

MEETING

Meeting Date:	17/10/2023	Ref.:
Meeting Place:	ESRIN, Frascati IT	Chairman: Yasjka Meijer
Minute's Date:	23/11/2023	Participants: See Annex A
Subject:	GHG Task Team Meeting-3	Copy:

Minutes

Description	Action Lead	Due Date
Minutes of Meeting from the CEOS / CGMS GHG Task Team, which was held on 17 th October 2023 at ESRIN, Frascati, Italy		
The list of participants can be found in Annex A The updated Meeting Agenda can be found in Annex B Meeting documents & presentations can be found at https://ceos.org/meetings/ghg-tt-3/		
In a tour-de-table, each participant introduced his/her background, interest and foreseen contribution to the GHG Task Team (TT) activities. Overview and meeting objectives were presented, see link		
Yasjka introduced the new way the GHG TT is organized including the new mailing lists of the whole TT and the one dedicated for the leads. He is hoping to count on the area leads to push ahead the actions. There is a need to obtain the points of contact from CGMS working groups. It was clarified that the lead on Cal/Val is A. Kuze with H. Suto and B. Leifer as deputies and identified support.		
2. Updates on <u>Annex C Actions</u> Yasjka would like to be more specific on which GHGs we are dealing with - split between CO2 and CH4, and along the different spatial scales.		
System Development Facilitation (Richard Engelen, ECMWF, see link). The team hasn't made a lot of progress. There are six actions under this area. Wording in the actions is perceived unclear and was inherited from		

<p>formulations in WG-Climate. The prototype system has been covered by the Pilots and should be considered covered/closed. In general, the language appears out-of-date and would benefit from an update. The area can now also include an activity to transfer some of the acquired knowledge to other interested agencies and to WMO's G3W.</p>		
<p>Organise a dedicated meeting on definitions and to reformulate actions under System Development Facilitation</p>	<p>Lead: R. Engelen</p>	<p>In 2023</p>
<p>Stakeholder Engagement (see link)</p> <ul style="list-style-type: none"> • This area has now five actions of which three are new. • Team provided input to GCOS IP - GCOS 244, Action F5, to develop an integrated operational global GHG monitoring infrastructure. Need to update the annex C actions in response. • Some of the ideas within action Stake-2 should be removed, due to changes in industry. • Engaged quite well with IMEO in the past few years, which is now streamlined through the new IMEO working groups. • Stake-5 is a pretty weak action on its own and Mark suggests removing it. • Noted the greenhouse gas portal, as well as the GST portal. Part of the outreach component. • Monitoring the progress of these programmes is a sufficient action. • Could be hard to decouple the modelling community from Stake-2. Perhaps needs more definition. • Need to also engage with AFOLU roadmap stakeholders. Could add an action to this section. Programmes like SilvaCarbon have active engagement with stakeholders. • Yasjka is not a fan of dropping Stake-5, but perhaps it could be added as a sub-bullet of Stake-2. 		
<p>Add action under Stakeholder engagement to coordinate with AFOLU Roadmap</p>	<p>Lead M. Dowell</p>	<p>In 2023</p>
<p>Finalise update of each area in Annex C</p>	<p>All Leads</p>	<p>In 2023</p>

<p>Calibration & Validation (see link). All actions are ongoing, several important meetings over the last few months. Action formulation is good, happy to have new items.</p> <ul style="list-style-type: none"> • Would it make sense for airborne support to be included in the June Railroad Valley campaign? JAXA working with NASA AMES and comparing in situ and satellite observations. • Airborne support is covered by current actions. • From the validation context, airborne sensors are incredibly valuable. Could add a new action about highlighting their importance. • Need for validation over ocean 		
<p>Add new actions covering importance of airborne sensors and need for validation over ocean</p>	<p>Lead A. Kuze</p>	<p>In 2023</p>
<p>3. GHG Cal/Val Networks</p> <p>J.-C. Lambert presented on this agenda item (see link), which came from an action taken at WGCV-52, and following a discussion held at two teleconferences held in August and September. The WG-CV developed a set of eight recommendations (see below) for sustainability of networks required for GHG monitoring. John asked about the criteria for deploying new sites. These need to be established and there are some ideas but nothing concrete.</p>		
<div style="background-color: #1a3d4d; color: white; padding: 5px;"> <p>Recommendations for Networks Sustainment CE </p> </div> <ol style="list-style-type: none"> 1. NETWORKS DESIGN AND EVOLUTION: to support gap analysis studies with a view to tailoring CO₂,CH₄ and N₂O networks deployments to Cal/Val needs of the GHG satellite constellation: background/hot spots, land/ocean, low/high albedo, full range of atmospheric temperature... 2. INSTRUMENT DEPLOYMENT: (i) to further develop (low-cost, light-weight, mobile) low-resolution infrared instruments; (ii) to support standardized production of enclosures for their deployment in the field; (iii) to maintain a supply of spare parts. 3. CALIBRATION: to support the development of and maintain mutually consistent calibration and QA/QC of the GHG Cal/Val networks – <u>within</u> and <u>across</u> networks. Key actions: (i) traceability towards internationally agreed standards; (ii) more regular and network-wide deployment of traveling standard; (iii) more regular intercomparisons within and across networks, and between in situ (AirCore...) and remote sensing (networks); (iv) facilitate AirCore deployment; (v) establish a central AirCore data archive. 4. DATA PROCESSING: to support GHG Cal/Val network data processing improvements needed to maintain FTIR data precision/accuracy and meet future goals: formal intercomparison exercise of the GGG and PROFFAST retrieval algorithms, development and standardization of profile retrievals, spectroscopy studies. 		

<p>5. DATA ACCESS: to establish interoperable <u>GHG Constellation Cal/Val Data</u> archives and tools for tailored network data (traceable, open, metadata, co-located...) and 'hidden' data (e.g. campaigns), ideally coupled to New Space related matchup database(s).</p> <p>6. TIMELINESS: to organize concertation between stakeholders and with networks data providers to support rapid and continuous availability and improved access to networks-wide GHG data.</p> <p>7. CENTRAL PROCESSING FACILITIES (CPF): to establish central processing facilities for every network product, which will directly support harmonized calibration (3), data processing, QA/QC and tailoring (4-5) and timeliness (6).</p> <p>8. GHG EMISSIONS AND ATTRIBUTION: to support the development of new Cal/Val protocols for satellite derived GHG emissions and fluxes, in collaboration with relevant bodies and initiatives (global stocktakes, WMO GGGW, UNEP IMEO, New Space...) Consider co-located measurements of GHG and tracers of anthropogenic/biogenic contributions for better attribution of emissions.</p>		
<p>T. Marbach presented on EMETSAT's Cal/Val Support Strategy (see link) including fiducial reference measurements (FRM). EUMETSAT is working toward service agreements with TCCON & COCCON</p>		
<ul style="list-style-type: none"> • It is important for EUMETSAT, as an operational agency, to ensure, as far as possible, a gapless provision of data in support of its Cal/Val activities, including for FRM when mission needs change or new needs arise. • The EUMETSAT FRM roadmap provides a process to monitor such data provision by <u>centralising</u> the EUMETSAT mission needs which are identified through the mission requirements and Cal/Val plans. • The resulting gap analysis identified targeted support to the AC and AQ missions operated by EUMETSAT • In particular the GHG missions, like CO2M, are actively working on Cal/Val solutions through studies and interactions with networks and entrusted entities. 		
<p>Following both presentations under agenda item 3, Yasjka invited the presenters to reflect on what should be included in the action list for the area Calibration & Validation. Possibly some actions need to be updated and some of the recommendations should be included as new actions.</p> <p>It was noted that there is an opportunity to discuss further at the joint meeting of the AC-VC and WG-CV AC-SG, which is scheduled for next week.</p>		
<p>4. Updates on <u>Annex C Actions</u> (continued)</p>		
<p>Operational Preparation and Training</p> <p>This area was left without lead and as such is responsibility of the whole task team. Yasjka suggested we could group them into another area. Mark suggested CGMS WG-4 could lead this area together with CEOS WGCapD, who should be able to support.</p>		

Connect “Operational Preparation and Training“ area to CGMS WG4 and WG CapD	J. Privette	In 2023
Sensor Development (see link): <ul style="list-style-type: none"> • Sens-1 has been completed. It can be removed from the list. • Suggest Sens-2 be moved to the cal/val list. Action has been slightly reworded. • Sens-4 will be moved to the stakeholder section. • Sens-5 to -7 has been reworded and the GHG TT agreed to new formulation 		
Move actions Sens-3 & -4 under “Calibration & Validation” in Annex C	W. Su	In 2023
L1 & L2 GHG Product Development (see link). There has been much progress on all actions. The team doesn’t want to change any formulation of the actions, which are considered very actionable and should remain open.		
Flux Inv. Model Development. Kevin and Frederic were not able to join, Yasjka will follow up with them offline.		
5. NewSpace Coordination for GHGs J. Worden presented on NewSpace in the context of GHG observations (see link). Currently ten of the fifteen facility-scale monitors are from new space, but this also depends on the vague definition of what NewSpace really entails/means. Intellectual property is a concern and plays a role in lack transparency on data provenance and processing. NewSPace should present their data compared to benchmark missions. Exact guidelines will need to be formulated as part of the GHG TT’s upcoming efforts.		
6. GCOS Implementation Plan Response Yasjka presented (see link) the responses as formulated for specifically four GCOS activities, relevant to space-based GHG observations. The CEOS response has meanwhile gone back to GCOS for potential further iteration.		
7. CEOS Deliverables. An overview of the current status and proposals for closure was presented by Yasjka (see slide 10 of link).		

<p>8. Auditing scheme for satellite-derived methane emissions products</p> <p>P. Green with support of P. Palmer jointly presented (see link) on a joint activity with NPL-UKSA support activity, which is working toward an audit for satellite derived methane emission products.</p> <ul style="list-style-type: none"> • The proposed standards will address emissions at all the scales, which would allow for synthesis and interoperability • Traceability from level 1 to level 4 data will be required. Transparent process description and estimation of uncertainties. • Uses CEOS endorsed QA4EO programme • Workshop to be hosted in Q1 2023 in the UK. Details will be shared as soon as available. 		
<p>9. GHG Mission Portal</p> <p>The newly developed GHG Mission Portal was presented by S. Ward (see link)</p>		
<p>Meeting was closed at 17:00 CEDT</p>		

Annex A

List of participants

CNES	Carole Deniel
Crisp Spectra	David Crisp
DLR	Albrecht von Bargaen
EC-JRC	Mark Dowell
ECMWF	Richard Engelen
ESA	Yasjka Meijer, Susanne Meckelenburg, Simon Pinnock, Stefano Casadio, Paolo Castracane Angelika Dehn, Giacomo Gostinicchi, Stephen Briggs
EUMETSAT	Thierry Marbach, Joerg Schulz
JAXA	Hiroshi Suto, Akihiko Kuze
NASA	Christine M. Bogner, Shanna Combley, John Worden, Argyro Kavvada, Barry Lefer
NOAA	Shobha Kondragunta, Ken Pryor
SIT Chair Team	Libby Rose, Stephen Ward
UK NPL	Paul Green
UKSA	Beth Greenaway
Uni Edinburgh	Paul Palmer
WGClimate	Jeff Privette
WGCV	Philippe Goryl (ESA), Jean-Christopher Lambert (BIRA-IASB)
WMO	Natalia Donoho

Annex B: Meeting Agenda

CEOS/CGMS Working Group on Climate Greenhouse Gas Task Team 3rd Workshop

17 October 2023, 1-5pm CEST
ESA-ESRIN Room U & Virtual

Topic	Time (CEST)
1. Welcome, Introductions	13:00
2. Updates on Annex C Actions (10 min each): <ul style="list-style-type: none">a. Stakeholder Engagement (Mark Dowell, EC)b. System Development Facilitation (Richard Engelen, ECMWF)c. Calibration & Validation (Akihiko Kuze, JAXA)	13:10 13:20 13:30
3. GHG Cal/Val Networks <ul style="list-style-type: none">a. GHG Cal/Val Networks Sustainment (Jean-Christopher Lambert, BIRA-IASB)b. EUMETSAT's Cal/Val Support Strategy (Thierry Marbach, EUMETSAT)	13:40
4. Updates on Annex C Actions (continued) (10 min each): <ul style="list-style-type: none">a. Operational Preparation and Training (Yasjka Meijer, ESA)b. Sensor Development (John Worden, NASA/JPL)c. L1 & L2 GHG Product Development (Ruediger Lang, EUMETSAT)d. Flux Inversion Model Development (Kevin Bowman, NASA/JPL)	14:10 14:20 14:30 14:40
5. New Space Coordination (John Worden, NASA/JPL) <ul style="list-style-type: none">o Development of evaluation criteriao Supporting validation activitieso Climate finance	14:50
6. GCOS IP Response (Yasjka Meijer, ESA)	15:10

Coffee Break	15:30
7. CEOS Deliverables (Yasjka Meijer, ESA) <ul style="list-style-type: none"> ○ CARB-23-01: Lessons learnt from pilot CO2 and CH4 products due Q2 2023 (June) – OVERDUE ○ CARB-23-02: Standards for uncertainty monitoring of flux estimates due Q3 (Sept) 2023 ○ CARB-23-03: GCOS IP response for GHG-related activities due Q3 2023 (Sept) ○ CARB-23-04: Update GHG Roadmap due Q2 2023 (June) – OVERDUE ○ CARB-23-05: New Space and GHG product development and standards setting due Q3 2023 (Sept) 	15:50
8. UKSA / NPL Auditing scheme for satellite-derived methane emissions products (Paul Green, Paul Palmer)	16:30
9. GHG Mission Portal (Stephen Ward, SIT Chair Team)	16:45
10. AOB <ul style="list-style-type: none"> ○ Next workshop plan 	16:50
11. Adjourn	17:00

Background documents:

- Action Spreadsheet
- GHG Roadmap document
- [Final report from the CEOS Reporting Emissions Workshop, 3rd July 2023](#)