The World Weather Research Programme

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WWRP Implementation Plan 2024- 2027

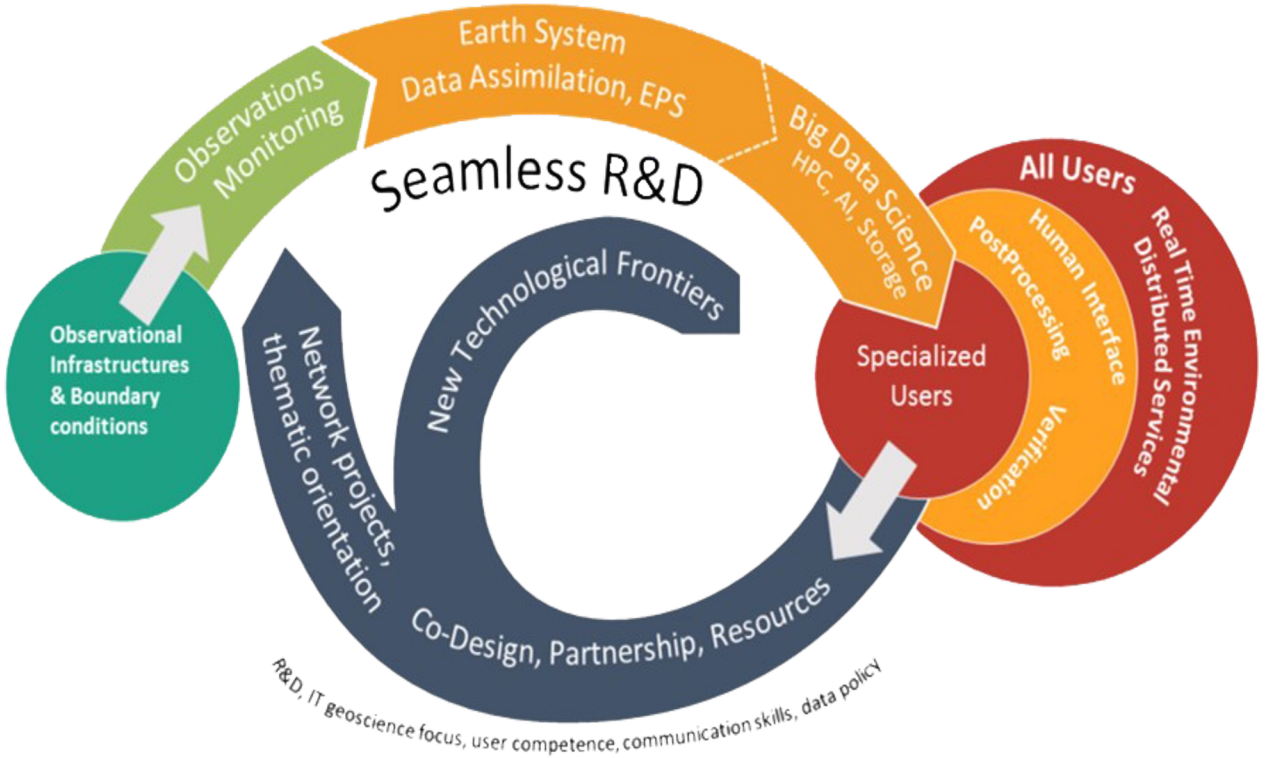
Goals

Advance Earth-system Science for Services, minutes to months

Enhance the warning process in a changing climate

Quantify, reduce and communicate prediction uncertainty

The Value Cycle Approach



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Our Activities

AWAR3E
Advancing Weather Research to Reduce Risk to Societies

- Nowcasting and Mesoscale Research
- Data Assimilation and Observing Systems
- Forecast Verification Research
- Predictability, Dynamics and Ensemble Forecasting
- Tropical Meteorology Research
- Societal and Economic Research Applications
- Expert Team on Weather Modification

Working Groups

Projects

- InPRHA
- ADVANCE
- SAGE
- URBAN (2025)
- PCAPS
- PEOPLE

Ending in 2025

Sciences for Services Projects

- Tropical Cyclones - RDP (through 2025)
- Aviation RDP (through 2025)

~35 endorsed projects

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WWRP WORLD WEATHER RESEARCH PROGRAMME

Urban PREDICT

Developing and integrating ultra-high-resolution weather hazard forecasting for enhances preparedness and response in diverse urban settings

Key activities

- Selected case studies for urban cities
- Model intercomparison
- Multi-actor workshops to evaluate the findings and build trust
- Collaborative/co-creative multi-hazard vulnerability maps

https://wwrp-urbanpredict.net/

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WWRP WORLD WEATHER RESEARCH PROGRAMME

InPRHA

Integrated Prediction of Precipitation and Hydrology for Early Actions

wpo.noaa.gov/inprha

Research Article in BAMS: 10.1175/BAMS-D-24-0332.1

Advance Research on Developing Multi-Hazard Flood Forecasting Systems for Early Warning From Minutes to Days

Integrating precipitation and hydrological predictions, and social sciences.

InPRHA project Goals

Goal 1

Engage with the diverse international communities of researchers, forecasters, practitioners and other stakeholders

Goal 2

Foster collaboration between research and operations towards better services, within national meteorological and hydrological services (NMHSs) and beyond

Goal 3

Bring together knowledge from different disciplines (meteorology, hydrology and the social sciences) and cultures, with particular consideration for the most vulnerable and least developed communities

Goal 4

Rethink the flood warning process, in a non-stationary system, by taking into account anthropogenic influences and changes on climate, land and water, as well as societal interactions, considerations and perception

PCAPS

POLAR COUPLED ANALYSIS AND PREDICTION FOR SERVICES

Aims at improved prediction services for the polar region

https://www.wwrp-pcaps.net/

Improving coupled weather and climate forecasting models, as well as on increasing the understanding of user requirements (user groups, products, timeliness, access, and scale)

Project Goals

- Advance scientific knowledge of the Earth system
- Enhance the science-for-service value cycle to ensure that scientific and technological advances improve predictive capabilities and analysi
- Advance and contribute to policy-relevant science

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Progressing EW4All Oriented to Partnerships and Local Engagement

https://wmo-people.du.ac.bd/

- To develop a set of characteristics and typologies for anticipatory risk governance for sustainable and equitable early warning systems for all.
- **To** identify barriers and enablers of socially inclusive early warning systems
- To identify context-appropriate approaches that can sustain actionable early warning systems that adapt to reflect the changing environmental and social risk context

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Agriculture
Energy
Disaster Risk Reduction
Health

Advance our understanding of how and where sub-seasonal to seasonal forecast information is and can be used to support decision-making

Advance our understanding of the skill and uncertainty and their sources

Develop methods for incorporating sub-seasonal forecasts and their associated uncertainty into decision-making and evaluating the worth of forecast information

Develop the community of scientists and practitioners who can advance the use of sub-seasonal to seasonal forecasts in decision-making

Existing/Possible Connections with WGNE

- **JWGFVR:** Verification of AI models in operational centres workshop (October 2025), WP-MIP
- **PDEF, DAOS, TMR, JWGFVR:** Contributions to Weather Predictions through WP-MIP
- **NMR:** WIPPS pilot project assisting the implementation of experimental AI-based nowcasting solutions (lightning and rainfall) in developing countries (or data-sparse regions)
- **InPRHA:** Contributions through projects and joint initiatives, e.g., pilot project AI flood forecasting SC-HYD (SERCOM) and ensemble inundation forecasting methods using AI for rapid inundation mapping
- **PCAPS**
  - **Verification Task Team (next slide)**
  - **AI-based sea-ice forecasting**, ORCAS Task Team anticipates producing a report by mid-2026 summarizing optimal observation and model data types, formats, and resolutions for AI model development and evaluation.
- **Urban-PREDICT:** The feasibility of sub-km-scale NWP; uses of ML for prediction with diverse data streams
- **SAGE:** Predictability in the coupled system for weeks 2-5.

PCAPS Verification Task Team

📍 Advance operational verification practices over Antarctic and Arctic regions

🗣️ Regular discussions on recent weather verification results from forecasting centres

🔄 Protocol for exchanging sea-ice verification scores

📊 Identification of baseline verification-reference products and uncertainty assessment

🧪 Development of diagnostics capturing model coupling, resolution, and extremes

👥 Co-development of user-focused verification for precipitation, clouds, visibility, wind

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