Monday, September 07

8:00–9:00 Registration

9:00–9:10 Organizers Information on general aspects of the meeting

General presentations

9:10–9:20 Martin Heimann, Welcome to MPI-BGC Jena


Greenhouse gases observations I: measurement networks (Chair: Martina Schmidt)

9:40–10:00 Jim Butler, Observation System Requirements to Support Greenhouse Gas Management Strategies

10:00–10:20 Justus Notholt, Thorsten Warneke, Paul Wennberg, Janina Messerschmidt, The TCCON network for the calibration of greenhouse gas column data and satellite validation

10:20-10:50 Coffee Break

10:50–11:10 Marcel van der Schoot, L. P. Steele, D. A. Spencer, P. B. Krummel, R. J. Francey, M. Schmidt, M. Ramonet, B. Wastine, Australian regional high precision GHG observation network : Southern Ocean network (CO₂ sink) and Australian tropical atmospheric research station.


11:30–11:50 Ingeborg Levin et al., The planned European ICOS network including Central Analytical Laboratory

11:50–12:15 Discussion on ICOS and other regional network calibration strategies (Chair: D. Worthy / J. Butler)
12:15–13:30 Lunch

*Calibration / propagation of scales for CO$_2$ in air (Chair: Jim White)*

13:30–13:50 **Pieter P. Tans**, Do we need the WMO Mole Fraction Scale for CO$_2$ and other gases?

13:50–14:05 **Kazuto Suda**, Hidekazu Matsueda, Kazuhiro Tsuboi and Shinya Takatsuji, Recent history of CO$_2$ standard gases in JMA

14:05–14:20 **T. Machida**, Y. Tohjima, K. Katsumata and H. Mukai, A new CO$_2$ calibration scale based on gravimetric one-step dilution cylinders in National Institute for Environmental Studies; NIES 09 CO$_2$ Scale

14:20–14:35 **Zoe M. Loh**, L. P. Steele, P. B. Krummel, M van der Schoot, D. M. Etheridge, D. A. Spencer, Linking Isotopologue Measurements to Existing Mole Fraction Scales

14:35–14:50 **Jörg Klausen**, Christoph Zellweger, Brigitte Buchmann, World Calibration Centre for Carbon Dioxide: Supporting the Quality of the Global Observation System

14:50–15:15 Coffee Break

15:15–16:00 General discussion on CO$_2$ calibration (Chair: P. Tans/T. Laurila)

*Calibration / propagation of scales for CH$_4$, CO, SF$_6$, N$_2$O, and H$_2$ in air (Chair: Ralph Keeling)*

16:00–16:15 **Brad Hall**, Geoff Dutton, Ed Dlugokencky, Nitrous Oxide: Are We Making Progress?

16:15–16:30 **Nobuyuki Aoki**, Kenji Kato, Takuya Shimosaka, Nobuhiro Matsumoto, Keiichi Katsumata, Toshinobu Machida, Preparation of nitrous oxide (N$_2$O) in air standard being traceable to SI by gravimetric method

16:30–16:45 **H.E. Scheel**, Report of the WCC-N$_2$O

16:45–17:00 **Armin Jordan**, Bert Steinberg, Is it time for a WMO Hydrogen calibration scale?

17:00–17:15 **Kazuto Suda**, Atsuya Kinoshita, Yukio Kurihara and Rie Nakamura, Quality assurance and quality control of WDCGG data

17:15–18:00 General discussion on GHG calibration and quality assurance (Chair: T. Machida/C. Zellweger)
Tuesday, September 08

**Intercomparison activities (Chair: H. Mukai)**


8:50–9:10 **Ken Masarie**, D. Chao and P. Tans, *New Capabilities For Interpreting Comparison Data*


9:30–9:50 **Andrew C. Manning**, What have we learnt from global intercomparison programmes and what should we do next?

9:50–10:20 Coffee Break


10:40-11:20 Various short contributions (~ 3’, max 10’) on flask / in situ intercomparison results at individual stations not already presented within national reports

11:20-11:40 **General Discussion on intercomparison programs (Chair: K. Masarie / B. Stephens)**

**Isotope calibration and measurements (Chair: Lingxi Zhou)**

11:40–12:00 **Jim White**, C. B. Alden, B.H. Vaughn, S.E. Michel, J. Winokur, and V. Claymore: *Uses and Limitations for Isotopes of Carbon Dioxide and Methane*

12:00–12:20 **Thomas Röckmann**, Robina Shaheen, Christoph Janssen, *Isotope exchange between CO₂ and O₃ in the stratosphere: atmospheric and laboratory measurements*
12:20–13:30 Lunch


14:10–14:30 **Jan Kaiser**, How accurate do we know ¹³C/¹²C, ¹⁸C/¹⁶O and ¹⁷O/¹⁶O ratios in CO₂ and their corresponding delta values?


14:50-15:20 Coffee Break

15:20–15:40 **Bruce Vaughn**, J.W.C. White, S.E. Michel, J. Winokur and V. Claymore: *Calibrations, Corrections, and Challenges for isotopes of Methane and Carbon Dioxide*

15:40–16:00 **Colin Allison**, Jim White, *Merging atmospheric δ¹³C data sets*

16:00–16:30 General discussion on isotope calibration and measurements *(Chair: R. Francey / M. Wendeberg)*

16:30-18:00 Poster Session I

17:00 Departure for MPI-BGC for Lab Tours (Bus lines #10, #13, #40)

17:30–18:30 Lab Tours MPI-BGC: (IsoLab, GasLab, ¹⁴C Accelerator)

**Important notes:**
1. There will be an opportunity to visit the BGC Labs on Friday with more time to spend. The tour today is for those who want to leave earlier.
2. Tours will be restricted to groups of 10, hence more than 30 people today will be difficult.
19:30 Conference Dinner at the down-town Tower Restaurant ‘Scala’ (http://www.scala-jena.de/)

Wednesday, September 09

Measurement techniques and comparison (Chair: Doug Worthy)

8:30–8:50 David Griffith, Nicholas Deutscher, Paul Fraser, Paul Krummel, FTIR analyzer for simultaneous high precision measurements of CO₂, δ¹³-CO₂, CH₄, CO and N₂O: intercomparison measurements at Cape Grim

8:50–9:10 Doug Baer, Manish Gupta, Tom Owano, Robert Provencal, Ian McAlexander, Feng Dong, Novel Instrumentation for Real-time Measurements of N₂O, CO, CO₂ and CH₄

9:10 –9:30 Scott Richardson, Natasha Miles, Kenneth Davis, Eric Crosson, Field testing of cavity ring-down spectroscopy instruments measuring CO₂

9:30–9:50 Aaron Van Pelt, Eric Crosson, Natasha Miles, Scott Richardson, Ken Davis, Christoph Thomas, Beverly Law, Recent developments in instrumentation for greenhouse gases and related tracer measurements


10:10–10:40 Open discussion on measurement techniques (Chair M. Ramonet / G. Brailsford)

10:40–11:00 Coffee Break

11:00-12:30 Side Event: TTorch (ESF RNP) Steering Committee meeting (please contact Alex Vermeulen)

11:00-12:30 Poster Session II

12:30–13:50 Lunch

Measurements and techniques for O₂/N₂ and Ar/N₂ (Chair: A. Manning)


14:10–14:30 Markus Leuenberger, Chiara Uglietti and Peter Nyfeler, Tracing local natural gas oxidation by means of oxygen to carbon dioxide ratio measurements

14:50–15:20 Open discussion on O2/N2 (Chair R. Keeling / M. Leuenberger)

15:20–15:50 Coffee

Related Tracer Observations and Analysis (Chair: Paul Krummel)

15:50-16:10 Jocelyn Turnbull, Scott Lehman, Pieter Tans, John Miller, John Southon, $^{14}$CO$_2$ Measurements in the NOAA/ESRL Co-operative Air Sampling Network: An update on measurements and data quality


16:50–17:10 Camille Yver, Martina Schmidt, Michel Ramonet, Mathilde Grand, Tropospheric hydrogen measurement in the RAMCES network

17:10–17:30 Ingeborg Levin, Tobias Naegler, Renate Heinz, Daniel Osusko, Emilio Cuevas, Andreas Engel, Johann Ilmberger, Ray L.Langenfelds, Bruno Neininger, Christoph v. Rohden, L. Paul Steele, Rolf Weller, Douglas E. Worthy, Sergej A. Zimov, Atmospheric observation-based global SF$_6$ emissions – comparison of top-down and bottom-up estimates

17:30-19:30 Side Event: ICOS Atmospheric stations instrumentation. For participation please contact Leo Rivier.

Thursday, September 10

Greenhouse gases observations II: Vertical distribution (L. Haszpra)

8:30–8:45 Colm Sweeney, Anna Karion, Pieter Tans, Validation of high altitude measurements of CO$_2$ and CH$_4$ using the AirCore

8:45–9:00 Charles Miller, Challenges for Validating Space-based XCO$_2$ Data

9:00–9:15 Gordon Brailsford, V Sherlock, A Gomez, K Riedel, D Smale, M Kotkamp, J Robinson, B Connor, B Stephens, S Mikaloff-Fletcher, In situ and ground-based remote sensing measurements of atmospheric CO$_2$ in New Zealand
9:15–9:30 Open discussion on gaps and future needs in integrated observation systems (Chair: C. Gerbig / A. Vermeulen)

**Greenhouse gases observations III: national and site reports (Chair: H.E. Scheel)**

9:30–9:45 Luciana V. Gatti, Monica T. S. D’Amelio, John B. Miller, Andrew Crotwell, Luana S. Basso, Alexandre Martinewski, Ed Dlugokencky, Pieter Tans, GHG Intercomparison NOAA/IPEN and Efforts in to start a GHG Network in Brazil

9:45–10:00 Jooil Kim, Bayarmaa Lkhagvadorj, Kyung-Ryul Kim, Understanding Northeast Asian CO$_2$ emissions from continuous monitoring at Gosan station

10:00–10:15 E-G. Brunke, C. Labuschagne, B. Parker and H-E. Scheel, Recent results from measurements of CO$_2$, CH$_4$, CO and N$_2$O at the GAW station Cape Point

10:15–10:30 Jan Winderlich, Huilin Chen, Annette Höfer, Christoph Gerbig, Martin Heimann, Continuous CO$_2$/CH$_4$ measurement at Zotino Tall Tower Observatory (ZOTTO) in Central Siberia

10:30–11:00 Coffee Break

11:00–11:15 Michela Maione, Umberto Giostra, Francesco Furlani, Jgor Arduini, Francesco Graziosi, Paolo Bonasoni, Paolo Cristofanelli, Rocco Duchi, Angela Marinoni, Long term observations of climate altering gases at the "O. Vittori" observatory at Monte Cimone (Italy)

11:15–11:30 Alex Vermeulen, Elena Popa, Pim van den Bulk, Piet Jongejan, Cabauw station report

11:30–11:45 Martina Schmidt, Greenhouse gas measurements at Trainou Tower (France)

11:45–12:00 Lingxi Zhou, Lixin LIU, Shuangxi FANG, Fang ZHANG, Bo YAO, Min WEN, Lin XU, Shuai GU, Kunpeng ZANG, Lingjun XIA, Xiaochun ZHANG, Yupu WEN, Xiuji ZHOU, Network Observation of Greenhouse Gases and Related Tracers in China

12:00–12:15 N.K. Indira, Efforts in measuring greenhouse gases by setting up stations in India

12:15–13:30 Lunch

13:30–16:00 Plenary discussion and approval of the draft recommendations
(Chair: I. Levin)

14:30 - 15:00 Coffee Break

16:00 *End of the meeting*
POSTERS

P1  
**Ed Dlugokencky** and GHG SAG Members, Current Activities of the GHG SAG

P2  
**Christoph Zellweger**, Jörg Klausen, Brigitte Buchmann, Summing Up 13 Years of Intercomparison Activities of the World Calibration Centre at Empa (WCC-Empa): Methane, Carbon Monoxide and Ozone

P3  
**Lee, Jeongsoon**, Jin Bok Lee, Dong Min Moon, GawngSub Kim, TaeYoung Goo, Goan-Young Park, and Jin Seog Kim, Preparation Of Standard Gas Mixtures For Measurement Of Ambient Level Of Greenhouse Gases

P4  

P5  
**Keiichi Katsumata**, Toshinobu Machida, Hiroshi Tanimoto, Hideki Nara, Hitoshi Mukai, Reevaluation of NIES CO Scale using High Concentration Gravimetric CO Standard Gases

P6  

P7  
**Magnus Wendeberg**, W.A. Brand, High precision isotopic analysis of CO$_2$ in air using a non-cryogenic GC-IRMS approach

P8  
**Hitoshi Mukai**, K. Tohmine, and Y. Kajita, Reevaluation of isotopic scale for CO$_2$ in NIES and its relation with inter-comparison works

P9  
**R.A. Werner**, Matthias J. Zeeman, Werner Eugster, Rolf T.W. Siegwolf, Joachim Mohn, Nina Buchmann, Measurement of d13C of Atmospheric CO2 on a Routine Basis

P10  
**Jan Kaiser**, Thomas Röckmann, Isobaric correction of mass-spectrometric isotope ratio measurements of O$_2$, CO, CO$_2$ and N$_2$O

P11  
**S.S. Assonov**, C.A.M. Brenninkmeijer, P. Taylor, Use of CO$_2$ dynamic mixing for mass-spectrometric isotope analyses of air CO$_2$

P12  
**Xiaomei Xu** and Susan E. Trumbore, $\Delta^{14}$C of Atmospheric CO$_2$ at Point Barrow, Alaska

P13  
**Ivo Svetlik**, Activity concentration of $^{14}$CO$_2$ as a tool to estimate $^{14}$C quantity in the troposphere

P14  
**Felix Vogel**, Jaroslaus Jeschka, Bernd Kromer, Axel Steinhof, Samuel Hammer and Ingeborg Levin, Evaluation of a new setup for long-term monitoring of fossil fuel CO$_2$ and other trace gases

P15  
**Mihály Molnár**, László Haszpbra, István Major, János Szádai, Ivo Svetlik, Performance test of a mobile fossil fuel CO$_2$ monitoring station developed in ATOMKI
R. A. Werner, B. Tuzson, J. Mohn, L. Emmenegger, M. J. Zeeman, Performance test, calibration and validation of a novel optical analyzer for continuous and high precision CO₂ isotope ratio measurements

Eric Crosson, Marc Fischer, Colm Sweeney, Aaron Van Pelt, Vertical profiles of greenhouse gas concentrations via airborne measurements

George Burba, Tyler Anderson, Liukang Xu, and Dayle McDermitt, Fast Portable Open-Path Gas Analyzer for Methane Flux Measurements

George Burba, Michael Furtaw, and Dayle McDermitt, New Compact Gas Analyzer for Eddy Covariance Measurements of Carbon Dioxide and Water Vapour Fluxes

D. Lowry, S. Sriskantharajah, R. E. Fisher, M. Lanoisellé, and E.G. Nisbet, Long-term laboratory performance of Picarro instruments prior to S. Atlantic remote deployment

Huilin Chen, Christoph Gerbig, Jan Winderlich, Annette Hoefer, A high accuracy analyzer for airborne measurements of greenhouse gases (CO₂ and CH₄)

Julia Steinbach, Christoph Gerbig, Karl Kübler, Reimo Leppert, Frank Voigt, and Bernd Schläffel, ICON; a new In-situ Capability for O₂/N₂ Measurements from airborne Platforms
P30
Britton Stephens, Sean Burns, Andrew Watt, Sherri Heck, David Moore, Ankur Desai, David Bowling, The Rocky Mountain Regional Atmospheric Continuous CO₂ Network

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Yu-Won Kim, Tae-Young Goo, Hee-Jung Yoo, Jeong-Soon Lee and Gowan-Young Park, Regional GHG Observation Strategy of KMA

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Patricia Lang, Molly Heller, Ken Masarie and Dan Chao, A Web-based Application to Manage Carbon Cycle Network Operations

P35
D. Worthy, M. Ishizawa P. Bergamaschi, J.F. Meirink, M. Krol, D. Chan, and E. Dlugokencky, The Sensitivity of Canada’s atmospheric CH₄ observational program to detect Canadian wetland sources. Is the network size sufficient?

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Mi-Kyung Park, Alane Bollenbacher, R.F. Keeling, Martin Wahlen, Kyung-Ryul Kim, A Study on the atmospheric CO₂ and its carbon isotopes at Gosan, Korea

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A.J. Gomez-Pelaez, R. Ramos, Improvements in the carbon dioxide and methane continuous measurement programs at Izaña Global GAW station (Spain) during 2007-2009

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Marc Delmotte, Jost V. Lavric, Andrew C. Manning, Laurent Bopp, Michel Ramonet, Martina Schmidt, Willi A. Brand, Cyrille Vuillemin, Claire Kaiser, Mathilde Grand, Claire Peureux, Benoit Wastine, A new atmospheric monitoring station in Ivittuut, Southern Greenland

P40
Salvatore Piacentino, A. di Sarra, F. Monteleone, C. Bommarito, F. Anello, F. Artuso, D. Meloni, D. Sferlazzo, Techniques for measuring greenhouse gases in ENEA Station on the Island of Lampedusa

P41
Samuel Hammer, Luisa Müller, Frank Meinhardt, Ludwig Ries, Steffen Knabe, Felix Vogel, Hartmut Sartorius and Ingeborg Levin, From background to urban stations: A comparison of H₂ and other trace- and greenhouse gases within central Europe

P42
M. Elena Popa, A.T. Vermeulen, W.C.M. van den Bulk, P.A.C. Jongejan, T. Röckmann, A. Batenburg, Measurements of H₂ vertical profiles at Cabauw tall tower station, in Netherlands
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**Mihaly Molnar**, Laszlo Haszpra, Istvan Major, Svetlik Ivo, *Urban and rural site regional fossil fuel CO$_2$ observations from Hungary using multi elevation sampling*

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**Yogesh Tiwari**, K. Ravi Kumar, *Glass flask air sample analysis through Gas Chromatography in India: Implications for Constraining CO$_2$ Surface Fluxes*

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**Stavert Ann Rebecca**, Stephen Wilson and Dianne Jolley, *An in situ examination of CO$_2$ and other greenhouse gas fluxes in the estuarine environment at high temporal resolution and their relationship to aqueous and sedimentary nutrient composition*

P53  
**Bert Scheeren**, Peter Bergamaschi, Niels R. Jensen, Carsten Gruening, Ignacio Goded, and John van Aardenne, *First results from the new JRC greenhouse gas monitoring site at Ispra, Italy*

P54  
**R. Curcoll**, J-A. Morguí, I.Pouchet, A. Font and X. Rodó, *Four years of atmospheric research at LMU station (Tall Tower, La Muela, Spain)*