

46th Session of the WCRP Joint Scientific Committee (JSC)

Date: 12-16 May 2025

DEADLINE: 15 Feb 2025

Instructions

Overarching content/goal: To provide an update on progress made during the last year, and to identify issues etc. in advance of the JSC meeting. This will allow more discussion and less reporting at the JSC meeting itself. The outcomes from this report will also feed into a highlights brochure planned for the first quarter of the year. The Secretariat will arrange calls prior to the JSC meeting with JSC liaisons (as appropriate) to discuss the input and any issues to the JSC meeting itself. Please work with the WCRP secretariat responsible for your activity, in the preparation of the report.

Please keep the information as focused as possible and provide links to websites where more details can be accessed.

Update report for the WCRP Joint Scientific Committee

GEWEX

1. High-level publications (in particular strategic publications/assessments that are direct outcomes of your activity)

- GVAP-II: Trent et al., 2024, <https://doi.org/10.5194/acp-24-9667-2024>
 - Global Vapor Assessment: Analysis of temporal stability shows that most data records are affected by breakpoints to a certain extent. Trends and regression results exhibit differences among the records, though a subset of records shows agreement despite small breakpoints.
- EEI: Hakuba et al., Surv. Geophys., 2024, <https://doi.org/10.1007/s10712-024-09849-5>
 - Earth Energy Imbalance
- PLUMBER2 work (<https://bg.copernicus.org/articles/21/5517/2024/>)
 - Model Benchmarking: highlight the significant deficiencies in the modeling of turbulent surface fluxes in land surface model
- The LS4P project published a special issue on “Sub-seasonal to Seasonal Predictability and Land-induced Forcing” in *Climate Dynamics*. 17 papers are included in the special issue (*Climate Dynamics*, Vol 62, nr. 4 April 24 Guest Editors Y. Xue and W. Lau).
- UTCC PROES: Upper Tropospheric Clouds and Convection -Process Evaluation Studies: The GASS UTCC PROES project introduces a new data product of upper troposphere (UT) cloud systems, based on cloud properties from IR sounders (AIRS and IASI). This data base has been complemented by vertical structure, in particular radiative heating rates, and a precipitation rate classification, using **machine learning and training** with CloudSat-lidar nadir track observations. It contains radiative heating rates and cloud properties from 30N-30S and from 2004-2018 and now released at: <https://gewex-utcc-proes.aeris-data.fr/data/>.
- Baltic Earth: New evidences for climate change impacts in Baltic Regions, from 40+ scientific papers by Baltic Earth RHP, summarized in 2024 Baltic Earth Climate Change Fact Sheet (<https://tinyurl.com/Baltic-ClimateChange-Facts2024>).

- Cheng, T.F., Chen, D., Wang, B. et al. Human-induced warming accelerates local evapotranspiration and precipitation recycling over the Tibetan Plateau. *Commun Earth Environ* **5**, 388 (2024). <https://doi.org/10.1038/s43247-024-01563-9>
 - the long-term actual ET (ETa) data over TPE and showing the significant increase in ETa over the region, twice larger than the global average. This is an important scientific finding RE manifestation of the climate change over high mountain regions.

2. Capacity Building/Education and Training Highlights

- 9th GEWEX OSC (~1200 Attendees) plus side meetings incl. ECR workshop (50 attendees)
- Webinars and Workshops (e.g. Baltic Earth, GWF, USRHP – H2US, Machine Learning for Land Models – ML4LM, Monsoon Panel, GHP Floods Initiative, Inarch)
- GLAFO network and sites continued to be expanded (e.g. Huancayo in Peru and SIRTa in France)
- Baltic Earth Winter School, Sopot, Poland (March 18 – 22, 2024)
- Central Asia Workshop Osh, Kyrgyz Republic (28 April – May 1, 2024)
- For more events see: <https://www.gewexevents.org> and <https://baltic.earth/events>

3. Linkages with other Core Projects, Lighthouse Activities, Academy etc.

- Activities or actions done in collaboration with other CPs, LHAs or Academy
 - Digital Earth – support their various activities and new interest in urban modelling and km-scale land surface modelling.
 - Collaboration with CliC on their new initiative IC-MontC by linking it to existing GEWEX Activities such as INARCH, Mountain related RHPs – ANDEX, GWF, TPE
 - GASS and GLASS are connected to ESMO and WGN
 - GHP is in close interaction with RiFS for regional projects and interaction with stakeholders.
 - Collaborations with APARC on km-scale modelling of the atmosphere and convection/waves interactions.
- Results or activities that you consider contribute to the objectives of other WCRP activities
 - GEWEX SSG Co-Chair (Zeng) led the establishment of the GPEX Lighthouse Activity
 - GEWEX SSG Co-Chair (Polcher) led the cycles activity
 - EEI Assessment contributes to CLIVAR ocean heat activities
 - High Resolution modelling under GHP contributes to Digital Earth LHA
 - The RHPs contribute to RiFS, ESMO and CliC directly

4. Partnerships with entities outside of WCRP

- All our RHPs have connections outside of WCRP, be it institutional or organizational e.g. IAI with ANDEX, Mountain Research Initiative Etc.
- Close interactions with WWRP on hydrological forecasting in a changing climate.
- Continued building on Central Asia network as preparation for an RHP, primarily institutional first, strong interest from Pakistan National Institute of Disaster Management as well as from Chinese side (CAS)
- Continued collaboration with WMO-Hydrology, Future Earth (a.o. iLEAPS, ACPC), Space Agencies (NASA, ESA, JAXA, NOAA, EUMETSAT, CNES, etc.), AIRCAS and DBAR in China etc.

5. Future Science Directions for JSC consideration (e.g., new groups, activities)

- *Consolidation of the new activities started in the previous years takes precedence over initiating more activities*
- *The wide range of programs and structures of WCRP hinders a closer and constructive collaboration between activities. Project offices and chairs do not have the time to truly engage with other activities and develop collaboration strategies.*
- *Potential for new coastal zone activities : coupling of the hydrologic processes and coastal circulation and biological activities to be explored with CLIVAR, with relevance to various Lighthouse Activities (e.g., Digital Earth, GPEX).*

6. New Activities (e.g., structural changes to your activity, plans for databases and other products not covered in the above)

- *New Global Ground Water Network activity kick started at GEWEX OSC*
- *RivEX cross cutting activity focused on using SWOT*

7. General (Highlight any other outcomes etc. that you wish to make the JSC and other WCRP activities aware of (in particular regionally focussed activities we could use in any highlights brochure). Are there particular challenges faced in the last year that the JSC should be aware of?

The GLAFO sites and expansion is a highlight with Huancayo becoming a GLAFO station.

ANDEX our South American RHP is now a full-fledged RHP with an active early career component (JOVEN ANDEX) – this is also closely related to other WCRP activities in capacity development, regional modelling and Digital Earth, ...

GASS has played a critical leadership role in the recent ORCESTRA (Organized Convection ExperimentS in the tropical Atlantic) field campaign, which took place in in Aug-Sep 2024 over the tropical Atlantic from Cape Verde to Barbados. The field campaign has been very successful and has collected observations over a wide range of scales (microphysical scale, turbulence scale, cloud-scale, meso-scale, large-scale) for studying convection organization. ORCESTRA will feed several GASS projects such as DYNAMOND, EUREC4A-MIP, Deep convective organization, UTCC-PROES, and GAP.

More examples (including figures) are available upon request.

Challenges:

Funding situation in the US has become very opaque and not clear what the impacts will be and how far reaching. IGPO is working on alternatives to safeguard continuity, but time is short.

Many of the US agencies carrying out operational observations and the associated research are being closed down (satellite program, observational networks). Threatening our climate monitoring and putting our colleagues onto the street. WCRP activities which have climate monitoring at their core (GEWEX, CLIVAR, CliC) are losing their base. The situation here is

much more critical than for WCRP activities relying more on exploratory research (GLASS and GASS for GEWEX).

The number of independent activities (Core Projects, Lighthouse Activities, other projects) within the WCRP family and the way these are organized has hampered effective communication and collaboration.

The support for the core projects from WCRP has effectively been going down while the number of activities to support has gone up. That is unsustainable in the long term. Hence, GEWEX is now looking at consolidation of its activities (i.e. no additional activities unless offset by activities that are ending, broadening where possible of volunteer base and assessment of risk /future proofing e.g. data sets and modelling infrastructure) and structure (maintain 4 panel structure plus monsoon panel), rather than expansion or reorganization while maintaining relevance.