

47th Session of the World Climate Research Programme
Joint Scientific Committee

Global Precipitation Experiment

Drs Annalisa Cherchi, Jeff Trapp and the GPEX
Community



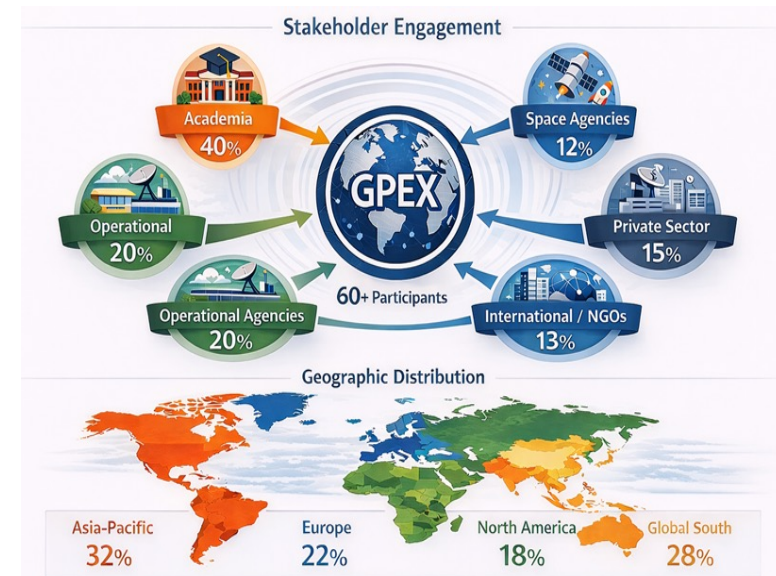
GPEX-Key highlights for the Joint Scientific Committee since May 2025

- GPEX Community Survey on Precipitation Datasets led by Working Group 2 with more than 120 responses.
- APN proposal submitted bringing together Japan, Nepal, Bhutan, Bangladesh and India under the umbrella of GPEX.
- A major milestone was reached during the Kyoto meetings in March 2026, which enabled GPEX to consolidate its governance, align WG priorities, and define a clear roadmap and action plan for 2026–2027.
 - GPEX Multistakeholder Workshop (5–6 March)
 - SSG Leadership Meeting (7–8 March)
 - CMIP7 side event “*Making Precipitation Count*” (9 March)

Major outcome of the workshop:

The **2028–2030** timeframe identified for the Years of Precipitation.

This will serve as a flagship global coordination framework linking field campaigns, observations, modelling, and applications across regions and communities.



AI generated image

WCRP

World Climate
Research Programme



WORLD
METEOROLOGICAL
ORGANIZATION



unesco
intergovernmental
Educational, Scientific and
Cultural Organization



International
Science Council

WG1

Coordinated Field Campaigns

Example activity: Engage with scientists and funding agencies to identify potential projects for each high impact precipitation systems across the globe.

Co-chairs : Fred (Marty) Ralph; Samson Hagos

WG2

Precipitation-Relevant Databases

Example activity: Contribute to the systematic evaluation of precipitation relevant datasets as well as aid the establishment and/or expansion of global and regional precipitation data.

Co-chairs : Akiyo Yatagai; Hui Su

WG3

Precipitation Modeling, Prediction, and Process Understanding

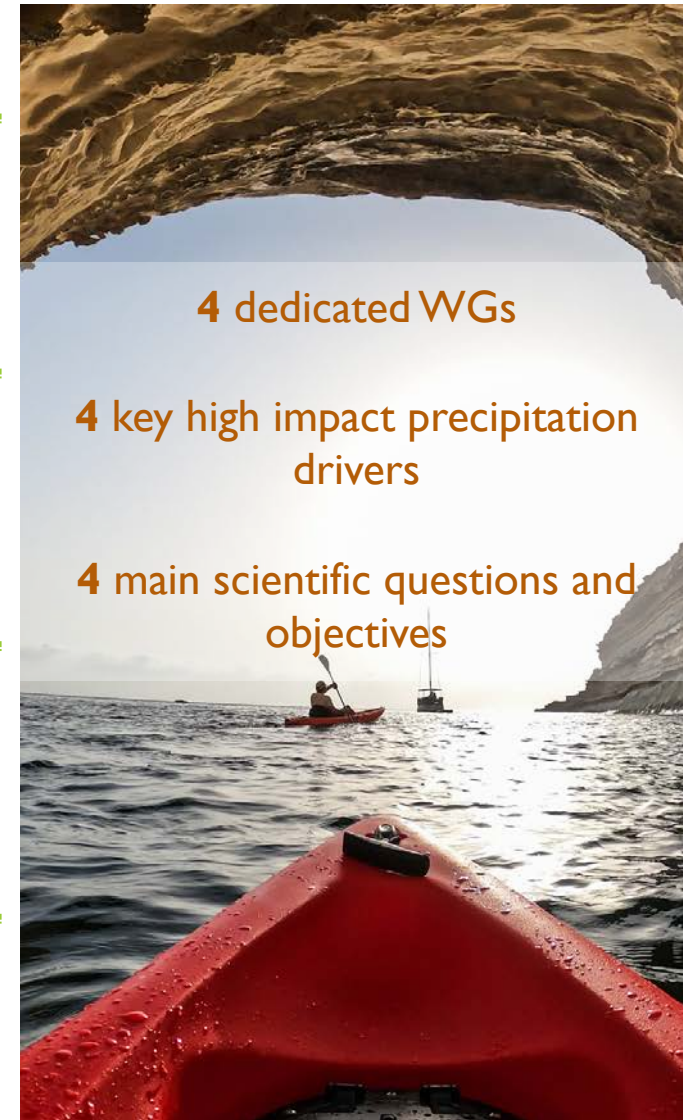
Example activity: Coordinate multi-scale precipitation analysis and forecasts, and support the establishment of multi-model databases, along with common evaluation metrics.

Co-chairs : Hayley Fowler; Maria Laura Bettolli; Julianna Dias

WG4

National/Regional Activities and Capacity Development

- Example activity: Work with other projects to make precipitation datasets available for resource-challenged scientists, for example in the Global South.
- Co-chairs : Jakob Steiner; Toru Terao



4 dedicated WGs

4 key high impact precipitation drivers

4 main scientific questions and objectives

GPEX WGI: Field Campaigns and Observations Towards WCRP Years of Precipitation (2028–2030)

Strategic direction :Years of Precipitation (YoP) as a coordinated global framework for field campaigns- 4 High Impact Precipitation Systems (HIPS)

Global coordination of field campaigns

- Develop a global inventory of planned campaigns (by region & HIPS)
- Proactive engagement with PIs, agencies, and funders to align efforts

Value of GPEX coordination

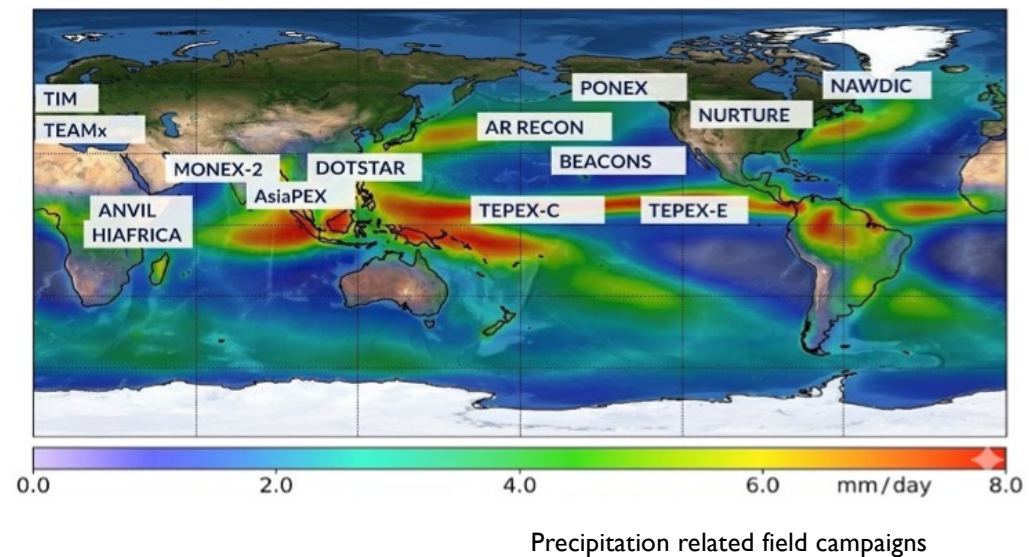
- Maximise scientific impact & return on investment
- Enable shared observations, expertise, and capacity development
- Strengthen global networking (“put your science on the map”)

Data & collaboration expectations

- Promote FAIR data sharing and common standards
- Encourage open collaboration and co-authorship across communities

Partnerships & outreach

- Engage NMHSs, WMO/WWRP, space agencies, funders, private sector
- Build links with professional societies (AGU, EGU, AMS, etc.)



GPEX WG2: Data & Precipitation Products

Benchmarking precipitation for science & societal relevance

Focus on extreme precipitation

- Assess high-impact precipitation events linked to four HIPS (ARs, monsoons, MCSs, TCs)
- Prioritise societally relevant extremes across regions

Benchmarking across datasets & campaigns

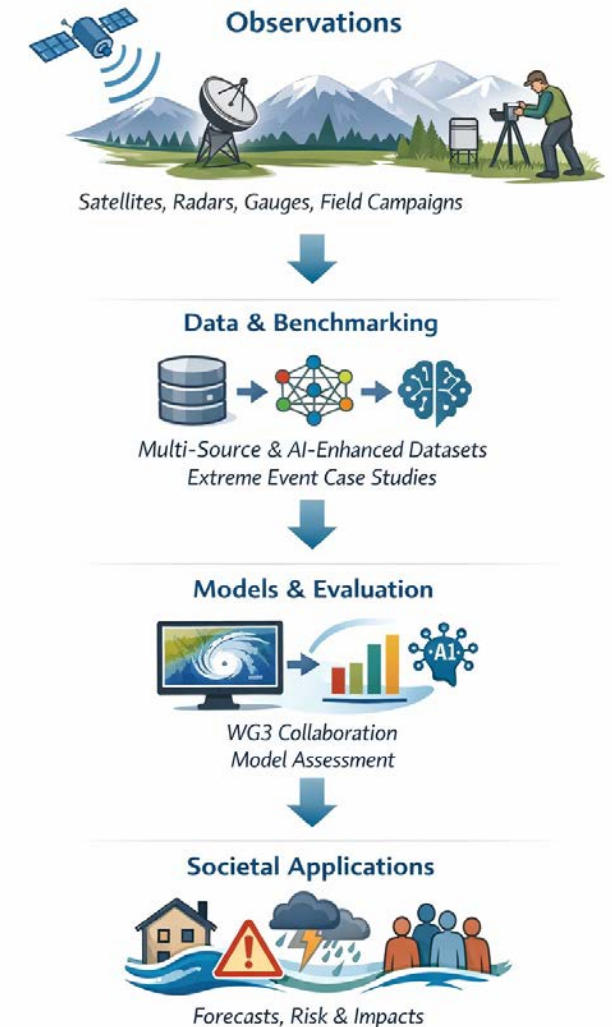
- Leverage past field campaigns + dense observational networks
- Identify successful case studies and key gaps (in synergy with WGI)

Flagship case studies

- Orographic precipitation as a priority testbed
- Collaboration with **GEWEX (GHPs)** and related communities

Data-model integration, AI and next generation datasets

- Work with WG3 to evaluate model performance against identified case studies
- Assess AI-based precipitation products and their performance
- Explore multi-source datasets (satellite, in situ, private sector) for benchmarking

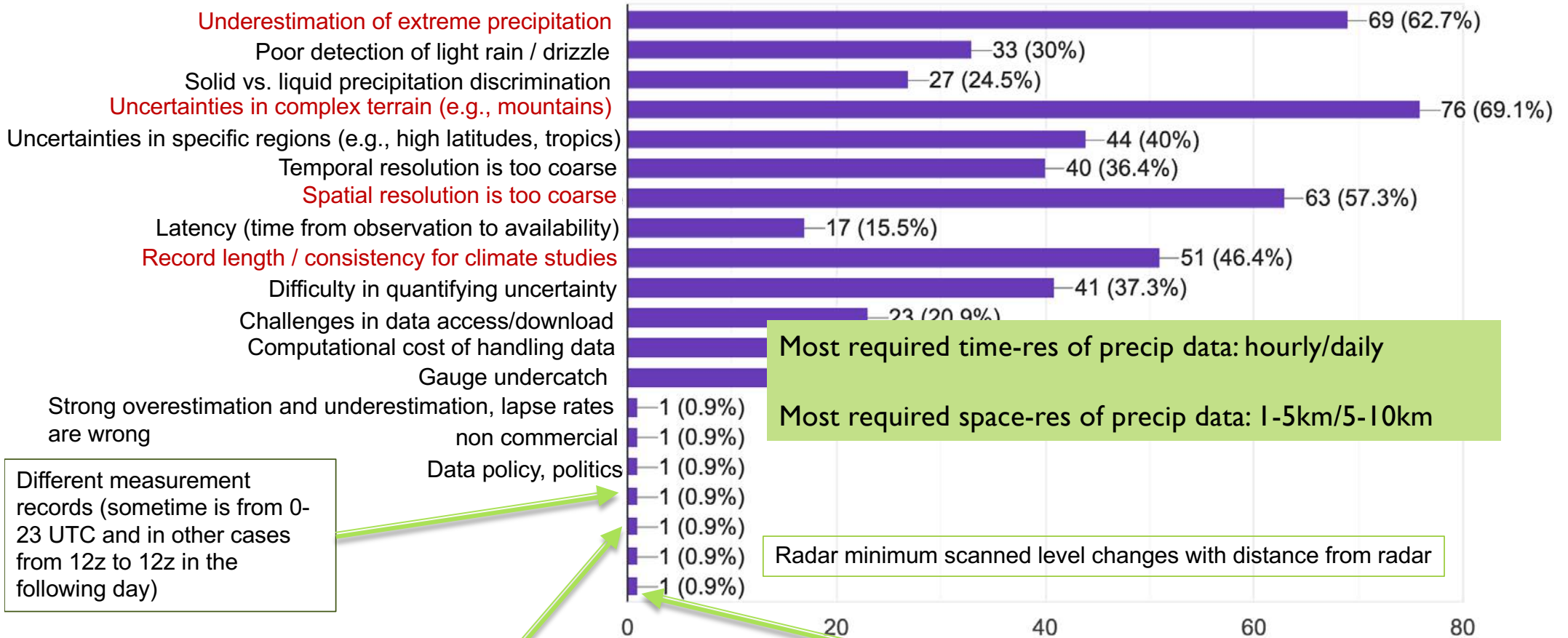


AI generated image

GPEX WG2: Survey on precipitation datasets (scientific community)

110 response

What challenges do you encounter in your work?



Most required time-res of precip data: hourly/daily
 Most required space-res of precip data: 1-5km/5-10km

Different measurement records (sometime is from 0-23 UTC and in other cases from 12z to 12z in the following day)

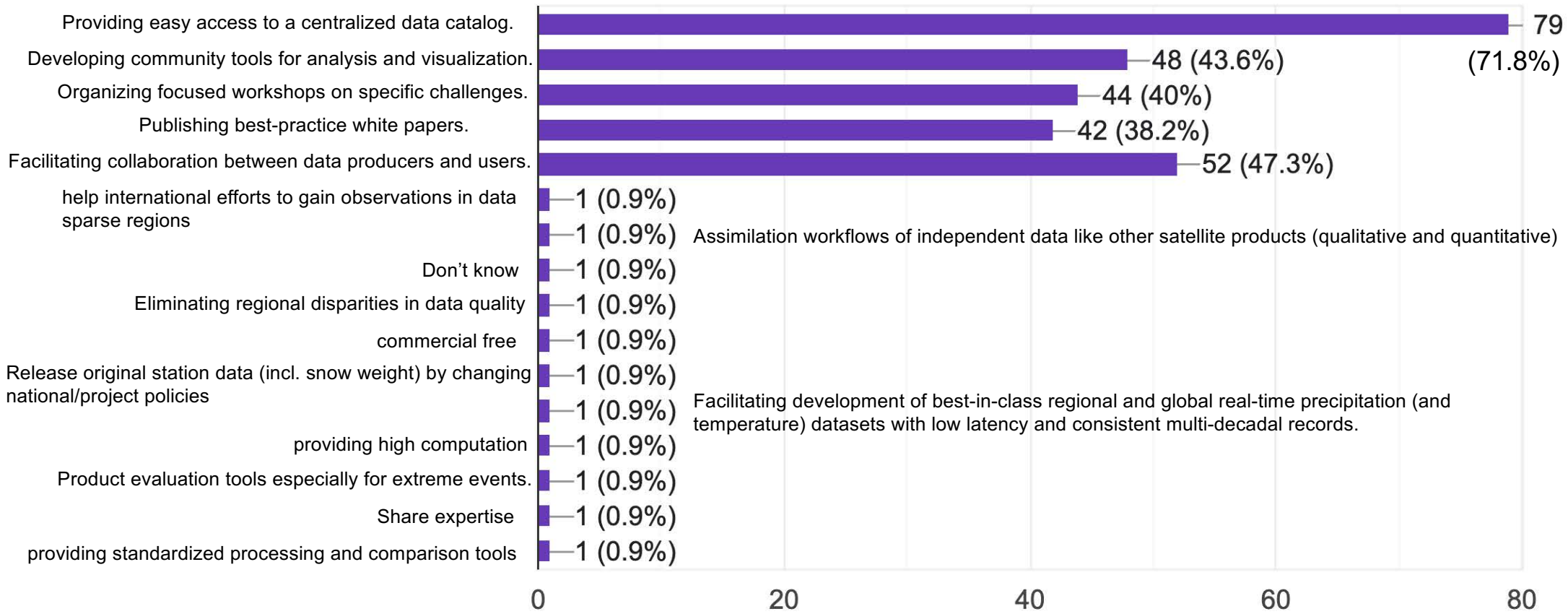
Radar minimum scanned level changes with distance from radar

challenges around extreme precipitation and precipitation in mountains

Improved forward modelling needed to use precipitation observations as radiances and reflectivity

How could GPEX best support YOUR work?

110 responses



Data, Integration & Partnerships – GPEX Approach

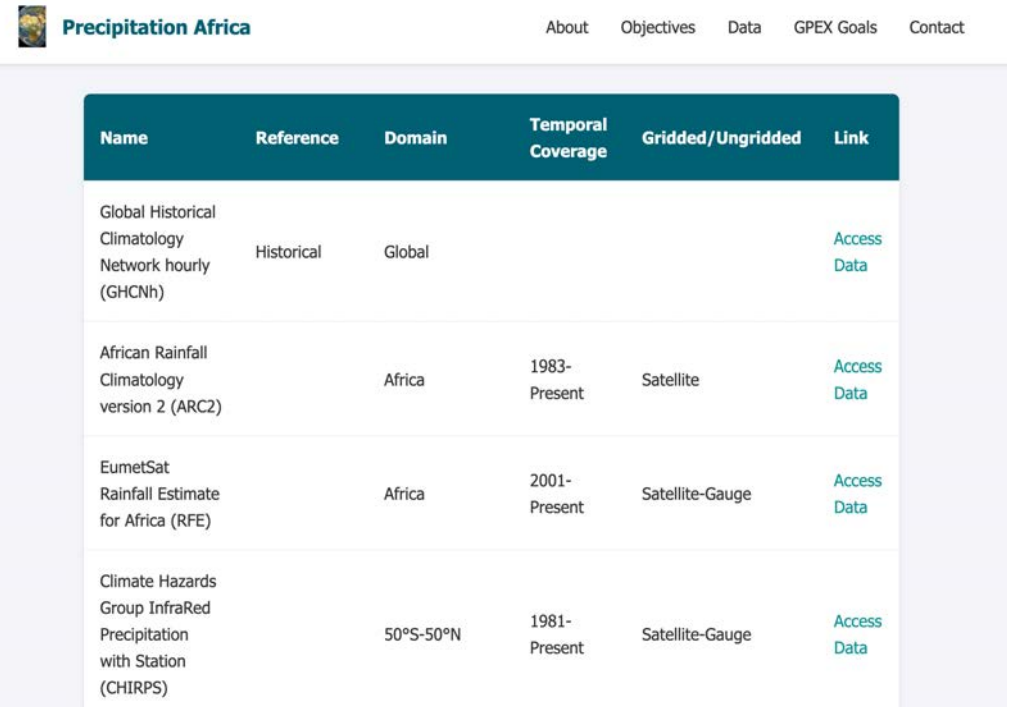
Data Resource Hub

For visibility, accessibility and alignment of existing datasets

First step: knowledge/resource platform (WGI)

- Prototype: “Precipitation Measurements over Africa”
- Provides:
 - overview of datasets & observations
 - links to existing platforms
 - support for data-sparse & high-risk regions
- To be scaled to other regions & YoP field campaigns

Led by Samson, WGI



The screenshot shows the 'Precipitation Africa' website. The page has a navigation menu with links for 'About', 'Objectives', 'Data', 'GPEX Goals', and 'Contact'. Below the navigation is a table listing various precipitation datasets. The table has six columns: Name, Reference, Domain, Temporal Coverage, Gridded/Ungridded, and Link. Each row represents a different dataset with its specific characteristics.

| Name | Reference | Domain | Temporal Coverage | Gridded/Ungridded | Link |
|--|------------|-----------|-------------------|-------------------|-----------------------------|
| Global Historical Climatology Network hourly (GHCNh) | Historical | Global | | | Access Data |
| African Rainfall Climatology version 2 (ARC2) | | Africa | 1983-Present | Satellite | Access Data |
| EumetSat Rainfall Estimate for Africa (RFE) | | Africa | 2001-Present | Satellite-Gauge | Access Data |
| Climate Hazards Group InfraRed Precipitation with Station (CHIRPS) | | 50°S-50°N | 1981-Present | Satellite-Gauge | Access Data |

GPEX WG3: Modelling, Prediction & Process Understanding

Advancing modelling of High-Impact Precipitation Systems (HIPS)

Strategic focus

- Address core modelling challenges for MCSs, ARs, Monsoons, Tropical Cyclones
- Strengthen observations → modelling → prediction linkages

Flagship activity: Review paper (for BAMS, Sept. 2026)

- Survey global modelling initiatives to identify priority gaps
- Synthesize advances, gaps and opportunities in precipitation modelling
- Define what modellers need & what observations are required (closing science gaps)
- Include case studies demonstrating how observations improve models

Model evaluation & intercomparison

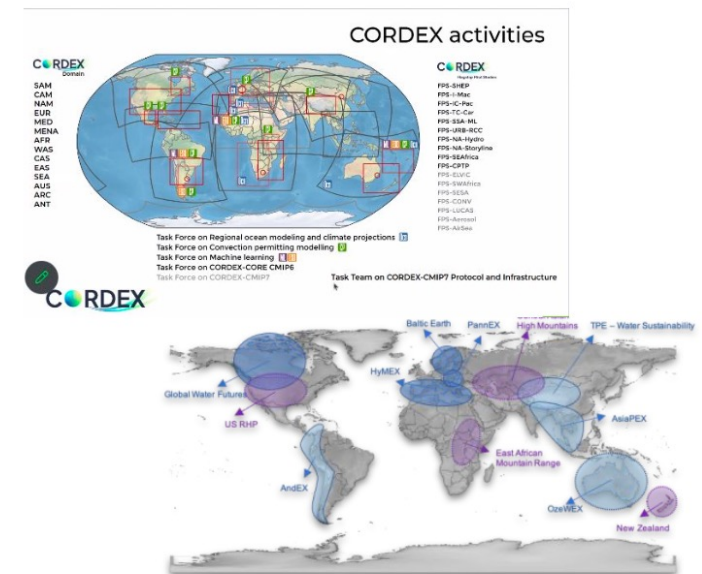
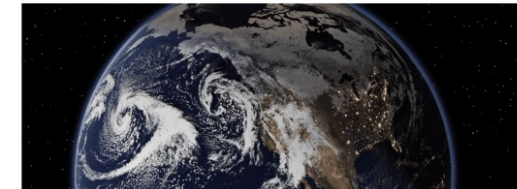
- Collaborate with WG2 on benchmarking & evaluation frameworks

Synergies with WCRP initiatives

- CORDEX : analyse CMIP6 simulations (e.g. MCSs across regions)
- ANDEX & mountain regions: link modelling with field campaigns (WG I)
- Explore anthropogenic influences on HIPS

DYAMOND3

Cess-Potter Uniform +4K Experiments



GPEX WG4 : Capacity Development, Community Engagement

Building a global, inclusive precipitation community from science to services

Community & communication

- Launch GPEX newsletter & enhanced web presence
- Improve visibility, branding and stakeholder engagement
- Develop knowledge-sharing platforms (e.g. Africa precipitation hub) with WGI

Data & infrastructure support

- Compile AWS metadata and regional observation inventories
- Facilitate access to regional datasets for research and applications
- Connect with WMO and partners on observing infrastructure

Capacity development & networks

- Strengthen EMCR engagement and regional participation
- Promote training, knowledge exchange and community building
- Address gaps in underrepresented regions (e.g. Africa, MENA, high mountains)

Partnerships & funding opportunities

- **Advance APN proposal**
- Engage with private sector on capacity development
- Explore co-development of tools, data access and training activities





GPEX Flagship Activity- APN CAPaBLE PROJECT PROPOSAL

Establishing a Regional Alliance for Extreme Precipitation Observation:
Coordinated Capacity Development and Quality Management of
High-Resolution Automatic Weather Stations in South Asia

- Thematic areas: Climate; Risk and resilience
- Priority Topic: Climate change adaptation, losses and damages, and the impacts of extreme events
- Countries: Japan, Bhutan, Nepal, Bangladesh, India, U.S.A

SUMMARY

- **Strengthen sub-daily rainfall observation networks** across South Asia by assessing current AWS and rain-gauge systems and identifying key gaps.
- **Develop practical guidelines** for station operation, maintenance, calibration, and quality control to improve data reliability.
- **Build regional technical capacity** through workshops, site visits, and knowledge exchange for early-career researchers, technicians, and local stakeholders.
- **Integrate gauge observations with radar, satellite, and reanalysis data** to enhance monitoring of extreme rainfall events.
- **Support early warning systems and climate risk planning** by improving detection and estimation of intense precipitation.
- **Establish the foundation for a long-term regional collaboration** on high-resolution rainfall monitoring and cross-border research cooperation.



Fundraising activities

- GPEX has initiated **targeted resource mobilisation efforts**, with increasing engagement from both public and private sector partners, enabling a shift from research outputs toward impact-oriented outcomes.
- Development of **potential research collaborations co-funded by private sector partners**, supporting innovation and applied outcomes (e.g. data validation, AI-based products)
- Growing interest from private sector stakeholders to support **capacity building, training, and data access initiatives**
- Exploration of funding opportunities aligned with the **Years of Precipitation (YoP)** framework, including support for coordinated field campaigns and regional activities meetings with national government funding agencies.

WCRP

World Climate
Research Programme



WORLD
METEOROLOGICAL
ORGANIZATION



unesco
Intergovernmental
Oceanographic
Commission



International
Science Council

GPEX- Future plans and priorities

Over the next year, GPEX will move into a focused development and coordination phase, building on the outcomes of the Kyoto workshop and SSG discussions to advance the implementation of the GPEX Science Plan and prepare for the WCRP Years of Precipitation (2028–2030).

The emphasis will be on strengthening scientific coordination across observations, data, and modelling, while expanding partnerships to support coherent and impactful programme implementation.

This includes:

- **Operationalising the Years of Precipitation (2028–2030)**
→ Align and coordinate global & regional field campaigns across key precipitation systems
- **Strengthening the observation- data- modelling link**
→ Connect field campaigns, datasets, and model evaluation through coordinated case studies
- **Addressing key science gaps**
→ Improve understanding and modelling of extremes, high-frequency processes, and regional variability
- **Advancing data & benchmarking**
→ Multi-source datasets (satellite, in situ), intercomparison, and common evaluation frameworks
- **Enhancing coordination with partners (internal e.g. GEWEX, ESMO, CORDEX etc. and external)**
→ Build on existing platforms, avoid duplication, maximise impact
- **Building community & capacity**
→ Regional engagement, data access and knowledge sharing
- **Expanding partnerships**
→ NMHSs, space agencies, research institutions, and targeted private-sector engagement

WCRP

World Climate
Research Programme



WORLD
METEOROLOGICAL
ORGANIZATION



unesco
intergovernmental
Oceanographic
Commission



International
Science Council

GPEX- Suggestions, issues or challenges

Ambition vs resources

→ GPEX (and YoP) is highly ambitious in scope and will require sustained and coordinated support

Need for early institutional backing

→ Initial seed funding and strategic support from the JSC are critical to demonstrate commitment, partnerships and external resources

Strengthening links with WMO and operational frameworks

→ Clearer alignment with WMO structures and programmes needed to maximise impact and relevance

Sustaining partnerships

→ Continued engagement with agencies, funders, and partners is essential to maintain momentum and delivery

WCRP

World Climate
Research Programme







Thank you

Stay tuned for upcoming developments and
progress from GPEX



WCRP
Lighthouse
Activities

Global Precipitation
EXperiment
(GPEX)