emep

Co–operative programme for monitoring and evaluation of the long–range transmissions of air pollutants in Europe

Thematic session on the linkages between air quality and climate

Which indicators should be developed to monitor and model SLCP/air pollution impacts on climate?

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EMEP/WGE, 13-16th
September 2016, Geneva

Which indicators could be followed to monitor/model air pollution impacts on climate?

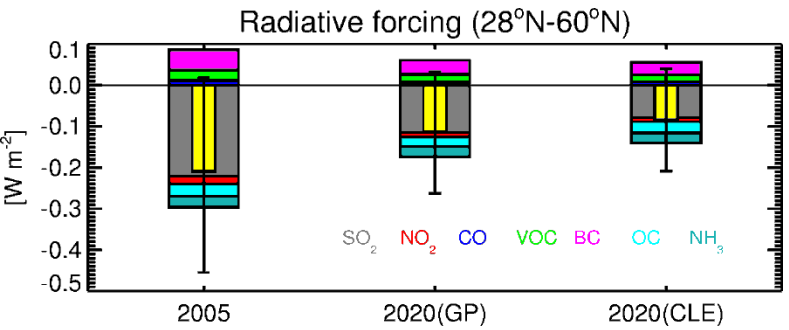
Modelling SLCP impacts on climate – alternatives:

- Earth system models
- CTM (EMEP) coupled to RF module
- Simplified climate metrics/indicators

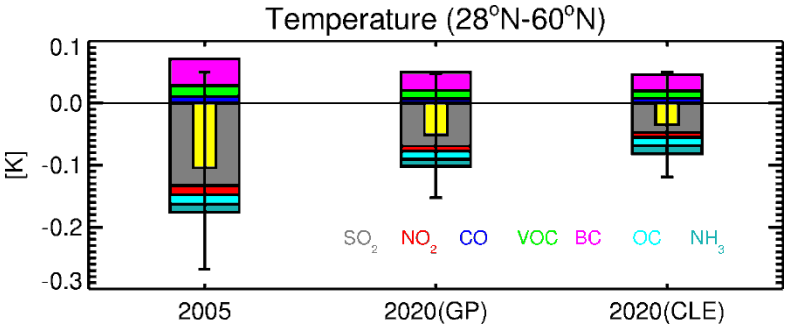
  (RFs, GWPs,GTPs…)

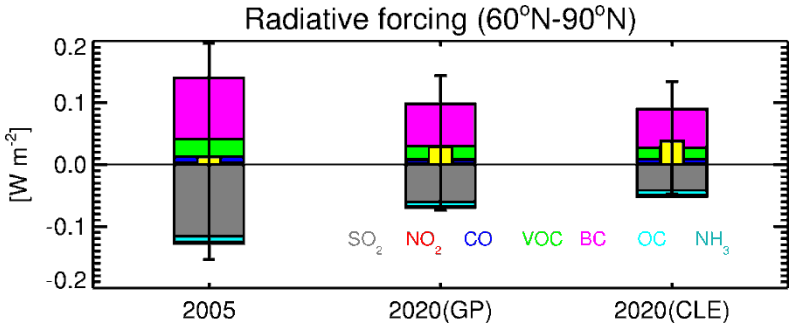
Example, regional response:
Regional impact of European emissions

Yellow =Total impact

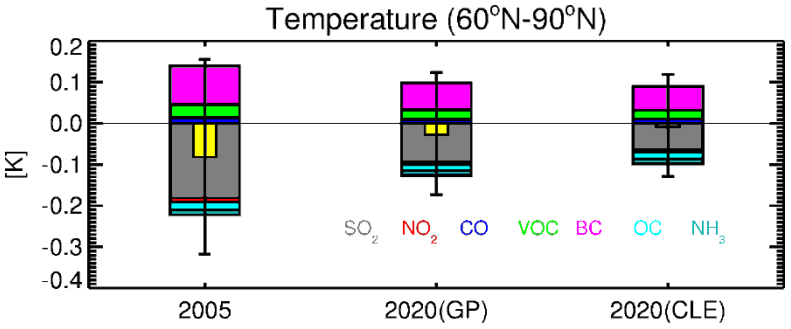


28N-60N





60N-90N



Preliminary results show a regional (European) climate impact of the GP protocol in the order of ~0.05 degree, and less than CLE (GP less ambitious than CLE), but large uncertainties

- Define one or several indicators to follow
- Make use of best scientific knowledge available as input (updates) to the climate metrics/indicators– **link to**

  AER-CHEM-MIP(CMIP), AeroCom, PDRMIP…
- Used in IAM, yearly reports, trends..?

AER-CHEM-MIP: Aerosols Chemistry Modeling Intercomparison Project (CMIP6)
AeroCom: Aerosol Comparisons between Observations and Models
PDRMIP: Precipitation Driver Response Model Intercomparison Project

Future monitoring: climate change and air pollution linkages

EMEP/CCC-Report 9/2003

EMEP Co-operative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe

The EMEP monitoring strategy 2004-2009

Background document with justification and specification of the EMEP monitoring programme 2004-2009

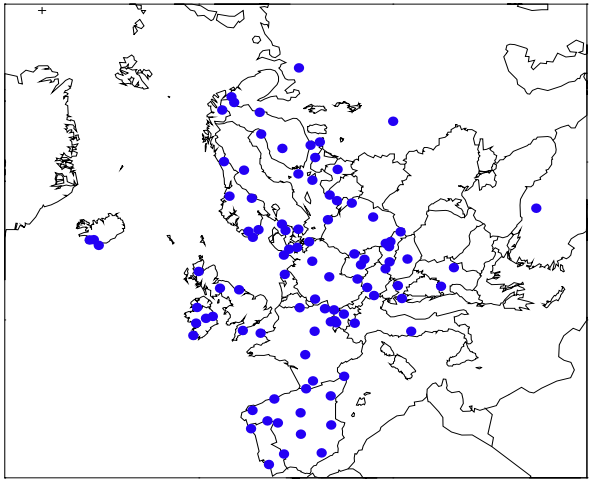
The EMEP data are also being increasingly used by new groups of scientists such as the earth observation community and the climate modelling community as there is a strong requirement for high quality observational data on atmospheric composition also in climate research, chemical weather forecasting, assessment of air quality, and terrestrial and aquatic ecosystem change. In this way, EMEP data support regulations and directives for sustainable environment in a broad sense. For instance, the effects of greenhouse gases and aerosols on climate are similar in magnitude but work in opposite directions. Also the effect of aerosols on climate has one of the largest uncertainties (IPCC). It is thus obvious that the compounds regulated by the Convention's protocols also contribute to other air pollution issues ranging from urban air quality to climate change and associated effects (biodiversity etc.). Aerosols and tropospheric ozone are good examples. The EMEP region constitutes an important part of the global atmospheric environment so EMEP has a heavy responsibility to be a driving force in global monitoring as

EMEP Monitoring programme:

Level 1

- Main ions in precipitation and in air
- heavy metals in precipitations
- ozone
- gas particle nitrogen ratios (low cost)
- PM_{10} and $PM_{2.5}$ mass
- meteorology

at ca 125 sites

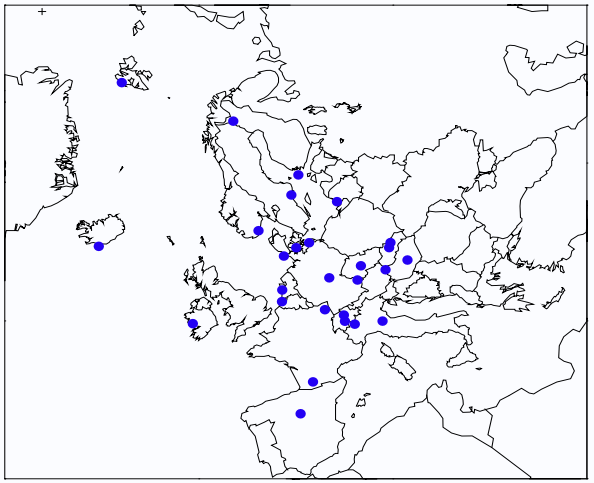


Level 2, supersites (joint EMEP/GAW)

- PM composition (EC/OC, mineral dust)
- Aerosol physical and optical properties
- CH_4
- Tracers (CO and halocarbons)
- POPs
- Heavy metals in air and aerosols
- VOC

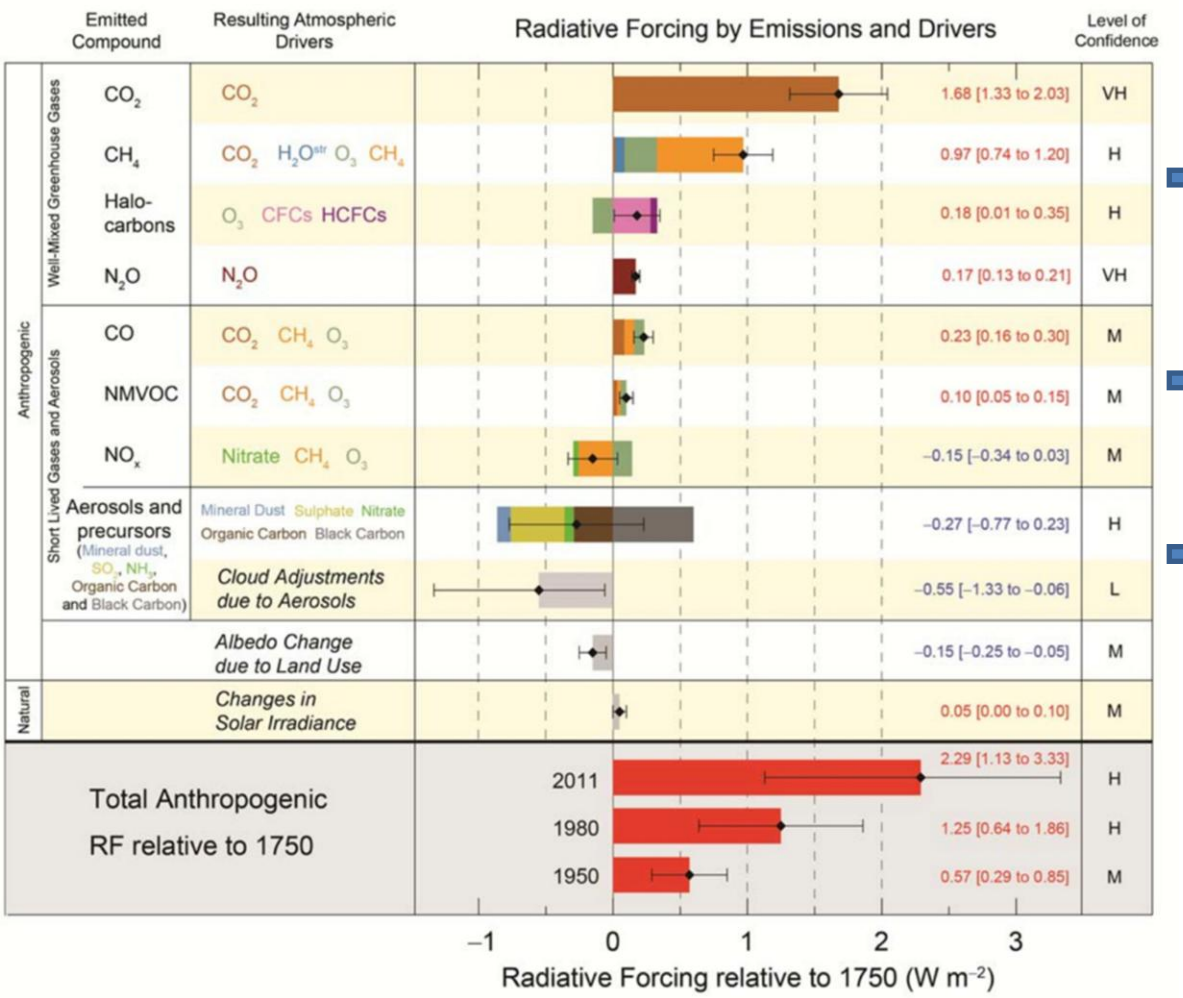
+ all level 1 activities

20-30 sites



Both levels are mandatory

The Radiative-Forcing bar chart: AR5 version



Rather low site density, exchange with oceans and terrestral spheres very important. High QA ambitions.
GAW and ICOS (many of the European sites are also EMEP sites)

Moderate site density (EMEP level 2) «a domain of EMEP (and GAW globally), ACTRIS as ESFRI intitative?

Moderate to high site density (EMEP level 1+2), EMEP (and GAW globally), ACTRIS as ESFRI intitative

Understading processes and feedbacks is essential

Assessing climate impacts sets higher requirements to data!

Final remarks - observations

- EMEP measurement stategy is adequate to support most atmospheric composition related data needs
- Complementary to the specific needs for climate and local air quality issues
- ACTRIS as a European Research Infrastructure (ESFRI)?
- Urban supersites and community based observations are new opportunities
- Data are highly used, not only in the EMEP centres work -> services!
- BUT, concerns about sustainability of observations at required quality – implementation
  - no collaborative EU projects anymore, ESFRI does not cover running costs, national agencies have limitations wrt funding

Climate Action, Environment, Resource Efficiency and Raw Materials - Work Programme 2018-2020 preparation

Article | Newsroom

How the work programme 2018-2020 for Societal Challenge 5 "Climate Action, Environment, Resource Efficiency and Raw Materials" is being shaped.

The multiannual work programme will take into account the policitical priorities of the European Union and foresight exercises.

A statement of the European atmospehric research community, june 2016:

Entering a New Era for the Quantification of Atmospheric Processes for a Sustained Environment

Key points:

- Current and future interactive development of regional air quality combined with climate mitigation and adaptation strategies require a more detailed and quantitative understanding of atmospheric processes and anthropogenic – biogenic interactions.
- A holistic approach of the current strengths in Europe: observation of the atmospheric state, process investigation (emission, chemistry and dynamics), and highly resolved (spatial and