

# Preliminary programme of the 2nd Workshop on "Remote sensing in oxygen absorption bands" 29–31 May 2024, KNMI, De Bilt, The Netherlands

Version date: 28 March 2024

*Presentations are 15 minutes + 5 minutes for discussion.*

## Day 1: Wednesday 29 May 2024

12:00 - 13:30 Registration

13:30 - 13:40 Welcome & logistics

### Session 1a

*Chair: ...*

13:40 - 14:00 From oxygen to carbon dioxide and back – an A-band journey  
*Graeme Stephens* (JPL, California Institute of Technology)

14:00 - 14:20 15-year O<sub>2</sub> A band dataset with TANSO-FTS  
onboard GOSAT  
*Akihiko Kuze* (Japan Aerospace Exploration Agency – JAXA)

14:20 - 14:40 Calculating the vertical column density of O<sub>4</sub> during  
daytime from surface values of pressure, temperature and  
relative humidity  
*Thomas Wagner* (MPI Chemie, Mainz)

14:40 - 15:00 Estimation of aerosol layer height from OLCI measurements  
in the O<sub>2</sub>A-Absorption band over oceans  
*Lena Jänicke* (Free University Berlin)

15:00 - 15:20 On-going EUMETSAT developments based on the use of  
O<sub>2</sub> absorption - Aerosol Layer Height (ALH) & Cloud Top  
Pressure (CTP) from Copernicus Sentinel-3/OLCI and  
EPS-SG/METimage sensors  
*Julien Chimot* (EUMETSAT)

15:20 - 15:40 Break

**Session 1b**

*Chair: ...*

- 15:40 - 16:00 Cloud and aerosol information content in pathlength moments of sunlight from O<sub>2</sub> absorption measurements  
*Anthony Davis* (JPL, California Institute of Technology)
- 16:00 - 16:20 Molecular oxygen in HITRAN2024  
*Iouli Gordon* (Center for Astrophysics | Harvard & Smithsonian)
- 16:20 - 16:40 Intensities of all rovibrational electric quadrupole absorption lines in O<sub>2</sub>(X<sup>3</sup>Σ<sub>g</sub><sup>-</sup>) calculated using a new quadrupole moment curve for O<sub>2</sub>  
*Maciej Gancewski* (Nicolaus Copernicus University, Toruń)
- 16:40 - 17:00 Overview of the FRESCO cloud retrieval algorithm for satellite spectrometers  
*Piet Stammes* (KNMI)
- 17:00 - 17:20 Discussion
- 17:20 - 19:00 *Icebreaker*

**Day 2: Thursday 30 May 2024****Session 2a**

*Chair: ...*

- 09:00 - 09:20 Cloud top height retrieval from O<sub>2</sub> A-band measurements: from early airborne to MERIS applications  
*Jürgen Fischer* (Free University Berlin)
- 09:20 - 09:40 An original method to store and use LBL data in transmission form – Part I. Theory  
*Frederic Andre* (LOA, University of Lille)
- 09:40 - 10:00 An original method to store and use LBL data in transmission form – Part II. Application to radiative transfer in the O<sub>2</sub> A-Band  
*Antoine Rimboud* (LOA, University of Lille)
- 10:00 - 10:20 Cloud retrievals from the TROPOMI UV/VIS/NIR measurements with aerosol signature  
*Athina Argyrouli* (Technical University of Munich)
- 10:20 - 10:40 Cloud retrieval for the CO<sub>2</sub>M NO<sub>2</sub> algorithm using the O<sub>2</sub>-O<sub>2</sub> absorption band  
*Benjamin Leune* (KNMI)
- 10:40 - 11:00 *Break*

**Session 2b**

*Chair: ...*

- 11:00 - 11:20 Cloud geometrical thickness's radiation pathlength account and retrieval using oxygen A band satellite measurements: past POLDER/PARASOL experience & future 3MI/EPSS-SG  
*Nicolas Ferlay* (LOA, University of Lille)
- 11:20 - 11:40 Line intensity measurements and far-wing intensity redistribution in the 0.76  $\mu\text{m}$  Oxygen band  
*Erin Adkins* (National Institute of Standards and Technology)
- 11:40 - 12:00 Cloud property retrieval based on DISAMAR: using Oxygen absorption band data from TROPOMI on Sentinel 5P  
*Xiaoyun Zhang* (KNMI)
- 12:00 - 12:20 Retrieval of aerosol layer height from Sentinel-3/OLCI observations  
*Gijsbert Tilstra* (KNMI)
- 12:20 - 12:30 Discussion
- 12:30 - 13:40 *Lunch & Balloon launch & Group picture*

**Session 3a**

*Chair: ...*

- 13:40 - 14:00 Cloud top pressure retrieval from Sentinel-3 OLCI O<sub>2</sub> A-band measurements  
*Rene Preusker* (Free University Berlin)
- 14:00 - 14:20 Retrieving XCO<sub>2</sub>, aerosols, and surface pressure from the CO<sub>2</sub>M mission  
*Sha Lu* (SRON)
- 14:20 - 14:40 Latest developments in Aerosol Layer Height retrievals from TROPOMI O<sub>2</sub>-A band measurements  
*Martin de Graaf* (KNMI)
- 14:40 - 15:00 Aerosol characterization using oxygen A-band measurements with application to CO<sub>2</sub> retrievals  
*Vijay Natraj* (JPL, California Institute of Technology)
- 15:00 - 15:20 Proposal for intercomparison of radiative transfer simulations of the atmospheric O<sub>2</sub> A- and B-bands  
*Piet Stammes* (KNMI)
- 15:20 - 15:40 *Break*

**Session 3b**

*Chair: ...*

- 15:40 - 16:00 Impact on the accuracy of aerosol and cloud properties derived from the oxygen bands by ignoring rotational Raman scattering  
*Luca Lelli* (German Aerospace Center – DLR)
- 16:00 - 16:20 Geometrical thickness of single-layer liquid cloud retrieved from OCO-2 hyperspectral oxygen A-band over both land and ocean  
*Siwei Li* (Wuhan University)
- 16:20 - 16:40 Line-shape parameters and their temperature dependency for the air-broadened oxygen B-band lines  
*Szymon Wojtevicz* (Nicolaus Copernicus University, Toruń)
- 16:40 - 17:00 Effect of using fixed input parameters on the retrieval of cloud properties in the oxygen bands: Case study with synthetic EPIC/DSCOVr measurements  
*Víctor Molina García* (German Aerospace Center – DLR)
- 17:00 - 17:20 Discussion
- 19:00 - ... *Dinner*

**Day 3: Friday 31 May 2024****Session 4a**

*Chair: ...*

- 09:00 - 09:20 Aerosol Optical Centroid Height (AOCH) retrieval from oxygen absorption bands: recent advances and next steps  
*Jun Wang* (University of Iowa)
- 09:20 - 09:40 Cloud top pressure retrievals from the O<sub>2</sub> A-band for the NASA PACE OCI sensor  
*Andrew Sayer* (UMBC at NASA / GSFC)
- 09:40 - 10:00 Pressure broadening and shift of the 118 GHz line and the P1 P1 A-band line in O<sub>2</sub> perturbed by N<sub>2</sub> from *ab initio* calculations  
*Maciej Gancewski* (Nicolaus Copernicus University, Toruń)
- 10:00 - 10:20 Harmonized OMI and TROPOMI cloud datasets using the O<sub>2</sub>-O<sub>2</sub> absorption band at 477nm  
*Huan Yu* (BIRA-IASB)
- 10:20 - 10:40 Assessing the effects due to the sub-pixel heterogeneity in the O<sub>2</sub> absorbing band of TROPOMI like measurements  
*Laurent C.-Labonnote* (LOA, University of Lille)

10:40 - 11:00 *Break*

#### **Session 4b**

*Chair: ...*

- 11:00 - 11:20 Deep space observations of oxygen absorption bands  
*Alexander Marshak* (NASA / GSFC)
- 11:20 - 11:40 Uncertainty of GEMS AEH products caused by AOD and surface reflectance  
*Sang Seo Park* (UNIST)
- 11:40 - 12:00 Determination of oxygen dimer cross-sections for different temperatures under ambient conditions from long-term long-path DOAS observations in the Antarctic  
*Bianca Lauster* (MPI Chemistry, Mainz)
- 12:00 - 12:20 Cloud altitudes and optical thicknesses retrieved by O2A-band spectropolarimetry of Earthshine  
*Michael Sterzik* (European Southern Observatory)
- 12:20 - 12:30 Discussion

12:30 - 13:30 *Lunch*

#### **Reception on the occasion of Piet Stammes' retirement**

- 13:30 - 15:00 Talks by KNMI and international colleagues
- 15:00 - ... *Party*

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#### **Poster presentations**

- Poster #1 Retrieving SIF from tall towers with the O2-Band Shape Fitting method  
*Christiaan Van der Tol* (University of Twente)
- Poster #2 Comparison between RTTOV and DISAMAR for GOME-2  
*Jerome Vidot* (CNRM/Meteo-France/CNRS)