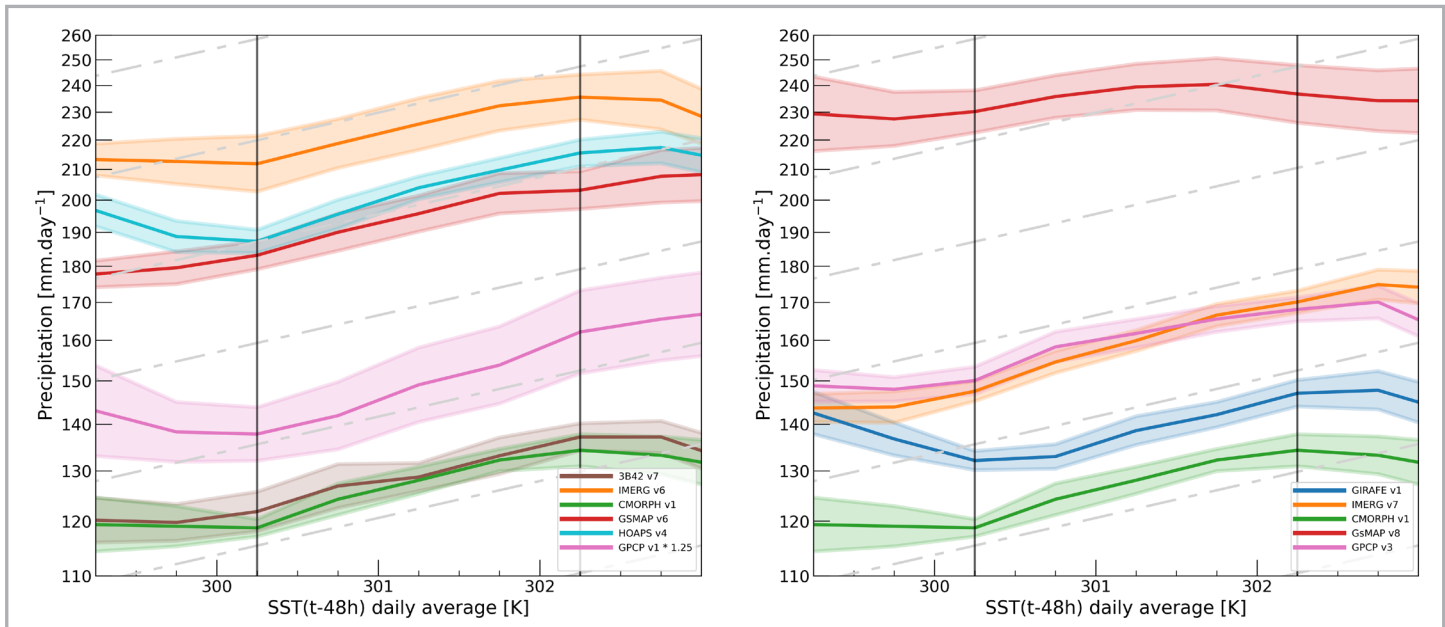


GEWEX is a Core Project of the World Climate Research Programme on Global Energy and Water Exchanges

Progress in the Characterization of Extreme Tropical Precipitation from Space



A short update on the GEWEX/IPWG Precipitation Assessment conducted 4 years ago reveals that the current suite of data products now shows much less spread in the magnitude of the extreme for precipitation. Figure 1 above shows the scaling of the 99.9th percentile extreme precipitation computed for all wet day ($P > 1\text{mm/d}$) grid boxes composited into a daily $1^\circ \times 1^\circ$ precipitation amount as a function of the 2 days lagged SST for the "initial" suite of products (left) and for the "current" generation of products (right). Note that in the left figure, the GPCP v1 values have been multiplied by 1.25 to fit on the plot. Read more on page 7.

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Commentary: Is GEWEX an Efficient Organization?

Xubin Zeng

Co-Chair, GEWEX Scientific Steering Group

Numerous books have been written about organizational efficiency. Publicly-listed companies on stock markets are constantly scrutinized, and even universities and their individual programs are regularly ranked, evaluated, and reviewed. However, the efficiency of international research programs or projects—such as the World Climate Research Programme (WCRP) and Global Energy and Water Exchanges (GEWEX)—receives far less attention. Here I present my non-comprehensive reflection on this often-overlooked topic.

Investment. Assessing efficiency requires a comprehensive quantification of investments, including financial support for staff, travel expenses for participants in relevant activities (e.g., committee meeting, open science conference), the number of staff, and the time contributed by all volunteers—particularly the leaders of the steering group, panels (or working groups), and individual projects.

Impacts. The quantifiable return includes metrics such as the number of projects and participants, committee meetings held and their attendees, major conferences (e.g., open science conference, pan-project conference) and their participants, events focused on capacity development and their participants, as well as outputs like new data sets, major reports, and articles. Beyond these, other returns on investment encompass significant contributions to government assessment reports, input on funding and programs (including the initiation of new satellite missions), and major model improvements. The long-term impacts extend to achieving the stated mission, shaping government policies, fostering international agreements, and benefiting society.

Organization. A program/project can organize its activities either as separate, parallel efforts or through a structured framework of panels or working groups. GEWEX adopts the latter approach by maintaining a simple yet flexible structure with 3–4 panels that oversee various projects. Cross-cutting projects may function as independent activities parallel to panels, or as integrated efforts

within one or two panels. WCRP employs the former approach for its Lighthouse Activities. In contrast, GEWEX encourages cross-cutting projects to engage with one or more panels for reporting and collaboration, while leveraging the expertise and broader membership of GEWEX to enhance their impact.

Transparency. Annual report of activities, along with active and diverse advisory committee participation in guiding an organization’s mission and strategy, ensures basic transparency. For the project or panel activities, the parent organization could conduct a closed-door evaluation and provide feedback, or opt for a two-way evaluation process with activity leaders before offering feedback. WCRP follows the former approach, while GEWEX adopts the latter. When selecting steering committee members and co-chairs, the parent organization might require multiple candidates for each position and select the final candidate, or it may assist the project or panel in narrowing down to a single candidate, which is then submitted for approval. Again, WCRP follows the former approach, while GEWEX adopts the latter.

Feedback. Broad and diverse volunteer participation and engagement are a key indicator of a project’s health. Regular surveys should be conducted among project participants, as well as after major events such as open science conferences, to gather feedback and insights. While academic units in universities generally undergo periodic review of teaching, research, and service/outreach, these reviews require significant efforts in personnel and time. For international research projects like GEWEX, which rely heavily on volunteers with very limited staff, a more efficient way could be to incorporate such reviews into the annual project evaluation. This could cover key areas such as identifying areas for improvement (e.g., in panel/project/program leadership), addressing bottlenecks, and managing risks.

Benchmarking. While it is difficult to directly compare different projects or panels, the change of their activities over time is more comparable. In addition, identifying and sharing best practices across projects can facilitate iterative improvements and foster greater efficiency.

Based on these points and my assessment of GEWEX activities, it appears that GEWEX demonstrates a high level of organizational efficiency. What are your perspectives? I would love to hear from you (xubin@arizona.edu).

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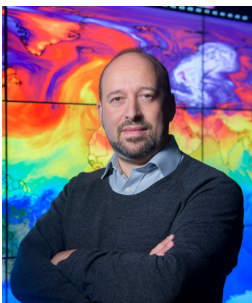
New GEWEX SSG Members



Dr. Richard Forbes, a Principal Scientist and Lead of the Atmospheric Physical Processes team at the European Centre for Medium-range Weather Forecasts (EC-MWF), is a new member of the GEWEX Scientific Steering Group (SSG). His career is devoted to the physical understanding of Earth system processes and improved representation of these processes in numerical models for weather prediction and climate. His research has covered topics from the ocean to the atmosphere, from the Arctic to the Tropics and from extratropical cyclones to convective storms. He has a particular interest in clouds and precipitation and uses a wide range of ground-based and satellite observations to evaluate and improve models across space and time scales. His interests are very relevant for GEWEX and its goals to better understand and improve the prediction of the water and energy cycles from global to local scales.



Prof. Li Jia, a leading scientist in Earth observation for terrestrial water cycle at the Aerospace Information Research Institute (AIR), part of the Chinese Academy of Sciences (CAS), joins the GEWEX Scientific Steering Group (SSG) as an experienced hydrologist and Earth observation specialist. Much of her career has been focused on GEWEX-related science, and within GEWEX, she was most recently a member of the GEWEX Hydroclimatology Panel (GHP). Her main research interests include understanding and modeling energy, water, and carbon exchanges between the land surface and the atmosphere using satellite remote sensing observations; radiative transfer modeling and retrievals of land surface biophysical and essential climate variables from satellite observations; and remote sensing applications to hydrological processes, water resource management, agricultural water use, drought monitoring, and cryosphere monitoring.



Gavin Schmidt is the Director of the NASA Goddard Institute for Space Studies in New York and was the acting Senior Climate Adviser to the NASA Administrator in 2021. He currently works on the simulation of climate in the past, present, and possible futures and has over 160 peer-reviewed publications. He was the author with Joshua Wolfe of “Climate Change: Picturing the Science” in 2009, and in 2011 was the inaugural recipient of the American Geophysical Union (AGU) Climate Communication Prize. He is a fellow of the AGU and American Association for the Advancement of Science, and was a 2014 TED main stage speaker on climate modeling.

A Big Year for Student and Early-Career Hydrologists

Paige Becker¹ and Adam Price²

¹2024 H3S Chair, Post-doctoral Fellow, Colorado School of Mines; ²2025 H3S Chair, Research Hydrologist, U.S. Forest Service

Happy end of 2024 from the American Geophysical Union (AGU) Hydrology Section Student and Early Career Subcommittee (H3S); what a year it has been for us! We welcomed a new cohort of 15 members to H3S in January 2024 and have been diligently working on new and ongoing initiatives within the hydrologic community.

H3S co-hosted its annual cyber seminar series with the Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI) titled “Navigating Academic Waters: Expectations, Collaborations and Service”, which focused on helping early career hydrologists identify missing skills, find a group of collaborators, and balance service in their new careers. The series can be viewed on YouTube at <http://youtu.be/wewf1rnofw&list=PLPG5Ed5L1SY7x45JzRzRkCh93mPS3nqD6>.

Similar to prior years, H3S members convened multiple sessions at the AGU Fall Meeting. This year we hosted a town hall on “Navigating Research Collaborations as an Early Career Researcher”, which included a panel discussion, a science communication session on “Thinking Outside the Box Plot: Communicating Science Beyond the Paper”, and a session on “Centering Diversity, Equity, Inclusion, and Accessibility in the Geosciences: Celebrating Success Stories in Education and Research”. Additionally, after last year’s success, we had a booth in the exhibit hall to engage with the broader AGU community and promote increased networking and interaction among students and early career scientists in the Hydrology Section and beyond.

The H3S Justice, Equity, Diversity, and Inclusion (JEDI) committee has had a highly productive and impactful year. The committee continues to engage and advise the wider AGU JEDI committee on the needs of student and early-career hydrologists as well as provide critical resources on developing codes of conduct, increasing accessibility in geoscience education, and field-based safety.

It is also the time of year that we have our application open for new H3S members! If you are a student or early career researcher (fewer than 5 years from your terminal degree) and are interested in making a significant impact on the hydrologic community, please consider applying. **The deadline for applications is early January.** The application is available at <https://forms.gle/H5SjpB4uJTVvkBtW9>.

Looking forward, we have a lot of great events planned for 2025! Stay up to date with all our happenings through our various platforms (visit our website at <https://www.agu-h3s.org/> for more information) and subscribe (<https://www.agu-h3s.org/contact>) to our newsletter.

In Memoriam: Professor Dr. Pierre Morel

Jan Polcher¹ and Peter van Oevelen², with contributions from Graeme Stephens, Soroosh Sorooshian, Tom Vonder Haar, Robert Curran, and William Rossow

¹GEWEX SSG Co-Chair; ²Director, International GEWEX Project Office



It is with sadness that we announce that on 14 October 2024, Pierre Morel, one of the founding members of GEWEX and the first director of the World Climate Research Programme (WCRP), passed away at the age of 91.

It is a legacy of Prof. Morel that GEWEX still combines remote sensing and in situ observations with modeling to advance our understanding of the energy and water cycles and their interactions.

Many GEWEX scientists have known Pierre Morel well, as during the first 15 years of the program, he participated actively in our meetings in his capacity as WCRP or National Aeronautics and Space Administration (NASA) director. In memory of Pierre, we would like to present here a few personal recollections of the colleagues who have known him well.

Peter van Oevelen, International GEWEX Project Office (IGPO) Director:

The first time I met Pierre was in Paris somewhere around 2005 during a workshop held at the United Nations Educational, Scientific and Cultural Organization (UNESCO) Headquarters. It was in my early days being involved in GEWEX, and I was not familiar with all the various actors in WCRP and GEWEX. I was sitting in the row before last, listening to a presentation by a well-known scientist, when I heard some mumbling and grumbling behind me. Something like “Oh nooo, no no no...mais c’est ne pas vrai uh (Eng: that is not true)” and other variations of discontent and disagreement were expressed in a French accent, interspersed with some to-the-point commentary in English. After a while, I looked around and saw this elderly gentleman and nodded my head. At the coffee break I introduced myself and got acquainted with Pierre Morel. Over the years, I met Pierre occasionally, primarily when we had a meeting in Paris.. It was always fun and extremely insightful, and he never shied away from expressing his views, as unpopular they may have been.

The last time I communicated with Pierre was a few years ago when he expressed that he felt the weight of his years, yet he remained as sharp and focused as ever in response to my inquiries which were on the subject of the foundation of GEWEX. In his own words: “*Actually, the concept of GEWEX was born at the first Suomi Memorial Conference in Madison, Wisconsin, sometime in early 1989 I believe, during the presentation of the (then new) NASA Earth Observing System (EOS) program by*



Pierre Morel on the left at the 2005 GEWEX Conference in Irvine, California

Shelby Tilford. The EOS did alright for about half the observation requirements for a complete water and energy research project, but lacked the other half. Vern Suomi, Lennart Bengtsson, and myself sat together and formulated a comprehensive research program (observation including new satellite instruments, data analysis, and modeling) focused on fast atmospheric and hydrologic processes, in order to pursue the second objective of the Global Atmospheric Research Program (GARP). We are still full of hope...”. Pierre’s insight, intellect, and scientific mind will be missed by us all, but his “joie de vivre” and drive even more by those who have met him!

Jan Polcher, Current Scientific Steering Group (SSG) Co-Chair:

I first knew Pierre Morel as a professor at the Université Pierre et Marie Curie. During the semester, he came from Geneva on Fridays to give his lecture on atmospheric dynamics on Saturday morning. Not a very student friendly schedule! Pierre introduced me to GEWEX at a Project for Intercomparison of Land-surface Parameterization Schemes (PILPS) meeting in Washington. It must have been the mid-1990s. After my presentation on the first ideas of a standard interface between the atmosphere and the land surfaces, he came to see me. He suggested that I attend the next Working Group on Numerical Experimentation (WGNE) meeting to represent land surface modeling and help numerical weather prediction centers improve their representation of continental surfaces, similar to what the GEWEX Cloud System Study (GCSS) was doing for clouds. From this initiative, the Global Land-Atmosphere System Studies (GLASS) Panel emerged a few years later. In the many interactions I have had with Pierre, I particularly appreciated his frankness and readiness to recognize the potential of new ideas.

Graeme Stephens, Former SSG Co-Chair:

There are certain memories of Pierre that, to me, remain vivid. Our tennis match at a WCRP meeting in San Diego in the early 90s is one. He was quite a bit older than I was, and I



Pierre Morel pictured on the right, with Soroosh Sorooshian center and Moustafa Chahine left during the 2005 GEWEX Conference in Irvine, California

thought this would be a gentle walk in the park. Wrong—he played with such a competitive intensity that, as I recall, it was a battle, and one I know he really enjoyed because he told me so. But then again, Pierre was intense about most things, as I am sure anyone who knew him recognizes. I will never forget his dismay about how he perceived Earth observational sciences was trending and losing its intellectual grip. His comment lives with me still: "good science doesn't require measuring everything everywhere all the time", which is the brute force tendency of today. His engagement in the many meetings I had the privilege to participate in with him, and for some, the ones that I had the challenge of chairing, were unforgettable. He was argumentative, critical, cutting in his comments, and direct; he took no prisoners, and that was when meeting was going well. You always knew where he stood on issues and topics, and that, too, was so refreshing. You also knew when things weren't going well because out came a note pad: he would start alphabetically listing all the cities of the world he could recall, maybe even visited. I am not sure of the fate of the meeting, or for that matter, the fate of any of us, if he ever got to the last letter of the alphabet.

I know others will comment on his remarkable influence on world science—an influence we still feel today. He was an intellectual icon, not only leading WCRP but also serving as its visionary. I highlighted his leading role in defining GEWEX in the GEWEX review article we published in the *Bull. Amer. Met. Soc.* recently. This is just one of many examples of his enduring influence.

Soroosh Sorooshian, Former GEWEX SSG Chair:

Pierre was a dear friend to my wife Shirin and I for over 30 years...he was a great man and never shied from expressing his views on many issues, especially scientific issues. When I was appointed as chair of the GEWEX program in the late 1990s, I always invited Pierre to our meetings, counting on his vision and ability to challenge speakers.

Tom Vonder Haar, Former SSG Member:

During the formative days of GEWEX, I was on the WCRP Joint Scientific Committee and a strong supporter of Pierre's ideas and plans for the new GEWEX. I became a member of the initial GEWEX Scientific Steering Group and Pierre's strong support and leadership helped shape it into a multi-decadal program. Among the early transformational missions he supported via GEWEX was the highly successful CloudSat/Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation (CALIPSO) cloud radar and lidar of Graeme and colleagues...and he was a featured speaker at the CloudSat/CALIPSO launch party in 2006 in California.

Robert Curran with Bob Schiffer, NASA Colleagues:

Pierre Morel was a member of the leadership of Earth sciences at NASA Headquarters at a significant period for that organization. His previous experience in advising and leading international science organizations provided support for program science management at a time when new significant Earth science observing capabilities were coming online. During his tenure at NASA Headquarters, he was a mentor and knowledgeable colleague to the program science managers in Earth Sciences. His previous experience in research and management provided in-depth knowledge of the research conducted through the programs managed. Following his tenure at NASA Headquarters, he was a visiting faculty at the NASA Goddard Earth Sciences and Technology Center at the University of Maryland, Baltimore County, where he continued to actively advise other international Earth science communities including WCRP and GEWEX.

William Rossow, Former SSG Member:

In the decade before GEWEX was established, Pierre Morel was already thinking about how to exploit new satellite capabilities to study the dynamics of the global energy and water cycles. As the first Director of WCRP, he helped organize three international satellite-based projects under the aegis of WCRP focused on global atmospheric processes: clouds (the International Satellite Cloud Climatology Project, ISCCP), precipitation (the Global Precipitation Climatology Project, GPCP), and surface radiative fluxes (the Surface Radiation Budget, SRB). The latter project complemented the ongoing NASA series of satellite measurements of the top-of-atmosphere radiative fluxes. Pierre's focus on the dynamics of energy and water exchanges was shown by his urging these projects to produce the highest feasible space-time resolution in their products, rather than only monthly averaged climatologies. GEWEX was then formed by combining these projects with process modeling and a set of in situ measurement efforts. His vision of the atmospheric component of the climate was all encompassing but also strategic: doing what could be done but focused on the key elements. His leadership is missed.

The GEWEX Global Groundwater Network

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Groundwater is of great socioeconomic significance and Earth system relevance. It sustains continental discharge via baseflow connecting mountains with oceans, keeping the continents in a delicate hydrologic equilibrium. Despite their known importance, groundwater and hydrogeology are underrepresented in GEWEX and Earth system models, which are used in the assessment of global change from the regional to the global scale (a more detailed discussion can be found in the *GEWEX Quarterly* Vol. 33, No. 1, Quarter 1 2023, pg. 5–6). Peter van Oevelen, GEWEX’s Director, recognized the need for greater focus on groundwater in GEWEX and has pushed for and supported a new groundwater activity that started in 2022.

The Global Groundwater Network seeks to bring together expert hydrogeologists and groundwater modelers with Earth system modelers on the challenges of hydrogeology and groundwater modeling across scales. This GEWEX effort was initiated and led by the authors and a steering group consisting of George Houben, Federal Institute for Geosciences and Natural Resources (Germany); Seifu Kebede Gurmessa, University of Kwazulu-Natal (UKN, South Africa); Christian Langevin, U.S. Geological Survey (USA); Alan MacDonald, British Geological Survey (United Kingdom); and Chunmiao Zheng, Southern University of Science and Technology (China).

A two-day workshop was held before the GEWEX Open Science Conference on 6–7 July 2024 in Sapporo, Japan. The workshop was inclusive and open to all interested parties, and advertised broadly. Attendance was excellent with about 25 scientists from all over the world present, representing various hydrologic disciplines and career stages. The agenda included four keynote talks and constructive plenary and breakout group discussions. The concrete outcomes were a Groundwater Network Mission Statement and a detailed path forward, which ultimately led to the official creation of the Global Groundwater Network in the GEWEX Hydroclimatology Panel (GHP). The excellent keynotes by Andreas Prein (NCAR, now ETH Zurich), Marc Bierkens (Utrecht Univer-

sity), Chunmiao Zheng (Sustech), and Seifu Kebede (UKN) covered the full range of topics related to Earth system modeling, large-scale water modeling, groundwater modeling, and large-scale hydrogeology. The keynotes set the stage for the breakout groups and discussion of the relevance of hydrogeology and groundwater modeling in GEWEX and Earth system models, including key challenges and opportunities. Hydrogeologic heterogeneity and uncertainty at all scales and its representation in models was raised. Other areas addressed include human impact, and the fragmentation, scarcity, and uncertainty of measured data. A major societal and scientific motivation for including hydrogeology and groundwater in Earth system models is the two-way feedback of groundwater across the land surface with the atmosphere at different time scales, both in how it maintains the aforementioned hydrological balance and within the context of global change. The degree of complexity required to represent groundwater in Earth system models surfaced as a potential avenue of future discussion.



Participants at the groundwater workshop earlier this year in Sapporo, Japan, which resulted in a mission statement for the new Global Groundwater Network

Moving forward, the central mission of the Global Groundwater Network is to bring together scientists from the hydrogeologic and groundwater modeling communities with the land surface and Earth system modeling communities to constructively link hydrogeology and groundwater modeling to Earth system models in GEWEX. The success of our network will depend on active participation of individuals

and the community. This article serves as a call to participate and contribute; for additional information and to sign up for the mailing list, please see <https://www.gewex.org/ggnl/>.

In the coming year, the Global Groundwater Network will be reaching out to the relevant scientific communities for active participation. We will identify initial working group topics based on the workshop, and subsequent discussions in the Steering Group and with Network members. These working groups will be used to discuss promising scientific and applied avenues for research within GEWEX and beyond. Ultimately, we expect that the synthesis of the working group outcomes will provide the basis for a rigorous scientific agenda and allow us to transfer the Network into a scientific project, ideally within a two year time frame. Please contact the co-leads, Stefan Kollet, s.kollet@fz-juelich.de, and Laura Condon, lecondon@arizona.edu, in case of questions and suggestions. The next online Global Groundwater Network meeting will be announced via the mailing list.

GEWEX/IPWG Precipitation Assessment: An Update on Extreme Daily Precipitation over Tropical Ocean

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Four years ago, the last precipitation assessment coordinated through the World Climate Research Programme (WCRP)/GEWEX and the World Meteorological Organization (WMO)/Coordination Group for Meteorological Satellites (CGMS)/International Precipitation Working Group (IPWG) revealed a tale of two about the ability of satellite-based precipitation products to document extreme daily precipitation over the tropical ocean. On one hand, the products exhibited a theoretically consistent scaling with sea surface temperature (SST) over the 300.25–302.25K range with a mean scaling of 6.33%/K very robust among the products (Roca et al., 2021). On the other hand, the magnitude of the extreme spread a wide range of value of the 99.9th percentile across the products, with almost a factor of two separating the two groups of products forming the ensemble (Figure 1, left panel, see cover). Since then, new products and new versions of the products have been released, and we assess the progress made in this short letter.

All data sets identified in Figure 1 have been first ingested in the Frequent Rainfall Observations on GridS (FROGS) database (Roca et al., 2019), a GEWEX/GEWEX Data and Analysis Panel (GDAP) initiative, and formatted in a common, easy-to-manipulate, format. The SST time series have been updated to account for the more recent period using the Operational Sea Surface Temperature and Sea Ice Analysis (OSTIA) record (Donlon et al., 2012). The scaling has been computed following the data pooling and SST-lagging technique of De Meyer and Roca (2021). The 99.9th percentile was computed for all wet day ($P > 1\text{mm/d}$) grid boxes corresponding to the SST bin for a 5-year period between 2007–2020. The selection of these 5 years is done randomly and a bootstrap of 50 members is constructed using this method. The standard deviation of the 50-member ensemble is added in Figure 1, represented by the shading, and indicates the sensitivity to the time varying configuration of the microwave constellation (Oliveira et al., 2022).

The results, updated for the current generation of products, is shown in the right panel of Figure 1. The magnitude of the extreme as defined here has evolved significantly from the earlier versions of the data. The extreme precipitation represented in the Global Precipitation Climatology Project (GPCP) has increased significantly from the earlier version (by ~25%) and so too has the Global Satellite Mapping of Precipitation (GSMaP) extreme precipitation, whereas the Integrated Multi-satellite Retrievals for the Global Precipitation Mission (IMERG) exhibits a strong decrease of the magnitude of the extreme tropical precipitation from its earlier version. The new product, the Global Interpolated RAINfall Estimation (GIRAFE), sits between the Climate Prediction Center

(CPC) MORPHing technique (CMORPH) and the GPCP and IMERG estimates. GSMaP now appears more like an outlier to the other products. When not considering GSMaP, the current suite of products now shows much less spread than 4 years ago. For instance, at 301K, the extreme now ranges between 125 and 155 mm/d against 110 and 210 mm/d for the previous generation. In terms of sensitivity to SST, over the 300.25–302.25K (so called “Clausius-Clapeyron”) regime, the new generation of products’ scaling is ~6.5%/K, which is in very good agreement with the theoretical expectation derived from energetic constraints (Roca et al., 2022). The sensitivity to the time period, as measured by the spread in the bootstrapped ensemble for each product, is smaller in the new generation of products than in the former one.

This short summary highlights marked progress in the characterization of extreme tropical precipitation from space, with the new generation of products preserving the SST scaling behavior of the former generation while improving on the spread between the products, which implies more robustness in the ensemble of products. Such striking progress likely calls for a more extensive assessment to be undertaken.

Data Availability

The FROGS database is maintained by the French national center for Atmospheric data and services, AERIS, and is readily available with the following DOI: <https://doi.org/10.14768/06337394-73A9-407C-9997-0E380DAC5598>.

References

- De Meyer, V., and R. Roca, 2021. Thermodynamic scaling of extreme daily precipitation over the tropical ocean from satellite observations. *J. Meteorol. Soc. Jpn.*, 99(2), 423–436. <https://doi.org/10.2151/jmsj.2021-020>
- Donlon, C.J., M. Martin, J. Stark, J. Roberts-Jones, E. Fiedler, and W. Wimmer, 2012. The Operational Sea Surface Temperature and Sea Ice Analysis (OSTIA) system. *Remote Sens. Environ.*, 116, 140–158. <https://doi.org/10.1016/j.rse.2010.10.017>
- Oliveira, R.A.J., R. Roca, S. Finkensieper, S. Cloché, and M. Schröder, 2022. Evaluating the impact of a time-evolving constellation on multiplatform satellite based daily precipitation estimates. *Atmos. Res.*, 279(May). <https://doi.org/10.1016/j.atmosres.2022.106414>
- Roca, R., Z.S. Haddad, F.F. Akimoto, L. Alexander, A. Behrangi, G. Huffman, S. Kato, C. Kidd, P.E. Kirstetter, T. Kubota, C. Kummerow, T.S. L’Ecuyer, V. Levizzani, V. Maggioni, C. Massari, H. Masunaga, M. Schröder, F.J. Tapiador, F.J. Turk, and N. Utsumi, 2021. *The Joint IPWG/GEWEX Precipitation Assessment* (Rémy Roca and Z.S. Haddad (eds.)). World Climate Research Programme. <https://doi.org/10.13021/gewex.precip>
- Roca, R., L.V. Alexander, G. Potter, M. Bador, R. Jucá, S. Contractor, M.G. Bosilovich, and S. Cloché, 2019. FROGS: A daily 1° × 1° gridded precipitation database of rain gauge, satellite and reanalysis products. *Earth Syst. Sci. Data*, 11(3), 1017–1035. <https://doi.org/10.5194/essd-11-1017-2019>
- Roca, R., V. De Meyer, and C. Muller, 2022. Precipitating Fraction, Not Intensity, Explains Extreme Coarse-Grained Precipitation Clausius-Clapeyron Scaling With Sea Surface Temperature Over Tropical Oceans. *Geophys. Res. Lett.*, 49(24). <https://doi.org/10.1029/2022GL100624>

Connecting the Future: JovenANDEX, a New Network for the Collaboration and Development of the Young Researchers in the ANDEX Program

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One of the priorities of the ANDEX scientific network is to encourage collaboration with young researchers working on the Andean region. JovenANDEX was created to integrate the perspective of young researchers in the scientific community, promoting specific activities and collaboration between people from different disciplines and contexts (local, regional, global) while creating opportunities for their professional and personal development. JovenANDEX also seeks to encourage participation in key scientific spaces, expanding the impact of members' research beyond academia.

What Is JovenANDEX?

JovenANDEX is a scientific network formed by young professionals living in an Andean country (or elsewhere) whose research is focused on the Andes in disciplines related to the natural and the social sciences.

Who Is It Aimed at?

JovenANDEX is aimed at young researchers who are pursuing Master's degrees, doctorates, postdoctorates, or scientists who are within seven years of their last degree.* Although the focus is on academia, professionals from other related sectors such as non-governmental organizations, governmental institutions, and private companies can also join the JovenANDEX network.

*The seven-year period does not include maternity, paternity, or sick leaves.

What are the JovenANDEX Activities?

Since its beginnings, our network has organized different activities for its members, including "Reading Clubs" where, once a month, participants read a selected relevant publication and then discuss and exchange ideas and knowledge with the authors and/or other experts on that particular discipline. Currently, there are three active clubs: Continental Hydrology, Climate System Modeling, and Cryosphere and High Mountain Water Resources.

Our network also organizes the poster session held in the context of the ANDEX annual meetings. This space offers young researchers a platform to present and discuss their work with other early-career scientists and with established researchers, generating valuable opportunities for feedback, collaboration, and learning.

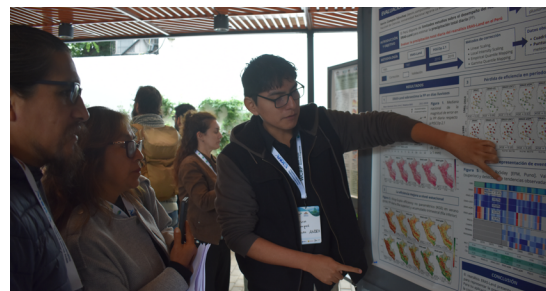
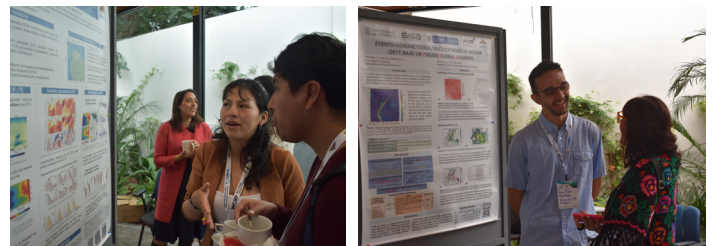
Finally, members of JovenANDEX also participate actively in the Ciencia Climática Observatory, an initiative of the Peruvian Ministry of Environment, managed by the Geophysical Institute of Peru, whose objective is to facilitate the access to scientific information on climate change to decision makers and the general public.

How Can I Join JovenANDEX?

Please read the document at https://drive.google.com/file/d/1UET2yhQem0JY6wwaP_IyUURy3-DdFvF7/view?usp=sharing that presents the short- and long-term objectives of our network, which was elaborated collaboratively by its members. You can then fill out the open form at <https://forms.gle/ij6TzcZhJ5GHQFj57> to make comments and suggestions, as well as to express your interest in becoming an active member of one of the network's working groups on membership, event planning, or communications.

By completing this form, you will also be able to access the JovenANDEX Slack channel, which will facilitate a closer and more efficient collaboration in the activities and projects of the network.

We hope you can participate and help us to continue developing JovenANDEX!



Scenes from a JovenANDEX poster session held during one of the annual ANDEX Regional Hydroclimatology Project meetings

Meeting/Workshop Reports

2024 GDAP Annual Meeting

Sapporo, Japan
6 July 2024

Hirohiko Masunaga and Tristan L'Ecuyer
GEWEX Data and Analysis Panel (GDAP) Co-Chairs

The 2024 GEWEX Data and Analysis Panel (GDAP) Meeting took place at Hokkaido University in Sapporo, Japan on 6 July 2024, the day before the 9th GEWEX Open Science Conference (OSC) began just a few blocks away. Sapporo is the capital city of Hokkaido, the northernmost island of Japan, known as a sanctuary from the notoriously hot, humid summer prevailing in the rest of the country.

GDAP's primary roles are (1) identifying the needs for global observations crucial for understanding the processes underlying Earth's water and energy cycles and (2) coordinating activities to assess and analyze the observation data to achieve the GEWEX Science Goals (<https://www.gewex.org/about/science/gewex-science-goals/>). Such GDAP activities are led either by Panel members directly or by external experts working together with the Panel. Historically, GDAP has worked in close collaboration with the International Satellite Cloud Climatology Project (ISCCP) and the Global Precipitation Climatology Project (GPCP) in the years since GDAP was called the GEWEX Radiation Panel (GRP). Recently, these products were integrated with other GDAP-initiated flux products—SeaFlux, LandFlux, and the Surface Radiation Budget (SRB)—to construct the GEWEX Integrated Product (IP), a comprehensive data set covering different elements of the water and energy cycles.

The Panel regularly reevaluates its portfolio to align its activities, questions, and foci to match emerging needs in a timely manner. GDAP's projects currently emphasize understanding Earth's Energy Imbalance (EEI) and coordinating the ISCCP Second Generation (ISCCP-SG) product while continuing existing cooperation with the Baseline Surface Radiation Network (BSRN) and Global Precipitation Climatology Centre (GPCC). The 2024 GDAP Panel Meeting centered on preparing to initiate new activities for the coming several years.

The 2024 GDAP Panel Meeting opened with two talks by new Panel members Xuelong Chen and Hanii Takahashi. Xuelong summarized his research covering broad areas of land-atmosphere interactions. Hanii outlined her work on satellite observations of shallow and deep convection with a focus on underlying physical processes. The Panel welcomed the two outstanding scientists with the anticipation that their contributions will spawn new GDAP activities.

One emerging direction in the GDAP portfolio is convective tracking. Hanii Takahashi presented outcomes from the GEWEX-Atmosphere Observing System (AOS)-Investigation of Convective Updrafts (INCUS) convective tracking workshop held at the National Aeronautics and Space Administration (NASA) Goddard Institute for Space Studies (GISS) from 17–21 April 2024. Methodologies have existed for decades to track the evolution of convective cloud systems in space and time using satellite data, but they are now increasingly gaining renewed interest. A few reasons are behind this. The capability to observe changes over the convective lifecycle in aspects of cloud systems (anvil cloud thickness, for instance) has been improved by the latest generation of geostationary meteorological satellites, which have enhanced spatial and temporal resolution with additional channels that were unavailable in previous generations. High-resolution (half-hourly, 0.1°-gridded) global precipitation data sets such as Global Satellite Mapping of Precipitation (GSMaP) and Integrated Multi-satellite Retrievals for Global Precipitation Measurement Mission (IMERG) opened a pathway to precipitation-based convective tracking in addition to the traditional infrared-based tracking. Convective tracking dovetails with the ISCCP-NG activity as a potential science application of the Level 1 Gridded (L1G) radiances. It will also feature in future directions within the Upper Tropospheric Clouds and Convection (UTCC) Process Evaluation Study (PROES) project, led within the Global Atmospheric System Studies (GASS) Panel. A third promising area of application is to use convective tracking as a tool for evaluating global km-scale model simulations, also in coordination with GASS.

Markus Ziese, who leads GPCC at Deutscher Wetterdienst (DWD), reported the status of database statistics and data processing for GPCC. GPCC provides a long-term record of quality-controlled monthly and daily global precipitation over land by integrating gauge-measured surface precipitation from different sources across the world. GPCC's continuing contribution to GEWEX via the GEWEX Hydroclimatology Panel (GHP) and GDAP is highly appreciated by the Panels.

The first session after lunch began with two briefing talks by the Panel co-chairs, followed by group discussion. Tristan L'Ecuyer first gave an introductory summary of GDAP's roles, and Hiro Masunaga outlined the feedback from the 36th GEWEX Scientific Steering Group (SSG) meeting in Budapest, Hungary, from 22–26 April 2024. Recommendations discussed in the SSG meeting span diverse topics, but they almost unanimously encourage GDAP to strengthen ties with other entities, especially with the other three GEWEX Panels. Field campaigns coordinated under the leadership of GHP and the Global Land-Atmosphere System Studies (GLASS) Panel, for instance, offer high-quality measurements of variables (e.g., precipitation, radiation, land-surface temperature) that would serve as a valuable reference for global-scale satellite-based data sets as part of GDAP-led assessments. Operational surface-measurement networks continue to be important partners for GDAP. While BSRN and GPCC annually report to GEWEX, the Panel currently lacks an official communication channel with the ground-radar network community. GDAP is seeking

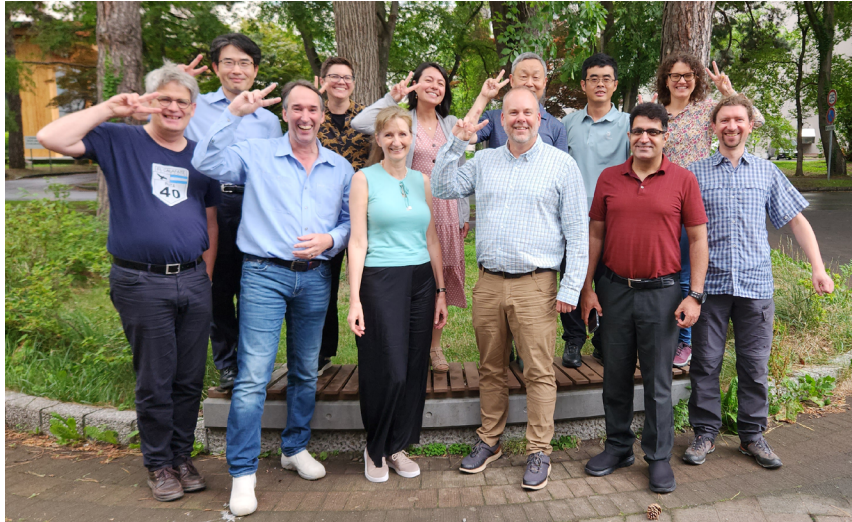
to expand membership with a ground-based weather radar expert, ideally with experience in intercalibrating and blending retrieved hydrologic parameters from multi-national, multi-radar networks.

As part of the group discussion in exploration of new GDAP initiatives, Xubin Zeng, GEWEX SSG co-chair, introduced the Global Precipitation Experiment (GPEX). GPEX is a new World Climate Research Programme (WCRP)

Lighthouse Activity aimed at filling in the gaps among the process-level understanding, observations, and modeling of precipitation with the ultimate goal of improving precipitation prediction skill for the benefit of society. GDAP has the potential to contribute to GPEX in multiple ways. A next round of the GEWEX precipitation assessment, as a follow-on to the previous assessment conducted in collaboration with the Coordination Group for Meteorological Satellites (CGMS) International Precipitation Working Group (IPWG), would be among the promising possibilities of future GPEX-GDAP synergies.

In the second session of the afternoon, presentations on activity updates resumed with the EEI assessment. EEI, or the radiative energy imbalance at the top of the atmosphere (TOA) resulting in a secular increase of ocean heat content (OHC), is potentially a critical element for the predictability and stability of Earth's climate system. Benoit Meyssignac, attending remotely, reported the status and recent trend of EEI as revealed by a variety of observations ranging from temporal changes in the in-situ OHC estimates to the satellite-retrieved TOA radiation. The latest findings from these observations were reported and discussed at the EEI Assessment Workshop held in Frascati, Italy, from 15–17 May 2024. GDAP has been and will be making a leading contribution in this area of research through the assessment of diverse EEI measurements evaluated with robust and reliable uncertainty estimation.

Jan Polcher, GEWEX SSG co-chair, gave a quick introduction to a joint effort by WCRP and the Global Climate Observing System (GCOS) to quantify the quality of essential climate variables (ECVs) in terms of global integrals. The overall idea is that the volume-integrated conservation laws with respect to global water, energy, and carbon cycles are exploited as a constraint to the ECVs relevant to each continuity/budget equation. Some of the current and future GDAP activities, particularly those involved in data assessment, are expected to benefit from insights to be gained under the global integral initiative.



Participants of the 2024 GDAP Meeting in Sapporo, Japan

BSRN updates were presented by Laura Riihimäki. Laura will become the new BSRN project manager in the fall of 2024, taking over from Christian Lanconelli, who steps down after four years of dedicated leadership to BSRN. The BSRN team has been committed to collecting broadband shortwave and longwave measurements from ground stations for decades across the globe. The 18th BSRN Workshop took place in Tokyo during the week (1–5 July) just

before the GDAP meeting, reviewing the status of operational and pending stations and the strategies for instrument calibration and data quality processing. The continuing effort by BSRN to maintain surface radiation measurements worldwide offers a valuable contribution to GDAP and broader climate-science communities.

To further address the need for more extensive coordination of new activities across the GEWEX Panels, GDAP co-chair Hiro Masunaga led an evening breakout session with co-chairs and interested members of all four GEWEX Panels on the evening of July 9th at the OSC venue. The GEWEX OSC provided a perfect opportunity for all GEWEX Panels to meet and discuss subjects of mutual interest. All the Panel and SSG members, along with anyone interested, were invited to this brainstorming session with no planned agenda. More than 20 participants joined the meeting starting at 7 pm despite the risk of missing dinner after a long day trapped in the conference room. Diverse topics were discussed, including the strategies to link km-scale model simulations with observations. Satellite remote sensing with various instruments, a dense network of simple measurements, and sophisticated observations from field campaigns each have complementary strengths and limitations that must be considered when analyzed together with model simulations. This topic aligns well with GDAP's core mission to coordinate and curate global data sets to address energy and water cycle science, and the Panel anticipates playing a central role in developing this potential pan-GEWEX project. In preparation of the protocol for a joint model-observation project, baseline location and period need to be carefully chosen bearing in mind the availability of existing observation data and numerical experiments. Conversations will continue in future occasions when different Panels meet again.

The next GDAP meeting will take place in Paris in May 2025, in conjunction with other workshops linked to relevant activities, including UTCC PROES.

2024 GEWEX Hydroclimatology Panel (GHP) Meeting

Sapporo, Japan
4–6 July 2024

Paola A. Arias and Ali Nazemi

GHP Co-Chairs

Thanks to the hospitality of Hokkaido University and our host, Professor Tomonori Sato, the 2024 GHP Meeting was held in wonderful Sapporo, Japan, during the first week of July, prior to the 9th GEWEX Open Science Conference (OSC). Once again, we had a very fruitful meeting with over 25 in-person attendees, including the majority of Panel members and activity leads. We also had participants that attended the meeting virtually. The 2024 GHP Meeting marked the busiest GHP assembly since the beginning of the COVID lockdown.

GHP hosts four different types of projects: (1) Regional Hydroclimate Projects (RHPs), aiming to understand and predict hydroclimatology in a specific region; (2) Cross Cutting Projects (CCs), encouraging knowledge mobilization and global synthesis of knowledge around a specific topic; (3) Networks, maintaining collaboration and building capacity for activities relevant to GEWEX science; and (4) Global Data Centers, collecting and distributing relevant hydroclimatic data. The 2024 GHP Meeting was an opportunity to demonstrate the important advances that these activities are providing to the regional and global scientific communities, GEWEX and its stakeholders, as well as the World Climate Research Programme (WCRP).

Besides evaluating the annual progress from our multiple activities, which is a typical meeting activity, the Panel had inspiring and thoughtful internal discussions on drafting guidance documentation regarding roles and responsibilities of Panel members as well as procedures for the different activities within GHP, including annual reporting procedures. These discussions led to delineating the next Panel activities moving forward. We also warmly welcomed new Panel members and activity leads.

Ongoing and Prospective Regional Hydroclimate Projects (RHPs)

RHPs are multidisciplinary projects to improve understanding of the physical and anthropogenic processes that affect water and energy exchanges within a specific region. There are currently six ongoing RHPs in the Panel. This includes two mature RHPs, i.e., Baltic Earth and Global Water Futures (GWF), along with four initiating RHPs, i.e., the Regional Hydrology Program for the Andes (ANDEX), Third Pole Environment-Water Sustainability (TPE-WS), the Humans and Hydroclimate in the United States (H₂US), and the Asian Precipitation Experiment (AsiaPEX). We also have a prospective RHP in the Panel, the Central Asia initiative.

Both mature RHPs include large groups of active researchers and established ties with local communities and end-users. As the Panel's oldest RHP, Baltic Earth is an example for a decentralized and bottom-up governing research program

without any core funding, in which individual researchers join forces and share research interests and resources. On the other hand, GWF is an example of a centralized and top-down RHP, with a large amount of core funding. Despite their differences in pursuing the RHP concept, both Baltic Earth and GWF keep demonstrating solid and continuous progress and have been quite influential in the policy and decision-making spheres. Baltic Earth's assessment reports and fact sheets have become a knowledge base for decision makers in the Baltic Sea region. Currently, the leading team within Baltic Earth is working on updating their 2017 Science Plan to be submitted to the GHP, while a new Project Office is under exploration. After seven years of ambitious research, GWF sunsets now to GWF-Observatories, aiming at continuing the data observations and research sites going up to 2029. GWF also played a central role in the formation of the new Canada National Water Agency. The Panel expects that GWF will keep leading the understanding of the water cycle in Canada through the integration between western and Indigenous knowledge.

Initiating RHPs also had a productive year. ANDEX is advancing at a solid pace. The ANDEX Scientific Committee is currently working on its Scientific and Implementation Plan. Its recent annual meeting in Peru (May 2024) allowed interaction between a wider ANDEX community through a 3-day workshop devoted to transdisciplinary research, as well as activities focused on Early Career Researchers (ECRs) and the JovenANDEX network. Considering the international attention on the first set of ANDEX review papers, the ANDEX team submitted two more review papers on the state of atmospheric modeling in the region, and is preparing another review paper addressing hydrological modeling. Moreover, the current momentum in ANDEX is boosting its interaction with other GHP, GEWEX, and WCRP initiatives such as the International Network for Alpine Catchment Hydrology, Phase 2 (INARCH-II), the Climate and Ocean: Variability, Predictability and Change (CLIVAR)/GEWEX Monsoon Panel, the Climate and Cryosphere (CLiC) project, the Regional Information for Society (RiFS) project, and the My Climate Risk Lighthouse Activity. TPE-WS is an ambitious and world-class scientific program in the Tibetan Plateau, devoted to understanding water and energy cycles in Asia's high mountains. TPE-WS continues setting up and improving multiple measurement sites, including the development of a wind profile data platform, while continuing with modeling activities and analyses, publishing in top journals, and disseminating data to the broader research community. During only the last year, over 500 new data sets were published by TPE-WS. The Panel is extremely pleased with how TPE-WS is developing.

Since the last GHP meeting in Maynooth, Ireland, GHP approved two prospective regional initiatives to become new initiating RHPs. After the recommendations given by the Panel, the Humans and Hydroclimate in the United States (H₂US) initiative is advancing with the consolidation of its Science Plan, and is pursuing the identification of a Project Office. The frequent H₂US Affinity Group meetings continue and help in shaping a solid scientific dynamic among the group. The second RHP approved by late 2023 is AsiaPEX. The AsiaPEX team is advancing

in updating its Science Plan, the digitalization of historical precipitation records, the development of field campaigns, improving interactions with the CLIVAR/GEWEX Monsoon Panel, and identifying synergies with the TPE-WS RHP and the WCRP Global Precipitation Experiment (GPEX) Lighthouse Activity. They also hosted a number of sessions and workshops during the OSC.



Participants of the 2024 GHP Meeting outside the Frontier Research in Applied Sciences Building at Hokkaido University

Our only current prospective RHP, the Central Asia Initiative, has been converging in bringing together the regional scientific community. The team has significantly advanced in identifying common interests and potential research avenues for the region. During 2025, the Central Asia Initiative aims at developing activities such as workshops and summer schools focused on specific modeling skills. The Panel understands the challenges in forming a strong RHP in this region, yet fully recognizes the importance of this activity in an area that was not previously pursued by the GEWEX community.

Ongoing and Prospective Cross Cutting (CC) Activities

CCs are integral activities within GHP aiming at addressing the GEWEX Science Questions and creating collaboration between RHPs, other GEWEX Panels, and WCRP activities. GHP currently includes three active and four prospective CCs. The oldest CC in the Panel, the Transport and Exchange Processes in the Atmosphere over Mountains Experiment (TEAMx), aims at improving the current understanding of exchange processes in the atmosphere over mountains and how these processes are parameterized in climate models. Since the last Panel meeting, TEAMx has put together an updated plan for the TEAMx Observational Campaign (TOC) and the first full version of the TEAMx Numerical Modeling Plan (NMP). These are two pivotal initiatives within this CC. In addition, TEAMx hosted its Third Workshop with more than 60 in-person and 30 online participants, who provided feedback to the TOC and NMP. Also, it hosted the TEAMx Online Community Event earlier this year, with more than 100 participants. Finally, this CC got 11 new funded projects during the last months (with national and/or international funding), demonstrating an outstanding momentum. Since 2023, TEAMx has had a Coordination Project Office led by Stephanie Westerhuis, which is now directed by Manuela Lehner with administrative support from Doris Fischer. The Panel thanks Stephanie for her great contributions, and warmly welcomes Manuela and Doris to the Panel.

Another mature CC is INARCH-II. This CC is advancing through its Common Observation Period Experiment (COPE), with data being collected and model runs in preparation. IN-

ARCH-II also established strong ties with RHPs and CCs, e.g., TPE-WS, ANDEX, H₂US, TEAMx, and other GEWEX and WCRP activities. IN-ARCH-II co-chaired the WMO High Mountain Summit in 2023 and has now become a key contributor to the United Nations Educational, Scientific and Cultural Organization (UNES-

CO) Intergovernmental Hydrological Programme in Mountain Water Sustainability.

Determining Evapotranspiration (dET) has been another active CC with the goal of advancing the determination of evapotranspiration across scales. During 2023 and particularly 2024, dET has progressed at a calmer pace, and is currently undergoing a structural reshape under the new leadership of Li Jia, a former GHP Member and incoming GEWEX Science Steering Group (SSG) Member, and Bob Su, former GEWEX SSG Member and a new GHP Member. The meeting allocated a dedicated discussion to the future of dET and suggested different possible paths for this activity. The aim during the coming months is to define a suitable avenue for this CC in conjunction with the GEWEX Land-Atmosphere System Studies (GLASS) Panel and the previous dET leadership.

GHP also includes four prospective CCs at different levels of development. The most advanced prospective CC is the Flood CC, which looks at a wide spectrum of challenges around understanding flooding processes from observations to model development to socio-economic impact assessments. The core team hosted its first online workshop in September 2023, in which more than 80 experts from across the globe discussed the hydroclimatological and anthropogenic factors of flood generation, the spatiotemporal variability of flooding, and the interplay between climate and land use in causing floods. The Flood CC also developed a session in the 2023 American Geophysical Union (AGU) Fall Meeting, aiming to connect the activity with the broader research community. This CC had a further in-person informal meeting during the 9th GEWEX OSC, looking for convergence in the definition of research objectives that can be articulated in a Science Plan. The Precipitation over Mountainous Terrain (MOUNTerrain) aims at better process understanding, model development, and prediction of precipitation in mountainous terrains. Although this activity continues in hiatus, the Panel considers MOUNTerrain both an important and timely activity, particularly in the context of the GPEX Lighthouse Activity, yet it also recognizes the current challenges due to the lack of an active leadership team. The Panel decided to form a task force consisting of Panel co-chairs and members from current RHPs and CCs active in the moun-

tainous regions along with stakeholders from SSG and other GEWEX Panels to give momentum to this activity.

The other two prospective CCs are the Groundwater and Surface Waters initiatives. The Groundwater initiative hosted a very successful workshop just after the GHP Meeting and before the 9th GEWEX OSC, with an engaged participation from attendees and a clearer convergence around the research objectives. Stefan Kollet from Jülich Research Institute and University of Bonn along with Laura Condon from the University of Arizona will lead the first version of the Groundwater Science Plan to be submitted to GHP. Having said that, the leadership teams and participants in the Groundwater initiative are tending toward forming a network at this stage, which is supported by the Panel co-chairs. Surface Waters is led by Cedric David of the National Aeronautics and Space Administration (NASA)'s Jet Propulsion Laboratory, who is actively pushing for a global river network observational and modeling initiative, given the new opportunities rising from the emergence of the Surface Water and Ocean Topography (SWOT) data. We will certainly see more positive developments of this prospective CC turning into an active GHP CC.

Ongoing Network

GHP Networks foster collaborations and capacity building activities relevant to GEWEX science. They may transition into an RHP or a CC upon successful initiation of research activities and sourcing of funds, or, alternatively, an RHP may develop into a Network upon completion. GHP currently hosts one active Network, the Pannonian Basin Experiment (PannEx). PannEx aims to provide a better understanding of Earth system processes over the Pannonian Basin. The activity started as an initiating RHP and later evolved into a vibrant group of scientists from different disciplines interested in the hydroclimatic processes of the region. During 2023, PannEx had multiple workshops, including hosting a training school on micrometeorological measurements with the participation of a considerable number of ECRs from the region. The PannEx team has also been active publishing in the second edition of a special Atmosphere issue on "Climatic Extremes in the Pannonian Basin".

Data Centers

GHP currently includes two Global Data Centers, the Global Precipitation Climatology Centre (GPCC) and the Global Runoff Data Centre (GRDC). Both Data Centers went through leadership changes after the retirement of Udo Schneider (the ex-director of GPCC) and Ulrich Looser (the ex-director of GRDC). The Panel recognizes years of active involvement from Udo and Ulrich and wishes them all the best during their retirements. The Panel warmly welcomed Markus Ziese and Simon Mischel, who are now leading GPCC and GRDC, respectively. GPCC is well-connected to other GHP and GEWEX activities and has shown steady progress on precipitation data acquisition and processing. GPCC foresees the complete production and release of the second version of homogenized data for Europe (HOMPRA-Europe2), as well as the release of next product versions in 2025. GRDC focuses on acquisition, harmonization, and storage of global histori-

cal river discharge data. The center is successfully progressing, continuously adding new data into the system. Most notably, GRDC has acquired the extended Baltic Sea Experiment (BALTEX, the former phase of Baltic Earth) data set, adding 768 new stations. The global usage of GRDC data has significantly increased since the launch of its online tool that made GRDC data accessible to the broader research community.

Other Business

GHP is closely linked with the GEWEX Panel on Global Land-Atmosphere System Studies (GLASS) through a number of joint activities. To facilitate the relationship between the two Panels, GHP Member Joshua Roundy of Kansas University serves as the GLASS-GHP liaison. During the 2024 GHP Meeting, Joshua presented a comprehensive summary of GLASS main activities, with a focus on Irrigation, a joint GLASS-GHP activity. During this discussion, the Panel raised the possibility of inviting Irrigation leaders to the next GHP Meeting, in order to strengthen links with GHP RHPs, such as H₂US.

Besides approving two new initiating RHPs (H₂US and Asia-PEX) and reviewing the updated Science Plan of the dET CC during 2023, GHP advanced in preparing an updated Terms of Reference on Roles and Responsibilities for Panel Members, seeking to provide more clarity to current and new Panel members. Moreover, the GHP Co-Chairs and the International GEWEX Project Office Director, Peter van Oevelen, prepared revised versions of the guidelines for prospective RHPs, CCs, and Networks. After fruitful dedicated discussions during the last day of the meeting, the Panel not only decided to have a review period for Panel members on the revised Terms of Reference and Activity Guidelines, but also to collect the feedback from current Activity Leaders on their corresponding guidelines before voting on the approval of these documents. The Panel members also decided to have regular seasonal meetings for a more engaged and participatory internal Panel activities.

GHP is continuously enriched through new Panel members. GHP acknowledges the insightful contributions from Dr. Li Jia, who will join the GEWEX SSG, and Dr. Xin Li, who leaves GHP. We wish both the best in their next challenges. We also welcomed four new Members: Dr. Michael Bosilovich, a NASA Scientist based in Greenbelt, MD, United States, and an ex-GEWEX SSG Member; Dr. Bob Su, Faculty of Geo-Information Science and Earth Observation (ITC) at the University of Twente in the Netherlands and an ex-GEWEX SSG Member; Dr. Quiaohong Sun, a shining ECR and Full Professor at the Nanjing University of Information Science & Technology in China; and Dr. Venkat Lakshmi, AGU's Hydrology Section President-Elect and professor at the University of Virginia, United States. During the 2024 GHP Meeting, refreshing and extremely insightful presentations were given by three of the new members.

As a final discussion, the Panel decided that the 2025 GHP Meeting will be held in Montreal, Canada, and hosted by GHP Co-Chair Ali Nazemi at Concordia University. We very much look forward to our next meeting in Montreal!

Updates on the International Network for Alpine Research Catchment Hydrology (INARCH) and Its 2024 Annual Workshop

14–18 October 2024
Lanzhou and Zhangye, China

John Pomeroy¹, Chris DeBeer¹, Tao Che², and Ignacio López Moreno³

¹Centre for Hydrology and Global Institute for Water Security, University of Saskatchewan, Saskatoon, Canada; ²Northwest Institute of Eco-Environment and Resources, Chinese Academy of Sciences, Lanzhou, China; ³Institute for Pyrenean Ecology, Spanish National Research Council, Zaragoza, Spain

Overview of INARCH

The International Network for Alpine Research Catchment Hydrology (INARCH, <https://inarch.usask.ca>) is a cross-cutting project of the GEWEX Hydroclimatology Panel (GHP) to better understand alpine cold regions hydrological processes, improve their prediction, diagnose their sensitivities to global change, and find consistent measurement strategies. At its core is a global network of highly-instrumented mountain observatories and experimental research sites, which are testbeds for detailed process studies on mountain hydrology and meteorology, developing and evaluating numerical simulation models, validating remotely sensed data, and observing, understanding, and predicting environmental change. There are now 38 research basins and sites in 18 countries and six continents, with more continuing to join the network. For a full description of INARCH and details on the research basins, participants, science questions, goals, and activities, visit our website and see the article in the Quarter 1 2023 issue of *GEWEX Quarterly* (<https://www.gewex.org/resources/gewex-news/>).

Update on the Common Observing Period Experiment (COPE), 2022–2024

INARCH has held the field observation phase of COPE as a focal activity to collect a high-quality and coherent observational data set of mountain meteorology and hydrology from around the world. In the diagnostic phase of COPE, these data will be used to address key INARCH science questions and for a series of hydrological process diagnostic modelling evaluations and analyses. The field observation phase progressed well, and there have been many successful fieldwork, experimental, and remote sensing activities. INARCH is now coordinating data management with the help of Global Water Futures Observatories and modelling activities at multiple institutions to make use of the observations. The aim is to better understand why models produce various behaviors and to see if models benchmark various known aspects and regimes of the coupled atmospheric-cryospheric-hydrological system. Model diagnostic evaluations will emphasize atmospheric, snow, glacier, and water processes in high mountain terrain and include sparse forest, non-needleleaf vegetation, glaciated, and alpine windblown sites. This has not been done globally in alpine regions and could be potentially

very powerful. Going forward, a collection of scientific papers will be submitted to a special issue of *Hydrological Processes* (<https://onlinelibrary.wiley.com/journal/10991085>) on “Improving measurement, understanding, and prediction of alpine cold regions hydrological processes and their sensitivities to global change,” and the data will be published and openly available for use in a special issue of *Earth System Science Data* on “Hydro-meteorological data from mountain and alpine research catchments” (https://essd.copernicus.org/articles/special_issue871.html). COPE will be completed by early 2026 and will be accompanied by press releases, outreach events, and plain language science summaries to explain the outcomes to the scientific community and policy makers.

Summary of 2024 Workshop, Lanzhou and Zhangye, China

INARCH held its 2024 Annual Workshop from 14–18 October 2024 in Lanzhou and Zhangye in central China, meeting as a network in Asia for the first time. The workshop was hosted by Dr. Tao Che, Dr. Shichang Kang, and Dr. Xin Li of the Chinese Academy of Sciences, along with tremendous local support from their staff and students. On 15th October, 46 scientists and students gathered in Lanzhou at the Northwest Institute of Eco-Environment and Resources, Chinese Academy of Sciences, for the workshop opening and keynote presentations, as well as a tour of the facility. That afternoon, a smaller group (36 participants) travelled by bus to Zhangye in Gansu Province, about 500km from Lanzhou and located in the Heihe River Basin near to field sites in the Qilian Mountains. Over the next two days, INARCH met at the Zhangye Hotel to convene scientific sessions on Observations, Remote Sensing, and Field Experiments and on Model Development, Applications, and Prediction, and held discussions on the Common Observing Period Experiment (COPE) and International Association of Hydrological Sciences-International Commission for Snow and Ice Hydrology (IAHS-ICSIH) initiatives, and took a tour of the Yakou snow observation supersite in the Qilian Mountains. Participants returned to Lanzhou on the afternoon of 18th October and departed from there.

The workshop was very fruitful in terms of assessing our progress, planning further activities, and scoping our contributions to global initiatives such as the International Year for Glaciers’ Preservation and the United Nations (UN) Decade of Action for the Cryospheric Sciences. The workshop statement below lists notable highlights and outcomes.

INARCH Statement 2024

- INARCH met in Asia for the first time and engaged with many scholars and institutes who are contributing substantially to increasing the capacity and advances of high mountain hydrometeorology and cryospheric science.
- Dramatic expansion of high-quality observations in High Mountain Asia and use of this data with sophisticated models to diagnose changing cryosphere and hydrology has occurred.
- Atmospheric forcing data including reanalysis continue to improve and refine resolution, but need bias correction in high mountains to be useable.



Top: INARCH workshop participants at the Northwest Institute of Eco-Environment and Resources, Chinese Academy of Sciences, Lanzhou, on October 15, 2024. Bottom: workshop participants at the snow observation site (Yakou) at 4,120m elevation in the Qilian Mountains, China, on 17th October 2024

- Risks and hazards in high mountains have been identified and there is a research need for observation, early warning, and prediction systems.
- Sub-surface flow and ecological interactions are important areas for development in INARCH with some advances and more needed.
- Black carbon and dust impacts on albedo and melt are a source of uncertainty that needs more attention.
- International teams are testing and applying a suite of models in multiple INARCH basins and show transferability of approaches and algorithms.
- INARCH should continue to develop collaborations with other groups and initiatives to enhance its capability and to build capacity.
- The International Year for Glaciers Preservation and UN Decade of Action for the Cryospheric Sciences start in 2025 and INARCH is poised to deliver advances in monitoring, science, and application to both initiatives. INARCH should continue.

Upcoming Activities and Events

EGU General Assembly 2025—INARCH session on “Improving Measurement, Understanding, and Prediction of the Mountain Cryosphere and Hydrological Cycle through Alpine Research Catchments”

The EGU General Assembly will be held in Vienna, Austria on 27 April to 2 May 2025. We have proposed a session for INARCH researchers and others in the mountain hydrology community and we encourage abstract submissions. See <https://meetingorganizer.copernicus.org/EGU25/session/51977> for further details. Abstract submission is now open and the deadline to submit is 15 January 2025 at 13:00 CET.

INARCH Workshop, Obergurgl, Austria, 11–13 September 2025, and International Mountain Conference 2025, Innsbruck, Austria, 14–18 September 2025

We are pleased to announce the next annual INARCH workshop will be held at the Innsbruck University Center in Obergurgl, Austria on 11–13 September 2025. Our local hosts are Professors Lindsey Nicolson, Rainer Prinz, and Ulrich Strasser from the University of Innsbruck. The plan is to arrive by bus from Innsbruck in the early afternoon of 11th September and hold oral and poster scientific sessions that afternoon and on the 12th, then tour the Rofental Catchment on 13th September and return to Innsbruck on 14th September. The International Mountain Conference will begin that evening in Innsbruck, and INARCH has proposed a focus session there that will be open to all, called “High Mountain Hydrology and Cryosphere under Global Change – observations, modelling, prospects.” Watch the INARCH events page for further updates.

The 2024 GLASS Panel Meeting

6 July 2024
Sapporo, Japan

Anne Verhoef and Nathaniel Chaney

GLASS Co-Chairs

On 6 July 2024, the Global Land-Atmosphere System Studies (GLASS) Panel convened at Hokkaido University in Sapporo, Japan, for its annual meeting. This one-day event focused on reviewing ongoing projects as well as discussing new directions and themes within the Panel.

The morning began with brief overviews from each GLASS project, emphasizing future directions and potential collaborations within GLASS and with other GEWEX Panels' initiatives, wider WCRP activities, as well as external activities. The projects discussed included the GEWEX Land/Atmosphere Feedback Observatory (GLAFO; led by Volker Wulfmeyer), the Solar Induced Fluorescence Model Intercomparison Project (SIF-MIP; led by Nicholas Parazoo), the Irrigation cross-cut (led by Patricia Parker and new co-lead Jacopo Dari; presented by Joshua Roundy), the International Land Model Benchmarking project (ILAMB; led by David Lawrence), the PALS Land Surface Model Benchmarking Evaluation Project, Phase 2 (PLUMBER 2; led by Gab Abramowitz), the Coupling of Land and Atmospheric Subgrid Parameterizations (CLASP; led by Nathaniel Chaney), the GEWEX Soil and Water Initiative (SoilWat; led by Yijian Zeng), and the Machine Learning for Land Modeling project (ML4LM; led by Souhail Boussetta).

A few highlights from the morning presentations and discussions included:

1. The new ML4LM project provides an exciting opportunity to galvanize the global land modeling community to leverage Machine Learning for improved process understanding, parameterization, and model development.
2. The recent PLUMBER 2 activities highlight the continued significant deficiencies in contemporary land surface models to accurately represent surface fluxes and provide strong arguments for a renewed focus on modeling surface fluxes and land-atmosphere coupling (Abramowitz et al., 2024).
3. The GLAFO initiative is considering a new site at Huancaayo, Peru; a site in Africa is also desirable, but financing this site is a concern. The establishment of shared data screening and processing protocols across the GLAFOs is of key importance; there is also an interest in adding SIF measurements to GLAFO sites to help understand the role of the carbon cycle in land-atmosphere interactions.
4. CLASP is exploring the potential to leverage Doppler Lidar observations in GLAFO sites to measure heterogeneity-driven circulations to inform parameterization development.



Participants of the 2024 GLASS Panel Meeting

5. SoilWat is planning a 3rd joint meeting (largely invitation only) with the International Soil Modeling Consortium (ISMC) on improved soil modeling and soil parameter sets in land surface models (14–16 July 2025 at the University of Reading, UK) to coincide with the week of the next GLASS Panel meeting (16–18 July 2025, also in Reading).
6. Our Panel member Laura Condon attended briefly to summarize the aims of the first GEWEX Groundwater Workshop (led by Laura and Stefan Kollet) that took place concurrently on the same Hokkaido University premises. An overview of this overall effort can be found at <https://www.gewex.org/gewex-content/files/mf11677625320Q12023.pdf> (*GEWEX Quarterly*, Vol. 33, No.1, Quarter 1 2023, pg. 5,6) and the summary of the workshop is presented in this newsletter.
7. The Panel needs to establish closer connections with the Earth System Modelling and Observations project (ESMO) and the Working Group on Numerical Experimentation (WGNE) to synergize our efforts.

During the second morning session, GLASS Co-chairs Anne Verhoef and Nathaniel Chaney provided an overview of the role of GLASS within GEWEX and the World Climate Research Program (WCRP) more generally; they also discussed potential interactions of GLASS with other GEWEX Panels and WCRP projects. The focus then turned to providing feedback from an internal GLASS Panel survey, conducted by the chairs, from earlier in the year to understand the strengths and weaknesses of the Panel and its international role. One of the key take-homes from those discussions included recognizing the key role that GLASS must continue to play towards encouraging the global community to focus on improving the modeling of surface fluxes and land-atmosphere interactions in land surface models; this point was the focus of the Panel's recent article in the second *GEWEX Quarterly* issue of 2024 (<https://www.gewex.org/gewex-content/uploads/2024/06/Q22024.pdf>). It also highlighted the importance of ensuring that the GLASS Panel is outward-look-

ing and seeks to facilitate regular interactions of the international community of modelers, theoreticians, and experimentalists of land-atmosphere processes and their interactions.

The first afternoon session featured insights from Joshua Rounding and Yunyan Zhang, who shared their experiences with the operation of the GEWEX Hydroclimatology Panel (GHP), the GEWEX Data and Analysis Panel (GDAP), and the Global Atmospheric System Studies Panel (GASS) and related communities. Their contributions sparked discussions about establishing clearer short-term to mid-term priorities for GLASS and emphasized the importance of focusing on depth over breadth in initiatives. These discussions also highlighted opportunities for more formal engagement with the global community, including workshops on key topics identified as weaknesses in land-atmosphere modeling, such as Monin-Obukhov similarity theory, the poor representation of lateral advection in the atmospheric boundary layer in surface coupling schemes, the diurnal cycle, and a potential Pan-GLASS meeting in 2027.

The final session focused on emerging projects within the Panel, notably the next phase of the GEWEX Atmospheric Boundary Layer Study (GABLS). Led by John Edwards, this project aims to utilize Large Eddy Simulations and GLAFO measurements to advance our understanding of boundary layer processes in climate and weather prediction models. This project seeks to foster strong collaborations between CLASP, GLAFO, and SoilWat, particularly regarding the impact of soil and vegetation heterogeneity on boundary layer dynamics. Concluding discussions also considered a slight restructuring of GLASS projects into three thematic pillars: observations and benchmarking, process understanding, and model improvement. Ongoing and emerging projects would fall into one of the pillars or across multiple ones.

As the meeting was held immediately before the GEWEX Open Science Conference that the Panel members later attended, many of the discussions and topics were furthered throughout the week, including dinner on the evening after the GLASS Panel meeting and other activities culminating in the highlight of a karaoke night on Friday.

Finally, the Panel would like to give a special thanks to our host, Hokkaido University, which made the meeting proceed flawlessly whether it was through the technical support that we had throughout the entire event, the food and coffee breaks that were provided throughout the day, or the overall level of detail to ensure a successful meeting. We look forward to our gathering next year in Reading, UK.

References

Abramowitz, G., A. Ukkola, S. Hobeichi, J. Cranko Page, M. Lipson, M.G. De Kauwe, S. Green, C. Brenner, J. Frame, G. Nearing, M. Clark, M. Best, P. Anthoni, G. Arduini, S. Boussetta, S. Caldararu, K. Cho, M. Cuntz, D. Fairbairn, C. Ferguson, H. Kim, Y. Kim, J. Knauer, D. Lawrence, X. Luo, S. Malyshev, T. Nitta, J. Ogee, K. Oleson, C. Otlé, P. Peylin, P. de Rosnay, H. Rumbold, B. Su, N. Vuichard, A.P. Walker, X. Wang-Faivre, Y. Wang, and Y. Zeng, 2024. On the predictability of turbulent fluxes from land: PLUMBER2 MIP experimental description and preliminary results. *Biogeosciences* 21(23):5517–5538. <https://doi.org/10.5194/egusphere-2023-3084>

ML4LM Webinar Series 2025

Coordinator: Dr. Souhail Boussetta, ECMWF

With the continuous improvement in computer science and high performance computing systems on one hand, and the availability of more accurate and frequent observations on the other hand, especially satellite-based ones, data-driven models, namely AI-based and machine learning models, are becoming more efficient and accurate in simulating the Earth system. These developments have opened a paradigm shift between considering physical-based models and data-driven ones, or even both combined in so-called hybrid systems.

Machine Learning for Land Modeling (ML4LM) aims at exploring the extent and the role that machine learning would play for better land surface studies, especially identifying the main areas where it could be applied and providing tools and data to the land surface modeling community. The ML4LM is a GEWEX project of the Global Land-Atmosphere System Study (GLASS) Panel. One of its activities includes a webinar series that gathers eminent scientists to share their experience in these combined fields. For the 2025 series, visit the webinar page at <https://www.gewex.org/project/ml4lm/2025-ml4lm-webinar-series/> for information on how to participate.

Date and Time (UTC)	Title and Presenter
20 January 2025 15:00 UTC	Advances in ML for Earth System Modeling <i>Dr. Peter Dueben, ECMWF</i>
20 February 2025 15:30 UTC	Towards Flexible Interfacing of ML with Land Models <i>Dr. David Lawrence, NCAR</i>
12 March 2025 09:30 UTC	ML for Benchmarking Land Models <i>Prof. Gab Abramowitz, UNSW</i>
3 April 2015 14:30 UTC	Advancing Predictive Understanding of Hydrological Systems through Trustworthy AI <i>Dr. Dan Lu, ORNL</i>
14 May 2025 13:30 UTC	Physically-Based Land Modeling & ML—What Are the Complementarities? <i>Prof. Christoph Rüdiger, ECMWF</i>
9 June 2025 14:30 UTC	Exploring the L-A Coupled System with ML <i>Prof. Pierre Gentine, LEAP-STC, U. Colombia</i>
9 July 2025 15:30 UTC	Hybrid Modeling for Land <i>Prof. Andrew Bennett, U. Arizona</i>
9 September 2025 13:30 UTC	On the Use of ML for Modeling Land Surface Dynamics <i>Prof. Nuno Carvalhais, Max Plank Institute</i>
15 October 2025 14:30 UTC	Machine Learning for Land Data Assimilation in Global NWP and Reanalysis Systems <i>Prof. Patricia de Rosnay, ECMWF</i>
12 November 2025 14:30 UTC	Physics Constrained ML which Benefits for Land Modeling <i>Dr. Paula Harder, Mila-Quebec</i>
10 December 2025 15:30 UTC	General discussion & future plans (1h:30) <i>All</i>

Water | 水
Climate | 気候

Call for Submissions to Two Special Issues on the GEWEX Open Science Conference (GEWEX-OSC) in Sapporo

We are pleased to invite you to submit your papers to the special issue of **Hydrological Research Letters** (HRL) and the joint special edition of the **Journal of the Meteorological Society of Japan** (JMSJ) and **Scientific Online Letters on the Atmosphere** (SOLA) dedicated to the outcomes of the 9th GEWEX Open Science Conference (GEWEX-OSC) in Sapporo. All participants of GEWEX-OSC Sapporo have the right to submit manuscripts to any of the journals, and we warmly encourage your submissions.

HRL Submission Details:

Publication Charges: The first 15–20 papers published online by June 2025 in HRL will be exempt from publication fees. Please note that this waiver is limited to the first 15–20 submitted papers due to budget constraints.

How to Submit:

Prepare your manuscript according to the HRL submission guidelines, available at http://www.hrljournal.org/data/hrl_gewex.pdf. Submit your manuscript via the HRL submission portal: <https://www.editorialmanager.com/hrl/default.aspx>.

When submitting, select "GEWEX-OSC Sapporo" from the drop-down list for Question 7 (regarding special collections). Please include your presentation paper number (e.g., 29–53) and the GEWEX-OSC Sapporo title in the comments section.

For submission assistance, please contact kure@pu-toyama.ac.jp.

JMSJ and SOLA Submission Details:

Submissions related to GEWEX-OSC Sapporo are encouraged to contribute to the "Special Edition on Recent Advances in the Global Energy and Water Cycle Exchanges (GEWEX) Sciences".

How to Submit:

Follow submission guidelines available at https://www.metsoc.jp/jmsj/special_issues_editions/JMSJ2024_GEWEX.html. Manuscripts should be prepared according to the guidelines of either JMSJ or SOLA. The instructions are available for:

- JMSJ: <https://www.metsoc.jp/jmsj/instructions.html>
- SOLA: <https://www.metsoc.jp/sola/instruction.html>

Papers must be submitted online via the respective journal's submission system:

- JMSJ: <https://mc.manuscriptcentral.com/jmsj> (to be renewed in 2025)
- SOLA: <https://mc.manuscriptcentral.com/sola>

Choose "GEWEX" during the submission process. Please also mention that your submission is for "GEWEX" in the cover letter.

For more information, please refer to the Call for Papers: https://www.metsoc.jp/jmsj/special_issues_editions/CallforPapers_JMSJ-SOLA_SpecialEdition_GEWEX.pdf.

We look forward to your valuable contributions to both special issues.

GEWEX/WCRP Calendar

For the complete Calendar, see <http://www.gewex.org/events/>

12–16 January 2025—105th American Meteorological Society (AMS) Annual Meeting—New Orleans, LA, USA

10–14 February 2025—37th GEWEX Scientific Steering Group (SSG-37) Meeting—Wellington, New Zealand

24–27 February 2025—CLIVAR Climate Dynamics Panel 5th Annual Workshop—Lorne, Australia

24–28 March 2025—7th International Baltic Earth Winter School for Young Scientists—Klaipeda, Lithuania

28–30 April 2025—American Water Resources Association (AWRA) 2025 Spring Conference: Development Risks & Challenges in Changing Climate Conditions—Anchorage, AK, USA

19–21 May 2025—GEWEX Upper Tropospheric Clouds and Convection Process Evaluation Study (UTCC PROES)—Paris, France

19–23 May 2025—2025 GEWEX Data and Analysis Panel (GDAP) Annual Meeting—Paris, France

26–30 May 2025—Baltic Sea Science Congress 2025—Sopot, Poland

9–11 July 2025—2025 GEWEX Hydroclimatology Panel (GHP) Meeting—Montreal, Canada

14–16 July 2025—International Soil Modelling Consortium (ISMC)—GEWEX Soil and Water Initiative (SoilWat) Meeting—Reading, UK

16–18 July 2025—2025 Global Land-Atmosphere System Study (GLASS)—Reading, UK

GEWEX QUARTERLY

Published by the International GEWEX Project Office

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