

# CEOS/CGMS Working Group on Climate 9<sup>th</sup> Plenary

28-29 March 2018  
WMO, Geneva

## Meeting Minutes



The 9<sup>th</sup> plenary meeting of the Working Group on Climate met from 28-29 March 2018 at the World Meteorological Organisation (WMO) in Geneva, Switzerland.

A full list of attendees to this meeting can be found in Annex A. Apologies for absence had been received from JAXA, CMA and INPE.

Fernando Belda (WMO) welcomed participants to WMO and stressed WMO's desire to continue effective collaboration with WGClimate. Belda made the point that it is important to maintain focus on user requirements. Conversely, users need to understand the problems that we are facing and become better informed. Training and capacity building are also a focus for WMO; data policy is the framework of its work.

The agenda was adopted (Annex B). Dowell asked for a small addition in the agenda to update the meeting on CEOS chair new initiatives that have some relevance to WGClimate. This was agreed.

## 1 Introduction and Context

Jörg Schulz, WGClimate chair (EUMETSAT)

Schulz presented the current status of the WGClimate.

There is one CEOS action related to the WGClimate:

<b>CEOS-31-01</b>	WGClimate to explore development of a brief, consolidated statement of space agency contributions in support of each Article of the Paris Agreement.	<b>32<sup>nd</sup> CEOS Plenary</b>
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Dowell explained that a lot of work that will relate to the above action would be done in 2018 as GEO is planning an event from 13-14 June 2018 that will focus on EO support following on from Paris. Effort has already started in going through relevant articles.

There was some discussion on the need to look into establishing a dedicated joint working group specifically on CO<sub>2</sub> / GHG observations. Dowell explained that he is going to prepare an options paper on CGMS collaboration for upcoming CEOS SIT and CGMS Plenary. Mohr supported the idea of a joint virtual constellation on carbon / GHG observations

Schulz presented a new definition for Interim Climate Data Records (ICDR) that was provided by a workshop on climate extremes in February 2017 with the recommendation for endorsement by WGClimate. Concerning ICDRs, Roca suggested that uncertainties should be part of the record. Schulz requested that if anyone had any comments on the ICDR definition they should be put forward for discussion to find agreement on this on the second day. Anything that may include some text on uncertainties that could be incorporated into the ICDR definition would be welcomed too.

Schulz further reported that the ECV Inventory was explicitly mentioned by SBSTA as a footnote, which is a large recognition. In particular Japan and the EU were very

supportive of both *in situ* and space-based measurements in GHG monitoring. Discussing the upcoming SBSTA meeting in June in Bonn, Germany, Richter added that the upcoming will focus on research. She will also have an informal meeting with the new SBSTA chair in May; who has expressed the desire to learn about what the EO community is doing. This provides the opportunity to keep our fruitful relation with SBSTA.

## 2 Gap Analysis Report, Recommendations and Actions Jörg Schulz, WGClimate chair (EUMETSAT)

The ECV inventory v2.0 has been public since October 2017. For the next update of the inventory, some CDRs will move from future to current as v2.0 has a cut-off date of 31 December 2016. The updates are planned to be incremental every year from now on. Throughout the second half of 2018, new entries can be added and changes requested, as well as anything within updated. The inventory updates should enter a kind of routine mode from now on, with a new release planned at the end of every year.

Inconsistencies between the WMO OSCAR and CEOS MIM databases were discussed in the light of experiences discovered during the inventory gap analysis. The coordinated action plan will include an action to mitigate such issues.

Tabary coordinated the CNES feedback to the ECV Inventory, with CNES contributing up to 100 entries. He commended the EUMETSAT team for their assistance in assessing the questions and in inputting the data. Tabary reported that being part of this process has led to an increased awareness from people internal to CNES of, e.g., what an FCDR is. He recommended keeping up the momentum and capitalising on the good practices that have been established on this activity by EUMETSAT. Schulz explained that the current funding prospects are such that EUMETSAT plans to assure effort on the ECV inventory until 2021. However, Schulz stressed that without any funding none of this would have been possible and he thanked the EC for this.

Dowell suggested that when Schulz communicates to SIT on the inventory, he should ask agencies to consider how they will actually use this resource for their own purposes. Mohr expressed his positive impression by what has been achieved with the ECV inventory. He believed that there be a very strong message (in writing) coming out of this meeting that stressed that funding should be continued. Counet added that without dedicated commitment the activities would simply stop; we definitely need to think about the long-term sustainability of this. Schulz explained that the amount of effort over the last 18 months taken to compile, verify and undertake a preliminary gap analysis on the ECV inventory comes to about 2 full time employees in house in EUMETSAT. Added to this is all the time the experts around the world have put into this. Tabary agreed that this type of effort comes at a cost, but there is an extremely high return on the investment and he was sure that all agencies could agree to that. Mohr added that the underlying reason for doing this is to provide data for climate services, and so he is very pleased with what has been achieved as this provides the possibility to establish effective climate services. Dowell added that, as it is the service

that justifies something like this, he could not see any reason why the EC funding would change since the EC has commitment to C3S.

Mohr suggested that there is a need to feed back errors found within the OSCAR and MIM databases to their curators. Schulz explained that there is already a technical working relationship with the MIM, but a technical representative from WMO is needed. There is also scope to feed back additional information, on instrument lifetime for example, from the inventory to OSCAR and MIM as this is information currently not available from OSCAR and MIM, in particular for historical satellite.

In addressing the ECV gap analysis report and, in particular its presentation to SIT, Counet commented that it should be made very clear that the inventory reflects the situation up to 31 Dec 2016. Merchant recommended the use of 'criteria assessment instead' instead of 'compliance' in most cases throughout the document. In interpreting the data might be misleading to use 'compliance' when a 'gap analysis against GCOS criteria' is more being applied. Dowell agreed and added that, as targets provided to data providers for the next 10 years, compliance is a misleading word.

Schulz explained that most of the CDRs in the inventory have been reprocessed. Some data records are continued with a certain timeliness, e.g., one month, and those are ICDRs. The cut-off date in the inventory is 31/12/2016 so mixtures of CDRs and ICDRs can exist in the inventory. For instance a data record is reprocessed up to June 2010 and then continued as ICDR is put into the inventory of existing as one data record and then in the part of planned as well as it progresses every month. If the processing algorithms are constantly changing, such as in NRT products, then the record is not a CDR or an ICDR at all and we tried to filter those out of the inventory during the verification process.

The plan for the completion of the gap analysis report is as follows:

- Schulz to send out final version for review by WGClimate by 04/04/18 (Action **WGClimate9-1**)
- Comments on this version to be received back asap, but by 06/04/18 at the very latest (Action **WGClimate9-2**)
- Final gap analysis report and coordinated action plan to be with SIT by 09/04/18 (Action **WGClimate9-3**)

Concerning the coordinated action plan, Dowell recommended that actions be uncontroversial and clear, and number not too many. Actions should be directed internally to CEOS agencies and/or to CEOS associates, e.g. WMO, GEO, and GCOS.

The meeting broke out into three groups to discuss the ECV focused gap analysis reporting, and agree recommendations and resulting actions for the land, ocean and atmospheric domains. Eight focused gap analyses had been undertaken for the following ECVs:

- Atmosphere
  - Carbon Dioxide
  - Methane
  - Precipitation
- Ocean
  - Sea Surface Temperature
  - Sea Surface Salinity
- Land
  - Land Surface Temperature
  - Leaf Area Index
  - Above-ground Biomass

### 3 Technical Supplement for the Response to the GCOS IP Simon Pinnock (ESA)

Pinnock presented and went through the technical supplement and discussed a few edits necessary, including some repeated text. Pinnock asked all to review the text and send him any edits. Schulz added that the main document has yet to go to CGMS and, as the technical supplement may eventually be reduced down to 4-5 pages once the redundancy is removed, he suggested that this text be included in the main document rather than as a supplemental annex. Richter confirmed that this is an information ('inf') document and so changes can be submitted as a 'revision' and labeled appropriately. This update needs to be submitted to SIT so the document needs to be with them by 09/04/18 (Action **WGClimate9-4**). Edits to Pinnock were requested by CoB 03/04/18, preferably by track changes within the text (Action **WGClimate9-5**). Dowell added that thanks need to go to all those who have been involved in putting this together as this has been a worthwhile and complex task. Merchant agreed with this, particularly as it was hard to engage agencies. He asked if there could be improvements for doing this next time. Dwyer suggested the task could be simplified, a template provided and the context more clearly explained, with examples, to engage the agencies better. Schulz added that we could learn from experiences with the ECV inventory, where a single key relationship had been established per agency to ensure clarity when engaging with each agency.

### 4 New initiatives

#### 4.1 CNES Space Climate Observatory Pierre Tabary (CNES)

Tabary presented the CNES Space Climate Observatory (SCO). He acknowledged his colleagues Selma Cherchali (Head of the SCO programme) and Richard Moreno (SCO Project Manager). The proposal for the SCO has been put together based on political governmental pressure and support; CNES is trying to develop this into a useful contribution and support opportunity to the international community.

As CEOS chair, Dowell confirmed that the EC has offered to host an informal side session at SIT to discuss this further; at the moment not all CEOS agencies are signed up to this. The CEOS chair has recognised that this is a response to high-level political pressures and commends CNES in trying to take positive advantage of this and to reach out collaboratively.

Dowell reported that, from the EC's perspective, the focus for concern would be what interface the SCO would have with C3S. Another very sensitive area would be to be explicit about what it meant by a climate data record, and what is supporting information, particularly in the interim as the SCO is being developed.

Richter was pleased to see in the proposal that the key elements have been stitched together in an effective and logical way, and that the GCOS role recognised. It will be important to assure that the feedback mechanism, and the GCOS role in an advisory capacity, is maintained.

Husband stressed that it had been a long and difficult process to establish the WGClimate, in terms of effective cooperation. One of the emphases had always been to be badge-less in order to be truly collaborative. It would thus be very important to maintain what has been achieved and bear these sensitivities in mind as SCO develops.

Mohr asked about the precise form the SCO would take, making sure that areas already well covered are not repeated. Schulz agreed that, from the WGClimate's viewpoint, it would be very beneficial to try to attach this within the framework of its architecture. There are elements in pillar 2, 3 and even 4 within the SCO proposal. Opportunities to increase the WGClimate's work in pillar 3 is particularly attractive, by trying to enhance the uptake of CDRs into almost a service-like structure. This would also allow traceability and quality control to be included. Bojinski explained that the WMO, together with the EC, had developed case studies to understand the flow of information that users need. It had been found that there are very few cases where satellites are the only solution. The original case studies had been very rough, and maybe the SCO could be used to develop further more detailed case studies of satellite applications for climate research. Tabary confirmed that quality control had not so far been well-defined, with more of a bottom-up approach being planned through the analysis of detailed case studies that would be planned, using the experiences of the WMO in doing this.

Rixen expressed the opinion that this appears to be a very good framework with all elements of the value chain and key players included. This is at the level of the WGClimate and Rixen suggested that the WGClimate could act as the governance of the SCO as it has the broader global vision. Rixen explained that this works well for WCRP who see WGClimate as their interface to the space agencies.

Schulz agreed to prepare the first reaction from WGClimate based on discussions held at this meeting, and to put some slides together for SIT. Counet confirmed that this proposal will also be discussed at CGMS. Tabary welcomed any further comments in the interim. Counet stressed the need to make sure that all relevant contributors are involved to ensure that this is a truly international collaboration.

## 4.2 WMO concept for the physical view of the Architecture for Climate Monitoring from Space

Werner Balogh (WMO)

Balogh presented the WMO concept for the physical view of the Architecture for Climate Monitoring from Space. Privette then updated the meeting on SCOPE-CM, which is involved in the sustainment of CDR generation and provision across the globe. This can include elements of capacity building for agencies less experienced in the production of CDRs.

Privette explained that in the future SCOPE-CM relies on the WGClimate to monitor the current and future status of coherence of CDRs, to identify gaps, and to identify top-level actions to fill in gaps. SCOPE-CM then can come in as a partner and follows up on the work plan to work the details, as they understand the scientific and production capabilities well. SCOPE-CM would work to get formal agreements from responsible agencies for filling in gaps as they have a link into the user community that then provides feedback to the production agencies, thereby ensuring the user community develops sufficiently and also that value is given back to the agencies.

Privette explained that there have been different degrees of success in sustaining the work in the various SCOPE-CM projects, mainly because those involved had to find their own funding. SCOPE-CM currently does bring value but not money. Schulz added that in phase 1, there were five pilot projects on CDR production involving multi-agency contributions. The projects had varying levels of success and impact, but the underlying problematic issues were the resources, and this is a challenge that needs solving.

Dowell identified that the main impact of the WMO paper outlining the concept for the physical view of the Architecture for Climate Monitoring from Space would be greater to CGMS more than to CEOS. The WMO paper is more focused on pillar 1 in relation to the WGClimate.

Dowell identified that the WGClimate has not had much success so far on working with the VCs, but this might well be improved with the production of the coordinated action plan. Dowell suggested that the WMO document reflect the SCOPE-CM more and, given the timeline, prioritise some of its content.

Counet noted that once the gap analysis is finalised and the action plan produced, it will be one of the duties of the WGClimate to identify not just actions, but actionees. At this point it would be more relevant for the WGClimate to consider the idea of the generation of a new group or not.

Richter asked that the references in the document be updated to the latest document releases. She also requested an annex with a list of ECVs that would be observed through the VCs as this would make the work of the GCOS panels easier. An initial list like this was produced some time ago, and Richter agreed to distribute this (Action **WGClimate9-6**)

Mohr suggested that following up the actions from the gap analysis could potentially be the role of the new VC. The proposal is that, if we have an agreement on the VC from CEOS and CGMS, the VC would report to WGClimate on their climate aspects. The intention of this paper is to get a discussion started. Counet added that in order to avoid confusion, this document be modified to put the need for high-level requirements up front.

Dowell suggested that QA aspects be more fully included in the WMO document.

WMO will revise the document before CGMS submission and provide it to WGClimate for review by 20/04/18 (Action **WGClimate9-7**). Belda thanked the meeting for its review and comments.

## 5 ECV Inventory next steps

Jörg Schulz, WGClimate chair (EUMETSAT)

The establishment of a specific inventory for FCDRs was discussed. It was agreed that there is a need to revisit the FCDR definition as it seems too vague at the moment. The definition can be brief, but alongside it we would need a more detailed technical explanation. Schulz suggested that the ICDR definition was discussed at this meeting, leaving the FCDR, and maybe also the TCDR definitions to be discussed more fully at WGClimate-10. Merchant agreed to draft a first definition for FCDR and present that for discussion as part of the agenda at WGClimate-10 (Action **WGClimate9-8**).

Schulz expanded on other items to address in the second half of 2018, including the the technical split of CDR and ICDR in the inventory, and the general update of the ECV Inventory information.

## 6 Governance, Summary and Actions

Jörg Schulz, WGClimate chair (EUMETSAT)

Dowell reflected that agency representation at WGClimate-9 had been somewhat lacking and that at some point it would be prudent to think about creating some activities that are not just restricted to the inventory, gap analysis and general workflow. It would be good to stimulate interest in agencies to engage with this working group. Schulz agreed and reported that he was trying to gain a commitment for WGClimate-10 to be hosted in Asia to try and overcome some of these barriers.

The meeting discussed the definition for ICDR provided by the WMO workshop on *Operational Space-based Weather and Climate Extremes Monitoring* and agreed on a modified new definition for ICDR that reads:

- **Definition:** *An Interim Climate Data Record (ICDR) regularly extends in time a Fundamental or Thematic Climate Data Record using a system having optimum*



*consistency with and lower latency than the system used to generate the FCDR or TCDR.*

The meeting disagreed with another recommendation from the same workshop that reads:

- **WMO Workshop RECOMMENDATION 10:** The CEOS/CGMS Working Group on Climate to confirm as best practice that the producer of the climatology (FCDR and TCDR) is best positioned to be responsible for an ICDR, in order to enable and maximize consistency;

Schulz as WGClimate chair agreed to send a letter to the WMO Space Programme, with copies to GCOS, CEOS and CGMS Secretariats, to indicate endorsement of the above ICDR definition (Action **WGClimate 9-9**).

The frequency of WGClimate meetings was addressed. The current principle is to hold a meeting every 8 months to allow for three meetings during one chair term. It is hoped that the next meeting should be in Asia (CMA has been approached but did not answer by the time of the meeting). Failing this, it would be held in the USA and the following (WGClimate-11) in Asia.

Schulz explained the procedure for the election of the next Vice-Chair, which will be followed very soon. This involves:

- A request for proposal will be sent by the Chair after WGClimate-9 (Action **WGClimate 9-10**);
- Nominations of candidates shall be received by WGClimate-10;
- At WGClimate-10, a nominee will be elected and proposed to CEOS and CGMS Plenaries in 2019; the nominee to be presented to CGMS-47 (2019) and CEOS (2019) for endorsement.

All presentations from the meeting can be found on the CEOS website at <http://ceos.org/meetings/wgclimate-9/>.

**POST MEETING ADDENDUM:** The CEOS Secretariat informed the Chair subsequent to the meeting that the Terms of Reference have not been formally endorsed. It is proposed to endorse the ToRs unchanged from those proposed 2013. The ToRs have been distributed to WGClimate with instructions on how to signal agreement or disagreement.

## 6.1 Actions

<b>Action</b>	<b>Description</b>	<b>Responsible</b>	<b>Due date</b>
WGClimate9-1	Distribute ECV Gap Analysis report version for review by WGClimate	Schulz	04/04/18
WGClimate9-2	Provide final comments on the ECV Gap Analysis report to Schulz	All	06/04/18
WGClimate9-3	Submit finalised Gap Analysis report and Coordinated Action Plan to SIT	Schulz	09/04/18
WGClimate9-4	Submit finalised text on the Technical Supplement for the Response to the GCOS IP to SIT	Schulz / Pinnock	09/04/18
WGClimate9-5	Provide final comments on the text within the Technical Supplement for the Response to the GCOS IP to Pinnock	All	03/04/18
WGClimate9-6	Distribute initial table of ECVs to WGClimate	Richter	09/04/18
WGClimate9-7	Revise the concept for the physical view of the Architecture for Climate Monitoring from Space document and provide to WGClimate for comment	Belda	20/04/18
Wgclimate9-8	Draft and present a redefinition for an FCDR	Merchant	WGClimate-10
WGClimate9-9	Send a letter to the WMO Space Programme, with GCOS, WCRP and CEOS/CGMS Secretariats in copy, on the endorsement of an ICDR definition	Schulz	31/05/18
WGClimate 9-10	Send invitation letter to CEOS and CGMS agencies seeking WGClimate vice-chair nominations	Schulz	31/05/18

## Annex A. Attendees

Jörg Schulz (EUMETSAT) - WGClimate Chair

John Dwyer (USGS) - WGClimate Vice-chair

Werner Balogh (WMO)

Albrecht von Bargaen (DLR)

Fernando Belda (WMO)

Stephan Bojinski (WMO)

Paul Counet (EUMETSAT)

Mark Dowell (EC/JRC)

Simon Eggleston (GCOS)

Marie-Claire Greening (EUMETSAT)

Robert Husband (EUMETSAT)

Chris Merchant (UKSA)

Tilmann Mohr (WMO)

Simon Pinnock (ESA)

Jeff Privette (NOAA)

Carolin Richter (GCOS)

Michel Rixen (WCRP)

Remy Roca (LEGOS)

Wenying Su (NASA)

Pierre Tabary (CNES)

# Annex B. Agenda

## 9<sup>th</sup> Meeting of Joint CEOS/CGMS Working Group on Climate

WMO, Geneva, Room C2 (basement)

### Preliminary Agenda of the Meeting

Day 1: Wednesday 28<sup>th</sup> March 2018

#### 1. Introduction and Context – Jörg Schulz

09:00 – 09:10	Welcome
09:10 – 09:20	Round table introduction
09:20 – 09:30	Acceptance of Agenda
09:30 – 10:00	Status of Working Group

#### 2. Gap Analysis Report, Recommendations and Actions – Jörg Schulz

10:00 – 10:15	Introduction
10:15 – 10:45	Final review of the Structure of the Document
10:45 – 11:00	Review of the Introduction
11:00 – 11:30	<i>Coffee Break</i>
11:30 – 12:00	Review of ECV Inventory Description and Gap Analysis Approach
12:00 – 13:00	Review of general GCOS Compliance
13:00 – 14:30	<i>Lunch</i>
14:30 – 15:30	Review of ECV Gap Analysis Atmosphere (Precipitation, CO <sub>2</sub> and CH <sub>4</sub> )
15:30 – 16:00	<i>Coffee Break</i>
16:00 – 17:00	Review of ECV Gap Analysis Ocean (SST and SSS)
17:00 – 18:00	Review of ECV Gap Analysis Terrestrial (LST, LAI, FAPAR)
18:00 – 18:30	Conclusions

Day 2: Thursday 29<sup>th</sup> March 2018

### **3. Technical Supplement for the Response to the GCOS IP (Simon Pinnock)**

09:00 – 09:30	Introduction to the Technical Supplement
09:30 – 10:30	Review and endorsement of the document
10:30 – 11:00	Coffee Break

### **4. New initiatives**

11:00 – 11:30	CNES Space Climate Observatory (Pierre Tabary, CNES)
11:30 – 12:00	WMO concept for the physical view of the Architecture for Climate Monitoring from Space (Fernando Belda, WMO)
12:00 – 12:30	Discussion
12:30 – 14:00	Lunch

### **5. ECV Inventory next steps – Marie Claire Greening**

14:00 – 14:30	Way forward for update of ECV Inventory
14:30 – 15:00	Discussion

### **6. Governance, Summary and Actions – Jörg Schulz**

15:00 – 16:00	Review of Minutes and Actions, Concluding Remarks
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**Joint Meeting of Joint CEOS/CGMS Working Group on Climate with WCRP  
Data Advisory Council**

**WMO, Geneva, Room C2 (basement)**

**Preliminary Agenda of the Meeting**

Day 1: Tuesday 27<sup>th</sup> March 2018

**1. Agenda – WDAC and WG Climate Chairs**

15:30 – 15:45	Welcome
15:45 – 16:30	Uncertainty in Climate Data Records (Chris Merchant)
16:30 – 17:15	WGClimate – ECV Inventory, Gap Analysis and Recommendations, Discussion
17:15 – 18:00	Discussion on agency involvement in WCRP (strategy etc.)