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Overview of EMEP concentrations, deposition and other model products

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The presentation is limited to the standard model output to ascii and metcdf files

Ascii files::

modrun.pl.oxxxx files with useful (and not so useful) information as links, print out of emissions, debug printouts etc. First place to look when something goes wrong.

Base_RunLog file. Smaller file with country emissions, links to emissions etc.

Sites and sonde files. Extended output at specific locations

Netcdf files

- Hourly, daily, monthly and annual files
- Special files for nesting



Hourly, Daily, Monthly and Annual netcdf files

- Daily (files mainly used for model verification (comparison with measurements))
- Avoid 3D output from hourly and daily files!
- Try to limit the amount of output from hourly and daily files
- Monthly files (sometimes useful to aggregate to seasonal files) and annual files used for plotting.

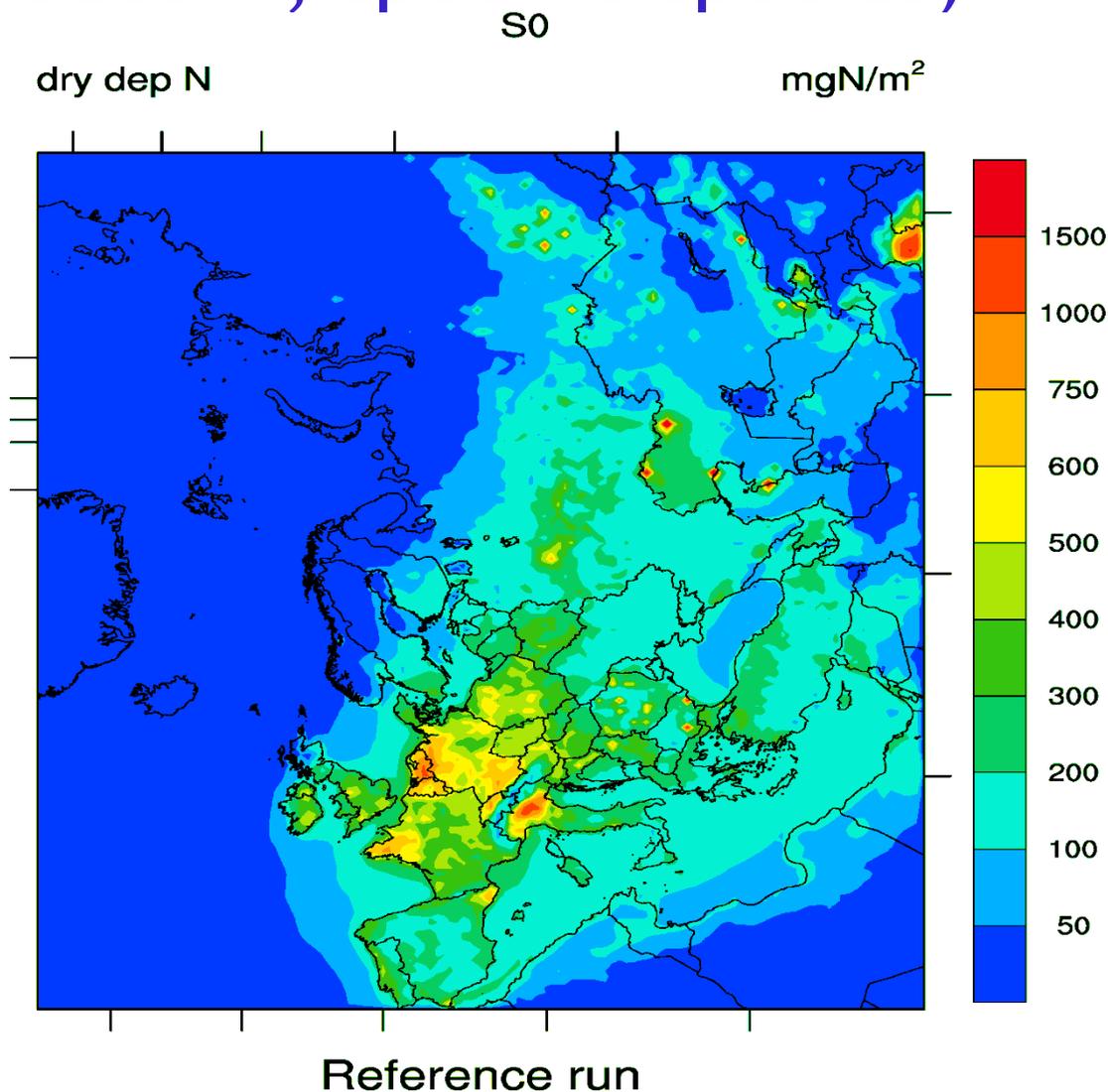


The content of the Netcdf output files can broadly be subdivided into different types of output:

- Concentration fields in either ppb_v (**SURF_ppb_xxx**) or in μgcm^{-3} (**SURF_ug_xx**)
- Emissions in mgm^{-2} . To get emissions per grid multiply by **area** (km^2)
- Dry and wet depositions **DDEP_XX** and **WDEP_xx** in mg(ATW)m^{-2} where ATW is the atomic weight (I.e ATW for N, S). Depositions to ecosystems (separate slide)
- Columns (separate slide)
- Ecosystem and health related indicators (separate slides)
- Miscellaneous output (grid info. Surface pressure etc ..)



Deposition (Sulphur, oxidized and reduced N, specific species)





Depositions to ecosystems

Coniferous/Deciduous forests, crops, seminatural vegetation ($\text{mg}(\text{xx})\text{m}^{-2}$)

Each grid will typically have a mosaic of landuse classes/ecosystems.

Note that these depositions refer to depositions in mg m^{-2} to the ecosystem in question. **You can not add up to get the total grid deposition!!**

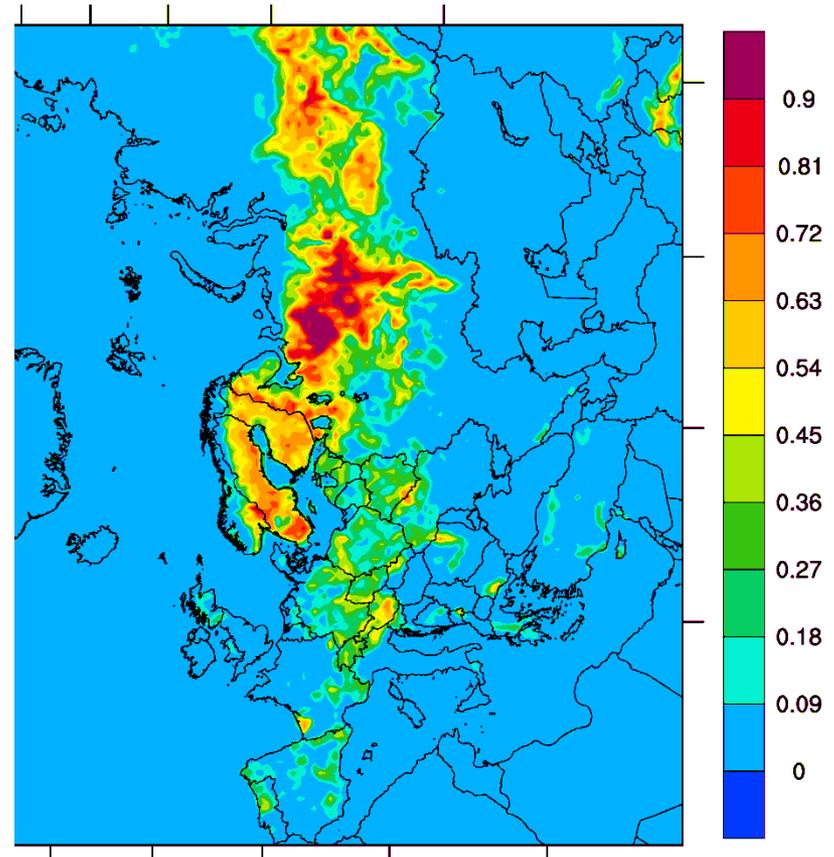
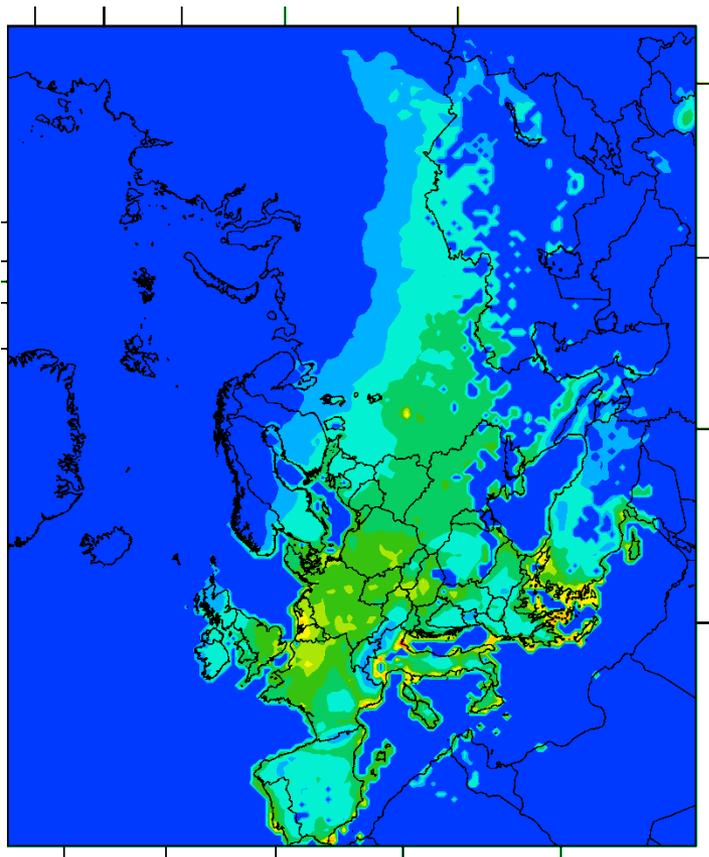
To get the deposition per grid multiply by Area_Eco_frac where Eco is the ecosystem in question

Example plots of ecosystem dep and fraction (dry dep. of ox. Nitrogen to conif. forests)



Dry dep. In mg(N) m^{-2}

Fractional area of conif. forest



These two can be multiplied to get the deposition to the grid



Ecosystem and Health related indicators: Definitions not provided here!

The indicators available on the netcdf files are all related to ozone.

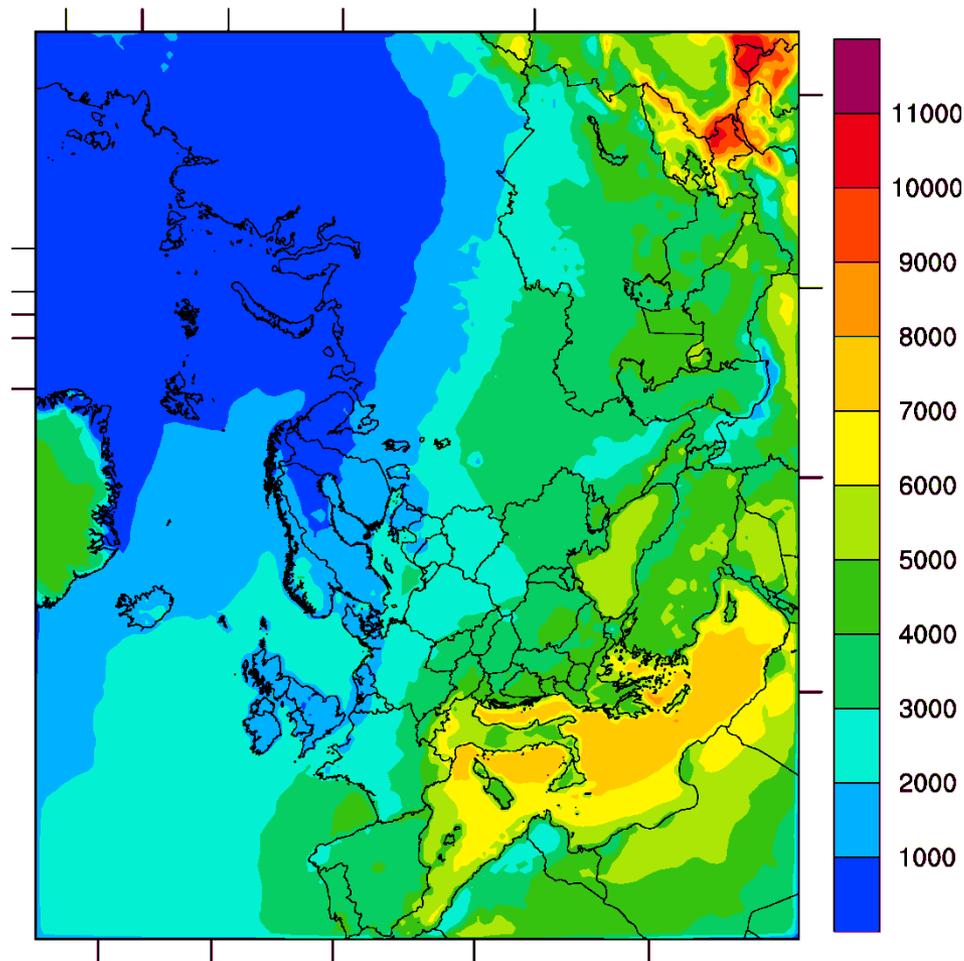
- Somo35 (health)
- AOT40 (ecosystem)
- POD (Phyto toxic Ozone Dose - Ecosystem)

Exceedances of critical loads for Sulphur and Nitrogen and health effects from PM are not direct output from the model.



Example plots of indicators:

SOMO35:
the sum of ozone
means over 35 ppb
(daily maximum
8-hour) accumulated
for one year.

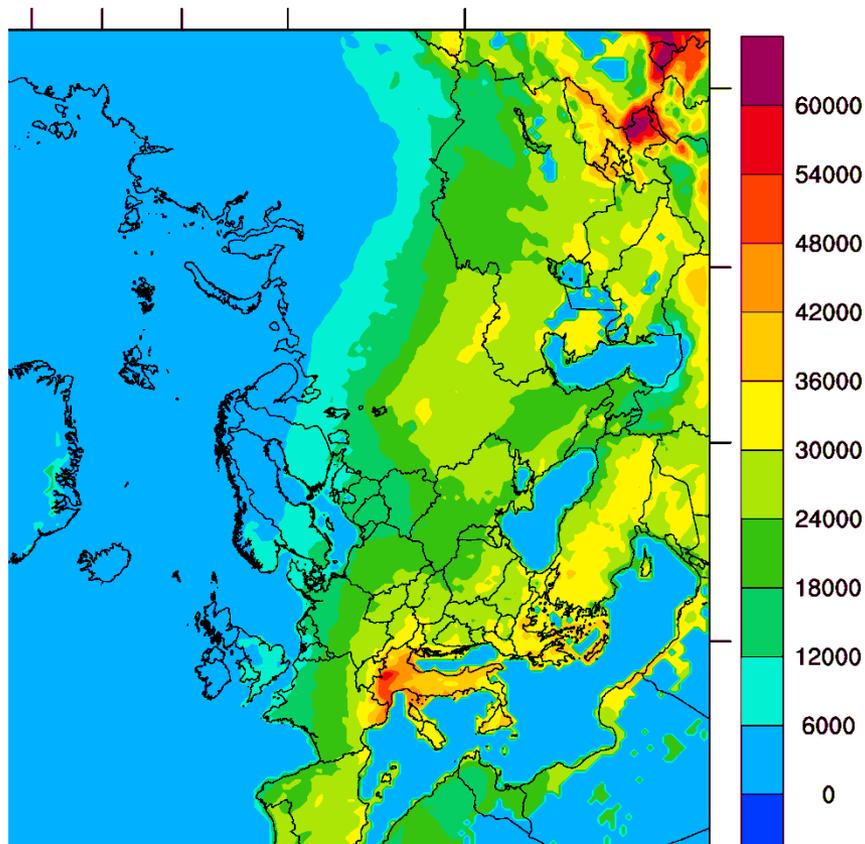


AOT vs POD (Phyto toxic Ozone Dose)



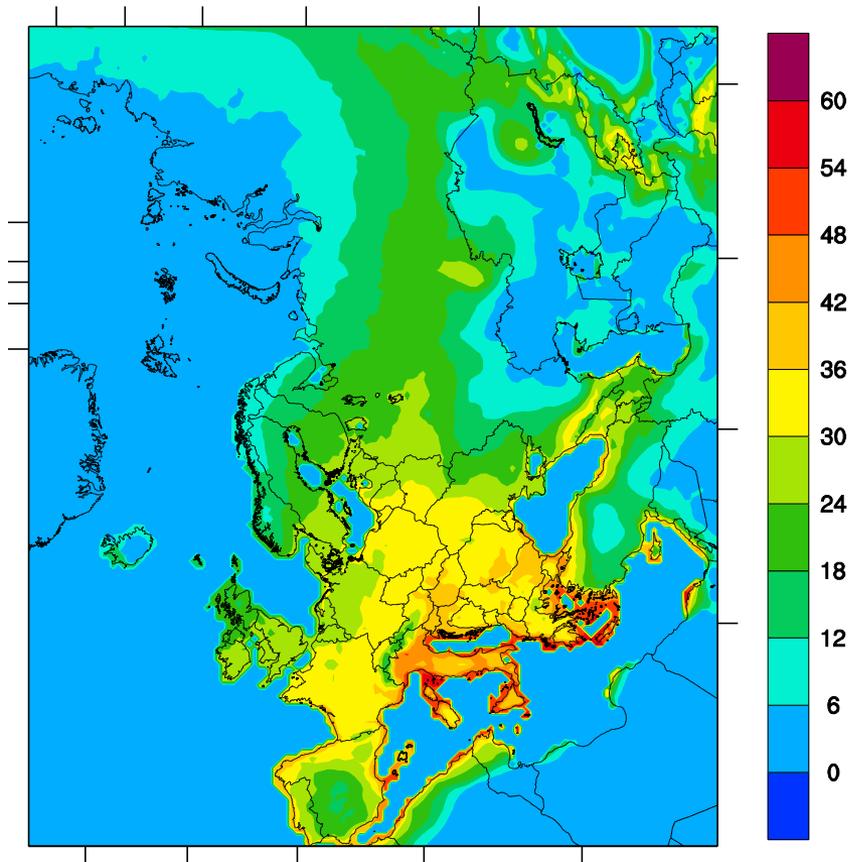
VMAOD40 IAM DF

ppb.h



POD1 IAM DF

mmole/m²



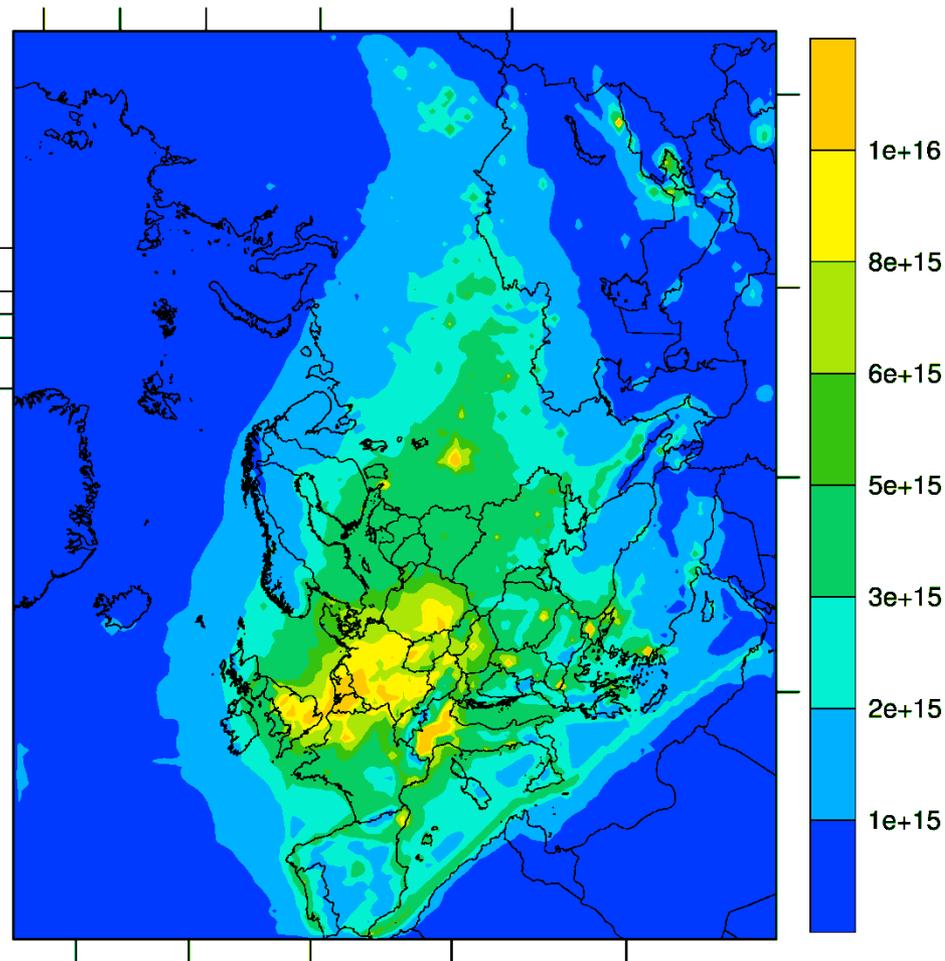
Notice the larger North South gradient in AOT compared to POD



Column NO₂

COLUMN NO₂ k20

molec/cm²



Column data summing up the the total number of molecules in the model Column. Comparable to satellite data.



Some points about AOT40 and POD

AOT depends only on ozone concentration and growing season

POD based on ozone flux affected also by soil water etc.

The IAM_DF species placed essentially everywhere that there is some vegetation, even in grids where the land-cover data-base says there is no DF.



Miscellaneous output

- Obvious output like Lat., Long., Grid area
- VG_XXX - Dry deposition velocities
- Meteorological output T2m, Psurf, Ustar
- VPD is vapour pressure deficit



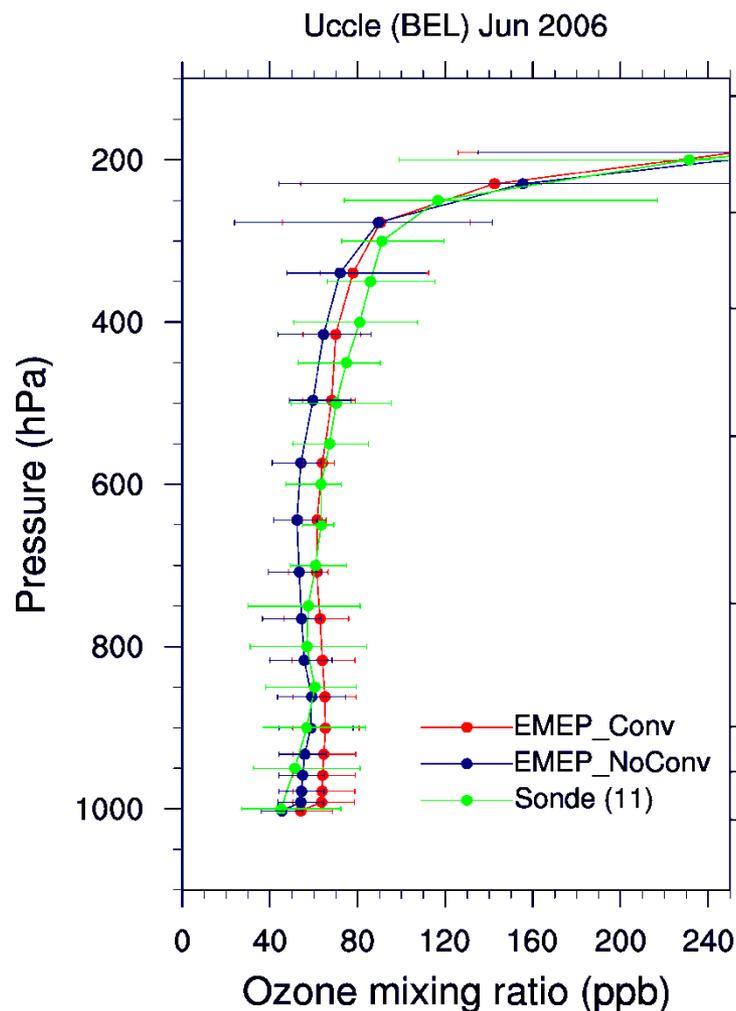
Sonde output

Sonde position set in
Input file
(Lat. Lon., site name)

Example output:

Uccle 198, 191, 191
Lerwick 176, 266, 266

16 Variables units: ppb
site,date,O3,NO2,NO,PAN ...
Uccle,01/01/2010 01:00, 3.129E+01, 3.509E+01,





Thank you for your attention!