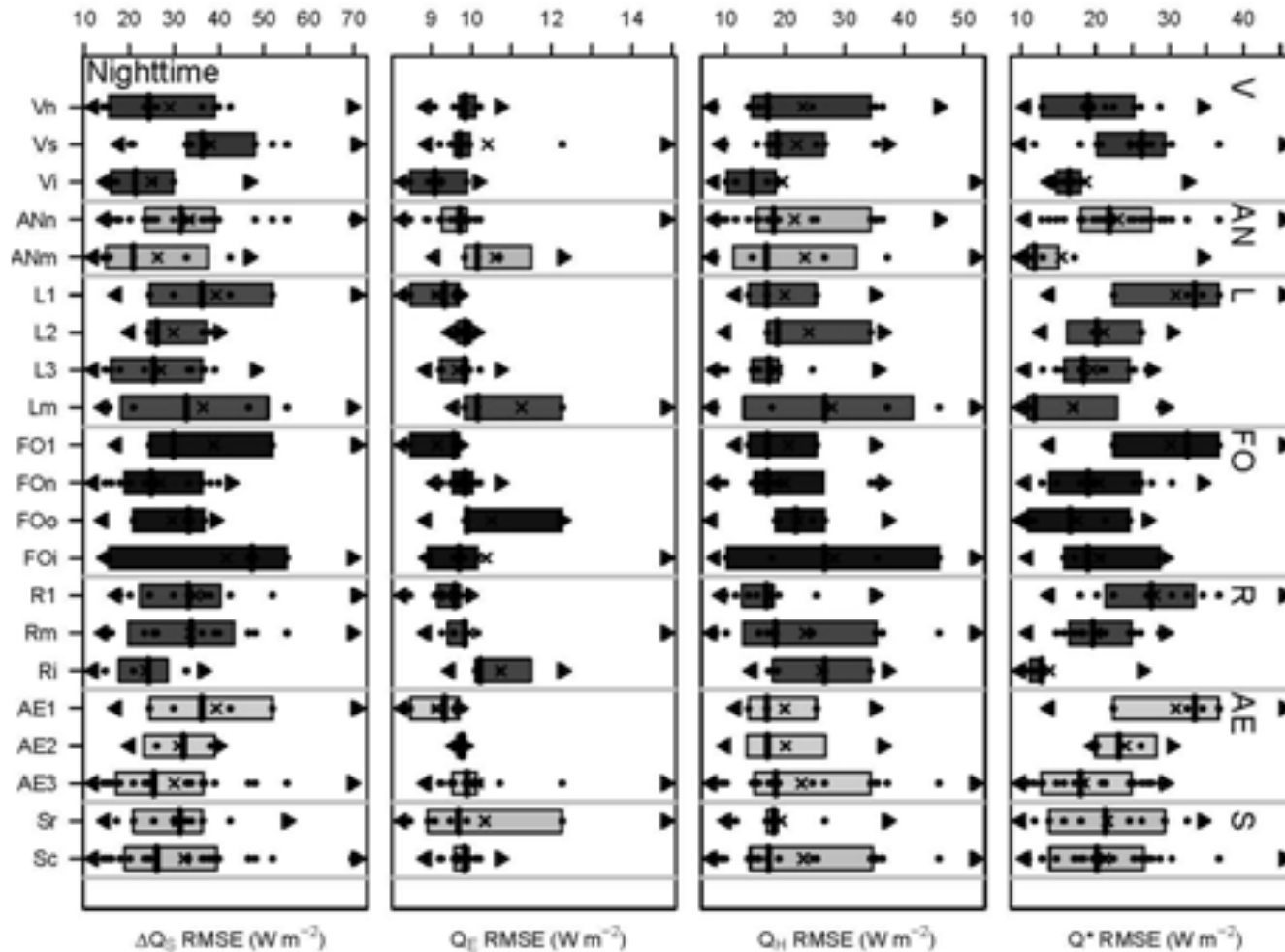
# MEGAPOLI Results: Urbanization

FP7/EC MEGAPOLI PROJECT



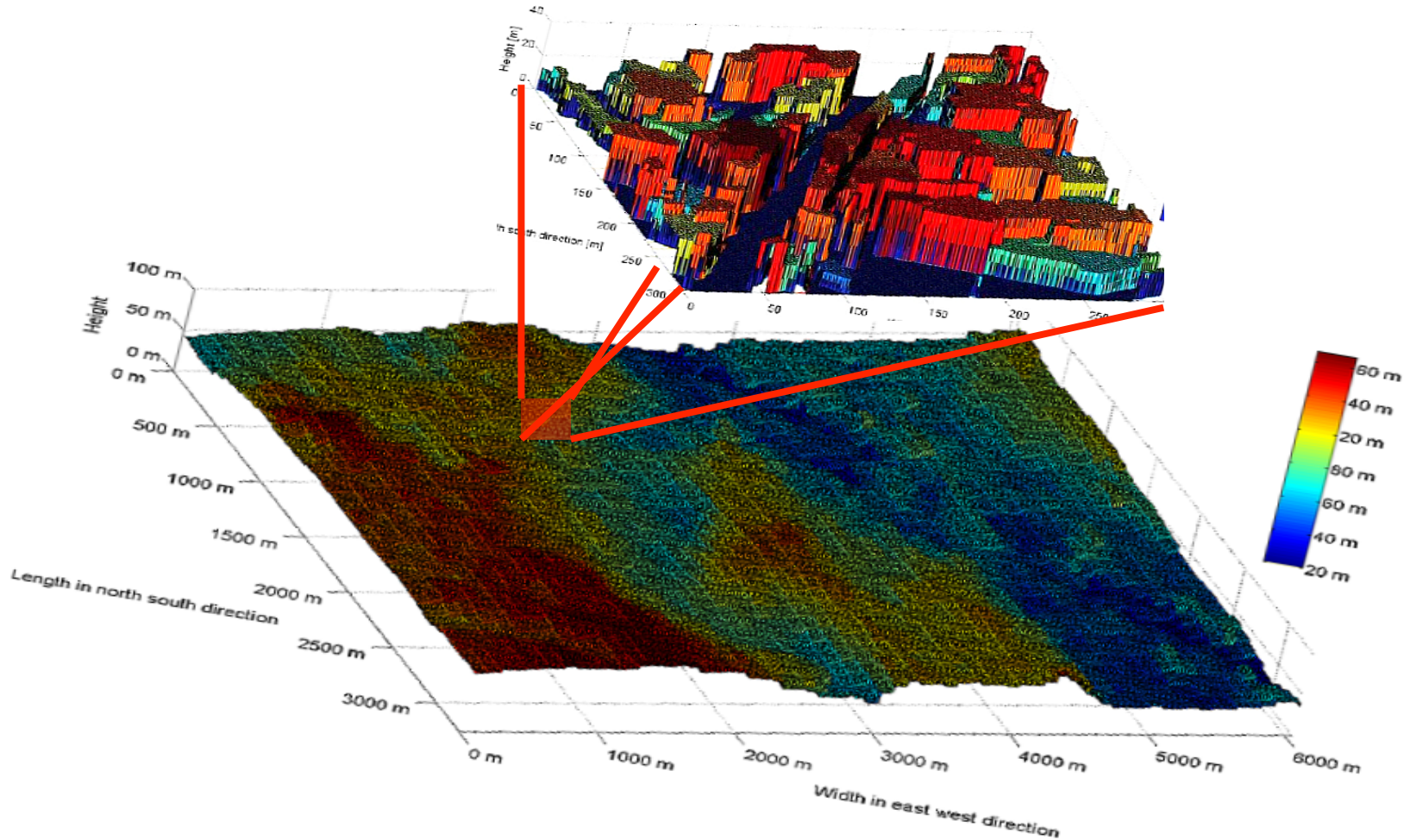


# MEGAPOLI Results: Urbanization



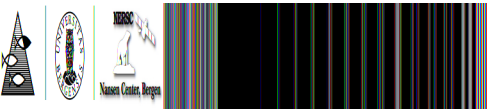
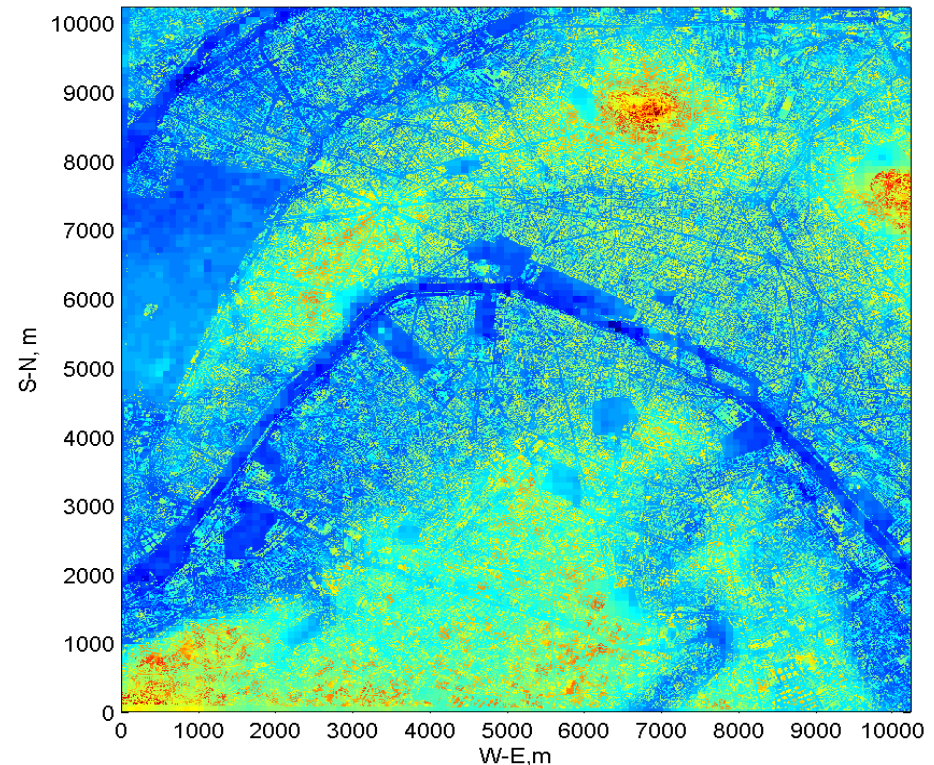


# MEGAPOLI Results: Urban scale

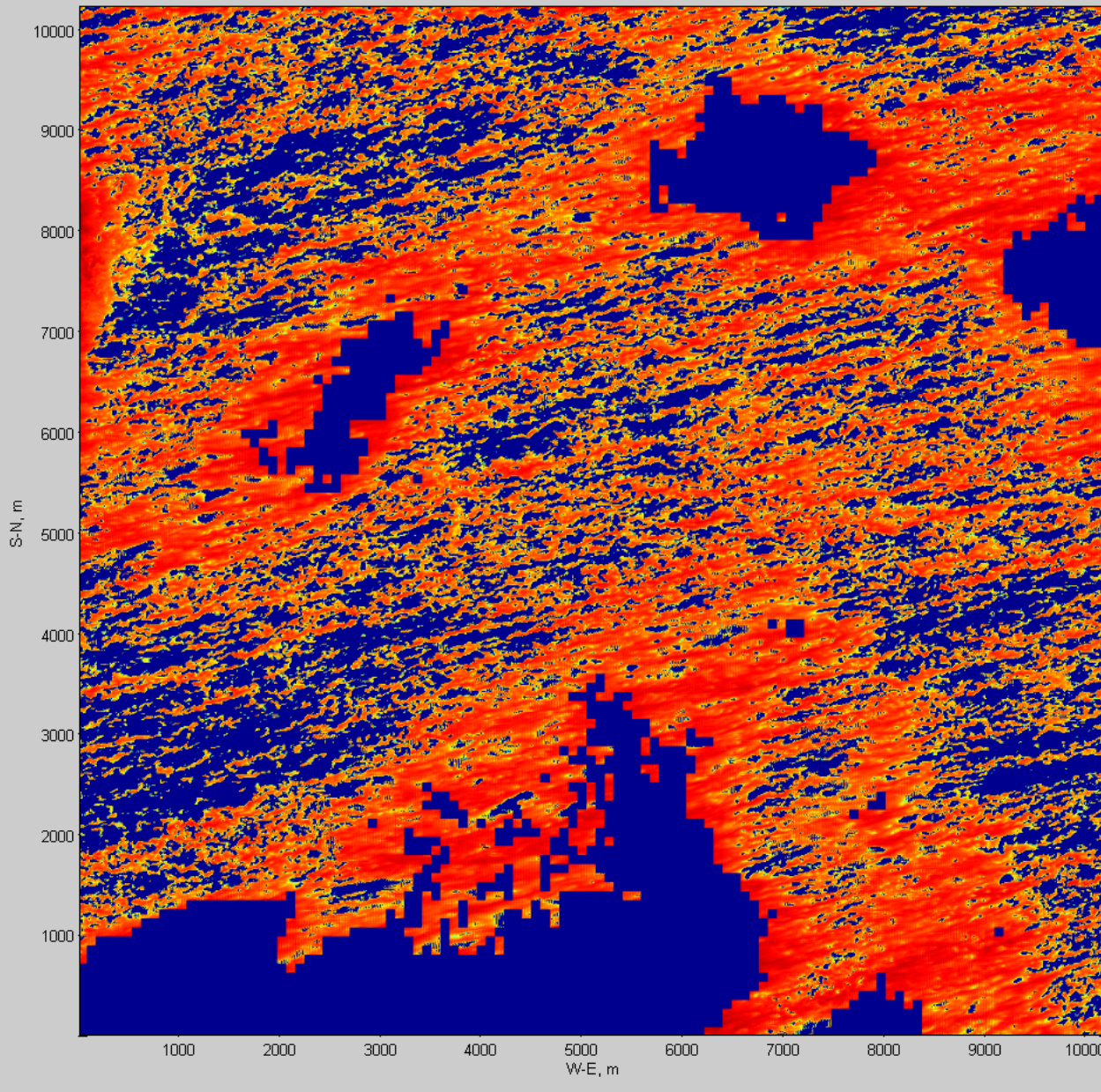


# City simulation tools

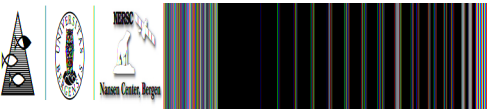
- New tool – turbulence-resolving model
- Resolution – 10 – 100 m
- Turbulent air flow within urban canopy, pollutant transport, wind load, micro-physics, and micro-climatology
- Computationally intensive  $O(10^3)$  CPU hours per run
- Small domain  $<100$  km limits forecasting utility
- Research is not fully ready for technology





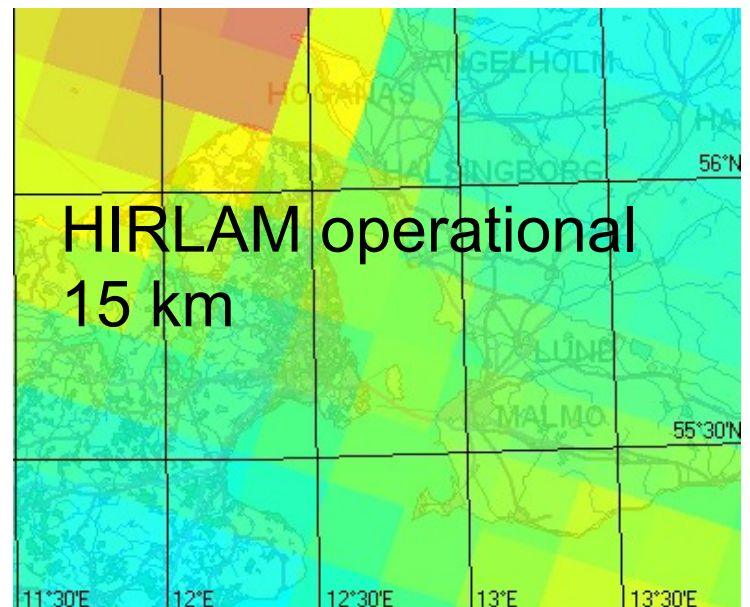
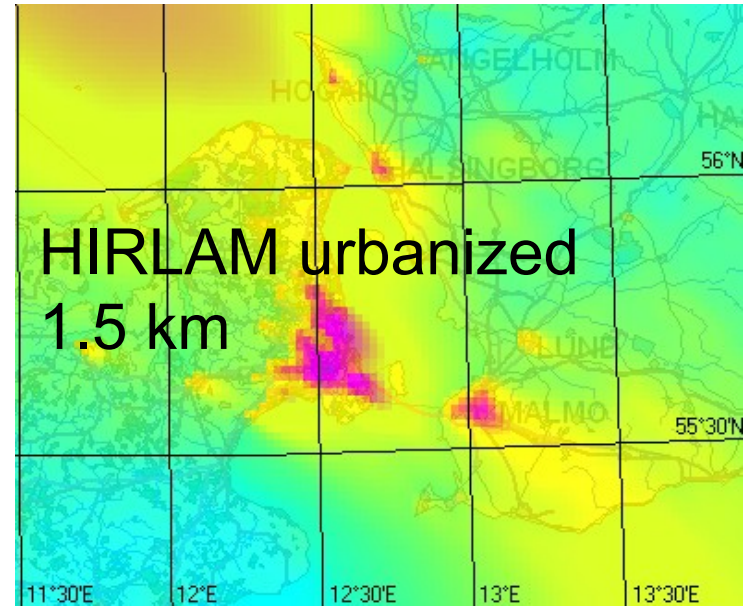


Ground born scalar mixing in central Paris, simulation with PALM 10 m resolution, 5000 CPU hours



# City simulation tools

- Climate models (GCM) – 100 km
- Weather forecast models (NWM) – 20 km
- Meso-meteorological research models – 2 km
- Too coarse (at best a few points over a city)
- Require sophisticated urbanization
- Do not reproduce urban canopy layer flow





# MEGAPOLI Dissemination



New Letters of the FP7 EC MEGAPOLI Project

**Megacities: Emissions, urban, regional and Global Atmospheric POLLution and climate effects, and Integrated tools for assessment and mitigation**



Theme FP7-ENV-2007.1.1.2.1:  
Megacities and regional hot-spots air quality and climate

[www.megapoli.info](http://www.megapoli.info)

MEGAPOLI-NL07-10-06

June 2010

Issue: 7

Welcome to the 7th issue of the Newsletter

### Editorial

The MEGAPOLI consortium is pleased to present the 7th issue of the MEGAPOLI Newsletter. Short contributions from Partners and Collaborators, as well as Research Teams introductions are given here. Details on the project progress can be found in public documents available at the project website ([www.megapoli.info](http://www.megapoli.info)). The purpose of the newsletters is to inform about activities, progress, and achievements of the MEGAPOLI project as well as to establish a dynamic communication link with the Partners, Collaborators, and Users Community, to monitor the project activities and to exchange input and experiences. For these reasons your contributions to newsletters and news at the web-site as well as comments are always welcome (send to [news.megapoli@dmu.dk](mailto:news.megapoli@dmu.dk)).

### Latest News

- ❑ Coming soon – MEGAPOLI 2<sup>nd</sup> Annual Meeting (1-2 Nov 2010; Hamburg, Germany)
- ❑ Coming soon – 5<sup>th</sup> MEGAPOLI WP Leaders telephone conference (14 Jul 2010)
- ❑ Coming soon – MEGAPOLI Paris Plume Study Workshop (14-15 Jun 2010; Paris, France)
- ❑ Coming soon – Database from the Paris summer (Jul 2009) measurement campaign became available (10 Jun 2010)
- ❑ 31 May 2010 – MEGAPOLI Mid-Term Scientific (coordination, management, dissemination and deliverables/ reports) Periodic Reporting to EC – finalized through the newly established ECAS portal system
- ❑ 3-4 May 2010 – special MEGAPOLI, CityZen, MILAGRO session & joint meeting at European Geosciences Union General Assembly, EGU-2010 (Vienna, Austria)
- ❑ 27 Apr 2010 – 4<sup>th</sup> MEGAPOLI WP Leaders telephone conference
- ❑ 19 Mar 2010 – working meeting of MEGAPOLI and Russian MEGAPOLIS projects' collaborators; progress report of the daughter project

### MEGAPOLI Periodic Reporting to EC

The FP7 EC MEGAPOLI project has reached the mid-term point. Just recently the MEGAPOLI Project Office has finalised contributions from all partners' teams as a joint Mid-Term Periodic Report and sent it together with 16 Deliverables' Reports, Description of Work (DoW), 6 Newsletters, etc. to the EC Scientific Officer through a new ECAS reporting web-portal. The first 18 months of research performed since the beginning of the project have been focused on the following:

- Field measurement campaigns in the Paris metropolitan area (France):
  - (i) Summer – July 2009;
  - (ii) Winter – January/ February 2010;
  - (iii) Analysis and modelling;
- Emissions database and future megacity scenario development;
- Continued model development from urban to global scales, analysis and interactions;
- Bringing these various activities together with first steps towards integrated modelling and mitigation scenarios;
- Modelling to quantify feedbacks among megacity air quality, local and regional climate, and global climate change.

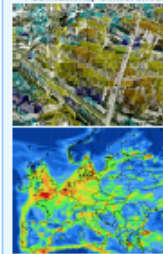
The MEGAPOLI WPs status and progress during the first reporting period were up-dated at the public MEGAPOLI web-site (<http://www.megapoli.info>) in section "Project Results" including:

- Summary and progress toward objectives;
- Summary details for each WP deliverables, milestones, and tasks;
- Significant results: methodologies and scientific achievements related to WP including partners' contributions;
- Socio-economic relevance and policy implications;
- Discussions and conclusions;
- List of WP reports, publications, presentations.

See details on the next pages

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Issue 7, June 2010

