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## Assessment of Air Pollution in the Conurbation of Munich - Present and Future - including an brief outlook on Alpine Environments

Peter Suppan

Institute for Meteorology and Climate Research  
Environmental Atmospheric Research (IMK-IFU)  
Garmisch-Partenkirchen / Germany

peter.suppan@imk.fzk.de

Institute for Meteorology and Climate Research  
Environmental Atmospheric Research (IMK-IFU)  
Garmisch-Partenkirchen / Germany

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## Problem

### Range of mobility is constantly extended

- Separation of living and working
- Trend towards a information- and service society
- Globalisation of markets
- Distance intensive leisure activities

### Negative impacts to conurbations

- Growing traffic capacity has reached the limits of existing infrastructure
- Traffic begins to obstruct itself, with all negative impacts to the quality of life, economic and welfare development

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## Problem

	HDV	PC	Total
Intermodal	69 000	1 418 000	1 487 000
Depot // Destination	68 000	835 000	903 000
<b>Total traffic 2000</b>	<b>127 000</b>	<b>2 253 000</b>	<b>2 380 000</b>

(Source: MOBINET - Project integration and Evaluation, 2000)



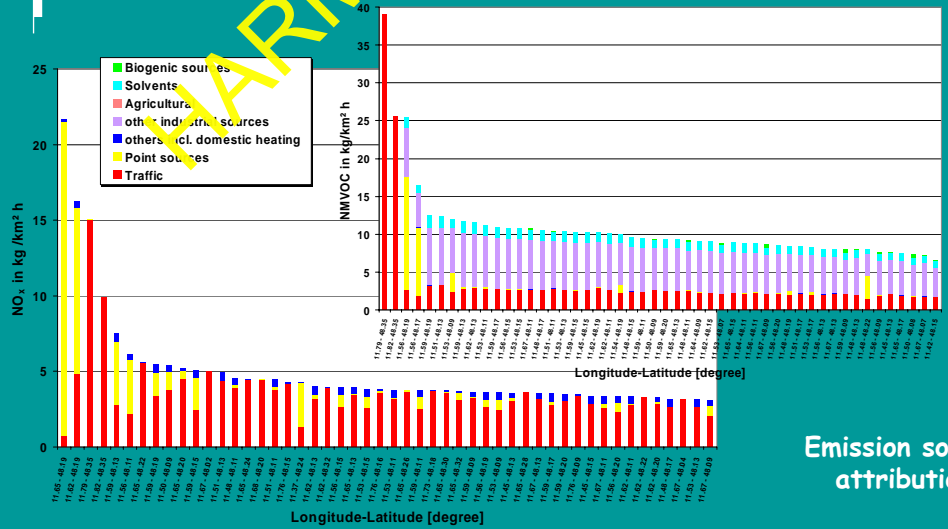
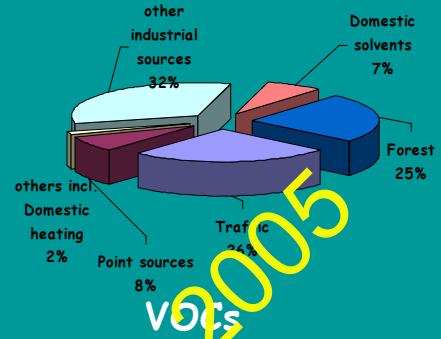
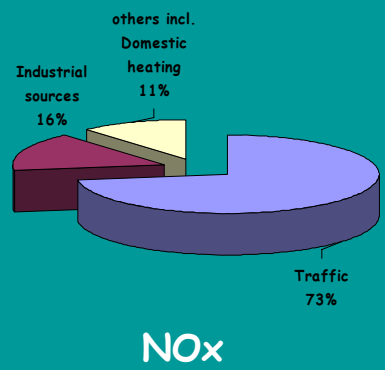
## Vision

...it should be demonstrated, that also in  
conurbations like Munich traffic related  
problems can find a solution...

(Christian Ude, Lord Mayor of Munich)



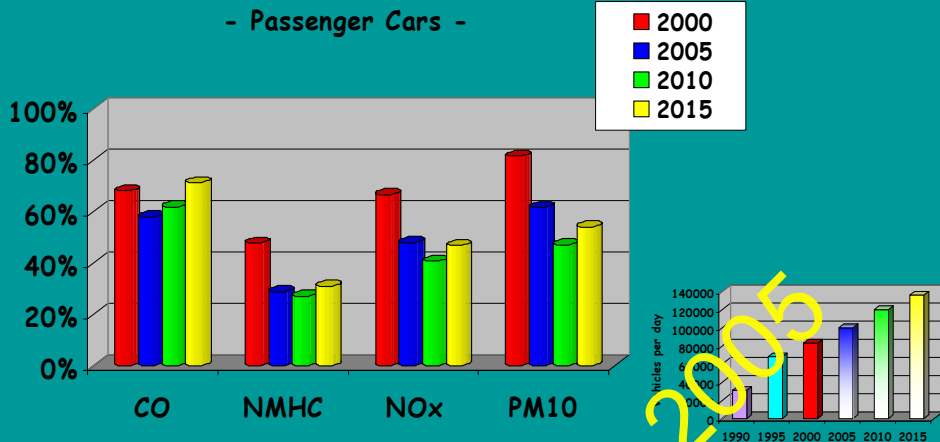
# Emission distribution



## Emission source attribution



Rel. Change of highway emissions (A92)  
- Passenger Cars -



Source: BMW / UBA, 2003

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Source: BMW 2003

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Target values

Pollutant	Value	Target	To be met	Reference
ozone	120 $\mu\text{g}/\text{m}^3$ (8 hour average)	< 26 days/year	2010	2002/3/EC
PM <sub>10</sub>	50 $\mu\text{g}/\text{m}^3$ (24 hour average)	< 36 times/year	2005	1999/30/EC
PM <sub>10</sub>	40 $\mu\text{g}/\text{m}^3$ (yearly average)	None	2005	1999/30/EC
nitrogen dioxide	200 $\mu\text{g}/\text{m}^3$ (1 hour average)	< 19 times/year	2010	1999/30/EC
nitrogen dioxide	40 $\mu\text{g}/\text{m}^3$ (yearly average)	none	2010	1999/30/EC

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## Situation

Location	Days	
Leipzig / Centre	88	
Munich / Landshuter Allee	83	
Bremen	69	Days of exceedance of the PM <sub>10</sub> threshold value of 50 µg/m <sup>3</sup>
Leipzig / Lütznerstr.	69	
Düsseldorf / Corneliusstr.	67	(13.10.05)
Hannover	60	
Dortmund / Brackeler Str.	60	
Halle	56	

(Source: UBA - Federal Environment Agency / Berlin)

## Online coupled meteorology-chemistry model MM5chem (MCCM)

### Meteorological part

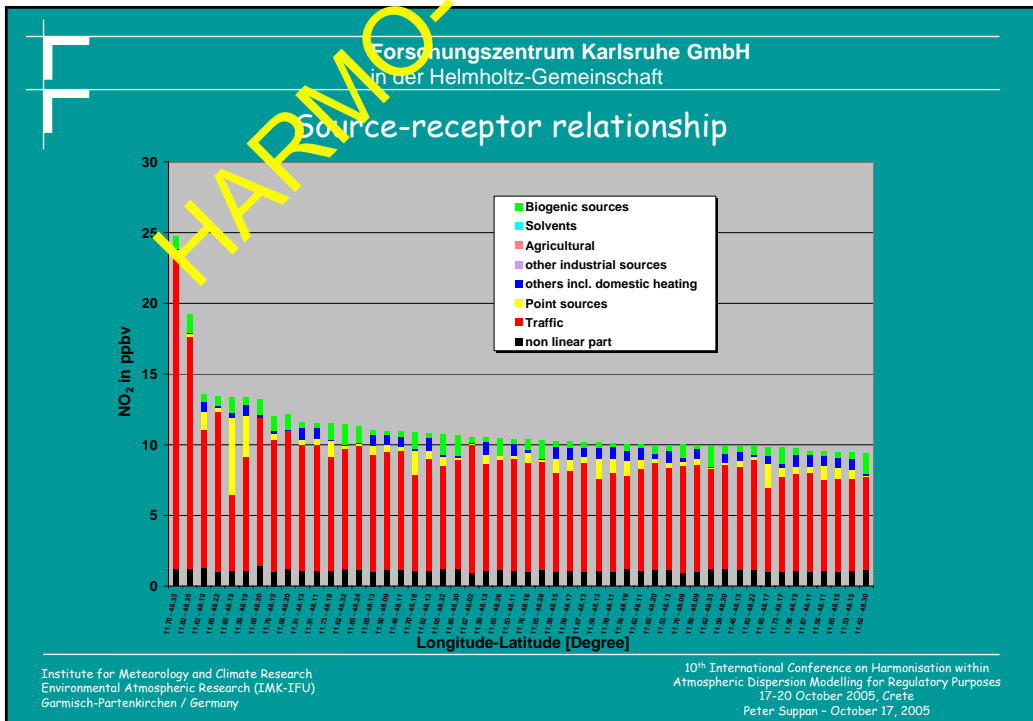
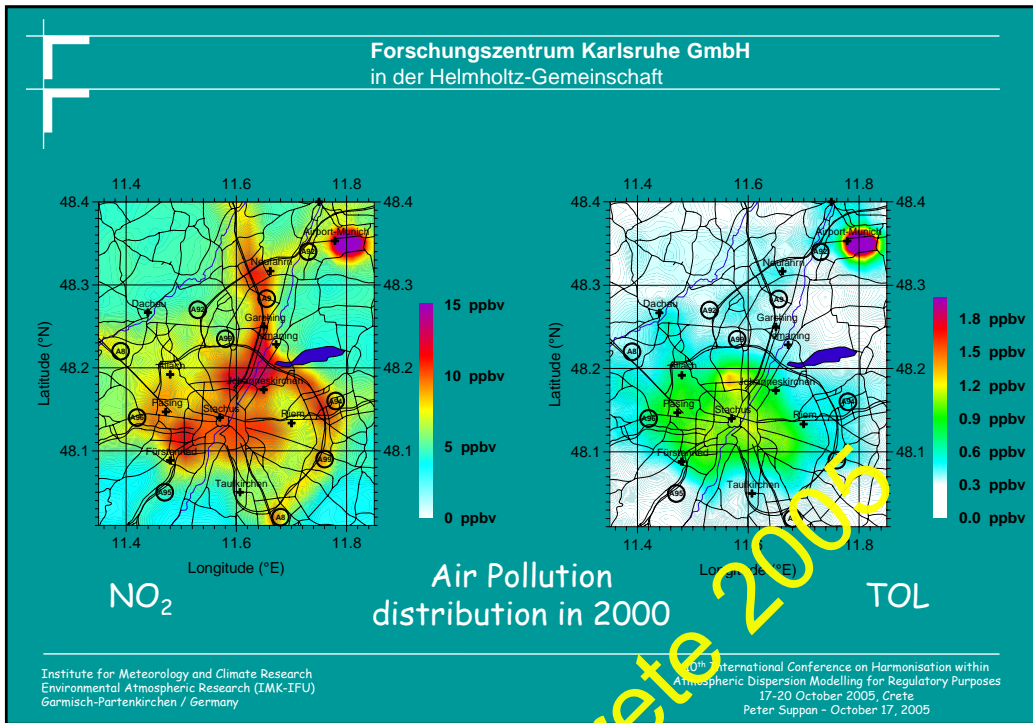
- Based on MM5
- Non-hydrostatic
- Nesting capability
- Soil and snow model

### Chemistry transport part

- RADM2 / RACM chemistry
- Photolysis model
- Aerosol module (SORGAM)
- Biogenic emission module

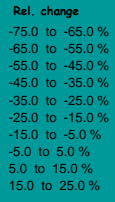
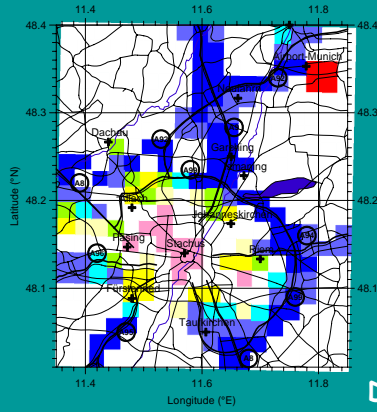
### Output:

Fields of temperature, humidity, cloud water and ice, rain water, snow, photolysis frequencies, concentrations of chemical compounds in the gas and particle phase; snow height ...



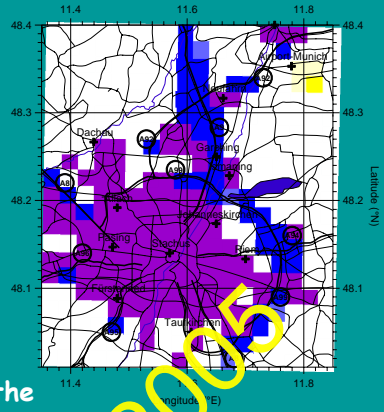


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NO<sub>x</sub>

Difference to the traffic emission projection in 2010



VOCs

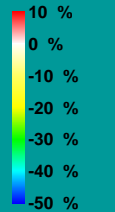
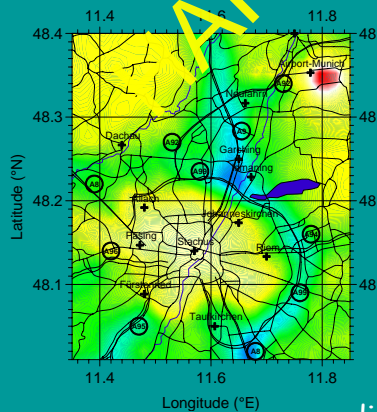
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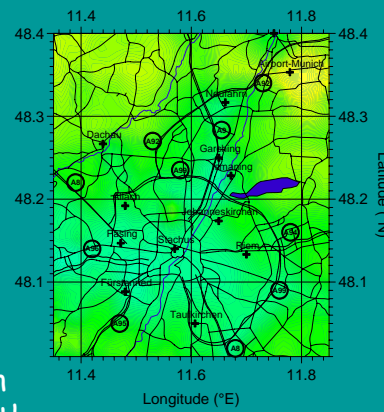


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NO<sub>2</sub>

Air Pollution difference to the projection in 2010



TOL

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ALPNAP

European Union

This project has received European Regional Development Funding through the INTERREG III Community Initiative

Alpine Space  
Interreg III B

**11 partners form an Alpine network of experts ...**

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DLR

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Interreg III B

**... in meteorology, air pollution, noise, and health**

(1)

(2)

(3)

Photos:  
(1) FZK-IMK-IFU Garmisch  
(2) Amt der Tiroler Landesregierung, Innsbruck  
(3) <http://www.asg.co.at/index.htm>

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... focusing on two major road and rail transit routes



Vallée de la Maurienne  
Frejus  
Val Susa

Unterinntal  
Brenner/Brennero  
Eisacktal/Valle Isarco  
Valle dell'Adige

## OBJECTIVES

### Application of innovative, scientific methods

- in selected pilot regions
- to assess the distribution of emissions in valleys
- to assess the impact of air pollution and noise on the environment, quality of life, and health
- to assess designed traffic regulations to meet noise and air quality standards
- to introduce sustainable Alpine-wide network of experts and authorities



## Conclusions ...

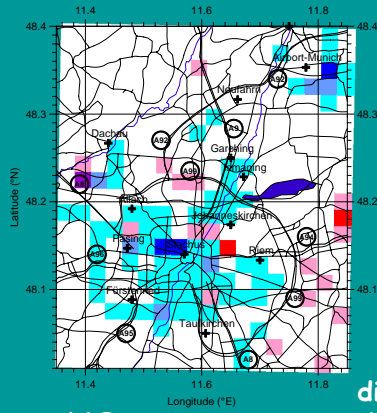
- Traffic emissions play (still) a significant role within the field of air pollution
- Even by a future emission reduction of 30 to 60 % of all emission categories, target values will be exceeded
- Recently by PM<sub>10</sub>, much more by NO<sub>2</sub> in 2010
- Introduction of technical measures e.g.
  - Multimodal traffic management
  - Innovative traffic technologies
  - New forms of mobility services
- Future activities shall also include the term of climate change

... air quality is still a challenging subject



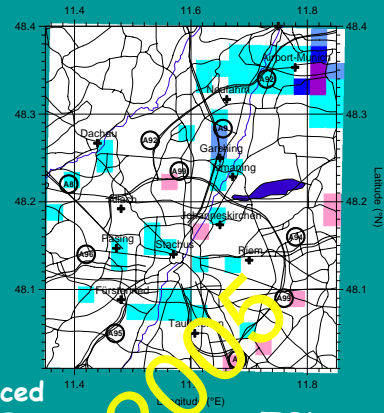
Thank you for your attention

HARMO-10 Crete 2005



NO<sub>2</sub>

Air Pollution  
difference deduced  
by the MOBINET  
measures

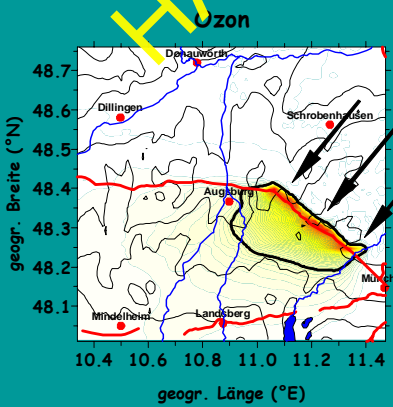


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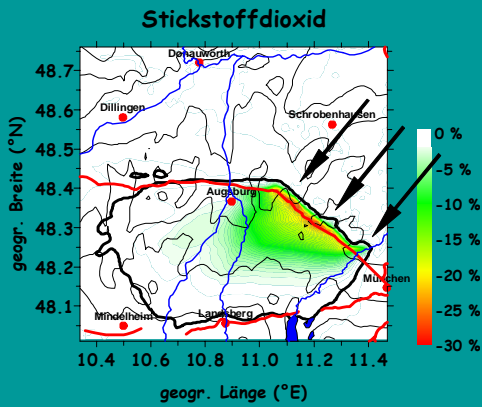


## Auswirkungen von Emissionsstrategien auf das Umfeld



geogr. Breite (°N)

geogr. Länge (°E)



geogr. Breite (°N)

geogr. Länge (°E)

