



In-service Aircraft for a Global Observing System

IAGOS

MOZAIC-IAGOS Scientific symposium on atmospheric composition observation by commercial aircraft

Toulouse France 12-15 May 2014

Programme

Tuesday, 13 May 2014

08:00 **Bus transfer to Météo-France**

Session 1 Evaluation/validation of satellites and surface remote sensing

- 09:00 **keynote Use of IAGOS data for verifying remote sensing observations and evaluating atmospheric chemistry model results**
Peter Van Velthoven, KNMI, Netherlands
- 09:30 1.1 Validation of Aura MLS stratospheric water vapor measurements by the NOAA frost point hygrometer
Dale Hurst, NOAA Earth System Research Laboratory, USA, A. Lambert, W.G. Read, S.M. Davis, K.H. Rosenlof, E.G. Hall, A.F. Jordan and S.J. Oltmans
- 09:45 1.2 Summertime tropospheric ozone assessment over the Mediterranean region using the thermal infrared IASI/MetOp sounder and the WRF-Chem model
Sarah Safieddine, UPMC Univ. Paris 06; Université Versailles St-Quentin; CNRS/INSU, LATMOS-IPSL, Paris, France, A. Boynard, P.-F. Coheur, D. Hurtmans, G. Pfister, B. Quennehen, J. Thomas, J.-C. Raut, K. S. Law, Z. Klimont, J. Hadji-Lazaro, M. George1 and C. Clerbaux
- 10:00 1.3 Consistency of measurement of tropospheric ozone by different platforms and techniques in the global databases
Hiroshi Tanimoto, National Institute for Environmental Studies, Japan, Regina Zbinden (Météo-France)
- 10:15 1.4 Role of dynamics and biomass burning on CO and O3 over Asia: MOZAIC vs. Models
Sheel Varun, Physical Research Laboratory, India, Lokesh Sahu, Physical Research Laboratory, India, M. Kajino, Meteorological Research Institute, Tsukuba, Japan, Valérie Thouret, Laboratoire d'Aérodynamique, CNRS, Toulouse, France
- 10:30 1.5 Analysis of tropospheric ozone and carbon monoxide profiles over South America based on MOZAIC/IAGOS database and model simulations
Marcia Yamasoe, University of Sao Paulo/ University of Toulouse, Brazil, Bastien Sauvage, Valerie Thouret, Philippe Nedelec
- 10:45 1.6 Monitoring and Estimating of NOx emission from space using WRF_Chem Model for Air quality study over south Asia
Chinmay Kumar Jena, Indian Institute of Tropical Meteorology, Pune, India, Sachin D. Ghude, G.G. Pfister

11:00 - 11:30 **Coffee break**

Session 2 Long-range transport of air pollutants

- 11:30 **keynote Hemispheric Ozone: Current understanding and future directions**
Kathy Law, LATMOS-IPSL, France
- 12:00 2.1 Source regions of elevated carbon monoxide in the northwestern Pacific upper troposphere
Kuo-Ying Wang, Department of Atmospheric Sciences, National Central University, Taiwan, Philippe Nedelec, Jean-Pierre Cammas, Valerie Thouret, Andreas Volz-Thomas, Andreas Wahner, Andreas Petzold

- 12:15 2.2 Impact of Eurasian biomass burning emissions on the springtime lower-tropospheric ozone in North China and the rest of Northeast Asia
Hongyu Liu, National Institute of Aerospace (NIA) / NASA Langley, USA, Jiayue Huang, James Crawford, Valerie Thouret, Jose Rodriguez, Susan Strahan, Megan Damon, Stephen Steenrod, and Sarah Strode
- 12:30 2.3 YAK-AEROSIB: continental scale aircraft measurements of trace gases above Siberia
Jean-Daniel Paris, Laboratoire des Sciences du Climat et de l'Environnement/IPSL, CNRS-CEA-UVSQ, France, Boris BelanGérard Ancellet, Philippe Nédélec, Mikhail Arshinov, Arnaud Pruvost, Antoine Berchet, Emmanuel Arzoumanian, Isabelle Pison, Philippe Ciais, Kathy Law
- 12:45 2.4 Lightning NO_x influence on large scale NO_y and O₃ plumes observed over the northern mid-latitudes
Alicia Gressent, LA-Université Paul Sabatier III, France, Bastien Sauvage, Eric Defer, Hans Werner Pätz, Karin Thomas, Ronald Holle, Jean-Pierre Cammas, Philippe Nédélec, Damien Boulanger, Valérie Thouret and Andreas Volz-Thomas
- 13:00 2.5 Variability of tropospheric ozone over an urban site in India: A study based on MOZAIC and CCM vertical profiles over Hyderabad
Lokesh Sahu, Physical Research Laboratory (PRL), India, Varun Sheel, M. Kajino, M. Deushi, Sachin S. Gunthe, P. R. Sinha, B. Sauvage, Valérie Thouret, Herman G. Smit
- 13:15 2.6 The Indian Summer Monsoon: Investigating Pollution Import, Chemical Processing, Mixing and Subsequent Export, Based on Measurements by the IAGOS-CARIBIC Observatory in the Upper Tropospheric Anticyclone
Carl Brenninkmeijer, **Armin Rauthe-Schoech**, Max Planck Institute for Chemistry in Mainz, Germany, Angela Baker and Carl Brenninkmeijer. *Andreas Zahn, Helmut Ziereis, Markus Hermann and Peter van Velthoven*

13:30 - 15:00 Lunch break

- 15:00 2.7 Ozone and Carbon Monoxide Climatologies from the Trajectory Mapping of Global MOZAIC-IAGOS Data
Mohammed Osman, Environment Canada, Canada, D.W. Tarasick, J. Liu, O. Moeini, V. Thouret, V. E. Fioletov, J. J. Jin, G. Liu, C. Sioris, C. McLinde
- 15:15 2.8 MOZAIC/IAGOS airborne measurements to evaluate CO emission inventory
Fabio Boschetti, MPI-BGC, Germany, Huilin Chen, Julia Marshall, Philippe Nedelec, Valerie Thouret, Christoph Gerbig

Session 3 Recent and new technical developments

- 15:30 keynote MOZAIC-IAGOS Technical history over 20 Years
Philippe Nedelec, CNRS, France,
- 16:00 3.3 Ice or Ash? Real time detection using the next generation IAGOS Backscatter Cloud Probe
Darrel Baumgardner, Darrel Baumgardner, Droplet Measurement Technologies, USA, Martin Gallagher, Angela Dean, Andreas Petzold
- 16:15 3.4 Simultaneous Measurement of Particle Extinction and Scattering Using the CAPSSsa Monitor
Timothy Onasch, Aerodyne Research, Inc., USA, Paola Massoli, Paul Kebebian, Frank Hills and **Andrew Freedman**

16:30 - 17:00 Coffee break

- 17:00 keynote Improving and enhancing the IAGOS data stream: recent developments within the IGAS project
Christophe Gerbig, MPI-BGC Jena, Germany
- 17:30 3.1 Latest developments for the IAGOS database
Damien Boulanger, CNRS, Observatoire Midi-Pyrénées, SEDOO, France, B. Gautron, P. Nédélec, B. Sauvage, A. Auby, M. Schultz, B. Brötz, A. Rauthe-Schöch, V. Thouret

17:45 3.2 Quantifying the source/receptor link for the IAGOS observation database
Antoine Auby, Laboratoire d'Aérodologie, Observatoire Midi-Pyrénées, France, Bastien Sauvage, Valérie Thouret, Damien Boulanger, Sabine Eckhardt, Sabine Darras, Solène Turquety, Ronan Paugam, Philippe Nedelec, Gilles Athier, Jean-Marc Cousin

18:15 **Bus transfer to downtown**

Wednesday, 14 May 2014

08:00 **Bus transfer to Météo-France**

Session 4 UTLS Chemical composition and trends

09:00 keynote **UTLS chemical composition and trends**

William Randel, NCAR, USA,

09:30 4.1 Comparison of ozone concentrations in the UTLS as measured by ozone sondes and commercial airliners (MOZAIC)

Johannes Staehelin, Institute for Atmospheric and Climate Science, ETHZ, Switzerland, Johannes Stauer, Fiona Tummon, Rene Stuebi, Herman Smit and Valerie Thouret

09:45 4.2 Free Tropospheric Ozone Trends over Southern Africa (1990-2008) Re-visited: A Study with MOZAIC and SHADOZ Data

Anne M Thompson, NASA/Goddard Space Flight Center, USA, Nikolay Balashov, Jacquelyn Witte, G. J. R. Coetzee, V. Thouret, F. Posny

10:00 4.3 High resolution simulations of indian pollution transport in the UTLS during the Asian summer monsoon

Flore Tocquer, OMP - Laboratoire d'aérodologie, FRANCE, BARRET Brice, MARI Céline

10:15 4.4 Ozone budget over South Asia during the summer monsoon: chemistry transport modelling versus satellite and IAGOS observations

Brice Barret, CNRS, France, Bastien Sauvage, Yasmine Bennouna and Eric Le Flochmoën

10:30 4.5 Ten Years of Carbon Monoxide Measurements from the MOZAIC Program

Hannah Clark, CERFACS, France, V. Thouret, P. Nedelec and the MOZAIC team

10:45 4.6 Nitrogen oxides in the UTLS: Long term observations with CARIBIC

Helmut Ziereis, Institut für Physik der Atmosphäre, DLR Oberpfaffenhofen, Germany, G. Stratmann, P. Stock, H. Schlager, K. Gottschaldt, C.A.M. Brenninkmeijer, A. Rauthe-Schoech, A. Zahn, M. Hermann

11:00 - 11:30 **Coffee break**

11:30 4.7 Seasonal changes of CO₂, CH₄, N₂O and SF₆ in the upper troposphere/lower stratosphere over the Eurasian continent observed by commercial airliner

Yousuke Sawa, Meteorological Research Institute, Japan, Toshinobu Machida, Hidekazu Matsueda, Yosuke Niwa, Kazuhiro Tsuboi, Shohei Murayama, Shinji Morimoto, Shuji Aoki

11:45 4.8 Aerosol Particle Distributions, Sources and Trends in the UT/LMS Measured by the CARIBIC Observatory since 2000

Markus Hermann, Leibniz Institute for Tropospheric Research, Germany, Bengt G. Martinsson, Sandra M. Anderson, **Denise Assmann**, Johan Friberg, Andreas Weigelt, Carl A. M. Brenninkmeijer, Armin Rauthe-Schöch, Peter van Velthoven, and Andreas Zahn

12:00 4.9 The extratropical tropopause inversion layer

Peter Haynes, DAMTP, University of Cambridge, UK, Alison Ming, DAMTP, University of Cambridge

12:15 4.10 Seasonality of the mean age in the UTLS region: Hemispheric differences and impact of the Asian monsoon

Paul Konopka, Forschungszentrum Juelich, Germany, F. Ploeger, B. Vogel M. Tao and R. Müller

12:30 – 13:30 **Poster session**

13:30 - 15:00 **Lunch break**

Session 5 Monitoring atmospheric composition, climate and air quality

- 15:00 keynote **The importance of IAGOS in-situ observations for the Copernicus Atmosphere Service**
Vincent-Henri Peuch, ECMWF, UK
- 15:30 5.1 Validation of the MACC-II atmospheric composition global forecasting service
Henk Eskes, Royal Netherlands Meteorological Institute (KNMI), Netherlands, MACC-II validation partners
- 15:45 5.2 Technical challenges to integrating aircraft measurements of atmospheric composition with numerical models
Mark Parrington, ECMWF, UK, Antje Inness, Richard Engelen, Martin Suttie, Vincent-Henri Peuch, Christoph Gerbig, Valérie Thouret, Paul Palmer, Daven Henze, Alastair Lewis, James Lee, Andrew Rickard, BORTAS science team, IGAS science team
- 16:00 5.3 Use of simultaneous O₃ and CO data from MOZAIC-IAGOS to evaluate the MACC-II Reanalysis in the UTLS
Audrey Gaudel, CNRS, France, H. Clark, V. Thouret, L. Jones, A. Inness, H. Eskes, V. Huijnen, P. Nédélec, MACC team, IAGOS team
- 16:15 5.4 Evaluation of hindcast simulations using aircraft and other types of observations
Thierno Doumbia, UPMC Univ. Paris 06, LATMOS-IPSL, France, K. Sindelarova (1), C. Granier, I. Bouarar, L. Emmons, K. Law, V. Thouret, S. Tilmes, J.F. Lamarque
- 16:30 5.5 Assessing the regional representation of MOZAIC trace gas soundings in the lower troposphere and suitability for use in regional chemical transport model evaluation
Morgan Silverman, SSAI/NASA Langley, United States, James Szykman, James H. Crawford, Christian Hogrefe, Brian Eder, Tom Pierce, S.T. Rao, Jean-Pierre Cammas, Andreas Volz-Thomas

16:45 - 17:15 Coffee break

- 17:15 5.6 Three-dimensional behaviors of atmospheric CO₂ revealed by CONTRAIL project and their use for carbon cycle studies
Toshinobu Machida, National Institute for Environmental Studies, Japan, Yousuke Sawa, Yosuke Niwa, Hidekazu Matsueda
- 17:30 5.7 Large-scale distributions of methyl chloride in the upper troposphere observed by CARIBIC
Taku Umezawa, Taku Umezawa, Max Planck Institute for Chemistry, Germany, A.K. Baker, C. Sauvage, A. Rauthe-Schöch, C.A.M. Brenninkmeijer, D. Oram, D. O'Sullivan, S.A. Montzka and A. Zahn
- 17:45 5.8 Global distribution and trends of tropospheric ozone: A review
Owen Cooper, CIRES University of Colorado/NOAA ESRL, Boulder, USA
- 18:00 5.9 Inter-annual variability of ozone and carbon monoxide in tropospheric columns derived from MOZAIC/IAGOS and compared to satellite data
Régina M. Zbinden, CNRM-GAME, UMR3589, Météo-France et CNRS, France
- 18:15 5.10 Impacts of Indian emissions in the tropospheric ozone levels in South Asian region
E.Surendran Divya, Indian Institute of Tropical Meteorology, Pune, India, Sachin D.Ghude, L.K Emmons, G.Beig, Chinmay K Jena

18:30 Posters and Cocktail

20:15 Bus transfer to downtown

Thursday, 15 May 2014

08:00 **Bus transfer to Météo-France**

Session 6 Water vapour and clouds

- 09:00 **keynote Ice supersaturation and cirrus clouds in the tropopause region**
Peter Spichtinger, Peter Spichtinger, Univ. Mainz, Germany,
- 09:30 6.1 **Reanalysis of upper tropospheric humidity data of the MOZAIC programme for the period 1994 to 2009**
Herman G.J. Smit, Forschungszentrum Jülich GmbH (IEK-8), Germany, A.Petzold, S. Rohs, P. Neis, K. Thomas, V. Thouret, P. Nedelec, D. Boulanger
- 09:45 6.2 **The evaluation of MOZAIC/IAGOS Humidity Devices during airborne field studies CIRRUS-III and AIRTOSS-ICE**
Patrick Neis, Forschungszentrum Jülich GmbH, Institute for Energy and Climate Research, IEK-8 Troposphere, Germany, P. Neis, S. Rohs, M. Krämer, N. Spelten, M. Klingebiel, F. Finger, , H. Smit, A. Petzold
- 10:00 6.3 **Processes controlling H₂O in the upper troposphere / lowermost stratosphere: An analysis of eight years of monthly measurements by the IAGOS-CARIBIC observatory**
Andreas Zahn, Karlsruhe Institute of Technology (KIT), Germany, E. Christner, P.F.J. van Velthoven, A. Rauthe-Schöch, and C.A.M. Brenninkmeijer
- 10:15 6.4 **First regular in-situ observations of the isotopic composition of water vapor (HDO/H₂16O) in the upper troposphere within IAGOS-CARIBIC**
Emanuel Christner, Karlsruhe Institute of Technology (KIT), Germany, C. Dyroff, S. Sanati, Andreas Zahn
- 10:30 6.5 **Role of deep convection in moistening the stratosphere: LES of Hector the Convectocor**
Thibaut Dauhut, Laboratoire d'Aérodynamique, CNRS and Université de Toulouse, France, Jean-Pierre Chaboureau, Juan Escobar, Patrick Mascart, All from Laboratoire d'Aérodynamique (CNRS and Université de Toulouse).
- 10:45 6.6 **Cloud Property Measurements from Commercial Aircraft**
Karl Beswick, University of Manchester, United Kingdom, Martin Gallagher, University of Manchester, Darrel Baumgardner, Droplet Measurement Technologies
- 11:00 6.7 **Development of an airborne dual-channel hygrometer based on photoacoustic spectroscopy**
David Tatrai, MTA-SZTE Research Group on Photoacoustic Spectroscopy; University of Szeged, Department of Optics and Quantum Electronics, Hungary, Zoltan Bozoki, Andreas Zahn, Herman Smit, Gabor Szabo,

11:15 - 11:45 **Coffee break**

11:45 – 12:30 **Closing**

12:30 – 13:30 **Sandwiches buffet**

13:30 **Bus transfer to airport**

Posters list

- P 1.1 First simultaneous space measurements of atmospheric pollutants in the boundary layer from IASI: a case study in the North China Plain
Anne Boynard, LATMOS/IPSL/CNRS, France, Cathy Clerbaux, Lieven Clarisse, Sarah Safieddine, Matthieu Pommier, Martin Van Damme, Sophie Bauduin, Charlotte Oudot, Juliette Hadji-Lazaro, Daniel Hurtmans and Pierre-Francois Coheur
- P 1.2 Preliminary analysis of long-term variability of upper tropospheric humidity in the northern mid-latitudes
Klaus Gierens, Deutsches Zentrum für Luft- und Raumfahrt, Institut für Physik der Atmosphäre, Oberpfaffenhofen, Germany, Kostas Eleftheratos, Lei Shi
- P 2.1 Atmospheric conditions associated with high and low summertime ozone concentrations in the lower troposphere and the boundary layer over some eastern Mediterranean airports
Pavlos Kalabokas, Academy of Athens, Research Center for Atmospheric Physics and Climatology, Athens, Greece, Valérie Thouret, Jean-Pierre Cammas, Andreas Volz-Thomas, Damien Boulanger and Christos C. Repapis
- P 2.2 Ozone and carbon monoxide distributions in the African upper troposphere: 5 years of pollution observations
Bastien Sauvage, Université Toulouse / CNRS, France, Cammas J.-P., Thouret V., Auby A., Barret B., Boulanger D., Nédélec P., Clark H., Smit H., Le Flochmoën E., Bennouna Y., Fontaine A.
- P 3.1 Measuring Aircraft Engine Soot Emissions with the CAPS PMex Extinction Monitor
Andrew Freedman, Zhenhong Yu, Aerodyne Research, Inc., USA, L. Ziemba, NASA Langley Research Center, R. Miacke-Lye, B. Anderson, D. Liscinsky, A. Freedman
- P 3.2 Development and Evaluation of Novel and Compact Hygrometer for Airborne Research (DENCHAR): In-Flight Performance During AIRTOSS-I/II Research Aircraft Campaigns
Herman G.J. Smit, Forschungszentrum Jülich GmbH (IEK-8), Germany, Christian Rolf, Martina Kraemer, Andreas Petzold, Nicole Spelten, Susanne Rohs, Patrick Neis, Rolf Maser, Bernhard Bucholz, Volker Ebert, David Tatrai, Zoltan Bozoki, Fanny Finger, and Marcus Klingebiel
- P 3.3 The IAGOS GHG package: a measurement system for continuous airborne observations of CO₂, CH₄, H₂O and CO
Annette Filges, Max Planck Institute for Biogeochemistry Jena, Germany, Christoph Gerbig, Harald Franke, Christoph Klaus, Huilin Chen
- P 3.4 The New NO_x Instrument Deployed in IAGOS – Design and First Results
Andreas Volz-Thomas, Forschungszentrum Jülich GmbH, Germany, H.-W. Pätz, N. Houben, M. Berg, H. Franke, S. Roth, N. Seidel, K. Thomas
- P 3.5 Development and first application of the IAGOS aerosol sensor package
Andreas Petzold, Ulrich Bundke, Forschungszentrum Jülich, Germany, Marcel Berg, Amir Ibrahim, Christoph Klaus, Harald Franke
- P 4.1 Water vapor transport in the lower stratosphere during summer linked to Asian monsoon and horizontal transport
Felix Ploeger, Forschungszentrum Jülich, Germany, Paul Konopka, Rolf Müller, Martin Riese
- P 4.2 Acetone in the UT/LMS
Neumaier Marco, Karlsruhe Institute of Technology (KIT), Institute for Meteorology and Climate Research (IMK), Germany, G. Fischbeck, R. Ruhnke, O. Kirner, H. Ziereis, G. Stratmann, C. A. M. Brenninkmeijer and A. Zahn
- P 4.3 An insight on Asian pollution transport to the UTLS over the region of the Asian Monsoon Anticyclone with MOZAIC-IAGOS data
Yasmine Bennouna, Université de Toulouse, Laboratoire d'Aérodologie, France, B. Barret, V. Thouret, B. Sauvage, and E. le Flochmoën
- P 4.4 Case studies of ozone stratospheric intrusions events over South America
Marcia Yamasoe, University of Sao Paulo/ University of Toulouse - Paul Sabatier, Brazil, Bastien Sauvage, Valerie Thouret, Philippe Nedelec

- P 5.1 Temporal Variation and Source Apportionment of Atmospheric Mercury Concentrations at Two Regional Background Sites in China
Lei Zhang, Tsinghua University, China, Shuxiao Wang, Long Wang, Hongying Dou, Jiming Hao
- P 5.2 Variations of tropospheric methane over Japan during 1988–2010
Taku Umezawa, Center for Atmospheric and Oceanic Studies, Graduate School of Science, Tohoku University, Sendai, Japan, D. Goto, S. Aoki, S. Morimoto, T. Nakazawa, K. Ishijima, P. K. Patra, and S. Sugawara
- P 5.3 Ozone and carbon monoxide in tropospheric columns: a climatology (24°N-50°N) derived from MOZAIC/IAGOS on a 1994-2011 period
Régina M. Zbinden, CNRM-GAME, UMR3589, Météo-France et CNRS, France,
- P 5.4 Aerosol sources over Jaipur in Northwestern India from ground based AERONET measurements
Sunita Verma, Birla Institute of Technology Mesra, Ranchi, India, Divya Prakash, Swagata Payra and Manish Soni
- P 5.5 Observation projects for atmospheric greenhouse gases by Japan Airlines (JAL)
Hiroki Eto, Japan Airlines, Japan, Yuki Nakajima, Yasuo So, Raku Yoshida, Yousuke Sawa, Yosuke Niwa, Hidekazu Matsueda, **Toshinobu Machida**, National Institute for Environmental Studies, Japan
- P 5.6 Potential of in-service aircraft based greenhouse gas observations within IAGOS for constraining regional carbon budgets
Shreeya Verma, Max Planck Institute for Biogeochemistry, Jena, Germany, Christoph Gerbig, Julia Marshall, Christian Roedenbeck
- P 5.7 Five Years of NO_y Measurements in the UTLS from MOZAIC
Karin Thomas, Research Centre Jülich, Germany, A. Volz-Thomas, H.W. Pätz, N. Houben, M. Berg, M. Schultz, V. Thouret, P. Nédélec
- P 5.8 Observations of atmospheric composition, clouds and precipitation in Dronning Maud Land, East Antarctica
Alexander Mangold, **Roeland Van Malderen**, Royal Meteorological Institute of Belgium, Belgium, Hugo De Backer, Andy Delcloo, Veerle De Bock, Irina Gorodetskaya, Christian Hermans