CEOS-CGMS Working Group on Climate 11th Plenary

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Minutes

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1 Introduction and Context

Welcome and Round Table Introduction

Jörg Schulz (EUMETSAT), WGClimate Chair

Jörg Schulz welcomed everybody to the 11th WGClimate Meeting (WGClimate#11) and suggested that the meeting would start with a *tour de table* so that all participants would have the chance to introduce themselves and get to know the other participants. Jörg moved on, conveying the attendants some apologies for absence: Mark Dowell (EC) apologised for absence, but will be joining parts of the meeting via WebEx and will attend the CEOS-SIT Technical Workshop in Fairbanks as well. This allows further discussion related to the WGClimate GHG Task Team. Chris Merchant (UKSA) cannot attend due to the overlap in time with the final meeting of the EC Project FIDUCEO, of which he is the PI. Selma Cherchali (CNES) was not able to come, due to holiday schedule, but she confirmed her continuity as the CNES delegate. Eunha Sohn (KMA) is still the KMA delegate to the WGClimate but was not able to come, and other ongoing bilateral meetings did not allow other KMA representatives to replace her.

Acceptance of the Agenda

Jörg Schulz (EUMETSAT), WGClimate Chair

Jörg Schulz went through the agenda, briefly commenting on the status of some open actions from the WGClimate#10 and emphasising the main goals set for this meeting.

Day 1: Jörg informed that there was not much progress on the (F/I/T)CDR definitions front, but both Jeff Privette and him drafted some lines in response to the decisions made in the previous WGClimate meeting. As for the non-GCOS ECVs and their inclusion in the ECV Inventory, the emphasis will need to be on the role they play, and how they are selected for inclusion in the inventory. A better understanding of commonalities and non-overlaps between the WMO Catalogue for Climate (based on a stewardship maturity matrix) was expected from the dedicated presentation and following discussion. Concerning case studies, CNES informed that it will not contribute at this point, and a clarification of the WMO contribution is expected. Nevertheless EUMETSAT and ESA will present proposals for Case Studies during the meeting. About the Website climatemonitoring.info, the discussion regarding the future approach will be held during the meeting. The attendants will be updated on the status and future of SCOPE-CM, following the decisions made during the CGMS-47 Plenary. Upcoming SBSTA-51 and the COP-25 Earth Info Day: a discussion on organisation, with an eye on the rigid deadlines is part of the agenda.

Day 2: The ECV Inventory and associated Gap Analysis process will take most of the day. An overview of the current status of activities and the foreseen delays for completion will trigger the discussion on changes in approach for the future and/or allocation of extra resources from Space Agencies. Time allowing, work sessions for the preparation of the Gap Analysis Report will be held during the meeting.

Day 3: Joint session with the CEOS Land-Surface Imaging Virtual Constellation (LSI-VC) aiming at a discussion of actions resulting from WGClimate's coordinated action plan on land surface. This is about establishing understanding of actions and possible contributions, upcoming work on the Biomass ECV and connection with the WGClimate-led GHG activities/actions. In addition, an update on the CEOS MIM database and links with the WMO OSCAR database is planned to be disucssed. After the joint session, the WGClimate will reconvene separately for the review of actions and adjourn.

There were no suggestions of change or additions to the agenda.

Status of Working Group

Jörg Schulz (EUMETSAT), WGClimate Chair

Jörg Schulz opened the presentation informing the attendants that regarding the leadership of the WGClimate, everything is now solved and "back on track": Jörg will remain as chairperson until the 34th CEOS Plenary (October 2020), when Albrecht von Bargen, officially vice-chair since June 2019, will take over. In early 2020 the WGClimate will ask for nominations for the next vice-chair. Following the alternating CGMS / CEOS chair approach, it will be up to CGMS Agencies to step forward.

On the status of the WGClimate, Jörg moved on with a summary of the main achievements since the previous meeting [WGClimate#10 in Marrakesh, March 2019], highlighting:

- the outcomes of the CGMS-47;
- the contribution to the CEOS 2019-2021 Work Plan;
- the interaction with UNFCCC / SBSTA and also IPCC, WMO, and WCRP;
- the progress made on the ECV Inventory and the Gap Analysis;
- a contribution on the WGClimate published in the CEOS Newsletter [No.53, August 2019].

A brief reminder of the goals set for this meeting were used to set the context expected for the next meeting of the WGClimate, to be held very likely around 8 months after this one, prior to the CGMS-48 Plenary (May 2020); the possibility of having an Asian space agency hosting the meeting will be pursued.

The discussion following Jörg's presentation was mainly focussed on the support to a more active participation of ISRO and CMA, and also on a closer cooperation with the CEOS Virtual Constellations (VCs), namely on their support to the Gap Analysis activities. On the latter, it was recognised that the few attempts made so far by the WGClimate were not very successful, and suggestions were discussed on how to better foster and coordinate this WGClimate / CEOS-VCs cooperation. It was pointed out that the results of the upcoming CEOS-SIT Technical Workshop on a possible reorganisation of the VCs may affect decisions on approach. It was decided to bring up this topic during the CEOS-SIT TW, in the form of a statement of needs of the WGClimate that the VCs could help fulfilling.

The next topic emphasised was the contribution of the WGClimate to the next GCOS-IP, and how to make sure that a timely input can be provided with respect to the product requirements set for the ECV Products that would be taken up by the GCOS Science Panels, unlike the outcomes of past attempts. The potential involvement of CEOS and

CGMS with a supporting role to this endeavour was discussed, with concerns being expressed over the risks of a lost opportunity of reformulating the approach to the requirements (e.g. considering application-dependent requirements) to result in a non-representative IP. Robert Husband volunteered to draft a formal letter from CEOS (and/or CGMS) asking GCOS to report on the status of the process that should have been triggered by the WGClimate recommendations on the requirements for ECV Products.

After meeting information: This letter was not send as the outcome of the CEOS Technical Workshop in the week after WGClimate #11 led to a direct interaction of the WGClimate Chair with the CEOS Secretariat.

As a closing topic, there was a discussion on the objectives of the joint session with the LSI-VC. Mark Dowell, not able to attend that session, suggested that the emphasis, regarding the GHG Monitoring Activities, could be focussed on integrating ongoing efforts to monitor Land Cover, Above-ground Biomass, and GHG. As a preparation for the CEOS-SIT TW, there could also be an attempt to have the support of the LSI-VC on bringing together the land, ocean, and atmosphere communities regarding the GHG monitoring.

Status of GHG Task Team and Roadmap

Mark Dowell (EC, GHG Task Team) et al.

Mark Dowell based his presentation on the set of slides on the development of the GHG Roadmap prepared for the upcoming COES-SIT TW. After a brief reminding of the context leading to the creation of the WGClimate GHG Task Team, Mark emphasised the positive situation regarding the GHG space-observation missions timeline, but with the period 2023-2025 relying mostly on the launch of GOSAT-3/GW.

When presenting the system-level approach for the integration of atmospheric data, Mark also identified the need to build a stronger relationship with the traditional community on terrestrial and ocean domains as a driving aspect to be taken up by the GHG Task Team, following the approach already discussed during WGClimate#10 meeting. A coordination of a distributed action plan involving many entities (e.g. CEOS AC-VC and WGCV, CGMS GSICS, etc.), these depending on the perceived needs as the project moves forward.

The main outcomes of the GHG Task Team meeting held in Tokyo in the second week of June were:

- the review of objectives and the boundary conditions when formulating the Roadmap;
- the decision to follow an iterative versioned approach for the implementation of the Roadmap;
- the prototyping of processes and outputs, times and horizon, and distribution of tasks among the CEOS and CGMS entities involved, and;
- the start of a discussion on the resources needed to accomplish the envisaged work.

Regarding the expected outcomes and impact, Mark referred that the Space Agencies have a window of opportunity to make a significant impact on the Paris Agreement. For

this international coordination is crucial, no matter how many resources are needed on the individual agency level (staff and research funding, travel and hosting of Workshops). It is important to engage with user communities on the GHG inventory and longer term support for the advancement of the state of the art in a rolling prioritization of research activities that should be implemented in terms of the internal funding programmes on an agency level. Mark provided links to the draft Roadmap document and Timeline Elements, informing that the Roadmap document still needs a fair amount of work, needing to be solid before the 2019 CEOS Plenary. To conclude, Mark listed a few points for discussion: GHG ECV requirements (how does the WGClimate use the interface to GCOS?), interface to users' communities (GEIA, etc.), the relationship with e.g. SBSTA (how to inform and educate?), and how to transition from scientific to operations background.

Discussion on of GHG Roadmap

David Crisp suggested that the WGClimate actions should include research to operations transition, provide a tool to be used to track the capabilities of partners, identifying requirements and deliverables linked to those. He added that these could be written into the Roadmap, which should be good enough to be understood and conveyed to the CEOS SIT TW [week after in Fairbanks] with the justification of the resources being asked for.

Albrecht von Bargen agreed with the inclusion of these actions in the Roadmap, but Robert Husband expressed concerns regarding the request for resources at such an early stage, emphasising the need for planning and harmonisation between the Timeline Elements and the project timeline.

Regarding the User Requirements, Robert advocated an active role of the WGClimate / GHG Task Team in the interaction with GCOS, in order to guarantee that the outcome is satisfactory. Mark Dowell suggested as a starting point to adopt an approach similar to that laid out in an article submitted to BAMS from the point of view of Copernicus programme, with high-level needs. Jörg Schulz emphasised the difference between the approach followed by GCOS in the definition of requirements and the objectives of the GHG activity. David emphasised that the GHG Task Team should embrace this activity, and suggested that the knowledge of the observation capabilities and the respective timelines could be provided as a baseline. Interaction with IPCC, SBSTA, etc. would then help understanding what the other parts of the system would add to that, and this should be enough to drive the process with the GCOS panels. Jörg pointed out that what David had just described was what the GCOS panels should be doing. Mark agreed that the GHG Task Team is more informed on the GHG requirements then what GCOS is, but the approach should not break the system that is in place, where missions are being justified based on the User Requirements. Jörg suggested that a possible approach would be to have the GCOS Panels following an application-specific requirements approach, and consider this GHG activity one of the very relevant applications. David added that the ECV Requirements written in the 2011 and 2016 GCOS IPs, which will very likely never be met, are not traceable, and that the GHG Task Team can show how the different components of the system can contribute to the end values. Mark expressed his hope on having in the next GCOS IP at least threshold and goal values for the requirements, and

suggested that the creation of a dedicated Working Group in the GEIA framework might be helpful in the process, adding that one of his EC colleagues had offered to champion that in the committee.

Regarding the presentation that Mark would give the week after during the CEOS-SIT Technical Workshop, and the preparation for the CEOS Plenary in October, Robert suggested that more work should be done on architecture and versioning (what is needed to get to each version, beta-testing, upgrading, and system design), so that the fundamental elements become understandable to the audience. Robert proposed that the constituent elements and the functional architecture of the successive versions of the system should be outlined, and the entity responsible for the definition of each version identified, preferably by the GHG Task Team. He further noted that version 3 is what UNFCCC will need, and that the parallel and serial links between this version and all the previous ones should be clear. David observed that the work done so far had not gone far enough on the versioning approach, and that the role of CGMS in the transition from research to operations should be made clear by integrating specific elements from CGMS in the planned activities for 2023-2025. David also informed that several products are maturing in parallel, e.g. regarding the inventories and the requirements, but none was yet mature to a satisfactory level. He further clarified to Jörg that these were high-level target requirements for spatial / temporal resolution, which would not be met by v1 but would instead represent the state of the art. It was agreed to hold a meeting with Mark the week after in Fairbanks to streamline and complete the presentation in light of the discussion.

WGISS Carbon Portal Demo

Eugene Yu & Liping Di (George Mason University, WGISS)

Eugene Yu gave a short presentation on the objectives and current status of the WGISS (CEOS Working Group on Information Systems and Services) Carbon Community Portal (https://gis.csiss.gmu.edu/carbon/cwicport/), followed by a brief demonstration of the tools and capabilities of the web interface.

Mark Dowell added that WGISS has been contributing a lot with what was expected from them. It would now be the time for other actors to explore the added-value brought by the portal, suggesting that the WGClimate together with other CEOS WGs and VCs could provide input to help tailoring the portal to specific needs of user communities, for applications on e.g. agriculture, forests, GHG monitoring. Jörg Schulz thanked the presenters for the overview and Mark for providing a bit more of context. Jörg also suggested the presenters to link the portal to the relevant content of the ECV Inventory, further encouraging a crossover of information between the portal and the Inventory, to make sure that all the Carbon-related CDRs in the *existing* component of the ECV Inventory, i.e. CDRs already produced and released, will be actually listed in the portal. Following Mark's suggestion, Jörg added that during the following week at the CEOS-SIT Technical Workshop, a discussion could be started on the different needs of the flux and stock communities and their potential relation with the development of integration tools for browsing different datasets using the portal. David Crisp supported the idea of the WGClimate joining efforts with other entities to bring the portal up to speed, suggesting

that the portal should have the critical capacity of linking measuring capabilities to products being developed. Mark further suggested that the portal should allow the combination of in-situ and satellite data, as that might be a useful tool for a future integration of the two types of data, adding that the portal should be tailored to a set of critical application areas only. Jörg asked Mark whether this could be a meaningful discussion with the stakeholders, and Mark agreed that it would be a good contribution from the WGClimate. David added that among the many applications that the portal could have, specific to different communities, the WGClimate should focus its contribution on having the portal allowing users to track down CDRs addressing specific applications. It was agreed that the WGClimate would follow-up on this discussion, explore capabilities of the WGISS Carbon Community Portal and synergies with GHG monitoring activities, and provide guidance for further evolution of the Portal to WGISS [***Action WGClimate11-1***].

2 Data Record Definitions

Update of FCDR, CDR, ICDR Definition

Jörg Schulz (EUMETSAT), Jeff Privette (NOAA) & Chris Merchant (University of Reading representing UKSA)

Jörg Schulz gave a short presentation on the recap of the discussion of definitions, briefly revisiting the overall context in which the process was started, and the main outcomes of the discussion held during the WGClimate #10 meeting. Jörg further informed the attendants that not much progress had been achieved since the previous meeting. This was followed by a presentation by Jeff Privette, adding details of the earlier proposed definitions and making suggestions for the way forward. Jeff expressed his concerns with respect to the strictness of the original definitions and proposed revisiting the GCOS guidelines from a more practical angle, in the shape of "non-functional requirements".

Discussion and eventual endorsement of proposals

All

In response to Jeff Privette's suggestions, Jörg Schulz pointed out that an excessive moderation of the definitions might automatically turn existing long time-series of in-situ data into CDRs. David Crisp remarked that it should be taken into consideration that within, e.g., GSICS and WGCV, almost all Cal/Val activities rely on some sort of ground truth data, being therefore important to not exclude in-situ data from the definitions. Jeff agreed that the definitions should be general enough to encompass both satellite and in-situ data.

Regarding the definition of FCDR, most of the discussion was focussed on the quantification of the uncertainty, and how to best phrase it. Wenying Su asked whether any constraints should be put on the length of the datasets, and Jörg reminded that the main issue is the application-dependent requirements for length, but also the specificity of the signal being measured, further adding that Chris Merchant had once suggested establishing a minimum threshold of 10 years.

During the discussion on the definition of the ICDR, Jörg suggested that it should be emphasised that the system used to produce the dataset should not be changed, with respect to that of the nominal CDR. Robert Husband remarked that the usefulness of ICDRs for reporting and their scope of application might impact timeliness. Simon Pinnock added that the timeliness of ICDRs might force changes in approach [system usage] but that the differences [with respect to nominal CDRs] should be quantified. Jörg emphasised the need for the definitions to be very clear with respect to the exact meaning of the words used.

The discussion on the requirements a CDR should fulfil in order to be compliant with the GCOS guidelines was opened by a suggestion from David to replace the list of non-functional requirements by a peer-review process. Jörg noted that it might be difficult to use that term for the whole process (e.g. code is not usually made public), which was acknowledged by David. Robert observed that the link to the GCOS guidelines should be kept, took the view that the WGClimate, as a link to the Space Agencies, could replace those, as they should be in any case reviewed. Jeff agreed with Jörg, suggesting that the link should be between the definitions and the guidelines. Misako Kachi questioned the inclusion of some of the GCOS guidelines, namely those regarding extensibility and sustainability, as they concern the ground segment rather than the measurements and retrievals. Misako further suggested that it would be useful to distinguish between essential and non-essential requirements for the production of CDRs, arguing that it might be impossible for many data producers to fulfil them all, and guidance on priorities would be much appreciated. Jeff agreed that many of the current guidelines are not followed, simply because it is not doable. Robert Husband advised caution on the proposed guidelines, so that they would not affect the ECV Inventory.

To conclude the discussion, with no agreement on the final definitions, Jörg suggested that the best way forward might be starting to write a publication, to help structuring ideas, and observed that the impact that such a publication could have on the community, as highlighted by Misako's suggestion, would ask for an especially cautious approach. Jörg proposed that Jeff and Chris should lead the writing of a publication on this topic, to provide some guidance to the community. Jeff was tasked to contact Chris and start structuring the publication, building up on the work already done on the definitions and categorizing the additional information, as well as initiating contact with potential reviewers [***Action WGClimate11-2***]. Wenying suggested the inclusion of examples and pictures in the publication, to make it more appealing. In answer to a question by Simon Pinnock, Jörg advised to involve GCOS only at a later stage, as part of the review process.

The role of non-GCOS ECVs for the ECV Inventory

Jeff Privette (NOAA)

In his presentation, Jeff Privette set the context that had triggered the discussion of the relationship on non-GCOS climate variables and the ECV Inventory. Jeff advocated the non GCOS-exclusiveness, and proposed some criteria that could be used to decide whether CDRs addressing such non-GCOS variables should be included in the Inventory.

David Crisp and Simon Pinnock expressed their concerns with the potential "explosion" of the number of datasets in the ECV Inventory as a consequence of detaching it from the GCOS reference. Simon added that it might also dilute the ECV Inventory's authority and obscure the ECV CDRs. David also suggested that the WGClimate should set a bar, asking the data producers to show that the variable being proposed for inclusion is of high value for climate applications. Jeff noted that most of the input would come from the already contributing Agencies, and those could perform a pre-submission screening of their own data records holdings.

Jörg Schulz explained that there are occasional offers to the ECV Inventory of CDRs addressing non-GCOS variables. The ad-hoc criteria used so far has been the existence of references to those variables in the GCOS IP, e.g., the variable is listed as an ECV (Product) but not labelled as space-observable, is a proposed ECV, or mentioned as a proxy or auxiliary measurement only. Jörg observed that there are nonetheless cases of variables that are not mentioned at all in the GCOS-IP, even though they are widely used as part of climate applications (e.g. NDVI as input to Land Cover) or for the characterisation of extremes. He agreed overall with an acceptance of inclusion in the ECV Inventory subject to justification, and noted that a nomenclature for these cases will also need to be discussed. David suggested the use of the IPCC report as a source for variables needed for the characterisation of the climate system.

It was agreed that Jeff would lead the activity of preparing the process of inclusion of non-GCOS climate variables in the ECV Inventory, also involving the CEOS VCs for information on usage/relevance of such variables [***Action WGClimate11-3***].

3 Activities towards and with Stakeholders & Partners

WMO Catalogue for Climate Data

Christina Lief (WMO) & Werner Balogh (WMO)

Christina Lief presented the recently created WMO Catalogue for Climate Data, explaining its main characteristics, recent developments, and underlying rationale. She finalised her presentation with an overview of the planned way forward, expressing her openness to cooperate with the WGClimate and find synergies with the ECV Inventory.

After thanking Christina for the information provided, Jörg Schulz expressed his concern with the respect of the criteria being applied to select the datasets included in the catalogue, mainly in what concerns their classification as CDRs, emphasising that different diagnoses may irritate the community, and questioning the choice of datasets currently listed in the Catalogue. Christina explained that the decisions of inclusion are made by Subject Matter Experts (SMEs), and that there is also a cooperation effort with GCOS, which is also involved in the project. She further added that the current 18 datasets are simply a pilot, and that after this implementation phase, more datasets could be added: synergy with the ECV Inventory would be welcome.

Jörg acknowledged that the use of the System Maturity Matrix adds information on Stewardship, with respect to the ECV Inventory, but pointed out the need to rely on SMEs

to fill and review the matrix, wondering whether such an approach would be sustainable. Jeff Privette noted that in order to avoid Reviewer- and Responder-fatigue, it would be advisable to align and synchronise approaches between this catalogue and the ECV Inventory, and to consider the option of machine-to-machine connection processes. Werner Balogh explained that he was not involved in the activity and that only by chance he actually learned about it, therefore no coordination effort could have been done at an earlier stage. Jörg reiterated his view that a link between the WMO and the WGClimate databases should be established to avoid the coexistence of two different approaches at least in what satellite-derived CDRs are concerned, and volunteered to send a proposal to Christina, in coordination with Werner [***Action WGClimate11-4***].

Case Studies: confirmation of role of WMO

Werner Balogh (WMO)

Werner Balogh opened his presentation with a short note on the approval of the WMO Resolution 51 (Cg-18) ("Implementation of the Architecture for Climate Monitoring from Space") during the 18th Session of the World Meteorological Congress in June 2019, after being acknowledged by the CEOS-SIT-34 and the CGMS-47. It was decided that the final text would be disseminated together with minutes of the current meeting [available at https://library.wmo.int/doc_num.php?explnum_id=9827#page=177].

In his presentation regarding the preparations for a new report of case studies to illustrate the implementation of the architecture for climate monitoring from space, Werner revisited the document compiled by Stephan Bojinski et al. in 2015 (WMO-No.1162), highlighting its main characteristics with respect to structure and selection of cases. Werner reminded the attendants of the topic-relevant actions resulting from the WGClimate #10, and confirmed the availability of WMO to lead the development and publication of a new case studies report (at least in pdf). He further provided a short summary of the outcome of his attempts to engage GFCS and GCOS in this initiative: both entities offered potential assistance in identifying case studies and publicizing the report (provided their logos are placed on the cover), and GCOS might also be able to provide some modest editorial support by allocating human resources. Werner concluded his presentation with a proposed timeline for the development of the project, from kick-off to publication of the report.

Jörg Schulz thanked Werner for his thorough presentation, acknowledging that the work already done is valuable introduction material for the project to be launched. He further remarked that the proposed timeline is very ambitious, noting and supporting the attempt to adjust it to the schedule of some relevant coordination meetings.

Jörg also agreed with the approach of taking the Bojinski et al. Case Studies Report from 2015 as an initial guideline, but observed that the structure should be revisited, and the link to the ECV Inventory, new to this report, clearly established. Jörg also clarified that only the logos of CEOS, CGMS, and WMO should be shown on the front cover, with other supporting entities (e.g. GFCS, GCOS) having their logos on the back. Regarding the selection of case studies to be included in the report, Werner asked whether cases from the previous report should be revisited or only new cases included -- with potential

contributions from GFCS, GCOS, ESA, NASA, CNES-SCO, EC, EUMETSAT / CM-SAF, NOAA, etc.. Robert Husband suggested the focus on examples including decision-making and, if possible, coming from the public sector, and Jeff Privette added that the inclusion of resulting economic benefits would be an asset. David Crisp observed that the case studies included should clearly illustrate that satellite data are very often the sole source of information, e.g., global applications, and Jeff noted that regional cases have the advantage of potentially motivating similar applications in other locations where the same kind of data is available. Jörg advised caution on the selection of cases that do not rely on satellite-derived CDRs: the use of ICDRs should be well justified (e.g. C3S), and the cases based on reanalysis should clearly show the impact of satellite data in the output. It was agreed to pre-select three to five cases from each proposing entity, and then decide which ones would be developed, in order to ensure a good range of scenarios and a representative geographical distribution. In addition to the case studies selected for the report and subject to the proposed timeline, other case studies could also be made available online at a later stage, on the climatemonitoring.info website, which could be updated on an ongoing basis. The report, although more limited in examples, would have a longer "shelf life". For each case study proposed, a point of contact should be provided to the WGClimate, for coordination in case of selection.

The discussion moved to the contents of the Introduction and its customisation towards the main goals of the report and the intended target audience. It was agreed that the report should serve as a source of learning material for users interested in applications, and as a showcase of usage of satellite-derived CDRs (also for data producers) with a link to the ECV Inventory whenever possible. In light of that objective, the proposals regarding the style and contents of the Introduction were for it to be light and focussed on the bigger picture, with little emphasis on the political aspects and without going into much detail regarding the description of the architecture for climate monitoring from space.

To conclude, the timeline proposed by Werner was revisited and it was agreed that he would send around a template to be used for each case study, to be reviewed by the WGClimate [***Action WGClimate11-5***]. The report is planned to be delivered by June 2020 [***Action WGClimate11-6***], and presented at the planned side event during the WMO Executive Council (EC-72) [***Action WGClimate11-7***]. The WGClimate will act as the review board, and end-of-chain reviewers will be added for an assessment of terminology and clarity, among others.

Case Studies: pre-selection of case studies

Simon Pinnock (ESA) & Jörg Schulz (EUMETSAT)

Simon Pinnock presented an extensive list of potential case studies, retrieved from the work plans of the ESA-CCI projects. The work-in-progress nature of these cases, with their development scheduled for the following 12 to 24 months, and therefore not compliant with the report timeline, would make them candidates for a later publication on the climatemonitoring.info website only. Simon offered to look for further examples that could be taken out of previous projects, in case more case studies would be needed for the report. Simon also emphasised the fact that although all the examples shown are to be pursued by the projects teams, irrespective of being selected to be included in the

WGClimate activities, some might not achieve the planned results, due to the research component involved. Jörg Schulz also presented a list of potential case studies based on projects being developed by EUMETSAT as part of its User Training Activities.

Jeff Privette suggested an approach also open to cases where satellite-derived CDRs are part of the input to a decision making process, even if only in combination with real-time data, and that the range of scenarios to be considered could encompass examples more focussed on research, on services, or on decision-making. Robert Husband observed that the selection process should follow some disciplined approach, in order to include a representative and balanced range of examples: global, regional, local, public sector, commercial, etc., and mentioned the IPCC as a good source of ideas for cases classifying both as public and global. Selma Cherchali, Mark Dowell, and Wenying Su will attempt to provide some more examples of case studies based on projects pursued or supported by CNES, EC, and NASA, respectively [***Action WGClimate11-8***].

Evolution of climatemonitoring.info

Jeff Privette (NOAA), Robert Husband (EUMETSAT) & Simon Pinnock (ESA)

In his presentation, Jeff Privette revisited the terms of reference of the WGClimate as a reference frame for setting the context of an evolved website, and presented a few suggestions regarding the structure and layout of the landing page of climatemonitoring.info, depending on the intended target audience.

Opening the discussion, Jörg Schulz observed that all the official information about the WGClimate membership, meetings and respective material (agendas, minutes, supporting documents) would still be placed exclusively on the CEOS website. Robert Husband proposed that the agreement on a central point for the website would be helpful in deciding on the evolved structure and contents. Robert further suggested the Case Studies to be considered as a shop window to have applications as a central point, based on the fact that the current EC funding for the ECV Inventory aims at supporting the policy decision-making. He also noted that the ECV Inventory, another option, might be too technical to be used as a central point for the front page, and should be instead highlighted through links from the case studies, leaving the technical details of the CDRs still accessible to the users who are interested. Robert emphasised that the contents and appearance of the front page are the key to capture the users' interest. David Crisp supported Robert's view stating that what affects people's lives brings people in, therefore suggesting that climate monitoring from space should be presented in its key roles on decision making for agriculture, energy production, transportation, city planning, etc..

Jörg agreed with the views expressed, observing that most decision–making people are more interested in reports than in data, thus supporting that the bridge to decision-making should be done with application examples and the respective case studies linking back to ECV inventory (per ECV Product). Regarding the structure and appearance proposed by Jeff, Jörg suggested that the applications could be displayed on the top row of the page, and the tools on the row on the left. Robert was tasked to propose a list of applications to be displayed on the front page, using the GCOS-IP and the 2011 GCOS

Satellite Supplement as sources. In reply to Jörg's question on how to develop the agreed approach, Robert volunteered to create a mock-up of the website in a power point file and implement two or three possible versions, with contents to be provided by Jeff [***Action WGClimate11-9***]. Jörg closed the discussion pointing out that the task of updating the live website, based on evolved and agreed mock-ups, might need to be outsourced (to be discussed at a later stage) and that the WGClimate should aim at being ready to produce a statement of work after the mock-up has been discussed by the WG.

Evolution of SCOPE-CM

Jeff Privette (NOAA), Chair of the SCOPE-CM Executive Panel

Jeff Privette started his presentation by revisiting the context that led to the discussion and decisions regarding the evolution of SCOPE-CM: an action from CGMS-46 on the Chair of the SCOPE-CM Executive Panel to kick-off the process exploring the possible coordination with the WGClimate. Jeff proceeded with an update on the developments since the previous meeting of the WGClimate: the endorsement of the resulting recommended strategy during CGMS-47, and the open action of developing new Terms of Reference and drafting an Implementation Plan (due at CGMS-48, planned for May 2020).

Jörg Schulz, who had given the presentation during CGMS-47 on behalf of Jeff, informed that the discussion at the Plenary was mostly focussed on the CGMS contribution to the architecture for climate monitoring from space. Jörg added more details regarding the main changes to be implemented and their underlying rationale. The former SCOPE-CM Executive Panel could be replaced by the CGMS Plenary/WG II, where the Space Agencies' representatives would be able to commit resources to SCOPE-CM projects. The projects to be pursued under SCOPE-CM would be therefore funded and committed via a formal signed agreement. Jeff clarified that most of the SCOPE-CM projects who had not succeeded in Phase II of the SCOPE-CM implementation were lacking synchronised funding from agencies, and it was expected that the proposed formal involvement of the Agencies might help to solve this problem. Jörg further explained that the decision on the continuity of the ongoing projects would be supported by the analysis of the ECV Inventory and the plans of the Agencies, reiterating the importance of funding as a key for committing and delivering. Jörg also informed that secretarial support to SCOPE-CM had not yet been granted by any agency, suggesting that WMO might be able to accommodate that. Wenying Su observed that there was an apparent overlap between the objectives of SCOPE-CM and those of the WGClimate, concerning the production of CDRs, but Jörg clarified that while the WGClimate would stay focussed on pointing the needs to the Agencies, SCOPE-CM would foster the sustainability of CDRs production by the Agencies. Jörg further emphasised that the recent decision of abandoning the "operational" aspect of production is expected to foster the involvement of more Agencies in SCOPE-CM, mentioning the ESA-CCI projects as one case.

COP-25 / SBSTA-51 Statement

Jörg Schulz (EUMETSAT) & David Crisp (JPL/NASA, GHG Task Team)

Jörg Schulz briefly set the context and proposed a timeline for the preparation of the statement to be presented at SBSTA-51, during the COP-25 planned for the first half of December, with Jörg Schulz, Mark Dowell, and David Crisp planning to attend. Misako Kachi and Susanne Mecklenburg (ESA) might attend as well, according to information provided during the discussion. Jörg also informed that the WGClimate would be likely given a time slot in the Earth Information Day, a complementary event organised by the UNFCCC Secretariat, with date and exact format still to be decided. (During the meeting, information provided by the UNFCCC outlined the planned format of the Earth Information Day: 1 hour of oral presentations followed by a poster session). It was agreed to decide on the details of the WGClimate participation during an informal meeting the week after in Fairbanks with Jörg to lead the preparations for the WGClimate contribution [***Action WGClimate11-10***].

Regarding the contents of the space Agency statement to be prepared for the SBSTA-51, Jörg revisited the outline of the previous statements and proposed some reflection regarding the emphasis on the existing topics and the inclusion of new ones. As a tentative timeline, Jörg suggested that the list of topics should be decided in Fairbanks (in parallel to the CEOS-SIT Technical Workshop), immediately followed by the compilation of the statement. He further informed that the deadline to submit the statement to SBSTA is late November, but the goal would be to have it ready for endorsement at the CEOS Plenary, if possible, after having been distributed to the Agencies via the WGClimate delegates, for review [***Action WGClimate11-11***].

4 ECV Inventory, Gap Analysis & Coordinated Action Plan

Status of ECV Inventory and Gap Analysis

Alexandra Nunes (Hamtec Consulting Ltd. c/o EUMETSAT) & Jörg Schulz (EUMETSAT)

Alexandra Nunes briefly presented the status of the ECV Inventory, with focus on its evolution since the previous WGClimate meeting: preliminary contents and gaps, and overall comparison with v2.0 of the inventory. The foreseen timeline leading to the publication of a new version of the database and the finalisation of the gap analysis activities was also discussed. Alexandra further informed the attendants of the status of stages 1 and 2 of the gap analysis, to set the context for the discussion on the way forward in the writing of the Gap Analysis Report. Given the level of response received at the date of the meeting, it was agreed to shorten the list of ECVs to be subject to a detailed Gap Analysis (stage 2), dropping for this exercise the following ECVs: Lightning for Atmosphere, and FAPAR and Glaciers for Land. Regarding the Ocean domain, Jörg Schulz proposed that the detailed analysis of the ECV Ocean-surface Heat Flux would depend on the future availability of the support material regarding the ECV Surface Winds. It was decided that Jörg would include in his WGClimate presentation to the CEOS-SIT Technical Workshop an update of the goals and foreseen schedule for the ECV Inventory and Gap Analysis.

Discussion on future of ECV Inventory and Gap Analysis

Jörg Schulz (EUMETSAT), WGClimate Chair & Alexandra Nunes (Hamtec Consulting Ltd. c/o EUMETSAT), All

Alexandra Nunes opened the discussion with an account of her experience with the current data collection and verification process of the ECV Inventory, as compared to the 2016-2017 cycle. Alexandra voiced her concerns regarding Responder-fatigue, which expresses itself by lack of input (e.g. many Responders from the previous cycle had not provided any update of their input, some newly identified Responders had not contributed any entries to the database), and delay or lack of feedback during the verification process. She further reported occasional complaints about the lack of synergy between the ECV Inventory and other agency-held databases still occurs, as well as about the low efficiency of the verification process (many iterations and tedious and time-consuming work). Alexandra expressed the view that some Agencies might not fully acknowledge the work done by the Responders in providing a complete and accurate input to the ECV Inventory, and suggested that this task might come to data producers simply as extra work, usually not resourced, and not part of key performance indicators.

Simon Pinnock informed that the ESA CCI project teams had been tasked to provide their timely input to the ECV Inventory, but that it was not currently set as a deliverable, unlike for the C3S projects. He added that a change in approach might be considered in the future, if needed. Jörg Schulz observed that it is important that the Agencies recognise and value the work done by their Responders, and provide support to this initiative in line with the decisions of the CEOS and CGMS Plenaries, and suggested to emphasise that in the coming CEOS and CGMS meetings [***Action WGClimate11-12***].

The general opinion of the attendants was supportive of a progressive simplification of the data collection, to ensure the sustainability of the process in the long term, and advocated a synergistic usage of databases when advantageous. Jörg observed that EUMETSAT's ECV Inventory Support Team had been facing some shortness of resources, in a scenario of evolution of the web interface to accommodate changes in approach and transition between versions of the database, and development of new tools to improve the efficiency of the verification and assessment processes. He further suggested that other member Agencies of the WGClimate could volunteer extra resources, even if only on an Agency-specific basis, e.g. assistance on verification process per agency, development of APIs for connection of Agencies' databases to the ECV Inventory. The meeting participants acknowledged that the very time-consuming verification of the database is a crucial step of the whole process and the sole safeguard of the reliability of the contents of the ECV Inventory. Assuming that no extra resources would be available to assist the current Support Team, it was suggested by Simon Pinnock and agreed by the meeting attendants, that the efforts for improvement and development of the web interface supporting the data collection and the Gap Analysis activities should be reduced to the strictly necessary to keep the process running.

Regarding the simplifications to the approach on data collection, with advantages also for the verification process and gap analysis, it was suggested by Simon, that the registration in the database of several individual datasets from the same collection, only differing in

spatial / temporal resolutions, could be replaced by a single entry. This may contain a one-to-many relationship accommodating the diversity of resolutions relevant for climate applications. Alexandra and Jörg proposed to discuss this and other options with the technical support colleagues at EUMETSAT.

Regarding the participation of Subject Matter Experts (SME) in the Gap Analysis activities, the WGClimate delegates, who had volunteered to gather the needed expertise to analyse the set of ECVs selected during the previous WGClimate meeting, also noticed issues with apparent lack of interest or response. Another issue pointed out by SMEs was the general lack of time/resources to fulfil the tasks within the required timeframes. In what concerns Stage 1 of the gap analysis (assessment against GCOS criteria), in spite of the effort put in the improvement of the web interface tools to improve the efficiency of the process, the large number of records and information to be assessed was still a challenge in terms of workload. Regarding Stage 2 of the gap analysis (detailed analysis), the perceived complexity of the process was presented as the main deterrent to participation, along with complaints about the seemingly incomplete / inaccurate support material listing the past, current and future Earth Observation capabilities by ECV Product, as retrieved from the WMO OSCAR database. The WGClimate delegates involved in the process also acknowledged the latter. In addition, Alexandra took the view that the lack of full recognition by the Agencies of the work of SMEs supporting the Gap Analysis activities might play a role as well, further demoting this best-effort endeavour to a lower priority activity. Jörg reiterated his intention to pass the message to the Agencies during his upcoming interventions in CEOS and CGMS meetings, asking them to continue supporting the ECV Inventory and Gap Analysis activities. Regarding the difficulties pointed out by the SMEs, Jörg and Alexandra proposed to investigate options for changes in the approach to Stage 2, to be discussed at a later stage with the WGClimate [***Action WGClimate11-13***]. On a general note, Alexandra also suggested that a better advertising of the ECV Inventory and the outcomes of the Gap Analysis, as well as potential information on data discovery and usage via the ECV Inventory might contribute some enthusiasm to all the external participants in the process. She suggested that to consider this when designing the new structure of the climatemonitoring.info website. Robert Husband emphasised the need for more engagement of the VCs into the gap analysis and to make sure that this is reflected in the VCs work plans, which are monitored.

The planned session on the coordinated action plan, working session on gap analysis were skipped due to the low maturity of inputs at the time of the meeting.

5 Joint Session with LSI-VC

The text below is a copy from the notes agreed with LSI-VC from the joint session.

Context and CEOS Work Plan Tasks and Deliverables

Matt Steventon (Symbios) LSI-VC Secretariat, Steve Labahn (USGS), LSI-VC Chair and Jörg Schulz (EUMETSAT), WGClimate Chair

Matt Steventon presented the background and history of the LSI-VC's thread of work related to requirements and gap analyses. The CEOS Carbon Strategy was selected as an

early focus for this work, as broad, generalised gap analyses were agreed to not look feasible. The LSI-VC reached out to the CEOS carbon community multiple times, with little result and infrequent interactions. It was agreed that there is not much we can do in a one-way fashion – LSI-VC needs inputs and feedback from the thematic side. The requirements tasks were discontinued in favour of focusing on progressing CEOS tools and information systems in support of gap analyses. Matt summarised what he sees as necessary for LSI-VC to restart the requirements and gap analyses work thread:

1. A thematic area with a reasonably small scope to trial an LSI-VC requirements/gap analysis process;
2. An active counterpart on the thematic side that can translate science requirements into observational requirements;
3. A specific set of unique requirements (e.g., global moderate resolution optical is not a good focus for a gap analysis).

Werner Balogh (WMO) asked about links to the WMO rolling requirements review, noting that they were working to link GEOGLAM into this work. Matt noted there's no existing link. Werner suggested this could be useful.

CEOS/CGMS WGClimate

Jörg Schulz (EUMETSAT), WGClimate Chair

Jörg Schulz reported background on WGClimate, including the Architecture for Climate Monitoring from Space, the ECV Inventory, the GHG Monitoring Roadmap, the WGISS Carbon Community Portal, and WGClimate's convention engagement work. He presented three actions from the WGClimate Coordinated Action Plan that have been delegated to LSI-VC and would be a useful output from the LSI-VC's requirements and gap analyses work thread.

Regarding Coordinated Action 22 the goal here is to do a deeper analysis looking at the availability of LST datasets. Datasets may also exist, but they may not necessarily be processed into a CDR. Data collection versus CDR generation is a key distinction. It was noted that Landsat is likely the only continuous historical dataset (with future continuity planned and in development, e.g., Landsat 9 TIRS-2 has been upgraded to a Class B instrument). There are a few plans being discussed by ESA/EC (Sentinel) and ISRO/CNES. Landsat is calibrated at Level 1, consistently processed, and should therefore meet the 2004 CDR definition from NOAA. Derived geophysical records would also comply. For this action, LSI-VC will begin by summarising the plans and projections of the way forward for USGS on Landsat TIRS, expanding to cover other missions and Agencies in time. Studying and understanding the future continuity of LST measurements is a valuable action for LSI-VC, as well as Space Agencies, outside of the WGClimate need. The question of whether these measurements are supporting a CDR would also need to be addressed in a study, including whether there is a processing plan in place. This would necessarily involve both LSI-VC and WGClimate expertise on scientific assessment. Steve asked if there is any sense of specific requirements with regard to bands, temporal resolution, or other desired characteristics for the CDR. Any further information that can help direct the

discussions regarding future potential additions to the CDR/contributing missions would be helpful.

Concerning Coordinated Action 23 of the Coordinated Action Plan, it was clarified that there are no resolution requirements for these LST datasets, and so that opens up many options, e.g., MODIS. Steve Labahn suggested the ARD stocktake could be a good starting point for this action.

Jörg suggested that activity and discussion on the following LAI, Coordinated Action 24 be postponed until there is an outcome from an ongoing assessment the ongoing Gap Analysis exercise within WGClimate.

Jörg reported that the dialogue with the SBSTA community is gaining some traction, and awareness of space-based capabilities (including for biomass) and initiatives like GFOI is growing. Jörg noted a CEOS Plenary action on SDCG (LSI-VC-8-21) to prepare biomass materials as supplements to the SBSTA 51 submissions.

Discussion: WGClimate collaboration opportunities with LSI VC

All

Stephen Ward presented on CEOS biomass mission coordination and data uptake, as well as the ESA Biomass CCI. Overall, there is a need to accelerate the policy relevance of these new biomass missions, which have had substantial investment from Space Agencies.

Biomass mission coordination is currently implemented through an informal multi-mission group, with close ties to WGCV/LPV but not formally recognised in the CEOS structure. CEOS Agencies need to consider whether there are benefits to be realised from formalisation within the CEOS Virtual Constellation framework – and should that be LSI-VC or a standalone VC? Stephen asked how might we take advantage of the incoming SIT Chair term to initiate cooperation and establish CEOS Principal attention and support. A two-hour side meeting dedicated to this topic is planned for the CEOS-SIT Technical Workshop next week.

David Crisp noted that biomass measurements are the key missing link in models for UNFCCC/IPCC reporting. Atmospheric GHG and land cover are directly measurable, but biomass measurements are desperately needed to close the loop on these models. CEOS coordination on this topic would be helpful.

MIM Database API and Web UI Update

George Dyke (Symbios) LSI-VC Secretariat

George Dyke presented an update on the MIM Database (addition of: launch activity based on WMO OSCAR, datasets based on OpenSearch, featured datasets, and links to exploitation platforms) and development of the API. George suggested that CARD4L could be added as featured datasets and linked to mission and instrument pages. Steve Labahn suggested reusing some of the DOI information that is already a prerequisite for CARD4L compliance.

There was a discussion around the inclusion of band information in the MIM Database. Steve Labahn strongly supports its inclusion in the Database as a standard feature, as it would be very helpful for interoperability and gap studies. This information should come from the Agencies directly to maintain the provenance and source of the data in the Database. Jörg noted that sensor performance will drift with time, so including very specific response curve information could be difficult. Steve Labahn suggested that the USGS Joint Agency Commercial Imagery Evaluation (JACIE) might be a useful source of information for band data and in general.

6 Summary and Actions

Jörg Schulz (EUMETSAT), WGClimate Chair

Review of Minutes and Actions, Concluding Remarks

Jörg Schulz, WGClimate Chair (EUMETSAT)

Jörg Schulz verbally summarised the main outcomes from every session of the agenda, with focus on pending issues and resulting actions. Jörg reminded the attendants that Alexandra Nunes would draft the minutes of the meeting, which would be later distributed to the participants for feedback. He further informed that all the presentations of the meeting, together with the agenda and the final version of the minutes, will be made publicly available on the WGClimate webpages on the CEOS website (http://ceos.org/meetings/wgclimate-11/), and that the participants will be informed by e-mail when this is done.

Regarding the next meeting of the WGClimate, Jörg suggested it should take place in Spring 2020, and there were several suggestions and constraints for dates, taking into account the schedule of other CEOS and CGMS meetings. The decision was postponed to a later time, with the most likely solution being having JAXA hosting the WGClimate #12 the week before or after the CEOS SIT 2020, scheduled for the end of March in Hobart, Australia.

Jörg thanked everybody for the active participation and interesting discussions in a very fruitful meeting, and adjourned the meeting wishing all safe travels, back home or to Fairbanks to attend the CEOS-SIT Technical Workshop.

Actions from WGClimate #11

Action	Description	Responsible	Due date
WGClimate11-1	Explore capabilities of the WGISS Carbon Portal and synergies with GHG monitoring activities and provide guidance.	All	Next WG Climate meeting
WGClimate11-2	Start the process of writing a publication on the definitions (broad sense) of CDRs and contact potential reviewers.	Jeff Privette, Chris Merchant	Next WGClimate meeting
WGClimate11-3	Prepare process for selection of non-GCOS climate variables to be accepted in the ECV Inventory.	Jeff Privette, All	Next WGClimate meeting
WGClimate11-4	Review / provide feedback to WMO Catalogue to make sure that the satellite information available there is consistent with that of the ECV Inventory.	Jörg Schulz, Werner Balogh	Next WGClimate meeting
WGClimate11-5	Prepare template for case studies and send for review	Werner Balogh	31.10.2019
WGClimate11-6	Prepare report on Case Studies	Werner Balogh, Simon Pinnock, Jeff Privette, Selma Cherchali, All	30.06.2020
WGClimate11-7	Organise side event on EC-72 to show Case Studies (Jun 2020)	Werner Balogh	30.06.2020
WGClimate11-8	Propose more case studies	Mark Dowell, Selma Cherchali, Wenying Su	Next WGClimate
WGClimate11-9	Compose list of climate applications to be displayed on the front page of climatemonitoring.info and prepare a mock-up of the web site with two or three possible versions.	Robert Husband, Jeff Privette	Next WGClimate meeting
WGClimate11-10	Prepare an deliver WGClimate contribution to Earth Info Day	Jörg Schulz	31.12.2019
WGClimate11-11	Prepare CEOS/CGMS SBSTA statement for COP-25	Jörg Schulz	CEOS Plenary 2019
WGClimate11-12	Convey to the CEOS SIT and Plenary the need for Space Agencies to clearly and continuously support the activities of the ECV Inventory and Gap Analysis.	Jörg Schulz	CEOS SIT and Plenary, CGMS Plenary
WGClimate11-13	ECV Inventory: propose evolution of data collection, verification, and gap analysis processes	Alexandra Nunes, Jörg Schulz	WGClimate#12

Annex A. Attendees[1]

Werner Balogh (WMO)

David Crisp (NASA) - Expert for CEOS AC-VC, GHG Task Team

Mark Dowell (EC) [remotely] - CEOS Coordinator for the Implementation of the Strategy for Carbon Observations, Lead WGClimate GHG Task Team

Steven Hosford (ESA/CNES) [Day 3] - CEOS Executive Officer

Robert Husband (EUMETSAT)

Misako Kachi (JAXA)

Alexandra Nunes, ECV Inventory Support Team (Hamtec Consulting Ltd. c/o EUMETSAT)

Simon Pinnock (ESA)

Jeff Privette (NOAA) – Chair of SCOPE-CM Executive Panel

Jörg Schulz (EUMETSAT) – Chair of the WGClimate

Wenying Su (NASA)

Albrecht von Bargen (DLR) – Vice-chair of the WGClimate, Vice-Lead of WGClimate GHG Task Team

External presenters: Christina Lief (Consultant to WMO), Eugene Yu & Liping Di (George Mason University, WGISS Representatives)

Joint Session WGClimate & LSI-VC

Organisation	Name
Agriculture and Agri-Food Canada	Andrew Davidson*
DLR	**Albrecht von Bargen#**
ESA	**Simon Pinnock#**
ESA/CNES	Steven Hosford
ESA (LSI SEC)	Stephen Ward
ESA (LSI SEC)	George Dyke
ESA (LSI SEC)	Matt Steventon
EUMETSAT	**Alexandra Nunes#**
EUMETSAT	**Jörg Schulz#**
EUMETSAT	**Robert Husband#**
GA	Andreia Siqueira
GA	Medhavy Thankappan
GEOGLAM	Alyssa Whitcraft
JAXA	Takeo Tadono
JAXA	Ake Rosenqvist
JAXA	**Misako Kachi#**
KARI	Chiho Kang
KARI	Daehoon Yoo
NASA	Brad Doorn
NASA	Dave Jarrett
NASA	Jeff Masek

[1] People in bold font are the agency representatives in the WGClimate.

Organisation	Name
NASA	Marissa Herron
NASA	**Wenying Su#**
NASA/JPL	**David Crisp#**
NASA/SEO	Brian Killough
NASA/SEO	Sanjay Gowda
USGS	Chris Barber
USGS	Chris Crawford*#
USGS	Jenn Lacey
USGS	Steve Covington
USGS	Steve Labahn
WMO	**Werner Balogh#**

Annex B. Agenda

11th Meeting of Joint CEOS/CGMS Working Group on Climate

Anchorage (AK), USA

Agenda of the Meeting

Day 1: Wednesday, 4th September 2019

1. Introduction and Context

09:00 – 09:30	Welcome and Introduction (J. Schulz) • Round table introduction (All) • Acceptance of Agenda (J. Schulz)
09:30 – 10:00	Status of Working Group (J. Schulz) • Status of CEOS Workplan Actions • Status of WGClimate Actions • Meeting Objectives
10:00 – 10:30	Status of GHG Task Team and Roadmap (M. Dowell & A. v. Bargen)
10:30 – 11:00	Coffee Break
11:00 – 11:15	Discussion on GHG Roadmap (All)
11:15 – 11:30	WGISS Carbon Portal Demo (Liping Di)

2. Data Record Definitions

11:30 – 12:00	Update of FCDR, CDR, ICDR Definition (J. Schulz, J. Privette & C. Merchant)
12:00 – 12:30	Discussion and eventual endorsement of proposals (J. Schulz)
12:30 – 13:00	The role of non GCOS ECV for the ECV Inventory • Introduction (J. Privette) • Discussion (All)
13:00 – 14:00	Lunch Break

3. Activities towards and with Stakeholders & Partners

14:00 – 14:15	WMO Catalogue for Climate Data https://climatedata-catalogue.wmo.int/ • Info and potential link (C. Lief, W. Balogh)
14:15 – 14:45	Case Studies • Confirmation of role of WMO (*WGClimate10-12*) (W. Balogh) • Pre-selection of case studies (*WGClimate10-13*) (S. Pinnock & J. Schulz)
14:45 – 15:30	Evolution of climatemonitoring.info • Proposal for a consolidated vision for the evolution of the climatemonitoring.info website (WGClimate10-20) (J. Privette, R. Husband, S. Pinnock)
15:30 – 15:45	Coffee Break

15:45 – 16:00	Evolution of SCOPE-CM (J. Privette)
16:00 – 17:00	COP-25/SBSTA-51 Stat (J. Schulz, D. Crisp) • Statement for SBSTA-51 • Earth Information Day (Discussion)

Day 2: Thursday 5th September 2019

4. ECV Inventory, Gap Analysis & Coordinated Action Plan

09:00 – 09:30	Status of ECV Inventory and Gap Analysis (A. Nunes & J. Schulz)
09:30 – 10:00	Coordinated Action Plan (J. Schulz)
10:00 – 10.30	Organisation of Working Session (J. Schulz) • As we struggle for several reasons with getting the gap analysis going, we need to do an effort at the meeting to review the material that we receive until the meeting and sort out the ECVs for which we have some expertise. This may follow the approach that we used in Geneva in March 2018.
10:30 – 11:00	Coffee Break
11:00 – 13:00	Working Session Gap Analysis (All)
13:00 – 14:00	Lunch Break
14:00 – 15:30	Working Session Gap Analysis (All)
15:30 – 15:45	Coffee Break
15:45 – 16:00	Wrap up Gap Analysis & Coordinated Action Plan (J. Schulz)
16:00 – 17:00	Discussion on future of ECV Inventory and Gap Analysis (J. Schulz) • This discussion shall be a reflection of round two of the ECV Inventory population, verification and gap analysis process. We think of discussing needed resources at agency level and maybe of new models to perform the work.

Day 3: Friday 6th September 2019

5. Joint session with LSI VC

09:00 – 09:10	Context and CEOS Work Plan Tasks and Deliverables (Matt Steventon & Jörg Schulz)
09:10 – 9:30	CEOS/CGMS WG Climate (Jörg Schulz) • Coordinated climate actions on land surface ECVs • Potential for LSI-VC support • Biomass ECV, including the role of the Biomass CCI
09:30 – 10:10	Discussion: WGClimate Collaboration Opportunities with LSI VC (All)
10:10 – 10:30	MIM Database API and Web UI Update (G. Dyke)
10:30 – 11:00	Coffee Break

6. Summary and Actions

11:00 – 12:00	Review of Minutes and Actions, Concluding Remarks (Jörg Schulz)
12:00	Adjourn