



TRANSPORT AND TRANSFORMATION OF POLLUTANTS ACCENT - T&TP

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T&TP aims

The aim of ACCENT Transport & Transformation of Pollutants (T&TP) is to bring together the European community of researchers concerned with atmospheric chemistry, in order to pinpoint the current problems of understanding and to foster research work aimed at resolving the principal difficulties, so that the models used for analysis and forecasting on global, regional and local scales are more precise and reliable.

Four topics were chosen for T&TP at the first Barnsdale Expert Meeting in October 2004:

- Chemical Complexity;
- Long-range Transport of Air Pollutants;
- Chemical Weather; and
- Chemistry and Climate Interactions.



Summary of the recommendations of the Barnsdale Expert Meeting

Group 1: Chemical Complexity (Andreas Volz-Thomas and Jonathan Williams)

- Formation of an expert group on the nitrogen cycle.
- Preparation of a summary of the main uncertainties in the formation of SOA.
- Compilation a catalogue of campaigns (on a website) to promote interactions.
- To encourage MCM - aerosol developments.

Group 2: Long-range Transport of Pollutants (Kathy Law and Claire Reeves)

- Collect together existing data that could be used to examine LRT.
- Organise a workshop to identify measurement requirements for modelling.
- Organise a workshop to plan an Arctic experiment.
- To encourage interaction with the ACCENT Aerosols Activity.

Group 3: Chemical Weather (Øystein Hov and Mark Lawrence)

- Organise a workshop on chemical weather, choosing a subset of the issues.
- List the currently operational (and "standby") chemical weather forecast systems.
- Link, via T&TP, with the chemistry-climate group to define metrics.

Group 4: Chemistry and Climate Interactions (John Pyle and Maria Kanakidou)

- Conduct a model experiment to explore climate/chemistry/convection interactions.
- Conduct a model experiment on natural variability.
- Cooperate on emissions within the ACCENT
- Cooperate in the completion of the AEROCOM exercise in 2005.
- Explore the area of multiphase chemistry with a view to it being an ACCENT topic.

The full report is published as ACCENT report 1/2005

Free radicals in the Atmosphere

Dwayne Heard
Hosted by T&TP

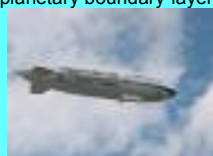
Some conclusions from the Leeds workshop, April 2005

- Models and measurements disagree for HO_x at high NO levels (models under-predict HO_x) – why? This is most important where O₃ levels are highest and have the biggest impact. Need better measurements of precursor species.
- Measurements of OH loss rates (lifetimes) are proving an invaluable tool for the interpretation of the budget of OH under polluted conditions. Lifetime measurements of OH are proving very useful, and should be encouraged where possible.
- Field campaigns are needed under conditions not previously studied, e.g. in the tropics, in cities and in city plumes.
- There is a need to measure speciated peroxy radicals, rather than just their sum. This is perhaps the single most important gap in the arsenal of instruments.
- HCHO, HONO and peroxides need to be measured better. HCHO provides a significant source of HO_x, and is an "integrator" of free-radical oxidation of VOCs. There are significant discrepancies with model predictions for these species. NO and NO₂ need to be measured better at very low concentrations.
- Portable instrument for OH highly desirable – a new technique is needed.

Zeppelin Workshop

Andreas Hofzumannhaus
Hosted by T&TP

The aim of the workshop, held in Juelich in 2004, was to bring together European researchers from different fields of atmospheric chemistry and physics, to initiate the employment of a Zeppelin-NT (New Technology) aircraft as a novel platform for atmospheric measurements in the planetary boundary-layer.



The unique properties of the airship would allow challenging new experiments, such as regional pseudo-Lagrangian experiments over densely populated areas and ecosystems. The goal of the workshop was to discuss the scientific, logistical and financial requirements to investigate aerosol formation and transformation processes coupled to photochemical oxidant formation by means of a Zeppelin based experiment.

Databases for Aircraft Data

Stuart Penkett
Hosted by T&TP

Long-term systematic databases exist for ground-based data and, increasingly, for satellite data. Both are available as web-based products. This is not the case for aircraft data even though it is much the most useful and diverse source of vertical profiles of many molecules in the troposphere.



The most important conclusions were the agreement by the creators of the two major sets of aircraft data (Louisa Emmons, NCAR and Dominik Brunner, ETH Zurich) that their data could be assembled into a common database which would form the nucleus of an ACCENT database on LRT.

Interest has been expressed in holding the ACCENT LRT database both by NILU and by BADC. The possibilities are now being pursued.



T&TP Workshops and Meetings

June 2004	Zeppelin Workshop
October 2004	Barnsdale Expert Workshop
February 2005	Data Bases for Aircraft Campaign Data
April 2005	T&TP in Urban Air Quality
April 2005	Free-radicals in the troposphere: Their measurement, interpretation of field-data, and future directions
May 2005	T&TP International Polar Year ICTCT-Arctic Planning Meeting
Forthcoming T&TP workshops	
October 2005	Understanding and quantifying the atmospheric nitrogen cycle
April 2006	Chemical Data Assimilation in Atmospheric Forecast and Re-analysis Models; an ACCENT/WMO Expert Workshop in support of IGACO
May 2006	Air Pollution Issues in Eastern Europe
July 2006	Integrated ocean-atmosphere measurements in the tropical Atlantic

