

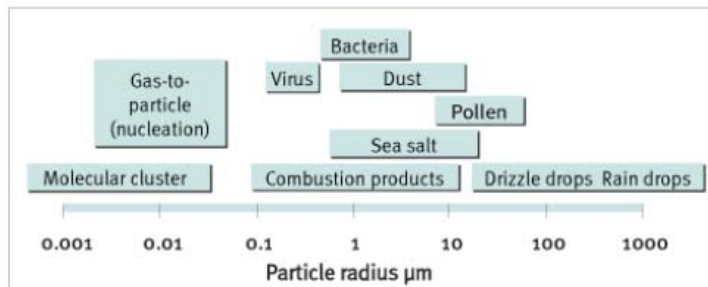
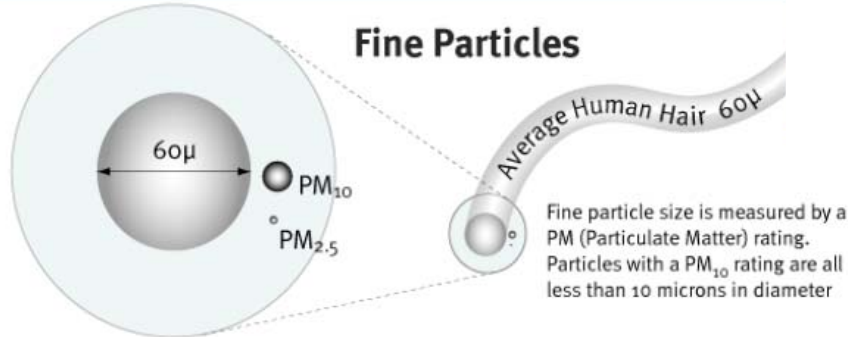


Satellite-based data on particulate matter

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German Remote Sensing Datacenter (DFD)

Motivation:

Tiny but potent



1. Health effect

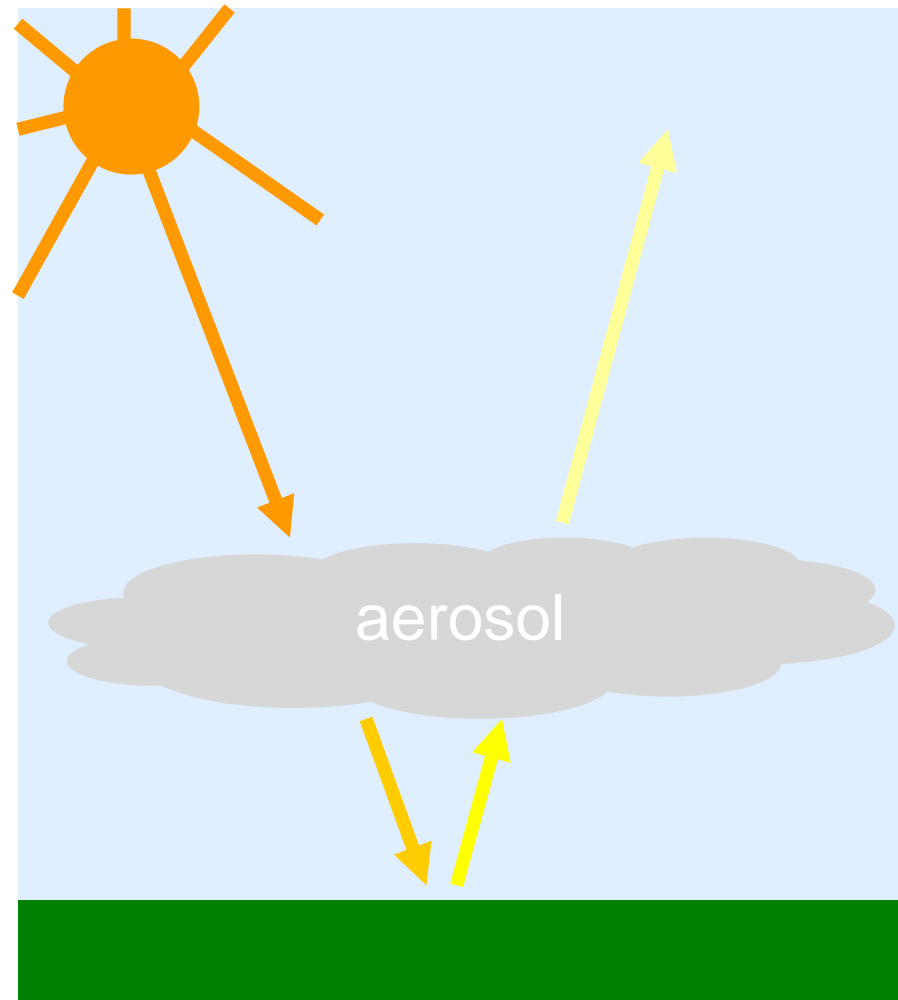
2. Visibility reduction:

- Form haze that reduces visibility
- Economical concerns (traffic)



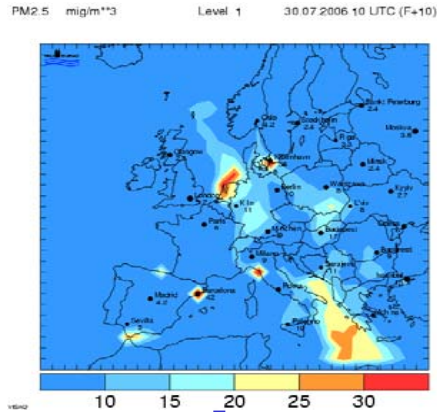
Can satellite measurements provide assessment of particulate matter?

In general: Yes, but...

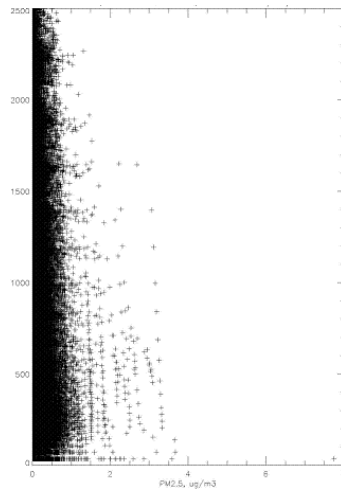


Retrieval of particulate matter (PM10, PM2.5) from satellite

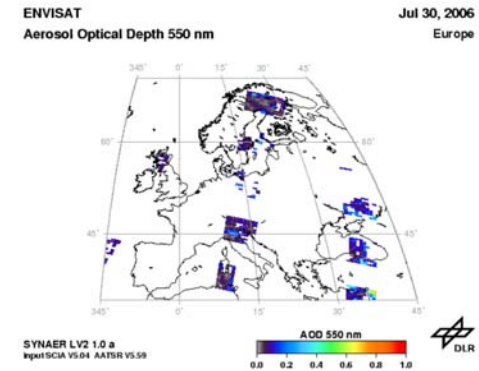
Model:



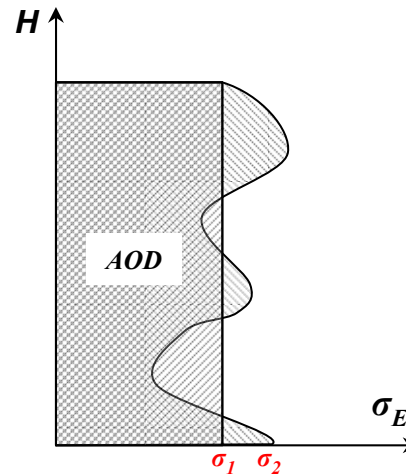
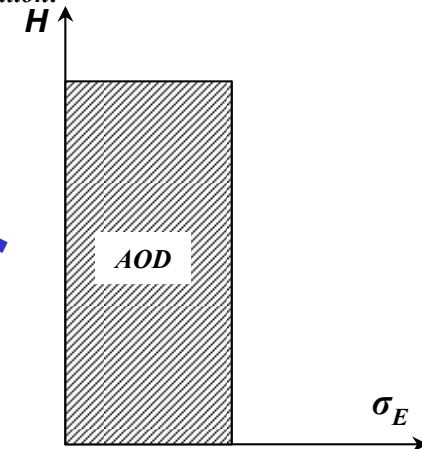
Distribution of concentrations over the height:



Satellite:



Satellite AOD-values without vertical distribution information:

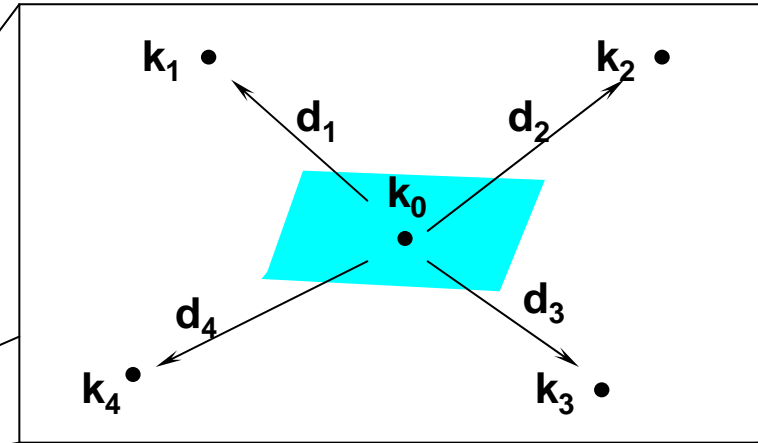
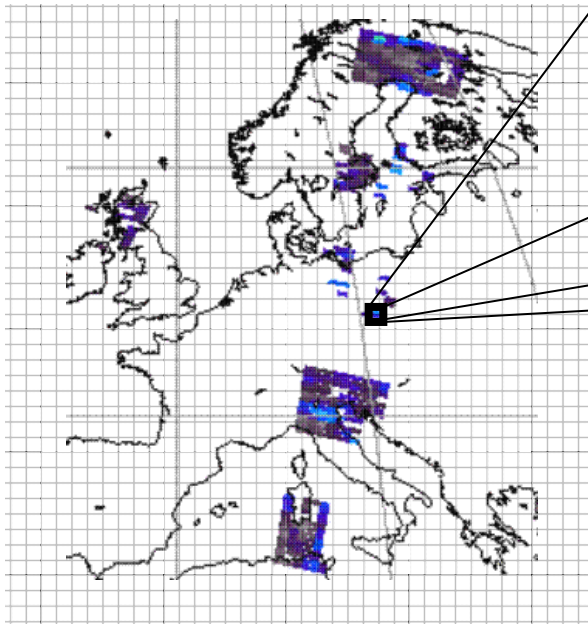


Correction coef. $k = \frac{\sigma_2}{\sigma_1}$

Retrieval of particulate matter (PM10, PM2.5) from satellite

Interpolation scheme:

Model Grid



Normalization and Inversion:

$$d_i = 1 - \frac{d_i}{\max(d_1, d_2, d_3, d_4, d_5)}, i = 1..4$$

Linear Interpolation:

$$k_0 = \frac{k_1 \cdot d_1 + k_2 \cdot d_2 + k_3 \cdot d_3 + k_4 \cdot d_4}{d_1 + d_2 + d_3 + d_4}$$

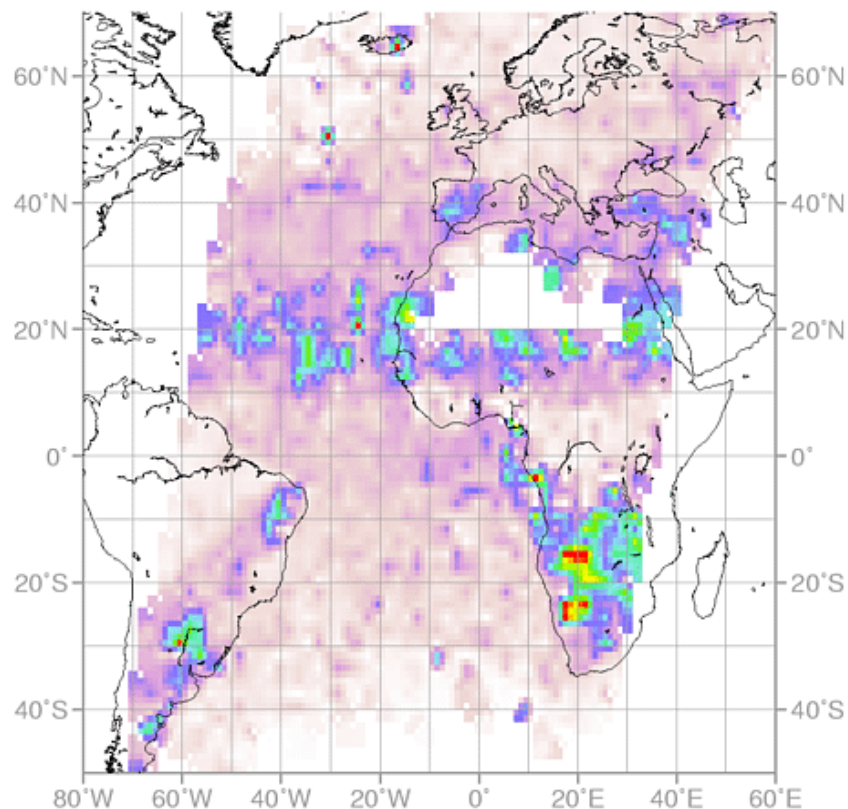


SCIAMACHY/AATSR

Jul to Oct 2003

Feinstaub (PM2.5)

Europe and Africa

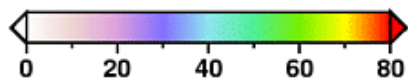


SYNAER

Feinstaub (PM2.5) [$\mu\text{g}/\text{m}^3$]

Version 1.8

<http://wdc.dlr.de>



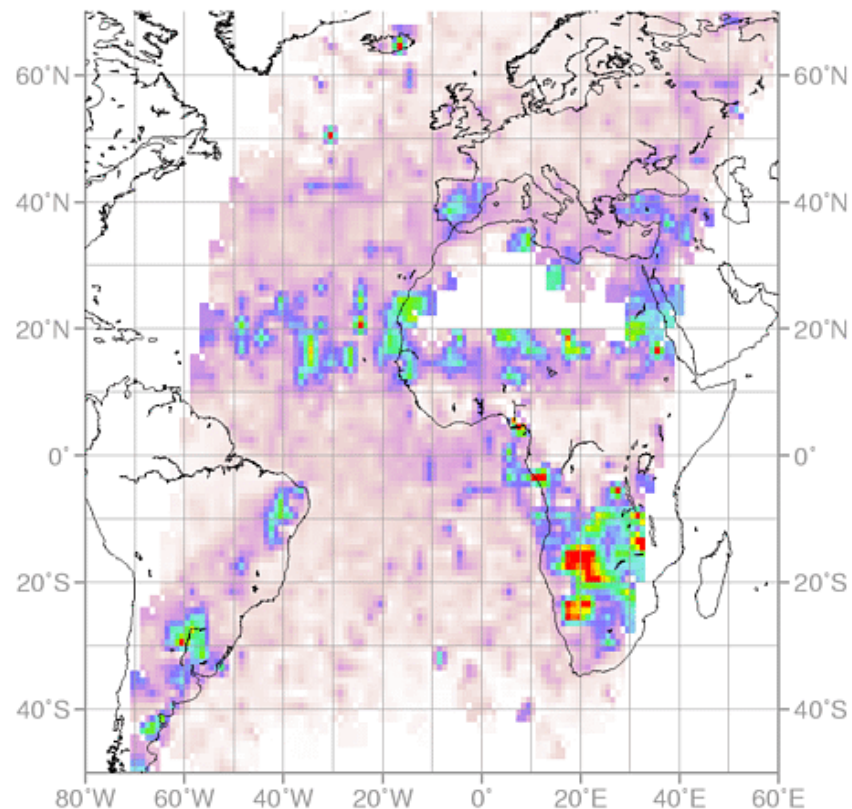
DLR

SCIAMACHY/AATSR

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Feinstaub (PM10)

Europe and Africa

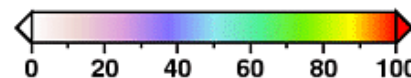


SYNAER

Feinstaub (PM10) [$\mu\text{g}/\text{m}^3$]

Version 1.8

<http://wdc.dlr.de>

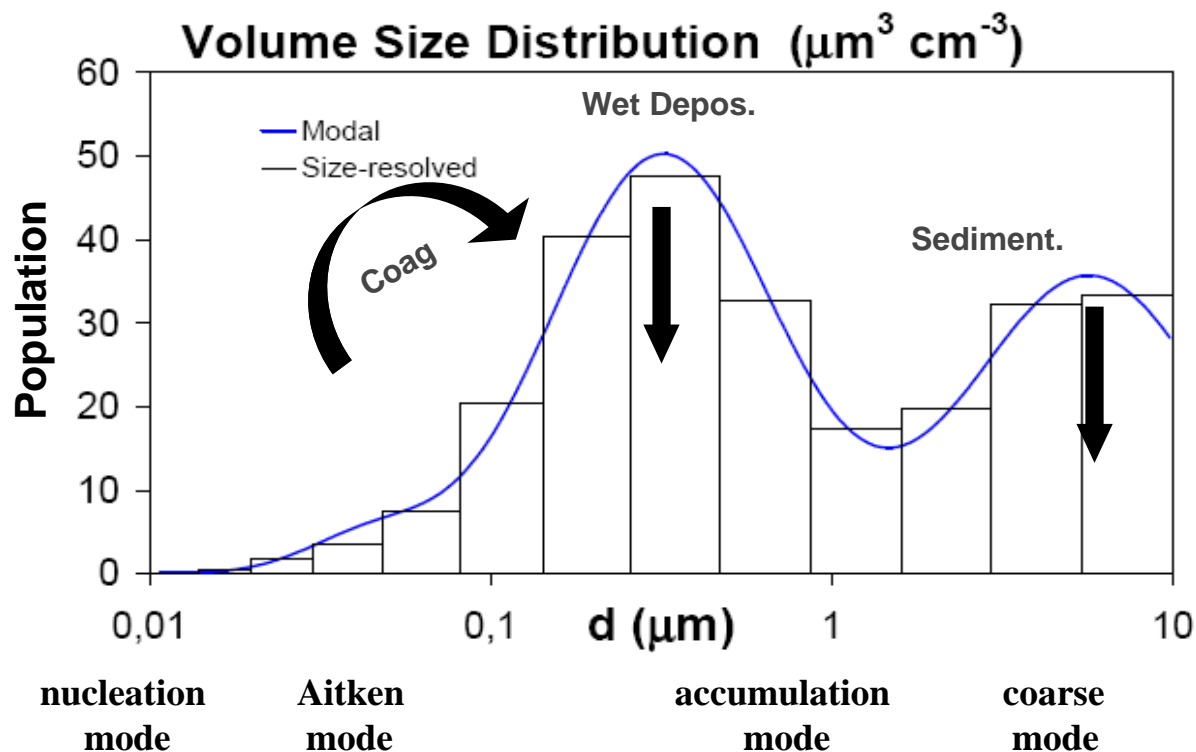


DLR

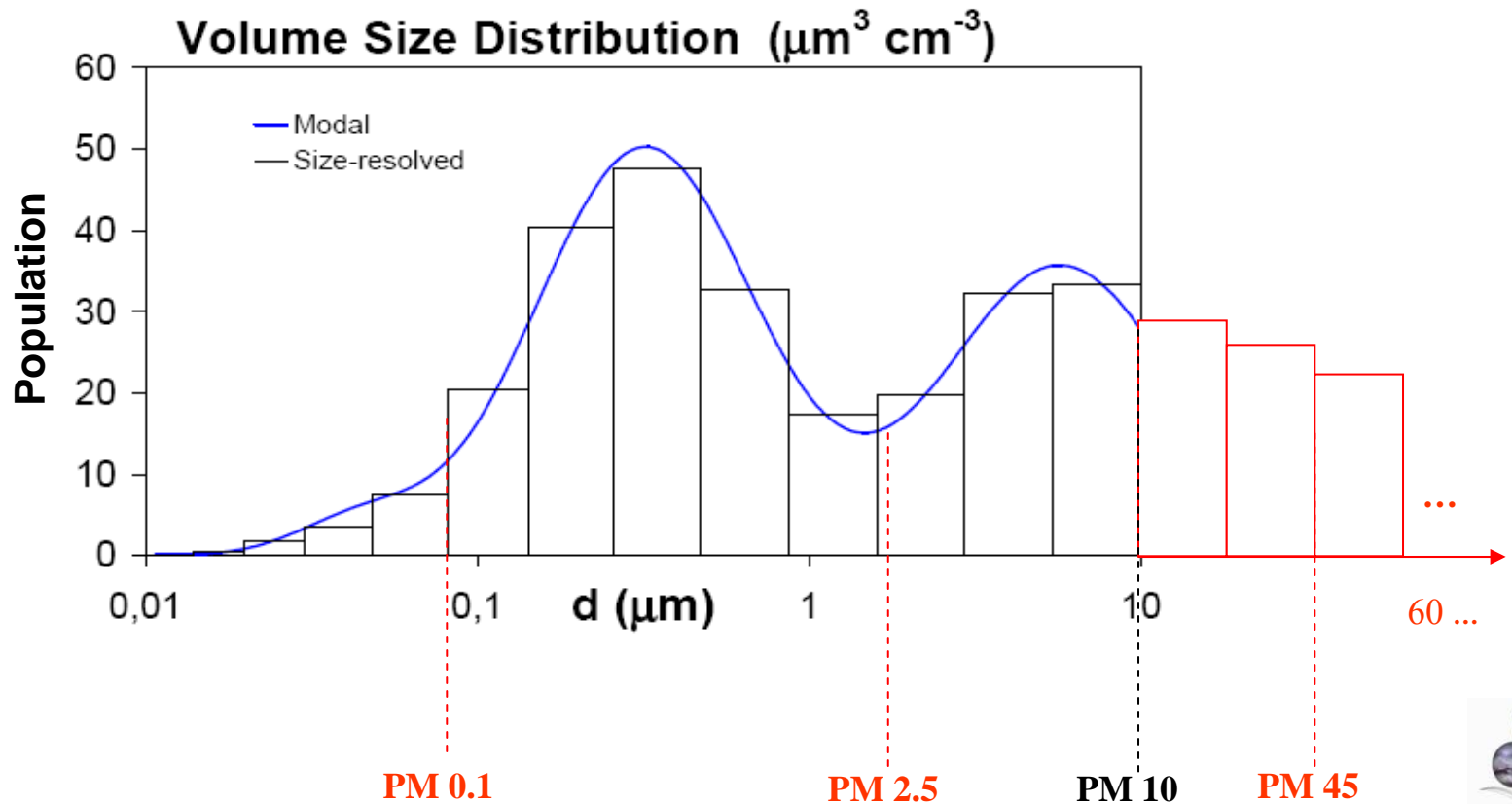


Deutsches Zentrum
DLR für Luft- und Raumfahrt e.V.

Our aerosol module: SIREAM

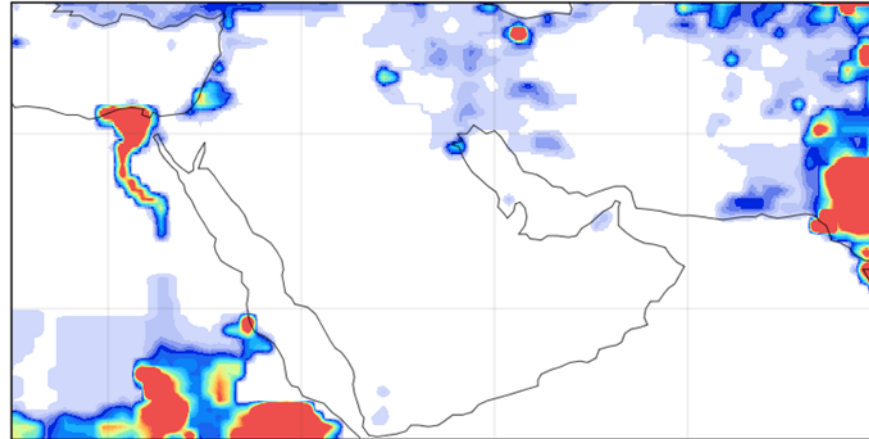


Our aerosol module: SIREAM

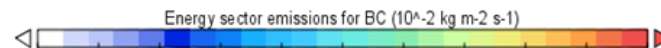
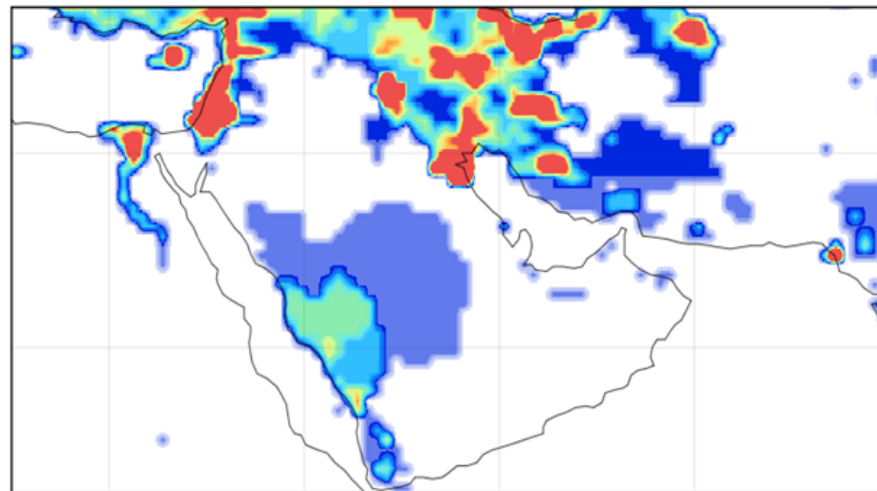


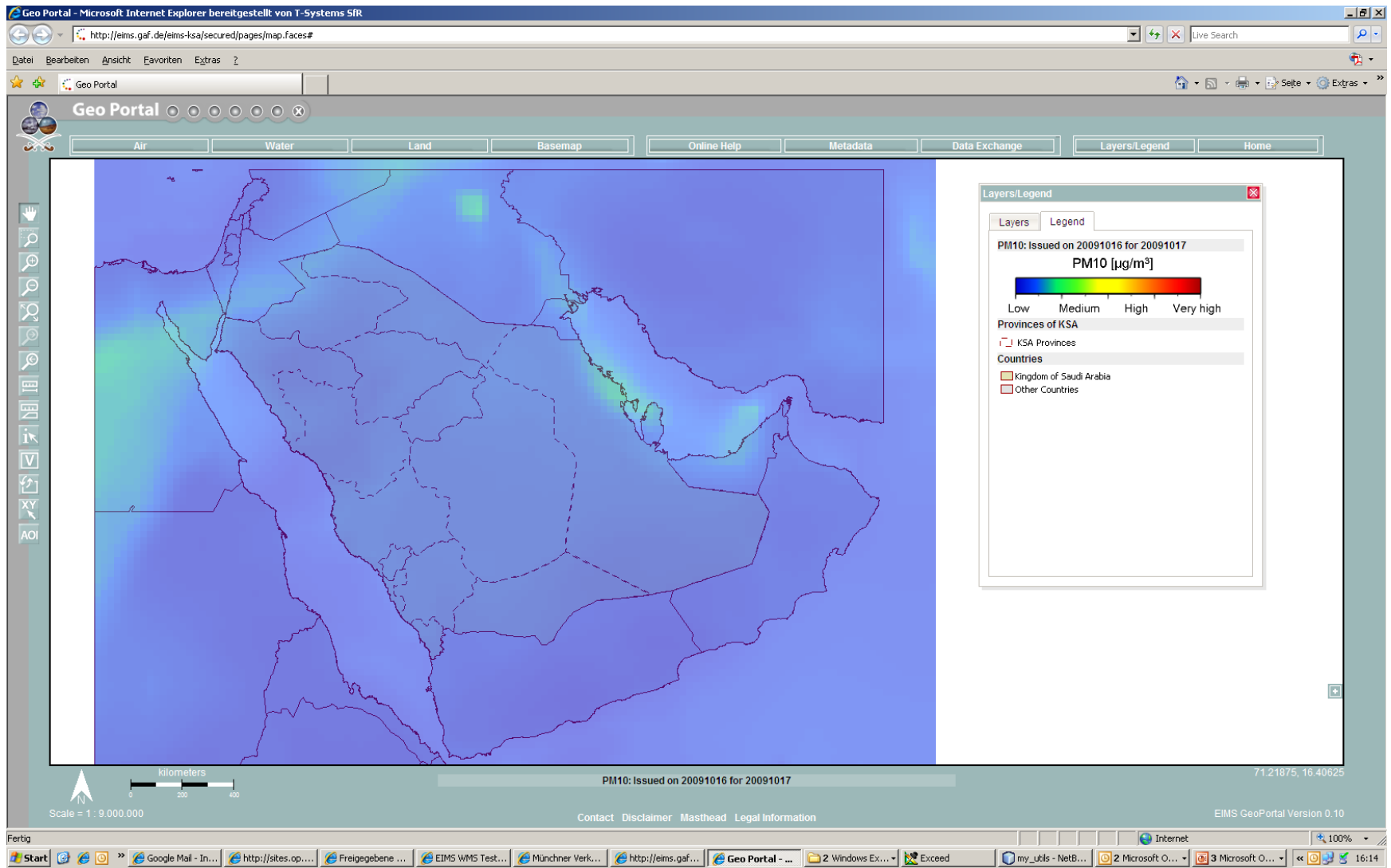
Black carbon emissions

Domestic sector emissions for BC



Energy sector emissions for BC





Summary:

- ☐ *Monitoring of ground-level particulate matter air pollution from space is an innovative, new, and promising area of research.*
- ☐ *New data on particulate matter can support environmental and other agencies in monitoring air quality.*
- ☐ *Satellite products are useful in the areas where surface observations are not available.*
- ☐ *Continued research and tool development will greatly enhance the data availability and usefulness to federal, state and local air quality agencies.*