http://www.pa.op.dlr.de/tac/proceedings.html

Edited by

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Foreword

The "International Conference on Transport, Atmosphere and Climate (TAC)" held in Oxford (United Kingdom), 2006, was organised with the objective of updating our knowledge on the atmospheric impacts of transport, three years after the "European Conference on Aviation, Atmosphere and Climate (AAC)" in Friedrichshafen (Lake Constance, Germany).

While the AAC conference concentrated on aviation, the scope was widened to include all modes of transport in order to allow a equitable comparison of the impacts on the atmospheric composition and on climate. In particular, the conference covered the following topics:

- engine emissions (gaseous and particulate),
- emission scenarios and emission data bases,
- near field and plume processes, effective emissions,
- impact on the chemical composition of the atmosphere,
- impact on aerosols,
- contrails, contrail cirrus, ship tracks,
- indirect cloud effects (e.g., aerosol-cloud interaction),
- radiative forcing,
- impact on climate,
- metrics for measuring climate change and damage,
- mitigation of transport impacts by technological means, i.e., environmental impacts of modifications to vehicles and engines (e.g., low NOx engines, alternative fuels),
- mitigation of impacts by operational means (e.g., air traffic management, environmentally friendly flight and ship routing).

The conference was also a forum for dialogue of the QUANTIFY\(^1\) project participants with the wider scientific community. At the same time, the conference marked the start of the EC funded project ATTICA\(^2\), which has the objective of providing a "European Assessment of Transport Impacts on Climate Change and Ozone Depletion".

The conference benefited from substantial financial support from the United Kingdom Department for Transport and the European Commission's DG Research, to whom the organizers are extremely grateful.

139 participants attended the TAC conference and there were 60 oral and 33 poster presentations. Extended abstracts of most of the presentations are included in this book of proceedings. After peer review, a subset of the papers will be published in a special issue of the journal *Meteorologische Zeitschrift*.

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\(^1\) QUANTIFY is an EC funded Integrated Project entitled "Quantifying the Climate Impact of Global and European Transport Systems", see also http://ip.quantify.eu.

\(^2\) http://ssa-attica.eu/
Program Committee

Prof. Robert Sausen, DLR, Germany (chair)
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Dr. Claus Brüning, EC
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Dr. Claudia Stubenrauch, LMD, France
Tim Wallington, Ford, USA
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Novel engine concept to suppress contrail and cirrus cloud formation

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Operational impacts of trajectory adjustments to avoid ice supersaturated regions

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Engine emissions, emission inventories and scenarios

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Homogeneous freezing of ice particles, including effects of aerosol size distribution in the University of L’Aquila CCM

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Radiative forcing and impact on climate

Calculating contrail radiative forcing with the Edwards-Slingo radiative transfer code

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Mitigation by technical and operational means

Pedestrian exposure to vehicle emissions: the role of traffic signal timings

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Potential methods to include the full climate impact of aviation emissions into the European Emissions Trading Scheme and their scientific integrity

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18:00 Registration
20:00 End of Sunday registration time

Monday, 26 June 2006
08:30 Registration

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10:05 Pierre Valette, Acting Director, European Commission, DG RTD I. Environment:
European Climate Research and Policy – the Role of Transport
10:20 Prof Frank Kelly, Chief Scientist DfT, UK:
Transport and Climate – the UK Perspective
10:35 Prof John Brooks, Vice Chancellor of Manchester Metropolitan University, UK:
Welcome Address
10:40 Prof Ulrich Schumann, Deutsches Zentrum für Luft- und Raumfahrt e.V., Germany:
Welcome Address on Behalf of the Board of DLR
10:45 Lee,
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Opening ceremony

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10:50 Coffee
11:20 Sausen, An introduction to QUANTIFY

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12:00 Wallington, Light Duty Vehicle Emissions
12:20 Delhaye, Ferry, Demirdjian, Ruiz, Penanhoat, Gouge, Suzanne, Physico-chemical characterization of soot emitted by a commercial aircraft engine: morphology, size, structure, and elemental composition
12:40 Yelvington, Herndon, Wood, Onasch, Miake-Lye, Development of an emissions database to inform comparisons of various transportation modes
13:00 Lunch

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14:00 North, Noland, Ochieng, Polak, Modelling of particulate matter mass emissions from a light-duty diesel vehicle
14:50 Baumgardner, Kok, Avallone, Kalnajs, Herman, Ross, Thompson, Toohey, In-Situ Micro-physical Measurements In Rocket Plumes With The Cloud And Aerosol Spectrometer (CAS)
15:10 Peeters, Middel, Historical and future development of air transport fuel efficiency
15:30 Bows, Anderson, Contracting UK carbon emissions: implications for UK aviation
Engine emissions, emission inventories and scenarios

15:50 Tea
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16:10 Pejovic, Noland, Williams, Toumi, Calculating UK CO₂ emissions using real air traffic data

16:30 Steller, Borken, First validation of a global road transport emission inventory for the year 2000

16:50 Schrooten, De Vlieger, Int Panis, Torfs, Forecasted maritime shipping emissions for Belgium with an activity based emission model.

Near field and plume processes, effective emissions

17:10 Kraai, Hensen, Duyzer, Hollander, Measurement method for emissions from inland navigation


17:50 Schlager, Arnold, Petzold, Rappenglueck, Gurk, Aircraft measurements in primary European ship corridors

18:10 End of presentations

18:20 Ice breaker

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09:10 Miake-Lye, Herndon, Knighton, Onasch, Jayne, Northway, Wood, Airport Emission Studies of Gaseous and Particulate Emissions

09:30 Whitefield, Lobo, Hagen, PM emissions from advected aircraft plumes at the Oakland International Airport

09:50 Popovicheva, Starik, Persiantseva, Shonija, Water-H₂SO₄-soot interaction in aircraft plume

10:10 Paugam, Cariolle, Paoli, Cuenot, Numerical Simulations of aircraft plumes using a meso scale code

10:30 Coffee Chair: Waitz

11:00 Bauer, Emissions of Gas Turbines and IC Engines

11:40 Davison, Boardman, Whyatt, Aerosol Evolution from a busy Road in North-West England

12:00 Weimer, Mohr, Prévôt, Bach, Baltensperger, Lohmann, Investigations of road traffic emissions in Switzerland using a mobile laboratory

Impact on atmospheric composition

12:20 Dessens, Marizy, Simon, Grewe, Ramaroson, Pitari, Rogers, Pyle, Results of the SCENIC project: impacts of supersonic aircraft emissions upon the atmosphere.

12:40 Köhler, Dessens, Wild, Rogers, Pyle, Changes in Ozone and Methane due to Aircraft NOx: Sensitivity to Cruise Altitude
Impact on atmospheric composition

13:00 Lunch Chair: Penner
14:00 Halenka, Huszar, Moldanova, Ship emissions impact on atmospheric composition - case study
14:20 Eyring, Stevenson, Lauer, Dentener, Butler, Collins, Ellingsen, Gauss, Hauglustaine, Lawrence, Rodriguez, Sanderson, Strahan, Sudo, van Noije, Wild, Multi-model simulations of the impact of international shipping on atmospheric chemistry and climate in 2030
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15:00 Introduction to posters I
15:30 tea Chair: Grainger
16:00 Poster Session I
17:00 Niemeier, Granier, Simulation of future road and ship traffic impact on air pollution

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17:20 Minnis, Duda, Nguyen, Palikonda, Sun-Mack, Analysis of missing contrail effects during USA air traffic shutdown
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09:30 Huebsch, Lewellen, Sensitivity Study on Contrail Evolution
09:50 Dedesh, Grigoryev, Development of methods to research atmosphere contaminations, conditions of formation and composition of airplanes' condensation trails
10:10 Fichter, How to prepare your proceedings contribution
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11:00 Shine, Metrics
11:40 Penner, Chen, Effects of soot aerosols from aircraft on cirrus clouds
12:00 Devasthale, Grassl, Detection and quantification of impact of traffic emissions on clouds
12:20 Schreier, Mannstein, Eyring, Bovensmann, Global Distribution of ship tracks from one year of AATSR data
12:40 Klima, Waitz, Baughcum, Assessment of a Global Contrail Modeling Method
13:00 Lunch Chair: Fuglestvedt
14:00 Duda, Palikonda, Minnis, Probabilistic Forecast of Contrails within Cirrus Coverage
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14:20  **Stuber**, Forster, Rädel, Shine, *The importance of the diurnal and annual cycle of air traffic for contrail radiative forcing*

14:40  **Grewe**, Stenke, Ponater, Sausen, Pitari, Iachetti, Rogers, Dessens, Pyle, Isaksen, Gulstad, Marizy, Pascuillo, *Climate impact of supersonic air traffic: An approach to optimize a potential future supersonic fleet – Results from the SCENIC EU-project*

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15:30  **Chair: Moldanová**

16:00  Poster Session II

17:00  **Fuglestvedt**, Berntsen, Myhre, Rypdal, Bieltvedt Skeie, *Climate Impacts of Transport Systems: Chemical responses and radiative forcing*

17:20  **Rädel**, Shine, *Sensitivity of radiative forcing due to aircraft altitude*

17:40  **Ponater**, Pechtl, Grewe, Matthes, Sausen, Schumann, *Climate Sensitivity of Radiative Impacts from Transport Systems*

18:00  End of presentations

19:30  Banquet

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09:10  **Olivié**, Teyssèdre, Salas-Méria, Cariolle, Royer, Karcher, *Results from pulse scenario experiments with the CNRM-CM3 global coupled model*

09:30  **Lim**, Lee, Sausen, *A climate response model for calculating aviation effects*

09:50  **Lukachko**, Waitz, Marais, *Valuing the Impact of Aviation on Climate*

10:10  **Lee**, Eyring, Lim, Sausen, *Radiative forcing and temperature response from global shipping emissions*

10:30  **Chair: Minnis**

11:00  **Gierens**, Contrails, contrail cirrus and ship tracks

Mitigation by technical and operational means

12:00  **Noppel**, Singh, Taylor, *Clean Exhaust Engine Concept*

12:20  **Egelhofer**, Marizy, Bickerstaff, *On how to consider the Earth’s atmosphere in aircraft design*

12:40  **Edwards**, *The reduction of transport emissions in Jamaica through the manipulation of road network condition*

13:00  **Lunch**  
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14:00  **Williams**, Noland, Toumi, *Operational impacts of trajectory adjustments to avoid ice-supersaturated regions*

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14:20  **Summary, conclusions, awards, ...**

15:30  **tea**
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Guldberg: *Contrails in a global climate model – effect of reducing systematic errors*
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Impact on atmospheric composition

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