Common Issues between Air Quality & Climate Change: Research & Policy Recommendations Report

Produced by the ACCENT Joint Research Programme on Aerosols: Air Quality & Climate

Common Issues Workshop, Dublin, 2006

Questions

- What are the Common Issues between
  - Air Quality and Climate Change with respect to atmospheric aerosol at the process level?
  - model development, application and validation?
  - measurement and monitoring strategies for Air Quality & Climate Change?
  - Air Quality & Climate Emission and Emission controls?

At the process level?

- Common essential processes are aerosol emissions, secondary aerosol formation, aerosol water uptake, interaction of aerosols with clouds, wet deposition of aerosols, nucleation and aerosol heterogeneous chemistry.

- Essential to use particle number and its size distribution

Model development, application and validation?

- Air Quality models need to be nested in Climate Change models, particularly in terms of up-scaling to capture the urban-to-regional scale aerosol transformation processes.
- Aerosol-Cloud interactions, including wet deposition require significantly better development in both model types at all scales.
- Operational Air Quality models must contain number-based schemes as well as mass-based aerosol modules.
- Number based models exert additional demands on appropriate data from observing networks for evaluation purposes.

Measurement and monitoring strategies

- Needs for a more coupled strategic development of observing networks and systems particular on the urban-to-regional scale transformation of pollutants.
- Aerosol number and related physico-chemical properties are urgent requirements on all observing systems.
- Quantification of combustion aerosols and the relative natural and anthropogenic contributions remains an important but currently lacking measurement in all networks.
- Ground-based networks can be significantly enhanced through the use of satellite observing systems.

Air Quality & Climate Emission and Emission controls?

- Integrated Assessment Modeling (IAM) is the primary tool used by policy-makers to negotiate emission reductions
- necessary to include both issues in an integrated assessment analysis to reach the most economically efficient abatement strategy
- the need for integration of climate models as well in the integrated assessment modelling activities seems quite urgent