

Report of the 8th session of the WCRP Data Advisory Council

18-21 March 2019, Marrakesh, Morocco



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Participants at the umbrella event “GCOS/WCRP/CEOS/CGMS Joint Panels Meeting”
(<https://gcos.wmo.int/en/gcos-joint-panels-meeting>)



WDAC8 participants:

Participating on-site, in picture from left to right: *Andrea Storto (for CLIVAR), Hiroyuki Enomoto (for CliC), Chris Kummerow (for GEWEX), Michel Rixen (WCRP JPS liaison), Susann Tegtmeier (WDAC co-chair and representing SPARC), Jean-Noël Thépaut (WDAC co-chair), Pascal Lecomte (on behalf of Simon Pinnock), Dorothee Bakker*

Participating on-site, not in picture: *Anna Rutgersson*

Participating remotely, not in picture: *Michael Bosilovich, Peter Gleckler, Duane Waliser, Patrick Laloyaux*

Executive Summary

The 8th session of the WCRP Data Advisory Council was held in Marrakesh in Morocco, on 20-21 March, in the context of a number of other relevant meetings of groups dealing with climate observations including the joint GCOS-WCRP AOPC, OOPC and TOPC panels, as well as the CEOS/CGMS WG Climate.

The WDAC session was purposely focused on redefining observations and data priorities of the Programme in the context of the new WCRP Strategy. Taking stock of the WCRP Sponsors's review, the meeting aimed at consolidating inputs to the 40th session of the Joint Scientific Committee meeting to be held 6-10 May and the preceding retreat on 4-5 May 2019.

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Participating as WCRP JPS liaison: Michel Rixen

1. Joint Panels meetings 18-19 March 2019

The WCRP Data Advisory Council developed some inputs to the Joint Panel meeting held on 18-19 March, which are summarized below.

The new WCRP Strategic Plan contains a number of explicit references to observations and data:

- Field campaigns for fine scale process studies, collocated measurements
- Sustained observations and data records: need for continuous records
- Data mining, machine learning: big data requires new tools to process and analyze data
- Data infrastructure, standards, protocols, data policy: currently many disparities calling for stronger integration, seamlessness

Integrated Earth System Approach: bringing different Earth system components together requires a much better understanding of exchanges/fluxes: lacking observations and understanding, lots of science required

Earth System Reanalysis is becoming increasingly important:

- Closing cycles
- Reference for model development, process studies, model initialization, etc
- Climate variability and change
- Continuous improvements, e.g. S-RIP to address shortfalls on stratosphere
- Plan in WCRP to move towards an “Earth System Reanalysis” intercomparison effort

Research also plays a critical role in promoting innovation on sensors and platforms (e.g. autonomous sensing such as ARGO fleet, WCRP-FPA2 Polar Challenge, etc).

Research is a primary user of observations too and has specific requirements (different from services or policy making). There is a need to complement the current GOCS role with a more agile mechanism to target specific research needs.

Sustained observations (and their uncertainties) are key for WCRP: GCOS's key role is duly acknowledged

2. WDAC8 session 20-21 March 2019

The 8th session of the WCRP Data Advisory Council was purposely focused on redefining observations and data priorities of the Programme in the context of the new WCRP Strategy. Taking stock of the WCRP Sponsors's review, the meeting aimed at consolidating inputs to the 40th session of the Joint Scientific Committee meeting to be held 6-10 May and the preceding retreat on 4-5 May 2019.

2.1 SPARC

- **ACTION:** Letter from AOPC to GCOS to advocate Limb sounders (AOPC Co-chairs and Susann)
- Comments back to SPARC: CO₂ and CH₄ measurements from aircraft and CO₂ air measurements from commercial ships
- How to promote and mobilize resources for basic (ground-based) observations, e.g., ozone sondes, CO₂ measurements, etc, in support of the space-based observing system?
- **ACTION:** talk to WG Climate about water vapor frequency bands (Susann, done)

2.2 CliC

- **ACTION:** promote use of Obs4MIPs in the community and ask for priority data sets (Mich, done)

2.3 GEWEX

- Data continuity is an issue (clouds)
- Should data portal for water and energy budgets work be moved to Obs4Mips? This should be encourage (Remy, Tristan to explore)

2.4 CLIVAR

- Lack of "data assembly center" for in-situ systems in order to provide common data format and meta data
- **ACTION:** promote development of a one-stop shop technical access to ocean data in close consultation with JCOMMOPS (OOPC co-chairs)

2.5 FLUXES

- Way forward with the flux task team?
 - **ACTION:** finalize white paper by mid-April (Anna)
 - **ACTION:** Pass on white paper to JSC, if ready (WDAC co-chairs)
 - Recommend that fluxes should sit at a high level (maybe as cross cutting research project) given its importance in the integrated Earth System approach?

- Need to coordinate with GCOS activities: there are both obs/ECV and model/reanalysis considerations on fluxes
- Where happens coordination/communication of the cycles? Need to coordinate/consult with new CLIVAR/GEWEX activity on energy budget and need also to consider carbon and water in the mix, as cycles are not independent? This would need to be discussed at the JSC level when developing the Implementation Plan

2.6 Obs4mips, ESGF, metrics

- Problem: no funding available for user support (for model download via ESGF) → 'Users help users' discussion forum?
- Upload obs4mips data: necessary to find someone with an ESGF node and experience
- **ACTION:** analyze the user uptake, in order in due time to make a priority list based on popularity, especially if the funding for help desk is limited (Peter).
- **ACTION** Possible 2nd Obs4MIPs meeting with WGClimat? (Mich to consult with WG Climate co-chair)
- **ACTION** Discuss potential technical synergies between C3S and Obs4mips (Peter and Jean-Noël)

2.7 TIRA and Reanalysis

- Where would a new reanalyses ESRIE group sit, especially if WDAC would disappear in its current form?
- **ACTION:** review proposal and send comments back to TIRA (mid April latest) (Mich to send to WDAC asap)
- **ACTION:** convey TIRA note to JSC40 (WDAC co-chairs)
- **ACTION:** inform Sean Davis, John McCormack and Quentin Errera about TIRA plans so that they can coordinate the relevant SPARC data assimilation activities (Susann)

2.8 Data assimilation

- Should WCRP/WDAC play a role in promoting and coordinating specific Observation Impact studies to address value of individual observing systems (coordinated with GCOS)?
- There is ample room for collaboration on data assimilation with the weather community (e.g. DAOS/WWRP).

2.9 Emerging topics: machine learning/data mining

- Rapidly developing field, needed in a big data context, WCRP should play a convening role and accelerate exploitation from other science disciplines
- C3S is planning some activities in this context
- **ACTION:** recommendation for inclusion in IP at retreat and JSC40 on data mining and machine learning (Susann)

2.10 Ethics on carbon and environmental footprint

- Ethical questions with respect to Carbon footprint and garbage from measurements
- **ACTION:** bring issue to JSC for a position (should WCRP commission a position paper?) (Susann, Jean-Noël)

3. Joint meeting with WG on Climate

- Idea to develop a position paper from WDAC and WG on needs of long-term sustained observations that should be covered by GCOS
- Requests of the WG regarding Obs4mips: better pipelines, use of satellite simulator
- Bring together data assessments done by the core projects to feed into the WG activities
- Can we develop a list of 'essential observations/observational products for WCRP' with the input from the WCRP groups and GCOS that can serve as a reference document to promote them (e.g. in WG Climate)?
 - Would encompass data sets essential for WCRP research
 - Could be sorted according to some priority list and updated regularly
 - Would include small scale field campaign type of data, continuous and sustained ground-based data, etc.
 - Would provide an agile mechanism to complement the GCOS Status Report/Implementation Plan
 - Should take advantage of the excellent work already done by CEOS-CGMS WGClimat for space observations

4. Business

- Next meeting: 23-25 March 2020, venue TBC
- Membership: suggestion for continuation until clarity on IP, need for data science/mining expertise
- Future of WCRP structure: WDAC counselling role could reside with JSC, whilst activities be re-structured as proposed in Annex 1

ANNEX 1: WDAC input for IP

Possible group ToRs and names:

- Working group on observations, reanalyses and data science
or
- Working group on analysis of observation and data assimilation
or
- Working group on data for climate research

3 main pillars:

1. Observations

a. Observations for process understanding

- Official WCRP document on observations required for key research (including priorities)
- Targeted field experiments
- Characterization of bias and uncertainty in instruments

b. Sustained reference data sets

- Synergies/consistencies between observing systems – GCOS
- Products for model evaluation (e.g. Obs4MIPs) and cross cutting research projects (e.g., fluxes, budgets) - WG Climate
- Benefits of new sensors/micro-satellites, citizen science?
- Observational needs, data rescue

2. Reanalyses and data assimilation

a. Earth System Reanalyses

- Common framework, umbrella for Reanalysis Intercomparison Projects (RIPs)
- Highlighting scientific research topics such as cycles
- Opportunities for synergies with WWRP and GAW

b. Data assimilation

- Coordination of OSEs/OSSEs
- Links to predictability/ensemble topic
- Opportunities for collaboration with WWRP/DAOS/PDEF and WGNE

3. Data science and data management

a. Data science/mining/visualization

- Information and knowledge exchange across WCRP entities
- Promote transfer of knowledge from other disciplines
- Identify areas for international collaboration on big data

b. Data infrastructure and management

- Open data access policy
- Common data formats, metadata requirements, and citation standards (including observations, reanalyses, simulations)
- Research-operations synergies

Overall:

- Cross cutting (across core projects and capability themes)
- Supporting individual research projects
- Connecting to climate research activities outside of WDAC: SOLAS, and leverage other data products e.g. GLODAP/SOCAT
- Connecting to GCOS, CEOS, CGMS, GAW, IGAC, Future Earth

- Linking to research and operations and exploit synergies on infrastructures, protocols, standards
- Counseling role of WDAC on data matters could fall under responsibility of JSC in new WCRP structure (same could apply for WMAC on modeling issues)

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