Atmospheric Research for Understanding and Mitigating Climate Change

in collaboration with the United Nations Office for Space Affairs (UNOOSA)

17 – 19 April 2018, Cologne, Germany
Dear Conference Delegate,

A warm welcome to you at the CCC 2018 here in Cologne.

We would like to thank you for taking up our invitation to be here. We believe that dealing with the effects of climate change is one of the biggest problems the Earth is currently facing. By attending this conference and taking an active part in the programme lined up for the next two days with fellow international scientists, members of the United Nations offices and politicians we hope to provide a further insight into possible causes, new impacts of Climate Change and suggested remedies.

We are looking forward to some interesting discussions on this important issue and ask you to contribute with your expertise and ideas to fully understanding the reasons for Climate Change, thus presenting us all with possible new solutions for counterreacting the detrimental effects of our climate.

Yours sincerely,

Prof. Dr. Pascale Ehrenfreund
Chair of the Executive Board, DLR e. V.

Prof. Dr. Hansjörg Dittus
Member of the Executive Board, DLR e. V.

Prof. Rolf Henke
Member of the Executive Board, DLR e. V.

Fig. 1: Observed (satellite, purple and pink) and simulated (EMAC) anomalies of the near global mean (60°S – 60°N) ozone (O₃) column.

Fig. 2: Simulated (EMAC) present day near surface methane (CH₄) concentration (1 ppmv = 10⁻⁶).
Fig. 3: Observed and simulated (EMAC) anomalies of the near global mean (60°S – 60°N) water vapour anomaly at 83 hPa.
Agenda – Tuesday, 17 April 2018

1000 Press conference, Registration

Joint opening session
Chair: Prof. Dr. Markus Rapp

1250 Prof. Dr. Hansjörg Dittus
Member of the Executive Board, DLR e. V.
Cologne, Germany
Welcome address

1305 Max Kroymann-
Leiter Referat DLR/ HGF
Representative of the Federal Ministry of
Economy Welcome address

1315 Prof. Dr. Petteri Taalas
Secretary-General of WMO, Geneva, Switzerland
The role of World Meteorological Organization in
the international climate agenda

1335 Dr. Gilles Rabin
Director for Science, Innovation and Application, CNES
Paris, France
Opening address

1355 Dr. Maurice Borgaud
Head of Science, Applications and Futures
Technologies Department, ESA Esrin, Rome, Italy
Opening remarks

1405 Dr. Youssef Nassef
Director Adaptation, UNFCCC, Bonn, Germany
The UNFCCC context: Strengthening the link
between the systematic observation community
and action to meet the Paris Agreement goals

1425 Dr. Juan Carlos Villagrán de Leon
Head of UNSPIDER Office UNOOSA/ UNSPIDER
Bonn, Germany
Space research and technology for low-
emission and resilient societies: The 2030 Space
Agenda

1445 Prof. Dr. Thomas Stocker
University of Bern, Bern, Switzerland
Keynote: Climate Change: Ocean services under
threat

1500 Coffee break

Session 1:
State of the art and major challenges
Chair: Prof. Dr. Robert Sausen

1540 Dr. Philippe Ciais
CEA, Paris, France
The potential of spaceborne imagery to quantify
fossil emissions

1600 Prof. Dr. Thomas Birner
Meteorological Institute of LMU, München, Germany
Climate change and circulation shifts

1630 Prof. Dr. rer. nat. Andreas Huth
Helmholtz Centre for Environmental Research (UFZ)
Department of Ecological Modelling, Leipzig, Germany
Forests, climate and remote sensing

1700 Dr. Peter Bauer
Centre for Medium-Range Weather Forecasts (ECMWF)
Reading, UK
Why do weather and climate prediction need to
come together?

1730 Dr. Torge Martin
GEOMAR, Helmholtz Centre for Ocean Research
Kiel, Germany
Blue vs. white ocean: frontiers in ice-ocean
modelling

1800 Prof. Dr. Peter Braesicke
Karlsruhe Institute of Technology (KIT)
Institute of Meteorology and Climate Research
Karlsruhe, Germany
Across scales atmospheric composition
interactions in weather and climate
applications

1830 End of Day 1

1900 Welcome Reception at ZooEvent
The welcome reception is a flying buffet style catered
event that will allow delegates to meet and network
while enjoying food and beverages.
Registration

Session 2: Improving our knowledge of the climate system
Chair: Prof. Dr. Andreas Huth

Dr. David W. Fahey
National Oceanic and Atmospheric Administration (NOAA), Earth System Research Laboratory
Boulder, CO, USA
Keynote: Improving our knowledge of the climate system

Prof. Dr. Thomas Jung
AWI, Climate Sciences & Climate Dynamics
Bremerhaven, Germany

Prof. Dr. Robert Sausen (DLR)
Prof. Dr. Sabine Attinger (UFZ)
Prof. Dr. Arne Biastoch (GEOMAR)
Prof. Dr. Peter Braesicke (KIT)
Prof. Dr. Stefan Kollet (FZJ)
Prof. Dr. Maik Thomas (GFZ)
Prof. Dr. Corinna Schrum (HZG)

The Helmholtz project Advanced Earth System Modelling Capacity (ESM) – Towards a common modelling environment

Prof. William Collins
Department of Meteorology, University of Reading
Reading, UK
The climate sensitivity to short-lived forcers

Prof. Dr. Dr. Peter Höppe
Munich Re and LMU, München, Germany
Is climate change already increasing losses caused by extreme weather events?

Coffee break

Poster session
See page 8

Lunch break

Session 3.1: Mitigation of climate change
Chair: Prof. Dr. Volker Grewe

Prof. Rolf Henke
Member of the Executive Board, DLR e. V.
Cologne, Germany
Aviation and environment – The aircraft as perpetuator and victim

Prof. Dr. Ottmar Edenhofer
Technische Universität, Berlin and PIK
Potsdam, Germany
Keynote: Post-Paris challenges: climate, coal and capital

Prof. Dr. André Thess
DLR Institute of Engineering Thermodynamics
Stuttgart, Germany
Renewable energy and energy storage for the 2 °C target

Dr. Bruce Anderson
NASA Langley Research Center,
Hampton, VA, USA
Alternative-fuel effects on aircraft emissions and contrails: Results from joint NASA-DLR missions

Coffee break

Session 3.2: Mitigation of climate change
Chair: Dr. Christoph Kiemle

Prof. Dr.-Ing. Josef Kallo
DLR Institute of Engineering Thermodynamics
Stuttgart, Germany
Electric flight

Prof. Dr. Volker Grewe
DLR Institute of Atmospheric Physics
Oberpfaffenhofen, Germany
Operational measures for mitigating aircraft climate impact

Session 4.1: Remote sensing for climate change (atmosphere)
Chair: Dr. Diego Loyola

Dr. Pepijn Veefkind
KNMI, De Bilt, and Delft University of Technology
Utrecht, The Netherlands
Results of TROPOMI on Sentinel 5 Precursor: the beginning of the Copernicus Atmospheric Composition Data Record

Dr. Heinrich Bovensmann
Institut of Environmental Physics, University of Bremen
Bremen, Germany
Towards space based contributions to monitor emissions of CO₂ and CH₄ – challenges and opportunities

Dr. Sander Houweling
Vrije Universiteit Amsterdam
Amsterdam, The Netherlands
Greenhouse gas surface flux estimation using satellite observations

End of Day 2

Reception and conference dinner
Flora Cologne, Room „Dachsalon“
### Agenda – Thursday, 19 April 2018

#### 08:00
- Registration

#### 08:30
**Session 4.2:** Remote sensing for climate change (aerosol, clouds)
- **Chair:** Dr. Claudia Künzer
- **Prof. Dr. Clemens Simmer**
  - Meteorological Institute, University Bonn
  - Bonn, Germany
  - *The challenge of remotely sensing precipitation changes in a warming climate*

#### 09:00
- **Dr. Julien Delanoe**
  - Laboratoire Atmosphères, Milieux, Observations Spatiales (LATMOS, ISPL), Paris, France
  - *Active synergistic observations for improving our knowledge on clouds*

#### 09:30
- **Prof. Johannes Quaas**
  - O. Sourdeval
  - J. Mülmenstädt
  - Institute for Meteorology, University of Leipzig
  - Leipzig, Germany
  - *Satellite observations for model evaluation of cloud-aerosol interactions*

#### 10:00
- **Dr. David M. Winker**
  - NASA Langley Research Center, Hampton, VA, USA
  - *Active Observations for Understanding Climate*

#### 10:30
- Coffee break

#### 11:00
**Session 4.3:** Remote sensing for climate change (land surface)
- **Chair:** Dr. Gerhard Ehret
- **Dr. Claudia Künzer**
  - DLR, German Remote Sensing Data Center (DFD)
  - Oberpfaffenhofen, Germany
  - *The Potential of Earth Observation to quantify Land Surface Dynamics*

#### 11:30
- **Prof. Dr. Matthew Hansen**
  - University of Maryland, College Park, MD, USA
  - *A strategy for global land change monitoring*

#### 12:00
- **Dr. Carsten Montzka**
  - Forschungszentrum Jülich (FZJ), Jülich, Germany
  - *Soil moisture: From observation to prediction*

#### 12:30
- **Dr. Konstantinos P. Papathanassiou**
  - Prof. Dr. - Ing. Alberto Moreira
  - DLR Remote Sensing Technology Institute
  - Oberpfaffenhofen, Germany
  - *Tandem-L: A challenging radar mission for climate research and environmental monitoring*

#### 13:00
- Lunch break

#### 14:00
**Session 5:** Detecting and projecting anthropogenic climate change
- **Chair:** Prof. Dr. Veronika Eyring
- **Dr. Claudia Tebaldi**
  - National Center for Atmospheric Research (NCAR)
  - Boulder, CO, USA
  - *Avoided impacts between alternative scenarios, with a focus on the low warming targets of 1.5 and 2.0 °C*

- **Dr. Peter Stott**
  - Hadley Centre, Met Office, Exeter, UK
  - *Detection and attribution of climate change*

- **Dr. Joeri Rogelj**
  - International Institute for Applied Systems Analysis (IIASA), Wien, Austria
  - *Can we meet the 1.5 °C target?*

- **Prof. Dr. Markus Rapp**
  - DLR Institute of Atmospheric Physics
  - Oberpfaffenhofen, Germany
  - *Concluding remarks*

#### 15:30
- **End of conference**
In the following the posters are listed in alphabetical order of the first authors' names:

C. A. Baumhoer, A. J. Dietz, C. Künzer:
**Antarctic glacier and ice shelf front dynamics in a changing climate**

C. Beer, J. Hendricks, M. Righi:
**Global modelling of ice-nucleating aerosol**

Ch. Böhm, S. Crewell, O. Sourdeval, J. Mülmenstädt, J. Quaas:
**Cloud base height retrieval from multi-angle satellite observations and its application to assess cloud heights over the southeast Pacific**

S. Brinkop, M. Dameris, P. Jöckel, H. Garny, St. Lossow, G. Stiller, R. Sausen:
**The millennium water vapour dropin chemistry–climate model simulations**

**Satellite-derived atmospheric CO2 and CH4, essential climate variable (ECV) climate data records (CDRs)**

M. Coldewey-Egbers, K.-P. Heue, D. Loyola, M. Dameris, P. Valks, Ch. Lerot, M. van Roozendael:
**Long-term total and tropospheric ozone data records from European satellite sensors for climate applications**

A. Dietz, C. Kuenzer:
**Snow Cover changes in Central Asia derived from long term series analysis of medium resolution remote sensing data**

**The role of clouds in the arctic amplification: insights from newobservations at the Arctic research base AWIPEV**

G. Ehret, A. Amediek, A. Fix, Ch. Kiemle, M. Quatrevalet, M. Wirth, S. Wolff:
**Greenhouse gas emission rates from strong point sources by airborne and space-borne IPDA sidar measurements**

R. Eichinger, S. Dietmüller, H. Garny, R. Walz, F. Fritsch, L. Hoffmann:
**Stratospheric transport today and in the future in CCMI model simulations**

St.O. Eze:
**The impacts of gully erosion on biodiversity conservation in South-Eastern Nigeria**

F. Frank, P. Jöckel, D. Brunner, St. Henne, M. Dameris:
**Revealing influencing factors on uncertainties in sources and sinks of atmospheric methane**

B.K. Gier, M. Buchwitz, V. Eyring, M. Reuter, S. Zechlau:
**Benchmarking CMIP5 models with ESA CCI data using the ESMVal Tool**

S. Groß, F. Ewald, M. Wirth, J. Delanoë, T. Zinner, Q. Cazenave, B. Mayer, M. Hagen, L. Hirsch:
**The use of combined active and passive remote sensing payload on HALO in preparation for EarthCARE**

W. Heldens, J. Zeidler, S. Üreyen, Th. Esch:
**Deriving surface characteristics for the new urban climate model PALM-4U using remote sensing and geo-data**

Ch. Kiemle, A.-K. Naumann, S. Groß:
**Airborne Lidar observations of water vapor variability in the tropics**

I. Klein, U. Gessner, St. Dech, C. Künzer:
**Daily dynamics of water bodies over 15 years. Selected examples for the relationship of water body extents, temperature and precipitation**

A. Laeng, T. von Clarmann, G. Stiller, N. Kramarova, K. Walker, J. Zawodny, J. Plieninger:
**Ozone before and post-1997 trends from merged SAGE II / MIPAS / OMPS satellite ozone record**
Estimation of methane emissions in the upper Silesian coal basin using portable FTIR spectrometry and WRF modelling

S. Matthes, B. Lührs, F. Linke, V. Grewe, F. Yin, H. Yamashita, L. Lim, K. Shine:
Mitigation potentials of climate-optimized routing: A concept study for Europe

CO₂ fluxes before and after partial deforestation of a spruce forest

M. Nützel, M. Dameris:
Variability of transport from the planetary boundary layer to the South Asian High

B. Pospichal, J. Beer, S. Trömel, U. Löhnert:
JOYCE-CF – Jülich Observatory for Cloud Evolution. A core facility for long-term cloud and precipitation observations

Better understanding of anthropogenic greenhouse gas emissions using aircraft-borne in-situ observations: Overview on first measurement results and future activities at DLR-IPA

J. Runge, L. Kühne, X. Tibau, Ch. Requena, Ch. Reimers, V. Trifunovand, V. Eyring:
Climate informatics: Causal discovery and deep learning in climate research and earth system science

M. Schlund, V. Eyring, A. Lauer:
Constraining transient climate response to cumulative CO₂ emissions from CMIP5 models with observations

G. M. Tsidu:
Detection and attribution of recent trends in climate extremes over Eastern Africa

Anthropogenic aerosol effects on shallow clouds in West Africa

H. Volkert, M. Kenntner:
Assisting atmospheric research for understanding climate change: SPARC in operation for 25 years as DLR hosts International Project Office

J. Wilzewski, J. Landgraf, B. Mayer, A. Roiger, A. Butz:
Spectral sizing of a satellite-borne CO₂ sensor to monitor localized emissions
Social Program

Tuesday, 17 April
Welcome reception at the ZooEvent

On Tuesday evening we would like to invite you all to a welcome reception at ZooEvent. This is a good opportunity to meet and network, while enjoying some local culinary specialities.

The ZooEvent is located right next to the Flora and can easily be reached by a short walk.

Wednesday, 18 April
Conference Dinner at the Flora

The evening will start shortly after the conference and includes a pre-dinner welcome drink, followed by a three course sit down dinner, soft, alcoholic drinks, tea and coffee.

Please note that return transport after the evening social event has to be organized individually.

ZooEvent
Riehler Str. 173,
50735 Cologne

Flora Cologne Dachsalon
Am Botanischen Garten 1a
50735 Cologne
Information for speakers

If you have not yet uploaded your presentation, please prepare a pptx (preferred) or pdf file on a USB device and hand it in at the registration office, at the latest by 30 minutes prior to your session. Please limit your presentation to the assigned time period (30 min incl. discussion, if not specified differently).

Information for poster presenters

Please pin your poster to the assigned board and be present during the Poster Session on Wednesday, 18 April, 11:00 -13:00.

WiFi

Free WiFi is available on site. The open network name is „Hotspot Köln“ . Despite the fact that it’s free, please concentrate on the oral presentations and posters.

The Venue

Flora Köln
Am Botanischen Garten 1a
50735 Cologne | Germany