

EIGHTH MEETING OF THE PACIFIC METEOROLOGICAL COUNCIL

PMC-8

Nuku'alofa, Tonga • 10, 11, 14 September 2026

Eighth Meeting of the Pacific Meteorological Council (PMC-8)

Weather Ready for a Secured and Sustainable Pacific

10, 11, 14 September 2026 | Nuku'alofa, Tonga

Agenda Item 23.2: Artificial Intelligence

Purpose:

1. To provide information on WMO implementation of AI, as well as AI's potential application across the early warnings value cycle.

Objectives:

1. To provide background information on AI in meteorological services.
2. To provide information on integration of AI into WMO global observations, data processing and forecasting infrastructure as well as AI's potential application across the early warnings value cycle in the context of the Early Warnings For All initiative.

Background:

1. Artificial Intelligence (AI) is rapidly transforming weather, climate, hydrological and environmental prediction services. Recent advances in machine learning and data-driven prediction systems have demonstrated significant potential to complement conventional numerical weather prediction (NWP) approaches, improve forecast accuracy, increase computational efficiency, and expand access to forecasting capabilities for Members with limited resources. The World Meteorological Organization (WMO) has therefore been actively exploring opportunities and challenges associated with AI adoption across the entire weather, climate and water value cycle.
2. Since 2023, WMO has undertaken a broad range of AI-related activities, including the establishment of expert groups, pilot projects, international consultations, and governance mechanisms. Key milestones include the initiation of WIPPS AI pilot projects in 2023, the publication of recommendations from the Research Board Task Team on Artificial Intelligence for Weather (AI4Wx), the organization of the first WMO AI Conference in 2025, and the establishment of the Joint Advisory Group on Artificial Intelligence (JAG-AI) in 2025. These activities have helped WMO develop a coordinated approach to supporting Members in the responsible adoption of AI technologies.
3. The WMO Research Board Task Team on AI4Wx examined emerging AI developments and provided recommendations to support scientific advancement, operational implementation and capacity development. The Task Team highlighted the benefits of integrating AI technologies into operational meteorology while emphasizing the importance of verification, interoperability, workforce development, equitable access and robust observational networks

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4. To evaluate the operational use of AI, WMO and its partners have established a series of pilot projects under the WMO Integrated Processing and Prediction System (WIPPS). These projects include:

- AI for Nowcasting Pilot Project (AINPP);
- Weather Prediction Model Intercomparison Project (WP-MIP);
- AI Weather Quest;
- AI Applications in Tropical Cyclone Analysis and Prediction; and
- Global Riverine Flood Prediction Pilot Project.

These initiatives bring together National Meteorological and Hydrological Services (NMHSs), research institutions and private-sector organizations to assess the performance of AI-based forecasting systems across multiple timescales and geographical regions. Initial results indicate that AI-based forecasting techniques can provide valuable complementary guidance and, in certain applications, achieve performance comparable to or exceeding traditional forecasting approaches.

5. Recognizing both the opportunities and challenges associated with AI, WMO established the Joint Advisory Group on Artificial Intelligence (JAG-AI) to coordinate AI-related activities and provide strategic guidance to Members. The work of JAG-AI is focused on five areas:
 - Verification, interoperability and standards;
 - Capacity, skills and infrastructure;
 - Authority, trust and accountability;
 - Data reciprocity and sustainability; and
 - Partnerships and collaboration with the private sector and academia
6. WMO has also initiated consultations on AI governance to advance equitable access to AI technologies and ensure that AI applications remain consistent with the authoritative role of NMHSs. Particular attention is being given to transparency, accountability, sustainable data exchange, and the continued maintenance of global observing systems that provide the foundation for AI-driven forecasting
7. A key priority is capacity development. WMO is developing an AI Training Action Plan that will provide an AI learning framework for operational meteorology, quality-assured training resources, and mechanisms to keep learning materials current as technologies evolve. WMO continues to encourage participation from Members, research institutions and operational centres in AI pilot projects and verification activities, recognizing that common evaluation frameworks and standards will be essential for the responsible and effective operational use of AI.
8. The increasing availability of AI tools presents significant opportunities for Pacific Island Members, particularly those facing capacity and infrastructure constraints. Through collaboration, knowledge sharing, pilot projects and targeted training programmes, WMO aims to ensure that all Members can benefit from emerging AI technologies while maintaining trusted and authoritative meteorological, hydrological and climate services

AI and Early Warnings

9. In July 2026, a joint report was launched by WMO, ITU, UNDRR and IFRC under the Early Warnings For All initiative that summarises how AI can potentially be leveraged to enhance multi-

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hazard early warning systems. The report is available at <https://www.itu.int/en/ITU-D/Emergency-Telecommunications/Pages/Publications/ai-ew4all-report.aspx>. It demonstrates AI's potential to address existing gaps in EWS and to make the systems more effective, resilient, and inclusive.

10. The report builds on the work of the AI for EW4All Group and allows policymakers, humanitarian partners, and local leaders to leverage emerging technology for protecting lives and livelihoods. Besides highlighting concrete solutions and pilots, the report emphasizes that AI is not a solution in isolation but requires strong infrastructure, partnerships, and a human-centered and responsible approach.
11. The report argues that AI can strengthen the entire early warning value cycle by (1) enhancing disaster risk knowledge, (2) improving hazard detection and forecasting, (3) enabling more targeted and inclusive warning dissemination, and (4) supporting preparedness and anticipatory action. Across these stages, AI processes large and diverse datasets to improve risk assessments, delivers faster and more accurate forecasts, tailors warning messages to different populations, and optimizes decision-making for early action. Realizing these benefits depends on high-quality data, interoperable systems, robust governance, transparency, and human oversight to address biases, data gaps, limited connectivity, and uncertainty.
12. The report also argues that future investment should therefore prioritize end-to-end or integrated, community-centred, and ethically deployed AI solutions that connect the entire early warning value cycle.

Recommendations:

The Meeting is invited to:

- I. **Note** the significant progress made by WMO in assessing, developing and coordinating the use of Artificial Intelligence for weather, climate, hydrological and environmental prediction and services.
 - II. **Recognize** the opportunities offered by AI to strengthen forecasting capabilities, improve service delivery and support the implementation of Early Warnings for All, particularly in Small Island Developing States and capacity-constrained Members.
 - III. **Note** the importance of high-quality input observations, good governance, and human oversight of the use of AI processes.
 - IV. **Request** WMO, regional partners and development partners to continue supporting capacity development, technical assistance and infrastructure enhancement to facilitate equitable access to AI technologies across the Pacific region.
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