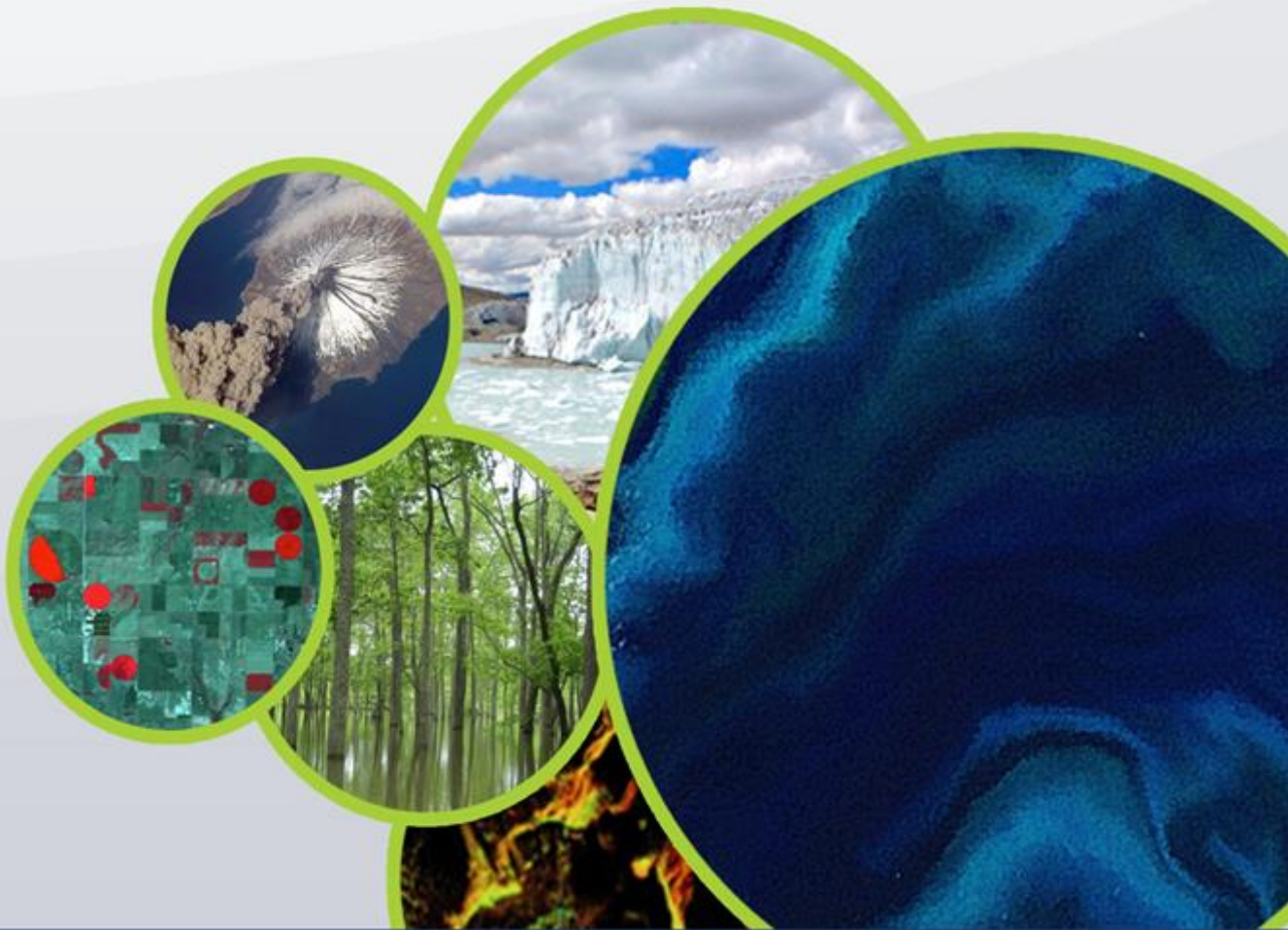




Committee on Earth Observation Satellites



Atmospheric Composition Virtual Constellation (AC-VC)
Working Group on Calibration and Validation / Atmospheric Composition SG (WGCV ACSG)

CEOS AC-VC-19 / ACSG Joint Meeting 2023

Brussels, Belgium / Hybrid
October 24 to 27, 2023

Agenda and technical guidelines

Version 3, 24 October 2023

CEOS AC-VC-19 / ACSG Joint Meeting 2023

Brussels, October 24-27, 2023

After three years of virtual events, the CEOS Atmospheric Composition Virtual Constellation (AC-VC) and the Atmospheric Composition Sub Group of the CEOS Working Group on Calibration and Validation (WGCV ACSG) organize a joint meeting on October 24-27, 2023.

This meeting will be hosted by the Royal Belgian Institute for Space Aeronomy (BIRA-IASB) and the Belgian Federal Public Planning Service Science Policy (BELSPO) at the Royal Belgian Institute of Natural Sciences (RBINS) in Brussels, Belgium. Participants are requested to wear their Visitor's Badge visibly and return it at the end of the meeting.

Please visit the event website for further details and for registration: <https://events.spacepole.be/event/126>

Hybrid Set-up

A hybrid set-up will allow remote participation. Presenters having announced their remote participation are identified in the agenda by an asterisk (*). All presenters are requested to register and to upload their presentation before the meeting. Dial-in and file upload information are provided separately. After the meeting, presentation material will be archived publicly on the [CEOS website](#). Presenters who DO NOT want their presentation to be shared publicly must inform the session chairs not later than one week after the event.

Please read carefully the applicable hybrid meeting protocol to ensure smooth progress of the meeting.

Agenda (all times given in CEST / UTC +2 / EDT +6 / PDT +9 / JST/KST -7 / AEDT -9)

Tuesday 24 October 2023		
08:25 CEST	Opening and logistics	N. Kalb, J.-C. Lambert
08:30 - 08:40	Tu-01 - Welcome by BELSPO	J.-C. Schyns (BELSPO)
08:40 - 08:50	Tu-02 - Welcome by BIRA-IASB	M. De Mazière (BIRA-IASB)*
GREENHOUSE GASES		
Chair: J. Worden (JPL) and Y. Meijer (ESA). Rapporteur: TBD		
08:50 - 08:55	Tu-03 GHG session welcome and introduction	J. Worden (JPL/Caltech)
08:55 - 09:05	Tu-04 GHG Constellation overview / gaps & concerns / items of interest	Y. Meijer (ESA/ESTEC)
Updates on Current Missions - Chair: Y. Meijer (ESA)		
09:05 - 10:00 4-5 min. each	Tu-05 - The GOSAT-GW mission: Updates on the GHG and NO ₂ observing capabilities	H. Tanimoto (NIES)
	Tu-06 - Role of the Orbiting Carbon Observatory missions (OCO-2 and OCO-3) towards an integrated global greenhouse gas monitoring system	A. Chatterjee (JPL/Caltech)
	Tu-07 - Status of CO ₂ M mission	Y. Meijer (ESA/ESTEC)

	Tu-08 - Status and Development of China's greenhouse gas monitoring satellite missions	Y. Liu (IAP/CAS)
	Tu-09 - TROPOMI CH ₄ status	I. Aben (SRON)
	Tu-10 - GOSAT Science team activities	R. Imasu (U. Tokyo)*
	Tu-11 – GEOCARB status	S. Crowell (LumenUs Scientific, LLC)
	Tu-12 – MICROCARB, MERLIN, GESat constellation	C. Deniel (CNES)
	Tu-13 - NarSha Project: The First Korean Near Real-time Methane Monitoring Microsatellite Constellation Mission	J.-P. Park (Nara Space)
	Tu-14 - Current Status of the GHGSat Constellation	E. Choi (GHGSat)
09:55 - 10:05	Q&A on current missions	All
Level-2 Algorithms - Chair: J. Worden (JPL/Caltech)		
10:05 - 10:12	Tu-15 - The TROPOMI CH ₄ Data Product: Current Status, Future Development, and New Mission Perspectives	J. Landgraf (SRON)
10:12 - 10:19	Tu-16 - GOSAT, GOSAT-2, and GOBLEU: 14-year global grid data and targeted mega city observations	A. Kuze (JAXA)*
10:19 - 10:30	Tu-17 - Q&A: (suggestions) What are additional improvements needed in L2 algorithms / observing strategies to reduce uncertainties in CO ₂ and CH ₄ observations?	All
<i>Coffee/Tea 10:30 – 10:45 (hosted)</i>		
Cal/Val Status / Needs / Synergies - Chair: H. Tanimoto (NIES)		
10:45 - 11:30 6-7 min. each	Tu-18 - Update on the GHG column/profile ground-based networks	M.K. Sha (BIRA-IASB)
	Tu-19 - OCO 2/3 validation needs	A. Chatterjee (JPL/Caltech)
	Tu-20 - Status of CO2M product processing and product validation developments	R. Lang (EUMETSAT)*
	Tu-21 - Vicarious calibration for GHG sensors	S. Kei (JAXA)*
	Tu-22 - Ground and ship-based remote sensing observations for GOSAT validation and Japan's urban flux estimates	H. Tanimoto (NIES)
11:30 - 11:45	Tu-23 - Q&A (suggestions): What is needed to support validation of observations in interesting locations (e.g. tropics). What are current rationale for selecting validation sites and techniques?	All
CEOS GHG Activities and Stakeholder Engagement - Chair: K. Bowman (JPL/Caltech)		
11:45 - 12:00	Tu-24 - GHG Task team updates, WG-Climate	Y. Meijer (ESA/ESTEC)
12:00 - 12:15	Tu-25 - Status of CEOS contribution to stock-take and next steps / Summary of "reporting emissions and uncertainties" workshop	J. Worden (JPL/Caltech)
12:15 - 12:30	Tu-26 - CEOS AFOLU status and evaluating with top-down emissions	B. Poulter (NASA/GSFC)*
12:30 - 12:45	Tu-27 - WMO and CEOS: role of space based observations in GGGW	O. Tarasova (WMO)*
12:45 - 13:00	Q&A (suggestions): How can CEOS increase stakeholder engagement of satellite products? Is this the right distribution of CEOS priorities?	All
<i>Lunch 13:00 – 14:00 (hosted)</i>		
Operationalizing top-down emissions estimation and reporting from satellite missions - Chair: D. Varon (Harvard)		
14:00 - 14:08	Tu-28 - NOAA observations relevant to quantifying fire emissions.	S. Kondragunta (NOAA)

14:08 - 14:16	Tu-29 - Detecting large methane point sources with the US Geostationary Operational Environmental Satellites (GOES)	D. Varon (Harvard)
14:16 - 14:24	Tu-30 - Integrating methane satellite observations at different scales.	B. Maasackers (SRON)
14:24 - 14:32	Tu-31 - Improved tracking of recent changes in CO ₂ and CH ₄ from NASA's quasi-operational modeling systems: contributions to the U.S. GHG Center contributions and future observational needs	S. Crowell (LumenUs Scientific, LLC)
14:32 - 14:40	Tu-32 - Top down estimates for GHG Center	K. Bowman (JPL/Caltech)
14:40 - 14:48	Tu-33 - Progress towards operational GHG inventory verification system in the UK	T. Gardiner (NPL)*
14:48 - 14:56	Tu-34 - A framework towards satellite-derived methane emissions product standards	P. Green (NPL)*
14:56 - 14:04	Tu-35 - CAMS	R. Engelen (ECMWF)*
14:04 - 15:12	Tu-36 - Prototyping the USA GHG Center	A. Kavvada (NASA HQ)*
15:12 - 15:30	Q&A (suggestions): What is the optimal role for CEOS in supporting top-down emissions reporting? What are possible steps to increase engagement with Global Stock-take with satellite GHG products?	All
Coffee/Tea 15:30 – 15:45 (hosted)		
Remote Only Session - Chair: E. Choi (GHGSat)		
15:45 - 16:40 6 min. each	Tu-38 - Future of OCO-2 MIP and CEOS top-down CO ₂ budget	B. Byrne (JPL/Caltech)*
	Tu-39 - Update on MethaneSat	D. Crisp (Crisp Spectra LLC)*
	Tu-40 - Greenhouse Gas and Air Quality Observations from the Arctic Observing Mission (AOM)	R. Nassar (ECCC)*
	Tu-41 - Outstanding issues in satellite-based CO ₂ and CH ₄ retrievals	C. O'Dell (Colorado State)*
	Tu-42 - TCCON status	D. Wunch (U. Toronto)*
	Tu-43 - Standards for methane point source detection and attribution	D. Cusworth (Carbon Mapper)*
	Tu-44 - Characterizing large methane and CO ₂ emissions from space with EMIT: U.S. Greenhouse Gas Center contributions and future needs	A. Thorpe (JPL/Caltech)*
	Tu-45 - Status and plans for EMIT mission and contributions to measurement of 100s of methane and carbon dioxide point source emitters across six continents for the US GHG Center.	R. Green (JPL/Caltech)*
16:40 - 17:00	Q&A: This session is heavily attended by facility scale / New Space observation talks. Suggestions for Q&A: What is needed for New Space missions to support science and policy with their data, e.g. ATBD, evaluation of reported products? How can CEOS best support L1 through L4 activities of New Space operations? Is there such a thing as “no false positive” or should we move to a graded reporting system for emissions?	All
Wrap-up - Chairs: Y. Meijer (ESA) and J. Worden (JPL/Caltech)		
17:00 - 17:30	Tu-47 - Emerging issues / concerns from meeting. Define agenda for Friday meeting on international collaborations.	All
17:30 Adjourn for the day		
17:45 - 19:00 A discovery walk through the centre of Brussels (~4 km optional walk starting from the museum; the group is on their own for diner)		

* Remote participation

Wednesday 25 October 2023

TRACE GASES AND AEROSOLS AIR QUALITY

Chairs: S. Kondragunta (NOAA) and B. Veihelmann (ESA). Rapporteur: M. Cheeseman (NOAA)

09:00 CEST	Introduction / Goals	S. Kondragunta (NOAA), B. Veihelmann (ESA)
Updates on Current Missions		
09:05 - 09:30	We-01 - TEMPO (Science Updates)	X. Liu (SAO)*
09:30 - 09:45	We-02 - GEMS	J. Yu (NIER), J. Kim (Yonsei University)*
09:45 - 10:00	We-03 – Sentinel-5P TROPOMI	C. Retscher (ESA)*
10:00 - 10:15	We-04 – MOPITT, CrIS, IASI	C. Clerbaux (LATMOS/IPSL), H. Worden (NCAR/ACOM)
<i>Coffee/Tea 10:15 – 10:30 (hosted)</i>		
Updates on Future Missions		
10:30 - 10:40	We-05 - GeoXO	S. Kondragunta (NOAA)
10:40 - 10:50	We-06 - Sentinel -4 and Sentinel-5 update from ESA	B. Veihelmann (ESA)
10:50 - 11:00	We-07 - Sentinel-4 and Sentinel-5 update from EUMETSAT	R. Lindstrot (EUMETSAT)
11:00 - 11:10	We-08 - SCISAT & Atmospheric Data Continuity and Improvement	M. Dejmek (CSA)
11:10 - 11:20	We-09 - AOS	P. Castellanos (NASA/GSFC)
11:20 - 11:30	We-10 - MAIA	D. Diner (JPL/Caltech)*
11:30 - 11:40	We-11 - PACE	A. Lyapustin (NASA/GSFC)*
11:40 - 11:50	We-12 - MEASMA - Middle East and Africa contribution to the GEO-RING	O. Emam (INTOSPASS)
Cal/Val Synergies		
11:50 - 12:00	We-13 - Sentinel-5P TROPOMI	A. Dehn (ESA/ESRIN)
12:00 - 12:10	We-14 - GEMS	M. Kang (EWha University)
12:10 - 12:20	We-15 - TEMPO	J. Szykman (EPA)/L. Valin (EPA)/L. Judd (NASA)*
12:20 - 12:30	We-16 - Pandora PGN	A. Cede (LuftBlick)*
12:30 - 12:40	We-17 - ASIA-AQ	J. Crawford (NASA)*
12:40 - 12:50	We-18 - AEROMMA TEMPO validation update	O. Cooper, B. McDonald* (NOAA)
12:50 - 13:00	We-19 - PEGASOS project	R. Lutz (DLR)*
<i>Lunch 13:00 – 14:00 (hosted)</i>		
Aerosols		
14:00 - 14:20	We-20 - PM2.5 WP Recommendations and Roadmap	B. Veihelmann (ESA) and S. Kondragunta (NOAA)
14:20 - 14:40	We-21 - Use case 1: EPA AirNow	B. Henderson (EPA)* and P. Dickerson (EPA)*
14:40 - 15:00	We-22 - Use case 2: CAMS	J. Flemming (ECMWF)
15:00 - 15:30	We-23 - Roadmap discussion	All (<i>hybrid</i>)

<i>Coffee/Tea 15:30 – 15:45 (hosted)</i>		
TEMPO Aerosol Products		
15:45 - 16:00	We-24 - NOAA Plans - Near Real Time AOD	H. Zhang (NOAA)
16:00 - 16:15	We-25 - NOAA Plans - Near Real Time Aerosol Index/Aerosol Detection	P. Ciren (NOAA)
16:15 - 16:45	We-26 - Panel discussion on Aerosol Layer Height	O. Torres (NASA)*, V. Natraj (JPL), J. Wang (U. Iowa)*, S. Kondragunta (NOAA), J. Kim (Yonsei)*, M. de Graaf (KNMI)
16:45 - 17:00	Wrap-up Wednesday session	All (<i>hybrid</i>)
17:00	Logistics for the evening and beyond	N. Kalb
17:00 Adjourn for the day		
17:15 Guided tour of the museum of the Royal Belgian Institute of Natural Sciences		
18:30 Diner in the museum co-hosted by BELSPO and BIRA-IASB		

* Remote participation

Thursday 26 October 2023		
CAL/VAL FOR THE CONSTELLATIONS		
Chairs: J.-C. Lambert (BIRA-IASB) and H. Tanimoto (NIES). Rapporteur: Ben Veihelmann (ESA)		
Generic Cal/Val Activities		
09:00 - 09:20	Th-01 - CEOS Cal/Val for Atmospheric Composition	J.-C. Lambert (BIRA-IASB)
09:20 - 09:35	Th-02 - CEOS-FRM Maturity Assessment Framework	N. Fox (NPL)*
09:35 - 09:50	Th-03 - CEOS Cal/Val Portal	P. Castracane (Rhea System for ESA/ESRIN)*
09:50 - 10:05	Th-04 - SI-Traceable Satellites (SITSat)	M. Thankappan (Geoscience Australia)*
10:05 - 10:20	Th-05 - Validation protocol for cloud and aerosol profiles	R. Koopman (ESA/ESTEC)*
10:20 - 10:30	Th-06 - GHG Cal/Val with outlook to Copernicus Contributing Missions	A. Dehn (ESA/ESRIN)
<i>Coffee/Tea 10:30 – 11:00 (hosted)</i>		
Level-1b Calibration Needs for Aerosol Retrievals - Chair S. Kondragunta (NOAA)		
11:00 - 11:15	Th-07 - Imagers	C. Cao (NOAA)*
11:15 - 11:30	Th-08 - Spectrometers	D. Flittner (NASA)*
11:30 - 11:45	Th-09 - GSICS perspective	L. Flynn (NOAA)*

Cal/Val Needs for the Constellations		
11:45 - 12:00	Th-10 - The CEOS Working Group on Calibration and Validation	A. Kuze (JAXA)*
12:00 - 13:00	Th-11 - Panel review of Cal/Val needs for the AER, GEO-AQ and GHG constellations. Discussion on the way forward (suggestions): need for framework documents, Cal/Val protocols, Task Teams, match-up databases, field activities...? General Q&A, wrap-up	S. Kondragunta (NOAA), J.-C. Lambert (BIRA-IASB), B. Lefer (NASA), H. Tanimoto (NIES), B. Veihelmann (ESA), J. Worden (JPL)
Lunch 13:00 – 14:00 (hosted)		
OZONE		
Chairs: D. Loyola (DLR) and J.-C. Lambert (BIRA-IASB). Rapporteur: D. Hubert (BIRA-IASB)		
Tropospheric Ozone Validation		
14:00 CEST	Introduction / Goals	D. Loyola (DLR), J.-C. Lambert (BIRA-IASB)
14:05 - 14:25	Th-12 - Harmonization of tropospheric ozone data records from satellites	A. Keppens (BIRA-IASB)
14:25 - 14:40	Th-13 - Homogenized ground-based column and profile ozone datasets from TOAR-II/HEGIFTOM: methods and station trends	R. Van Malderen (RMIB)
14:40 - 14:55	Th-14 - Intercomparison and geophysical analysis of harmonised satellite tropospheric ozone CDRs	D. Hubert (BIRA-IASB)
14:55 - 15:10	Th-15 - Southern Hemisphere Additional Ozonesondes (SHADOZ) Network, Data Quality Assurance, and Trends Updates	R. Stauffer (NASA/GSFC)*
Tropospheric Ozone Products		
15:10 - 15:30	Th-16 - GOME-Type tropical tropospheric ozone and S5P-BASCOE tropospheric ozone	K.-P. Heue (TUM/DLR)*
Coffee/Tea 15:30 – 15:45 (hosted)		
15:45 - 16:00	Th-17 - NASA tropospheric ozone from EPIC, OMI, and OMPS satellite measurements: Current status and science results	J. Ziemke (NASA/GSFC)*
16:00 - 16:15	Th-18 - Tropospheric Ozone and its Precursors from Earth System Sounding (TROPESS)	K. Bowman (JPL/Caltech)
Tropospheric Ozone Trends		
16:15 - 16:30	Th-19 - An update on global tropospheric ozone trends and the impact of COVID-19	O. Cooper (NOAA CSL/CIRES)
16:30 - 16:45	Th-20 - Challenges of detecting free tropospheric ozone trends in a sparsely sampled environment	K.-L. Chang (NOAA CSL/CIRES)*, presented by O. Cooper
Updates on Limb Missions		
16:45 - 17:00	Th-21 - OMPS-LP	N. Kramarova (NASA)*
17:00 - 17:15	Th-22 - OMS-L	Y. Li (NSMC/CMA)
17:15 - 17:30	Th-23 - ALTIUS	E. Dekemper (BIRA-IASB)
17:30 Adjourn for the day		

* Remote participation

Friday 27 October 2023

SPECIAL TOPICS

Chairs: B. Lefer (NASA) and E. Knowland (NASA). Rapporteur: M. Cheeseman (NOAA)

Data Assimilation

08:55 CEST	Introduction / Goals	B. Lefer (NASA)
09:00 - 09:20	Fr-01 - NASA Aerosol DA activities	P. Castellanos (NASA/GSFC)
09:20 - 09:40	Fr-02 - NASA Composition Forecast System	E. Knowland (NASA/GSFC)
09:40 - 10:00	Fr-03 - JCSDA Atmospheric Composition Activities Overview and Preparation for TEMPO DA	J. Barré (JCSDA-UCAR)*
10:00 - 10:15	Fr-04 - CAMS DA	A. Innes (ECMWF)*
10:15 - 10:30	Fr-05 - Multi-mOdel Multi-cOnstituent Chemical DA (MOMO-Chem)	K. Miyazaki (JPL/Caltech)*
10:30 - 10:45	Fr-06 - Data assimilation of multispectral vs. separate TIR and SWIR products	H. Worden (NCAR/ACOM)

Coffee/Tea 10:45 – 11:00 (hosted)

Link with Policy

11:00 - 11:15	Fr-07 - Can satellite data drive public policy for fine particulate pollution?	S. Kondragunta and M. Cheeseman (NOAA)
11:15 - 11:30	Fr-08 - Reducing climate forcing uncertainty	R. Kahn (NASA/GSFC)*
11:30 - 11:45	Fr-09 - PACE NO ₂ retrievals	J. Joiner (NASA/GSFC)*

CONCLUSION

Chairs: B. Lefer (NASA), H. Tanimoto (NIES), B. Veihelmann (ESA). Rapporteur: M. Cheeseman (NOAA)

11:45 – 12:30	Emerging AC-VC topics	All (<i>hybrid</i>)
12:30 – 13:00	Wrap-up and reflections on AC-VC activities and cooperation with WGCV ACSG Next AC-VC meeting Concluding remarks	S. Kondragunta (NOAA), J.-C. Lambert (BIRA-IASB), B. Lefer (NASA), D. Loyola (DLR), H. Tanimoto (NIES), B. Veihelmann (ESA), J. Worden (JPL)

13:00 Adjourn of AC-VC-19 / ACSG Joint Meeting 2023

* Remote participation