

World Climate Research Programme

JOINT SCIENTIFIC COMMITTEE (JSC)

41st online session

Global Energy and Water Exchanges (GEWEX) Report (draft 1)

1. Highlights for JSC

a. Scientific Highlights

- ISCCP-NG progressing well, involving international coordination with operational sat-met agencies enabling continuation of ISCCP Cloud related climate data records (higher space-time resolution, more accurate, stable etc.)
- EEI Assessment: Earth Energy Imbalance Assessment has begun, and community consultations have occurred in order to identify the best way forward
- Orographic drag effects when resolved are similar across models vs when parameterized are diverse in terms of magnitude and position:-> high res. Modelling can constrain parameterizations
- LES and NWP fog MIP: shows significant variations between models and lot more consistency for LES than SCMs, suggesting that microphysics & radiation are key causes (and not turbulence).
- LS4P: High elevation land surface and subsurface temperatures in the Third Pole region have substantial predictive capability for precipitation on S2S timescales.
- UTCC PROES: Cloud System Analysis allows process studies by relating anvil properties to convection & provides new observational metrics to further constrain model parameterizations. The emissivity structure of mature convective systems changes with convective depth, with more surrounding thin cirrus
- GABLS-4: better simulation of the Low Level Jet in many models (compared to the previous GABLS experiment) thanks to a TKE scheme and a height of the first level about 3m. For the LES, to reduce the differences or the uncertainties in the LES results it is necessary to use a resolution about 1 meter for the horizontal and the vertical directions
- SoilWat: Small-scale soil structural features may have large-scale implications in water and carbon cycles and ultimately on climate.
- Benchmarking: PALS - Modelevaluation.org web-based platform for benchmarking models against observations and iLAMB a global benchmarking toolkit for climate model variables (seasonal to annual)
- Land-Atmosphere MIPS: GSWP-3, LS3MIP and LUMIP
- GEWEX/GLASS Land-Atmosphere Feedback Observatories (GLAFOs) a new project to develop observatories for long-term, high-frequency obs. of soils, vegetation, surface fluxes and the planetary boundary layer (3-Dimensional).
- Regional Hydroclimate Projects: 4 well established(GWF, Baltic Earth, Hymex, PANNEX), 3 Initiating (ANDEX, TPE-Water Sust, AsiaPEX), 3 in development (USA-CONUS, Central Asia and Eastern-Africa) -> regional networks and application of climate science bringing together models, observations, scientists and practitioners and stakeholders. Good link with CORDEX in most of these. Convection Permitting Modeling integral part.

- Cross-cutting projects; INTENSE develop high resolution precipitation data set to study extremes, INARCH develop mountain hydrometeorology watershed observational network, and a new one TEAMx that studies transport and exchange over mountainous regions. Evapotranspiration is a new crosscut in development
- Strong collaboration/involvement global data centers (BSRN, GPCC, GRDC and to lesser extent Hydrolare)
- A coordination of model development around human water management and field campaigns have been initiated

b. Programmatic Highlights

- Continuation NASA support for IGPO for 5 years
- USGCRP Support for US GEWEX related activities in development with a town-hall meeting organized at AGU in December 2019 and AMS in January 2020.
- New RHPs in development focusing on high mountain regions in Central Asia and Eastern Africa in close collaboration with START
- GASS further develops strong links with other WMO atmospheric modelling activities in particular with WWRP, WGNE. The panel is now complete and fully active.
- GDAP restructuring develops well with strong focus on process-oriented activities, product assessments and new earth observation systems

2. Primary science issues (looking ahead, 3 to 5 years)

- GEWEX is currently developing its science plan and implementation to optimize its structure with the new WCRP strategy (SATM)
- Move to process-oriented view can bring tension to other more variable centric approaches (e.g. CDRs). But there is a clear need within the water and energy cycles to refocus on process understanding to better use observations and models.
- Water for the Food Baskets GC has the potential to become a GEWEX theme/focal point should GC disappear.
- Extremes will continue to be a dimension to future GEWEX after sunsetting the GC. The growing lengths of the global climate data records overseen by GEWEX offer potential to make advances, as shown in the GEWEX contribution to the GC study of precipitation extremes.

3. Issues and challenges, for example:

- Tendency to over coordinate the activities (top down) where the focus is on structure and not people.
- Monsoon Panel coordination is improving but clarity is needed on responsibility. Current situation is not ideal where monsoon panel is under CLIVAR and GEWEX but the office is under CLIVAR IPO.
- Uncertainty in future structure can have a paralysing effect on activities and endangers funding from national organisations.
- The WDAC and WMAC are too isolated and rethinking of purpose is needed
- GEWEX community is growing and thriving, with many new activities in the pipeline. Stronger engagement with both the younger side of the community as well as the LDC side. The RHPs in particular have a good effect on the latter. Eastern-Europe and Latin America are current focal points, to be widened to Central Asia and Africa in near term
- GEWEX continues to work strongly with non-WCRP partners e.g. START, Space Agencies etc.
- Funding from third parties is fine. Difficulty lies in how in particular US Gov. money can be spent. WMO vs other UN agency support can also be tricky.