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COMMISSION

29th Session of the GCOS/WCRP Atmospheric Observation Panel for Climate (AOPC-29)

NCEI, Asheville, United States

17-20 September 2024

GCOS-264
WCRP 6/2024

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Table of Contents

1. Opening Session of AOPC-29	4
Improve working agreement with NCEI.....	5
2. Report to AOPC	5
3. GCOS TOPICS	7
ECV Rationalization (Peter Thorne):	7
Earth Cycles (Caterina Tassone):	7
Global Climate Data Centers (Tim Oakley):	7
4. GCOS Implementation Plan.....	7
5. WMO	8
6. TALKS FROM NCEI	9
7. Closing of the meeting	9
ICR6:	9
GCOS Timeline:	9
Update of GCOS-144	9
Members contribution to AOPC:.....	9
How would you like to contribute to AOPC next year, taking into account both the priorities for AOPC as well as your personal and professional interests?	9
Closing of the meeting.....	11
Annex 1: AOPC-29 LIST OF PARTICIPANTS	12
Annex 2: Agenda	14
Annex 3: List of AOPC-29 Actions.....	17
Annex 4: List of AOPC-28 Actions.....	18



1. OPENING SESSION OF AOPC-29

AOPC-29 was held in Asheville, NC, United States, hosted by the National Centers for Environmental Information (NCEI), from the 17th to the 20th of September 2024. This preceded by a week the catastrophic impacts arising from Hurricane Helene which have devastated western North Carolina. GCOS expresses its heartfelt sympathies to all staff at NCEI impacted by this event and hopes for a speedy and complete recovery for NCEI and the broader region.

The list of participants can be found in Annex 1 and the agenda in Annex 2.

All presentations are made available on the GCOS website at <https://gcos.wmo.int/en/aopc-29-2024>.

The meeting had as its primary goals: i) to review and progress with the GCOS IP actions relevant to AOPC; ii) to improve working agreement with NCEI; iii) to update on AOPC activities; and iv) to improve integration with relevant WMO activities.

Peter Thorne presented the decisions, actions and recommendations of the GCOS Steering Committee, held in July 2024 (GCOS-263). He also presented a report on his activities as the chair of AOPC. These included several interactions with WMO, such as chairing the Workshop on the tiered networks, being involved in the group on data policy and preparing a paper for the upcoming INFCOM-MG meeting in October 2024 as the basis for a discussion on the establishment of a climate infrastructure task team. There has been substantial progress also in the Systematic Observations Financing Facility (SOFF), where now GCOS has a place in the SOFF Advisory Board, with Peter Thorne as GCOS representative and Tim Oakley as alternate. This represents an opportunity to ensure a sustained climate voice in support of decision making for SOFF. Finally, Peter requested volunteers to step up to the role of vice-chair of AOPC.

Actions from the AOPC-28 meeting were reviewed (See Annex 4). Most of the actions have been completed, a few of them were deemed to be no longer relevant and two of them were kept open. The first such action is AOPC-28 A3 on increasing thunder day records in the Copernicus repository. This action is not completed as it was decided that, before sending a letter to the specific countries requesting existing thunder day records to be delivered to the Copernicus repository, an inventory and assessment of the usability of the data in the repository should be undertaken.

N.	Action	Who	When
AOPC A1	Steve agreed to talk to Earle and see whether he can take responsibility of assessing what we already have in the database.	Steve and if Earle accepts, Earle for the assessment.	Steve: by the end of December.

The second such action from AOPC-28 is AOPC-28 A25 on the review of GCOS-143. According to Blair, this document needs review as important material is not covered in either the WIGOS Manual or the WIGOS Guide. WGClimate is aware of this document and interested in updating it, so we need to continue working with them on this.

N.	Action	Who	When
AOPC A2	WGClimate aware of this document and interested in updating this document. We need to continue to work with them on it. Proposed participation of Caterina in WGClimate meeting.	Caterina	Ongoing with check at the WGClimate meeting in February 2025

Improve working agreement with NCEI

A separate meeting was held in advance of AOPC, with the participation of the GCOS Secretariat, Caterina Tassone, the AOPC chair, Imke Durre, the GCOS Network Manager Tim Oakley, Imke Durre and Russ Vose, Ken Knapp and Christina Maurin from NCEI. The discussion was presented to the panel and can be summarized as follows:

- The mutual benefits of continuing engagement and coordination were recognized
- The importance of a sustained NCEI voice in AOPC and GCOS is fundamental
- The value of NCEI’s work on fundamental data records to the broader climate/science community is substantial.
- Pros and cons of a federation plan for global climate centres were discussed

However:

- NCEI and GCOS both are resource limited
- NCEI is increasingly sectorial/industry focused
- NCEI is increasingly process oriented reducing flexibility
- A number of single points of failure were identified

In terms of NCEI’s role as the GCOS Monitoring Centre it was recognized that:

- NCEI provides a number of important and unique monitoring services
- Many of the monitoring services were conceived and configured years/decades ago and would benefit from a review (noting that NCEI has limited resources)
- There was agreement that an unified database that could be queried might be beneficial for all parties allowing substantial future flexibility and reducing maintenance overheads considerably
- GCOS, via the Secretariat, will go through the process of reviewing what NCEI is currently providing and advise what remains most relevant and what may be able to be discontinued

N.	Action	Who	When
AOPC A3	Review the use and benefit of NCEI monitoring products generated for GCOS and feed this back to NCEI	Tim Oakley	

2. REPORT TO AOPC

According to their governance, several networks and the task team on lightning have to report annually to AOPC.

Sarah Gallagher and Fabio Madonna, respectively co-chairs of the two GCOS reference networks, GCOS Surface Reference Network (GSRN) and the GCOS Upper-Air Network (GRUAN), gave a presentation to AOPC. This was followed by a presentation on the Baseline Surface Radiation Network (BSRN), by its chair, Laura Riihimaki.

Tim Oakley presented the GCOS Upper-Air Network (GUAN) and the GCOS Surface Network (GSN), including the network and station list update and the performance of GSRN and GUAN, showing a decrease in the active GUAN stations in the last 4 years. Two new GSN stations were added in RA-VI, one was relocated, and one was closed in Antarctica. One GUAN station was replaced in Argentina. The changes to the list of stations were approved by the AOPC.

Decision: AOPC approves the changes to the list of GSN and GUAN stations as proposed.

The discussion following the presentations focused on the collaboration between GRUAN, GSRN and BSRN. The goal is to encourage the BSRN colleagues to develop uncertainty quantification for radiation products. A document aiming to outline the requirements for establishing reference data products for radiation was submitted to the attention of BSRN by GRUAN and complemented by GSRN related documentation. The aim is to agree on the requirements for radiation products planned to be provided at both GRUAN and GSRN. BSRN already developed a framework for uncertainty estimation of shortwave radiation products and the one for the longwave product will be ready within 1-2 years.

To avoid unnecessary duplication, the hope is that the station scientist of a GRUAN or GSRN station observing also radiation, will submit the radiation product to the same centre as currently used by BSRN where it will be processed to a GRUAN or GSRN Data Product (GDP). The BSRN centre will therefore under this arrangement become the GRUAN or GSRN reference processing centre for radiation. It was decided that it is important for these reference networks to regularly exchange information to build understanding towards this aspirational goal. The GCOS Secretariat will organize a meeting with the chairs of the 3 networks every 6 months to keep the discussion going.

N.	Action	Who	When
AOPC A4	Facilitate a meeting every 6 months between the leads of GRUAN, BSRN and GSRN on surface radiation measurement	GCOS Sec	Every 6 months

Peter Thorne offered the 3 networks that AOPC could send a letter of support if the networks thought it beneficial. However, AOPC would need directions from the network.

Finally, a certificate of recognition for all his efforts for BSRN was presented to Christian Lanconelli, outgoing chair of BSRN, and collected by Laura.



Peter Thorne thanked the chairs of the two reference networks, Sarah and Fabio, and the Chair of the BSRN, Laura, for the continues efforts.

Steve Goodman, chair of the AOPC TT-LOCA (Task Team for the Lighting observation for climate applications), presented the work of the task team, including the exemplary lighting data sets, the possibility of the lightning ECV to be associated with other variables and the proposal to collaborate with WHO and WMO Disaster Risk Reduction Programme. The AOPC members are asked to review the final report produced by the task team.

N.	Action	Who	When
AOPC A5	Provide comments on the report of the TT-LOCA to the GCOS Secretariat	AOPC members	15 November

Peter Thorne thanked Steve and the members of the TT-LOCA for their work on the ECV lightning. The team is now closed, but Steve, as a member of AOPC, will continue to be responsible for keeping the connection with the lightning community.

3. GCOS TOPICS

This section of the meeting summarized the progress in the topics that were started at the Joint Panel Meeting in 2023 as cross-panel activities. Of the 6 groups, 3 are still relevant for AOPC.

ECV Rationalization (Peter Thorne): The team has made significant progress. There is now a new list of proposed ECVs and ECV quantities. Mostly, this is a redistribution of quantities under different ECVs or merging ECVs under a single one while keeping the same quantities. The total number of ECVs went from 55 to 42, while the ECV quantities went from 177 to 170. Two ECVs have been deleted, anthropogenic water use and anthropogenic Greenhouse Gas fluxes. The revised list of ECVs and ECV quantities will now be shared with selected stakeholders for feedback. This consultation will then be followed by a public review. By the end of 2025, a first draft of an ECV paper describing the process and introducing the new ECVs should be ready. Peter stressed that nothing is final until everything is final and that the proposal may change arising from the consultation period.

Earth Cycles (Caterina Tassone): After the Workshop on the Earth cycles, held in June 2023 with WCRP, the work on the Earth cycles has followed the recommendations arising. So far, a paper is being drafted about the global integrals. This will have first to be completed and reviewed by the community and only after the publication, work on this topic will start. At this point, the GCOS Secretariat will revert to AOPC members to ask for collaboration.

Global Climate Data Centers (Tim Oakley): This group is working on action D1 which asks to define the requirements for a Global Climate Data Centre. The idea is to use a set of requirements called Core Trust SEAL (CTS), which defines a number of requirements that a data centre is expected to fulfil. The representatives of the major repositories which are member of this team, have been asked to look at these CTS requirements and try to identify, for their own repositories, which of the requirements are easy, which are challenging and which impossible, identifying also the reason for any encountered difficulties.

4. GCOS IMPLEMENTATION PLAN

One of the main scopes of the meeting, was to progress with the GCOS IP actions which are under the responsibility of AOPC. The actions had been divided into 'flash talk' actions, for which the IP rapporteurs had been requested to prepare a short presentation on the progress, and 'long' actions, where the IP rapporteurs had been asked to chair a longer discussion in order to identify the best possible way to move the action forward. The IP rapporteurs in charge of both these categories have been asked to update the live document on the actions (GCOS-IP tracker) to reflect the discussion held at AOPC. The actions below capture some of the steps required to move forward.

N.	Action	Who	When
AOPC A6	IP rapporteurs to update the GCOS-IP tracker with progress and any outcomes from this meeting.	IP Rapporteur	15 November

N.	Action	Who	When
AOPC A7	ECV stewards to finalize C1 table. GCOS Sec to check consistency with other panels and highlight potential gaps for the consideration at the next AOPC meeting	ECV Stewards	15 November

N.	Action	Who	When
AOPC A8	GCOS Secretariat to amend table D2 and ECV stewards to update with information on accessibility and campaign/research data (scoring and comments)	ECV Stewards	15 November

5. WMO

Under this item, the chairs or secretariat of the standing committees in Infrastructure relevant to AOPC, had been invited to explain how AOPC could better interact with them. Albert Fisher presented relevant interaction of AOPC with SC-ON, Dave Berry with SC-IMT, and in particular WIS 2.0 for the exchange of historical data, and Gianpaolo Balsamo presented the G3W. Unfortunately, the chair of SC-MINT was not able to attend.

Regarding the SC-ON priorities for 2024 and 2026, Albert Fischer identify the GBON expansion and the WIGOS tools as the most relevant for AOPC and asked the panel to contribute to the development of the GBON roadmap to address the request from INFCOM to incorporate climate monitoring. He also asked to provide experts for the Expert Team on Earth Observing System Design and Evolution (ET-EOSDE), the Expert Team on Global Observing System (GOS) Surface-based and basic Observing Networks (ET-SON) and the Expert Team on WIGOS Tools and Regional WIGOS Centres Operations (ET-WTR).

N.	Action	Who	When
AOPC A9	AOPC to nominate a member to join ET-EOSDE who will be responsible for developing a future observations strategy roadmap, ET-SON and ET-WTR	AOPC	30 November

Dave Berry presented the key concepts of WIS 2.0 and in particular how to share historical data in WIS 2.0. There is a strong interest to improve the interface between GCOS AOPC and the activity in SC-IMT. This can be achieved by having an AOPC member in the ET-metadata and ET-data.

N.	Action	Who	When
AOPC A10	AOPC to nominate experts to join ET-Metadata and ET-Data	AOPC	30 November

Finally, Gianpaolo Balsamo gave a presentation on the G3W progress. At the moment, there is no need for AOPC formal engagement, but this will be important for the next G3W Implementation Plan that will be written in 2027.

6. TALKS FROM NCEI

NCEI experts gave a series of talk to AOPC covering topics of common interest, including: the work at NCEI, the effort on satellite CDRs, climate monitoring, datasets of monthly, daily and hourly surface observations, climate data access with the ClimateEngine, and climate data rescue. The talks were very appreciated by the AOPC participants who had the opportunity to better understand the important work that goes on at NCEI in part as support to GCOS.

7. CLOSING OF THE MEETING

ICR6: Martin Ridal gave a brief overlook on the agenda of the upcoming 6th WCRP International Conference on Reanalysis meeting. Both Martin and Peter will attend the meeting, and their presence will be beneficial in moving the GCOS IP actions on reanalysis forward.

GCOS Timeline: Peter Thorne presented the timeline for GCOS over the next 3 years. The next panel meeting will be held jointly with the other panels in the beginning of 2026. During the meeting, the work on the next Status Report will be started, with the idea of publishing the Status Report in February 2027. Immediately after this publication, the panel will start working on the Implementation Plan that will be published in August 2028. Peter Thorne stressed the fact that in this period, every member of the panel needs to contribute to the work of the panel to make these two publications successful.

Update of GCOS-144 on the requirements for GUAN and GSN: Tim asked Blair and Imke to look at the draft that he has started working on. The first step will be deciding whether they are going to do a light touch update or a radical update in terms of making the networks more future proof. Colin and Stephan also offered to help.

N.	Action	Who	When
AOPC A11	GCOS-144 to be circulated to Imke, Blair, Stephan and Colin to comment on an update	Tim, Imke, Blair, Stephan and Colin	Update by 30 October, updates by end of January

Members contribution to AOPC: Before closing the meeting, the AOPC members participating to the meeting were asked to answer the question:

How would you like to contribute to AOPC next year, taking into account both the priorities for AOPC as well as your personal and professional interests?

Responses are reported below, and they also include the ones for members who were not attending the meeting but were asked the same question offline.

Steve Goodman:

Continue work on how the ECVs are related to each other. Steve and his coauthors started looking at that for the articles for the state of the climate in BAMS. The authors realized that there is a lot of material on this topic, and they would like to write a full journal article about the relation between lightning and the different climate aspects and establish whether the new ECV Lightning is correlated to the other ones. This could also be connected to the issue of

interoperability, by looking how difficult it would be to combine the ECVs identified in the study and thinking on how to improve the interoperability for the ECV that are correlated.

Additionally, Steve has good connections with NASA and NOAA, and could work with them to make GCOS more visible by asking them where we could plug in and be more effective.

Colin Morice:

Colin's background has been developing uncertainties for surface temperature products; therefore, he is happy to be the IP rapporteur for GCOS IP Action C3 (General Improvement to in situ data products for all ECVs). There is a lot to be learned across different institutes and from the satellite community and he is interested to see what can be done to improve these products. There is also a consideration on access to information, data products are in different archives, in different formats, which change all the time.

Colin is also interested in looking at the in-situ marine data, which lies between two domains and is often forgotten. Finally, he will also assess how many datasets are there for each ECV. While it is likely that for temperature there are multiple datasets, for ECVs such as radiation, surface wind, humidity, the chances are that there is going to be one dataset.

Martin Ridal:

Martin is the IP rapporteurs for C4, the reanalysis action. He can also help out with the satellite data as he has been constantly looking out to new missions. At SMHI they have an active group for satellite application facilities, and he can talk to them and see what they are missing and what they would like to see in terms of satellite missions.

Another important point is to create the right connections within WMO. Reanalysis in WMO comes under WIPPS, and the GCOS Secretariat will ask whether there is an Expert Team under WIPPS working on reanalysis and whether they would be interested in having the connection with climate, which could be provided by Martin. Similarly, there is a WMO Expert Team on Radar, where Martin could contribute his expertise on radar data, in order to have the climate needs included in the outcome of this expert team.

Liz Kent:

Liz would like to continue the work to improve the representation of marine data in the atmosphere and continue as an ECV stewards representing the marine component of the surface ECVs data. She is also working on the key performance indicators of the Voluntary Observing Ships (VOS), including some for the climate (for ex. information on how many reports have also metadata), which should help understand the amount of data that we are getting from these networks and that are going to be useful for climate. She would also like to work on best practices for climate application for VOS. In general, and through several topics, Liz is trying to link the work of GOOS and of GCOS together, which is quite challenging as these two programs work very differently from each other.

Liz is working seeking funds for activities which will be helpful also for the work for GCOS/AOPC, such as: improving SST datasets, structural uncertainties for global surface temperature datasets, which will provide the evidence for the need of multiple datasets; data pipeline for rescue data and improving access to metadata. Liz would also like to contribute together with Colin to Action C3 and maybe she would also agree to represent AOPC in a future WMO Task Team on the tiered networks.

Laura Riihimaki:

Laura is an ex-officio member representing BSRN, so her participation to AOPC is linked to the interaction between AOPC and BSRN. She is interested in continuing to push forward withing the

BSRN for the quantification of uncertainties and with interacting with the other GCOS networks. She would also continue her work with the ocean community. Looking at the tiered approach, she would like to work to understand how reference surface radiation observations are linked to the other ones. Finally, she might be included, if needed, to the AOPC discussion on data centers, to make sure the developed concept fits well with the radiation community.

Blair Trewin:

Blair's interest and expertise are in long term in-situ datasets. Blair is connected to WMO climate monitoring activities. There are some significant developments at WMO of interest to AOPC, such as the WMO Unified Data Policy and WIS and we should try to maximize these opportunities that ultimately will let to increase the quantity on data available.

Blair is on the Expert Team on Monitoring and Communicating Climate Variability and Change (ET-MCCVC) and on the Task Team on Methods and Monitoring of Temperature against Paris Agreement Goals (a.k.a. the TT1.5), both under Services. Given his experience with WMO, Blair could join the ET-Metadata if SC-IMT is in agreement. As he is one of the only AOPC expert located in the Southern Hemisphere, Blair can also work on improving data coverage in the tropics and in the southern hemisphere.

Imke Durre:

Imke can support helping to monitor the historical record. NCEI contribution can be in terms of monitoring the completeness of the data records (Daily CLIMAT and hourly surface observations), not only with the present-day receipts but also in identifying stations with long term records. Imke also asked for AOPC to give NCEI some direction on how AOPC is thinking to evolve the monitoring so that NCEI can consider processes and make them easier to maintain. Secondly, NCEI is quite focused to improve access to data, and while traditionally they have mostly served users downloading the whole data sets, now they are much more thinking to improve access to all kinds of users with different skill levels, knowledge and expertise. Both for FCDR, using the cloud technology and for derived products, Imke can monitor this. Imke, working at NCEI, has a part in all the actions D on data management, as she is linked with a good group of people at NCEI she can talk to.

In terms of updating GCOS reports, Imke could not lead the efforts, but she could contribute on GCOS-143 or GCOS-144. At the moment Imke is more drawn to the access side and the adaptation side of data products.

Carmen Garcia Izquierdo

Carmen background is on thermal metrology, and she is interest in the field metrology for climate. She would like to increase the metrology background on the AOPC activities, by including metrological concepts, guides and documents. She can also translate to the metrology community the metrological needs detected by AOPC. She can contribute to the B1.4 and on the action on fluxes.

Closing of the meeting: the panel agreed the actions for AOPC29 (See Annex 3)

Peter thanked all the participants and in particular Imke Durre for hosting the meeting. He also thanked Rainer Holman, an outgoing member, who had been part of AOPC for several years and had provided several contributions to the work of AOPC.

The meeting was closed on 18 September 2024, at 12:00.

ANNEX 1: AOPC-29 LIST OF PARTICIPANTS

Members:

In person

Peter Thorne (Chair) – Maynooth University, Ireland

Imke Durre – NCEI - USA

Steve Goodman – NOAA- USA

Colin Morice – UK Metoffice - UK

Martin Ridal – SMHI – Sweden

Blair Trewin – BOM – Australia

Online

Stephan Bojinski – EUMETSAT - Germany

Elizabeth Kent – NOC-UK - UK

Ex-officio:

Laura Riihimaki – CIRES, NOAA GML - USA

GCOS Secretariat

Caterina Tassone – WMO - Geneva

Tim Oakley – WMO - Geneva

Invited experts:

In person

Steve Ansari - NCEI - USA

Jason Cooper – NCEI - USA

Karin Gleason - NCEI - USA

Ken Knapp – NCEI -USA

Matthew Menne - NCEI - USA

Carrie Morrill – NCEI – USA

Christina Maurin – NCEI - USA

Russ Vose – NCEI - USA

Online

Gianpaolo Balsamo – Director of G3W – WMO - Geneva

Dave Berry – WMO - Geneva

Albert Fischer – Director of WIGOS – WMO - Geneva

Sarah Gallagher – co-chair of GSRN – Met Eireann- Ireland

Tim Kralidis – ECCC - Canada

Fabio Madonna – co-chair of WG-GRUAN – University of Salerno - Italy

ANNEX 2: AGENDA

Day 1: Tuesday 17 September 2024					
Time	Item	N.	Presenter	Notes/Outcome	Docs
09:00-10:30					
	Opening of the meeting	1.			
5'	Welcome and adoption of agenda	1.1	Peter Thorne		
10'	Tour the table - 10 min	1.2	All		
15'	Report of GCOS SC	1.3	Peter Thorne	Outcome that needs AOPC input	
10'	Report from the Chair	1.4	Peter Thorne	(Tiered Networks; data policy, Climate Infrastructure....) -	
15'	Report on previous day activity with NCEI	1.5	Peter Thorne	Meeting with NCEI	
30'	Review of AOPC-28 actions	1.6	Peter Thorne and action owners		
10:30-11:00	Coffee Break				
	Report to AOPC	2.			
11:00-12:30					
15'	GSRN	2.1	Sarah Gallagher		
15'	GRUAN	2.2	Fabio Madonna		
20'	GUAN and GSN	2.3	Tim Oakley	Reports	
15'	BSRN	2.4	Laura Riihimaki		
30'	Discussion on networks				
12:30-14:00	Lunch				
14:00-15:15					
	Report to AOPC (cont.)	2.			
20'	TT-LOCA final report	2.5	Steve Goodmann	Report	
	GCOS Topics	3.		Updates from JPM cross-panel groups	
15'	ECV rationalization	3.1	Peter Thorne		
10'	Earth cycles	3.2	Caterina Tassone		
10'	Global Climate Data Centers	3.3	Tim Oakley	Updates from cross-panel groups on climate data centers	
15'	Discussion and decisions on topics in 2. and 3.				
15:15-15:45	Coffee break				
	GCOS IP	4.			
15:45-16:00	Reassessment of IP rapporteurs and ECV stewards	4.1	All	IP Rapporteurs ECV Stewards	
16:00-17:15	Report on selected IP actions - Flash Talks	4.2	Caterina (A1), Peter (B1.4), Tim (B2), Martin (C4), Peter (D5), Tim (F1.4)	A1; B1.4; B2; C4; D5; F1.4 (10 min each)	

Self-funded Aperitif

Day 2: Wednesday 18 September 2024

09:00-10:30	WMO	5.			
20'	Interaction of SC-ON with GCOS	5.1	Albert Fischer		
20'	Interaction of G3W with GCOS	5.2	Gianpaolo Balsamo		
20'	Interaction of SC-IMT with GCOS	5.3	Dave Berry	New development at WMO on historical data exchange	
30'	Discussion				
10:30-11:00	Coffee break				
11:00-12:30	GCOS IP			Progress on IP actions: For selected actions For each selected action approx. 1-1.5 hr either in plenary or BoG on how to address/report on this action	
	Action C1 (Best practice)	4.3	Lead: Tim Oakley	1st long action	
12:30-13:30	Lunch			Short lunch - delivered	
13:30-15:15	C3: General improvements to in-situ data products	4.4	Lead: Colin (to give talk on general innovations in surface temperatures this cycle as an example)	2nd long action	
15:15-15:45	Coffee break				
15:45-17:20	D1: Data Center requirements D2: Ensure Global data centers exists for all in-situ observations	4.5	Lead: Caterina Tassone/Tim Oakley	3rd long action	

Day 3: Thursday 19 September 2024

09:00-12:30	Talks from NCEI	6.			
09:00-09:30	NCEI overview	6.1	Russ Vose	What is NCEI and what does it do? How do they deliver towards the GCOS IP?	
09:30-10:00	Satellite CDR at NCEI	6.2	Ken Knapp	CDR work at NCEI (including the difference of definition of CDR between NCEI and EUMETSAT)	
10:00-10:30	Climate Monitoring at NCEI	6.3	Karin Gleason		
10:30-11:00	Coffee break				
11:00-11:30	NCEI's Flagship Datasets of Monthly, Daily, and Hourly Surface Observations	6.4	Matthew Menne		
11:30-11:50	Climate Data Access with the ClimateEngine	6.5	Steve Ansari		

11:50-12:10	Climate Data Rescue at NCEI	6.6	Jason Cooper		
12:10-12:30	Best Practices for Making Data FAIR	6.7	Carrie Morrill	Data management: how do they make data available, archives and DOIs	
12:30-14:00	Lunch				
14:00-15:15	GCOS IP	4.			
75'	D3: Improving discovery in GDC	4.6	Lead: Imke Durre	4th long action Discussion will have maybe started already on Monday	
15:15-15:45	Coffee break				
15:45-17:15	BOG	BOG. 1	BOG topics to be determined based upon what issues remain open and require further technical discussion	On actions and on GCOS-144 and GCOS-143	
Day 4: Friday 20 September 2024					
09:00-12:30					
	GCOS IP	4.			
90'	F1.3: Increase temporal resolution of surface temperature and precipitation	4.7	Lead: Blair Trewin	5th Long action	
10:30-11:00	Coffee Break				
11:00-12:30	Closing session	5.			
15'	ICR6	5.1	Peter Thorne and Martin Ridal	Conference on reanalysis – GCOS presence	
30'	Timeline for next 3 years	5.2	Peter Thorne	Next Joint Panel Meeting, Status Report and Implementation Plan. Next meetings of importance for AOPC	
60'	Actions and next steps	5.3			

ANNEX 3: LIST OF AOPC-29 ACTIONS

N.	Action	Who	When
AOPC A1	Steve agreed to talk to Earle and see whether he can take responsibility of assessing what we already have in the database.	Steve and if Earle accepts, Earle for the assessment	by end of December
AOPC A2	WGClimate aware of this document and interested in updating this document. We need to continue to work with them on it. Proposed participation of Caterina in WGClimate meeting.	Caterina	Ongoing with check at the WGClimate meeting in February 2025
AOPC A3	Review the use and benefit of NCEI monitoring products generated for GCOS and feed this back to NCEI	Tim Oakley	
AOPC A4	Facilitate a meeting every 6 months between the leads of GRUAN, BSRN and GSRN on surface radiation measurement	GCOS Secr	Every 6 months
AOPC A5	Provide comments on the report of the TT-LOCA to the GCOS Secretariat	AOPC members	15 November
AOPC A6	IP rapporteurs to update the GCOS-IP tracker with progress and any outcomes from this meeting.	IP rapporteurs	15 November
AOPC A7	ECV stewards to finalize C1 table. GCOS Sec to check consistency with other panels and highlight potential gaps for the consideration at the next AOPC meeting	ECV stewards	15 November
AOPC A8	GCOS Secr to amend table D2 and ECV stewards to update with information on accessibility and campaign/research data (scoring and comments)	ECV stewards	15 November
AOPC A9	AOPC to nominate a member to join ET-EOSDE who will be responsible for developing a future observations strategy roadmap, ET-SON and ET-WTR	AOPC	30 November
AOPC A10	AOPC to nominate experts to join ET-Metadata and ET-Data	AOPC	30 November
AOPC A11	GCOS-144 to be circulated to Imke, Blair, Stephan and Colin to comment on an update	Tim Imke, Blair, Stephan and Colin	Update by 30 October, updates by end of January

ANNEX 4: LIST OF AOPC-28 ACTIONS

N.	Action	Who	When
AOPC A1	Discuss with the marine community about potential reference ocean stations which are measuring temperature at surface	Co-Chairs of TT-GSRN	N/A
AOPC A2	GSRN, GRUAN and BSRN to have a discussion about reference surface radiation measurements to make sure that we are working together and not duplicating efforts	GCOS Secretariat	December 2023
AOPC A3	GCOS Secretariat will work with WMO to contact countries to request existing thunder day records to be delivered to the Copernicus repository.	GCOS Secretariat	December 2023
AOPC A4	Panel members to reach out to their countries about the operational implementation of CLIMAT (daily) Raise up the issue to operational implementation of CLIMAT at SC-ON	Blair for Australia; Imke for US AOPC Chair	Report at next AOPC Next SC-ON
AOPC A5	a. Raise the issue of exchange of historical data, following on from the paper sent to members in 2022, with SC-ON b. Raise the issue around the exchange of recent (within the past two weeks) data that did not get transmitted, with SC-ON	AOPC Chair	Next SC-ON
AOPC A6	Discuss with GGGW to have an ex-officio post for AOPC	GCOS Secretariat	December 2023
AOPC A7	Discuss with the marine community about extending the in-situ monitoring of atmospheric composition over the ocean (IP Action B4)	Paolo and Liz	Report at next AOPC
AOPC A8	ECV stewards to undertake an audit to capture relevant data products and how they are maintained. Initially, Liz will complete an example and share this with all AOPC ECV Stewards. (IP Action C3)	Liz ECV Stewards	Liz: by the end of August ECV stewards by next AOPC
AOPC A9	Produce a best practices paper, highlighting some of the best practices used for in situ data sets creation.	TDB	TDB
AOPC A10	NCEI to provide monitoring on surface hourly data holdings (GCHN) to demonstrate the impact of GBON (IP Action F1.3)	Imke	Next AOPC
AOPC A11	Forward to WGClimate the recommendation from AOPC-28 for Actions B1.3; B1.5 and D4.1	GCOS Secretariat	Next WGClimate-GCOS Sec meeting
AOPC A12	ECV Stewards to undertake initial entries into table A1.1	ECV Stewards	December 2023
AOPC A13	ECV Stewards to undertake initial entries into table C1.1	ECV Stewards	June 2024
AOPC A14	ECV Stewards to undertake initial entries into table D2.1	ECV Stewards	December 2023
AOPC A15	Follow up about data from wind farms: are there any data made publicly available? Invite wind industry representative to present at a future panel virtual meeting (IP Action B9-meeting requirements for PBL) CV Stewards to undertake initial entries into table D2.1	Peter	September 2023

AOPC A16	CPG ECV Rationalization: Caterina to identify volunteers for the group that will work on the ECV rationalization. These volunteers should regularly report back to the panel.	Caterina	October 2023
AOPC A17	CPG Air-Sea fluxes: Contribute to the drafting of the document: Liz, Carmen, to contribute to writing a report and preparing a workplan.	Liz, Carmen	December 2023
AOPC A18	CPG on Data centers: Imke, Stephan and Rainer to continue to engage with this group. Imke to lead this group and report back to AOPC.	Imke, Stephan and Rainer	Ongoing
AOPC A19	Scope out a draft of an ECV product for UV-radiation: Paolo proposed to go back to Joanna and report that we need an ECV product related to radiation and a better justification for making it an ECV product.	Paolo	Hold until decision on rationalization
AOPC A20	Review the Climate Monitoring Principles	Imke, Rainer, Stephan	October 2023
AOPC A21	Contact C3S to see whether they can host parallel data holdings in a unified and usable manner	Blair, Chiara	Report at next AOPC
AOPC A22	Encourage more precipitation in situ observations that would help resolve the difficult areas, encourage more international transmission of precipitation data w/o restrictions.	ECV steward for precipitation	Report at next AOPC
AOPC A23	Invite WGClimate to consider the role of new and novel technologies and novel orbital configurations to address persistent spatio-temporal gaps in satellite observations	Caterina	Next WGClimate-GCOS Sec meeting
AOPC A24	GCOS-144: relevant ECV stewards to undertake a review of the document with a view of producing an updated version.	Tim to coordinate; ECV stewards	By next AOPC
AOPC A25	GCOS-143: Blair is going to review and check whether this is now captured within other WMO publications	Blair	October 2023
AOPC A26	GCOS-127: Blair is going to review and check whether WMO is planning to publish a guidance.	Blair	December 2023
AOPC A27	Produce a working document to track AOPC relevant documents.	GCOS Secretariat	October 2023
AOPC A28	Caterina to provide input on ECV Inventory to WGClimate as drafted and agreed during the meeting	GCOS Secretariat	

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