Arctic snow and sea ice properties and interaction with the atmosphere

Date: 6.-8. November 2017 / Location: Bremerhaven – Glashaus, building F (Bussestraße 24)

INVITATION: On behalf of the Transregional Collaborative Research Center TR 172 "ArctiC Amplification: Climate Relevant Atmospheric and SurfaCe Processes, and Feedback Mechanisms (AC)³" we cordially invite you to attend the Topical Workshop on "Arctic snow and sea ice properties and interaction with the atmosphere" which will take place in Bremerhaven, Germany from 6 to 7 November 2017. One aim of the topical workshop is to strengthen the goals of the upcoming aircraft campaign PAMARCMiP (April 2018). A preparation meeting of PAMARCMiP will followed the workshop from 7 to 8 November.

RATIONALE: Snow and sea ice albedo are essential to quantify the Arctic energy budget. Only small changes in surface albedo can trigger feedback mechanisms, which enhance the Arctic sea ice loss. However, the snow and sea ice albedo are influenced by a multitude of parameters, such as snow grain size, black carbon concentration, surface roughness, the presence of leads and melt ponds, snow and sea ice thickness and the presence of clouds. Therefore, the local optical and physical properties of snow and sea ice have to be well characterized. Especially, aerosol particles including black carbon may alter the snow optical properties but still raise scientific questions like: What are the most relevant sources of aerosol particles contribution to the reduction of snow albedo? How are aerosol particles transported into the Arctic and deposited to the surface? How aerosol particles interact with the cloudy atmosphere and are scavenged or modified along the transport path? These questions can be answered only by a collaborative effort of different types of measurements and modeling activities that together will capture the full picture of snow-atmosphere interactions.

AGENDA:

Monday 6. Nov. 2017 **SESSION I (13:15 – 17:00)**

- 13:15 Andreas Herber (AWI) – Welcome and Short Introduction

SNOW / SEA ICE PHYSICAL AND RADIATIVE PROPERTIES (MEASUREMENTS AND SIMULATIONS)

- 13:30 – 14:00 Marie Dumont (CEN Grenoble) – Optical properties of snow: measurements and modeling" (Key Note Speaker)
- 14:00 – 14:15 Marcel Nicolaus (AWI) – Observing the seasonality of optical properties of snow and sea ice
- 14:15 – 14:30 Hans- Werner Jacobi (Grenoble) – The surface albedo feedback related to snow
- 14:30 – 14:45 Evi Jäkel, (LIM Leipzig) – 3D radiative effects over Arctic surface"
- 14:45 – 15:00 Larisa Istomina (IUP Bremen) – Remote sensing of sea ice: albedo, melt pond fraction, thickness
- **15:00 – 15:30 Coffee Break**
- 15:30 – 15:45 Christine Pohl (IUP Bremen) – Influence of opening angle and spectral bandwidth on spectral bidirectional reflectance factors and broadband albedo
- 15:45 – 16:00 Tim Carlsen (LIM Leipzig) – Parameterization of snow BRDF measurements in Antarctica
- 16:00 – 16:15 Tobias Donth (LIM Leipzig) – Airborne and Ground-Based Remote Sensing of BC in Snow

- 16:15 – 16:30 Heidi Sevestre (University of St. Andrews) – "Green" sampling for Black Carbon in Svalbard: an innovative approach – planned campaign in 2020
- 16:30 – 16:45 Stefanie Arndt (AWI) – Seasonal transition of snow properties from remote sensing and in-situ measurements

Monday 6. Nov. 2017 SESSION II (17:30 – 19:00)

Evening POSTER SESSION with drinks and finger food

- Andre Ehrlich (LIM) "$(AC)^3$ Overview
- Hannes Schulz (AWI) Characterising the vertical presence of atmospheric black carbon in the Arctic from airborne measurements
- Niels Fuchs (AWI) Evaluation of airborne melt pond photogrammetry
- Conrad Jentzsch (Tropos) High and Low Volume Flow Aerosol Particle Filter Sampler (HERA) for medium and high-altitude aircraft applications
- Tim Carlsen (LIM) Comparison of different methods to retrieve effective snow grain size in central Antarctica
- Tobias Donth (LIM) Simulations of the surface radiative forcing of BC – differences between BC located in the atmosphere and snow
- Stefanie Arndt (AWI) Seasonal transition of snow properties from remote sensing and in-situ measurements
- NN tba

Tuesday 7. Nov. 2017 SESSION III (09:00 – 12:15)

AEROSOL AND TRACE GAS ATMOSPHERIC TRANSPORT

- 09:00 – 09:30 Bjørn Samset (Cicero Oslo) – Absorbing aerosols: Where are they, and how do we know? (Key Note Speaker)
- 09:30 – 09:45 Marianne Lund Cicero Oslo) – Constraints on global BC lifetime from aircraft observations and implications for poleward transport and deposition"
- 09:45 – 10:00 Bernd Heinold (Tropos Leipzig) – Modeling the transport of Arctic aerosol
- 10:00 – 10:15 Makoto Koike (University of Tokyo) – Black carbon in the Arctic: Observation and numerical model calculation
- 10:15 – 10:30 Heiko Bozem (JGU Mainz) – Empirical Trace Gas Gradients in the Arctic and the Polar Dome Location
- **10:30 – 11:00 Coffee Break**
- 11:00 – 11:15 Henrik Skov (Aarhus University) – Chemical composition of Arctic aerosol
- 11:15 – 11:30 Andreas Massling (Aarhus University) – Physico-chemical properties of Arctic aerosols and their implications for regional climate"
- 11:30 – 11:45 Rossana Bossi (Aarhus University) – Ground-based VOC measurements in the high Arctic with a PTR-TOF-MS
- 11:45 – 12:00 Oliver Eppers (JGU Mainz) – Quantification of biogenic and anthropogenic sources for Arctic aerosols
- 12:00 – 12:15 Heike Wex (Tropos) – Determination of cloud condensation nuclei and ice nucleating particles in the Arctic
- **12:15 – 13:30 Lunch**

Tuesday 7. Nov. 2017 SESSION IV (13:30 – 17:00)

PREPARATION AND DETAILED PLANNING OF PAMARCMIP 2018 (SCIENCE)

- **13:30 – 14:30 Airborne Activity [each 6 min talk + 4 min questions]**
  - Andre Ehrlich / Evi Jäkel (LIM) – Remote sensing activity
  - Heiko Bozem (JGU Mainz) / Rupert Holzinger (IMAU) – Trace gas activity

- A. Petzold (FZ Jülich) – Aerosol activity
- Makoto Koike (University of Tokyo) – BC & Cloud microphysics activity
- Stefan Hendricks (AWI) – Sea ice measurements
- Tobias Binder (AWI) – Geophysics program to the dame time

- **14:30 – 15:30 Groundbased Activity [each 6 min talk + 4 min questions]**
  - Henrik Skov / Rossana Bossi (Aarhus University) – Villum ground-based program
  - Andreas Massling (Aarhus University) – Vertical measurements atmospheric parameter with UAV
  - Frank Stratmann (TROPOS) – INP Measurements during PAMARCMIP
  - Marco Zanatta (AWI) - BC Ground-based measurements
  - Holger Siebert (TROPOS) – Tethered Balloon activity
  - Gerit Birnbaum (AWI) / Tobias Donth (LIM) – Surface Albedo measurements

[the talks should include: Motivation / Instrumentation / Measurement strategy: Flight pattern, sampling strategy / Logistic requirements: calibration time, instrument heating up, lab space, lesson to learn from PASCAL/ACLOUD]

- **15:30 – 16:00 Coffee Break**
- **16:30 – 17:30 Discussion ALL**
- **18:00 – 19:00 Visit of Schifffahrtsmuseum (small tour)**
- **19:00 – 22:00 Joint Diner "Café' Weserblick" (Im deutschen Schifffahrtsmuseum)**

Wednesday 8. Nov. 2017 SESSION V (09:00 – 12:30

PREPARATION AND DETAILED PLANNING OF PAMARCMIP 2018 (LOGISTIC)

- **09:00 – 10:30 Logistic aspects [each 6 min talk + 4 min questions]**
  - Andreas Herber (AWI) – Status of the campaign (preparation status / logistics)
  - Henrik Skov (Aarhus University) – Information on Villum
  - Silke Henkel (AWI) – Courses plan in preparation /necessary forms
  - Martin Gehrmann (AWI) – Certification status and installation time window
  - Andre' Ehrlich – Proposed flight patterm and coordionation with ground activity
  - Kristina Bär (AWI) – K & M activity during PAMARCMIP
  - Rich Cameron (KBAL) – Constrains by operation of both aircraft at Villum
  - Ralf Brauner (JADE HS) – weather charts and flight planning procedure
  - NN – tba
- **10:30 – 11:00 Coffee Break**
- **11:00 – 12:00 Discussion (ALL)**
- **12:00 – 13:30 Lunch**
- **13:30 Start with the bus from Bussestraße 24 – main door**
- **14:00 – 16:00 SIGHTSEEING TOUR ON POLARSTERN**
  [please let us know, if your are interested to join this tour]