Highlights of OCP-6 on AI

EC-79, 17/6/2025

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Adoption of Open Principles

- Are the <mark>core of the WMO success story</mark>, well demonstrated in World Weather Watch;

- The rationale behind WMO`s Unified Data Policy;

- Access to open data <mark>unleashed innovation</mark> in the academy and private sector, the public databases and the reanalysis data sets are <mark>feeding the AI revolution</mark>. The research and industry ecosystems are in need of open, reliable data feeds, which are a benefit from the public investments;

- In the Tropics we often have scarcity of in-situ measurements and hence special importance to availability of open satellite data sets together with more efficient data assimilation analysis technology;

- Data needs of the AI systems go beyond only typical/traditional weather data sets (such as ERA5) - atmospheric composition, sea-ice, land and other related data sets have recently demonstrated ability to improve predictions;

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Adoption of Open Principles (Cont.)

- Open Science principles adopted by the industry in recent years <mark>allowed the exponential evolution in AI</mark> – publications in peer reviewed journals, open source codes;

- The European Meteorological Infrastructure effort – joint efforts of ECMWF, EUMETNET & EUMETSAT – demonstrates the power of the open approach. An example of operational global AI model, the Anemoi framework allowing "forecast-in-a-box" open source software (the AI model and the viewer) available to all;

- The FuXi short and medium Model includes a comprehensive set of essential meteorological variables and is available as open source on Github since 2023, which <mark>enables its utilization across various sectors</mark> like wind and solar energy, aviation, marine shipping etc.;

- Needed for trust and accountability – essential attributes for operational use;

- To be trustworthy we need – <mark>transparency, traceability, interpretability, objective evaluation/ routine verification;</mark>

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Adoption of Open Principles (Cont.)

- Private players recognize the importance of transparency and openness in technological advancements. At the same time, the materials they share are designed to ==strike a balance==— providing sufficient detail to demonstrate the depth of their research and the effectiveness of their solutions, while ==protecting the intellectual investments== that drive continued innovation in addressing weather and climate-related challenges.

Supporting small NMHSs / Global South

- **"The democratization promise":** The AI technology is an opportunity for the least developed/developing world to "leap frog" and reach quickly to enhanced predictive capabilities, using the latest science and technology, without a need of substantial computational burden and building extensive scientific teams. Combining Local knowledge and data can also improve the model customization and adaptation to least developed/developing world;

- ECMWF/Met. Norway/Malawi BRIS **pilot project– example of how the promise could be realized**: the training is performed on extensive computational resources of the global North and the operational run will be done through modest resources in the Tropics, local expertise/know-how will be integrated with global expertise through joint co-design & capacity building through dedicated training;

- **The Tropics is a region where the training data set may be inferior** – lack of sustainable in-situ observations, lack of high-resolution re-analysis. Investment in these directions may be needed to materialize the AI promise to its full extent in these regions;

- Possible modality that could assist countries that lack the ability to maintain modern data centres might be the use of cloud platforms; Shanghai Academy and CMA promote all-in-one service on such platforms;

- **Knowledge transfer/ training is essential** to enhance the capabilities and allow proper local adaptation and appropriate use of the new technologies;

Roles of NMHSs; Public/Private working modalities

- The new technology reshapes how and in some cases by whom forecasts are produced, ==this calls all players to adapt== to new modalities and for developing proper framework to optimize this;

- Private sector may be more agile and embrace innovations faster, public institutions invest in establishing infrastructure that creates the huge data sets needed for the AI algorithms and are serving wide range of different users – ==a joint effort== has the potential to improve the lives of billions;

- The big Tech. companies expressed their wish to ==help unlock the potential of AI and support the greater public good== – to help adaptation, to save life and property, to empower people and organizations across the planet.

- Up-to-now, both the Academia and the big Tech. companies made various efforts to ==work closely with NMHSs and the WMO.== The NMHSs brought into the partnership their meteorological/ hydrological knowledge/expertise (and data sets) and the Academy / High-Tech companies brought the AI/ML expertise;

- ==The WIPPS pilot project== concept is a win-win Public-Private partnership modality, allowing innovation to grow and to prototype new solutions. Such joint exploration of the technology should be encouraged;

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Public/Private working modalities (Cont.)

- The private sector understands the value of ==working with trusted agencies and respecting their mandates==;

- The public sector will need ==sustainability and transparency commitments== from the industry in order to integrate the new tools into operations. Contribution of non-traditional sources to WIPPS will be able only under such commitments;

- The public and private sectors have ==complementary roles== – public entities are the nation's trusted public service for safety-critical decisions and act as the single authoritative voice for weather warnings. On the other hand, private companies are more consumer and business-focused, providing customized insights for decision-making and daily life. Private companies also help amplify the warnings from NMHSs by further distributing those alerts to consumers and businesses within their countries.

- Collaboration between public and private sectors is essential to enhance public safety and maximize the impact of weather information, with the greatest value achieved when each brings its unique strengths to the partnership.

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Public/Private working modalities (Cont.)

- AI/ML holds the possibility not only to improve the prediction, but also the decision-making process, that is – one can design end-to-end AI/ML solution. This holds a promise on one hand but also may conflict with the Single Authoritative Voice principle. Ethical considerations need to be discussed together to address these challenges;

- It might be beneficial to all sectors to establish a joint coordination body to have open continuous discussion and elaboration of joint principles (a "CGMS-like" coordination mechanism);