WMO Artificial Intelligence for Disaster Risk Reduction and WMO's support for the Focus Group

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WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

WMO OMM
World Meteorological Organization
Organisation météorologique mondiale

AI:
AI for Natural Disaster Management
ITU Focus Group

World Meteorological Organization (WMO)

- WMO originated 1950 from the International Meteorological Organization, established 1873

- Since then, WMO is a UN specialized agency and the UN authoritative voice for weather, climate, water and environmental services

- WMO facilitates free & unrestricted exchange of data & services in real- or near-real time related to safety and security of society, economic welfare and protection of the environment

- In 1988, WMO together with the United Nations Environment Programme (UNEP) created the Intergovernmental Panel on Climate Change (IPCC)

WMO Vision, Mission, Objectives and Strategy

VISION 2030	By 2030, we see a world where all nations, especially the most vulnerable, are more resilient to the socioeconomic consequences of extreme weather, climate, water and other environmental events; and underpin their sustainable development through the best possible services, whether over land, at sea or in the air *(and in space)*		

OVERARCHING PRIORITIES	Preparedness for, and reducing losses from hydrometeorological extremes	Climate-smart decision-making to build resilience and adaptation to climate risk	Socioeconomic value of weather, climate, hydrological and related environmental services
CORE VALUES	**Accountability** for Results and **Transparency**	**Collaboration** and **Partnership**	**Inclusiveness** and **Diversity**

LONG-TERM GOALS

1 Services	**2** Infrastructures	**3** Science & Innovations	**4** Member Services	**5** Smart Organization
Better serve societal needs	**Enhance Earth system observations and predictions**	**Advance targeted research**	**Close the capacity gap**	**Strategic realignment of structure and programmes**

STRATEGIC OBJECTIVES

FOCUSED ON 2020-23

• Strengthen **national multi-hazard early warning/alert systems** • Broaden provision of **policy- and decision-supporting climate, water** and **weather services**	• Optimize **observation data acquisition** • Improve access to, exchange and management of **Earth system observation data and products** • Enable access and use of **numerical analysis and prediction products**	• Advance **scientific knowledge of the Earth system** • Enhance **science-for-service value chain** to improve predictive capabilities • Advance **policy-relevant science**	• Enable developing countries to **provide** and **utilize essential weather, climate, hydrological** and related **environmental services** • Develop and sustain **core competencies** and **expertise** • Scale up **partnerships**	• Optimize WMO **constituent body structure** • Streamline WMO **programmes** • Advance **equal, effective** and **inclusive participation**

Rapidly changing big data landscape

- Met Office is investing in data infrastructure
- Needed to enable our big-data to be effectively used
- This cloud-based platform is critical to our purpose:
  'Helping you make better decisions to stay safe and thrive'

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The perspectives widens, given the increase of data and data handling:

- Handling the I/O of an Earth System Model on exascale machines
- Handling data for data exchange
- Broad access & dissemination (supporting AI)

- How best to make use of these infrastructures to support the access to and delivery of weather and climate information to all and leave no one behind?

THE EUROPEAN WEATHER CLOUD

ECMWF and EUMETSAT have joined forces to set up a distributed Cloud Computing infrastructure to serve the European Meteorological Infrastructure and its users.

AI – Defining a scope for the WMO

- WMO coordinates a global programme of surface-based and satellite observations
  → **AI** offers potential to combine data of different resolutions, levels of quality/completeness, different reference systems and different formats

  → **AI** offers potential for the *entire value chain*, from combining observation screening, post-processing, bias correction to intelligent analytics for quality better operational forecasting & applications

- **AI** can lead to dissemination optimization with data following *FAIR* (Findability, Accessibility, Interoperability and Reusability) with clear guidance on best practices

- **AI** in combination with other tools can enhance situational awareness of natural hazards worldwide and help *Disaster Risk Reduction*

AI – Defining a scope for Disaster Risk Reduction

- The WMO **Disaster Risk Reduction Programme** and **Multi-Hazard Early Warning System** assist countries in protecting lives, livelihoods and property from natural hazards and strengthening meteorological support to humanitarian operations for disaster preparedness

- **AI can help through**
  - → **enhanced accuracy** in extreme weather forecasts, early warning of disasters and improved preparedness

  - → **reduced disaster risks** with systematic efforts to analyze and reduce the causal factors of disasters

  - → **reduced exposure to hazards**, lessening vulnerability of people and property, wise management of the environment and better communication for decision makers and public

 - → **advanced disaster management** that will leave no one behind
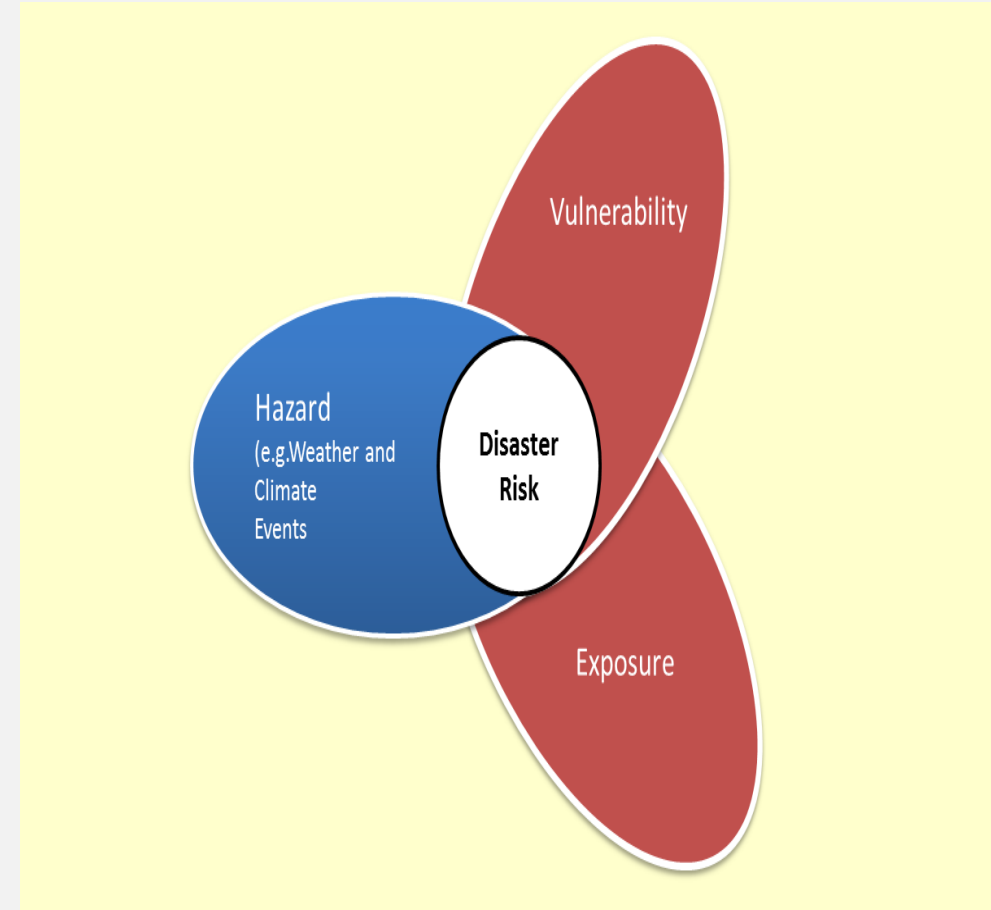
Ethical considerations

- Develop a framework that considers human and ecological vulnerabilities

- Identify data biases (e.g. if collecting data from cell phones consider what subset of the population owns a cell phone)

- Train algorithms to interpret data following an ethical framework that considers minority and vulnerable populations

- Consider decision and decision makers and whose value is optimized

- Promote diverse development teams to better ensure various contexts are taken into account
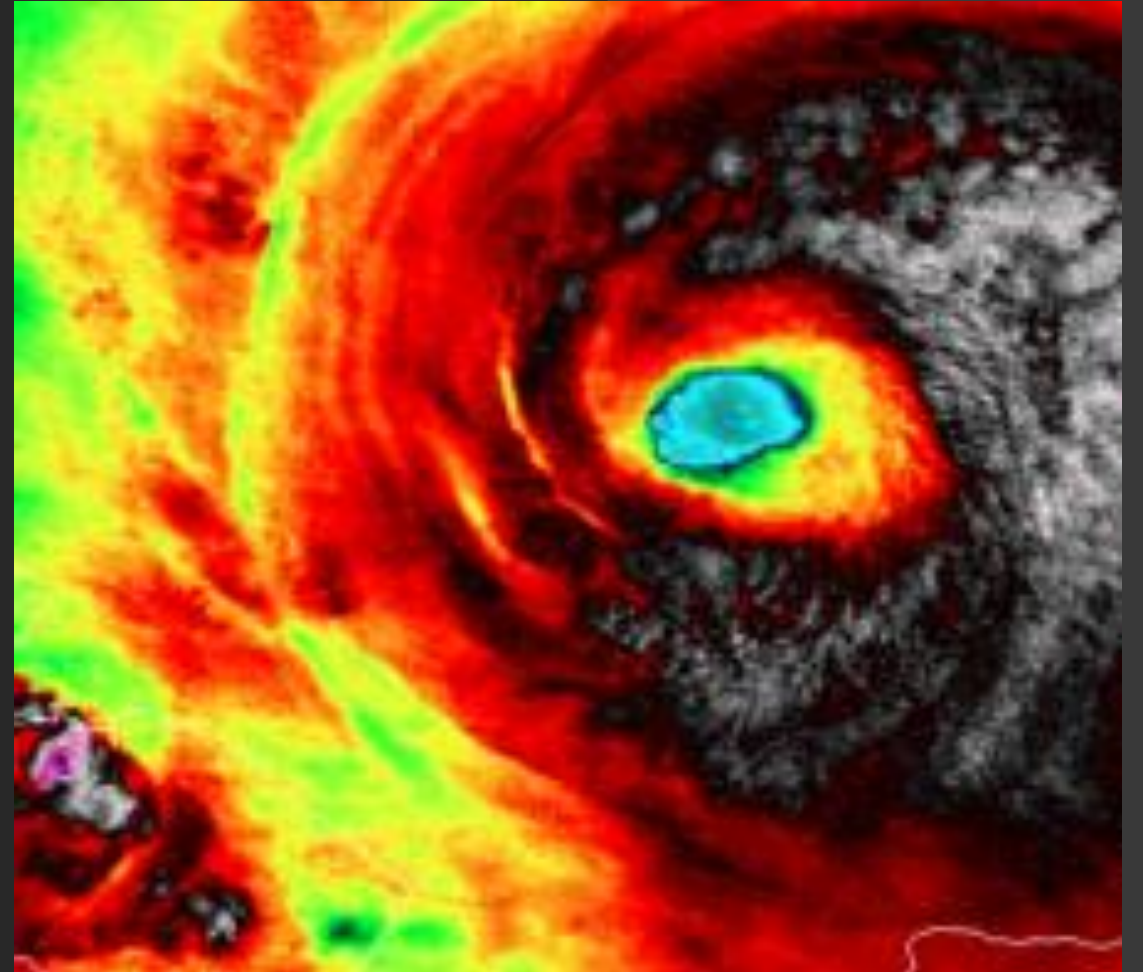
Importance for WMO to be involved in the Focus Group on *'AI for Natural Disaster Management'*

- **Because** it supports global efforts to improve our understanding and modelling of natural hazards & disasters

- **Because** it pays attention to the needs of vulnerable and resource-constrained regions which are most impacted by natural hazards and supports their participation

- **Because** it distills emerging best practices to develop a roadmap for international action in AI for natural hazard management and supports disaster risk reduction

- **Because** of its international and interdisciplinary nature to help countries worldwide to improve communication of risks
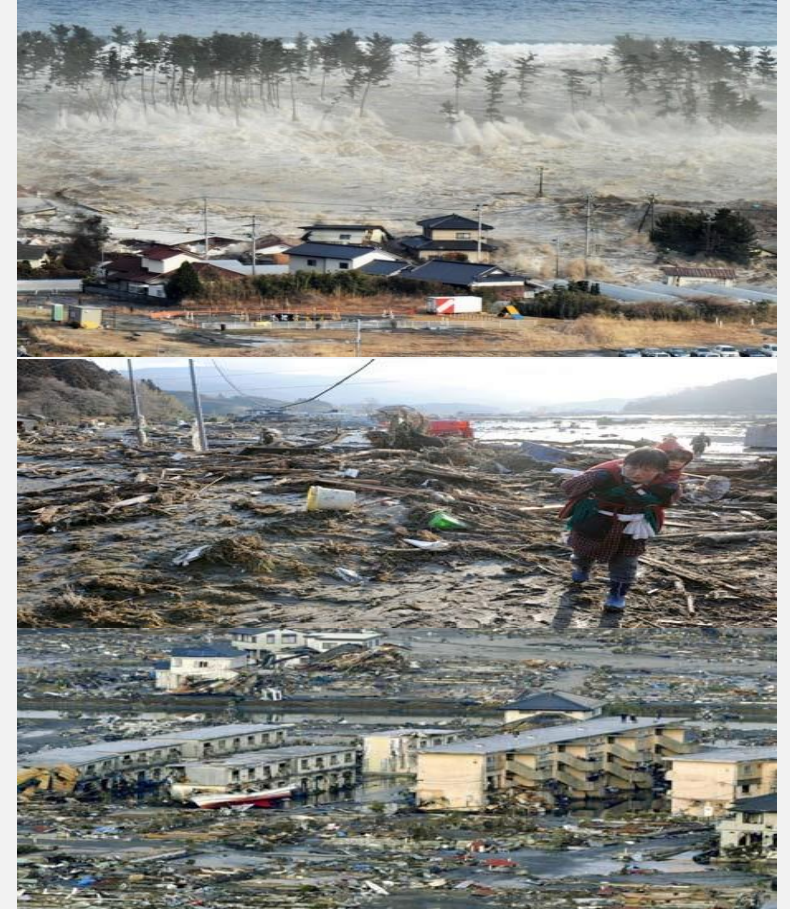
Current WMO involvement in AI and support of the

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- **WMO Task Team on Exascale computing, data handling and Artificial Intelligence (started summer 2020); development of two concept notes**

- **New WMO Scientific Officer Position on AI/big data, hopefully soon to be approved (selection of tentative responsibilities/duties):**

- Performing simulations to quantify the added values of AI related to the characterization and detection of extreme weather, climate, environmental conditions for decision support;

- Engage in public-private partnerships for methodological developments around the exploitation of big data volumes and novel observations for the benefit of public services

- **Support the ITU/WMO focus group on *AI for Natural Disaster Management* through defining requirements & best practices on the use of AI related to natural hazards in SIDs and LDCs**

Thank you very much for your attention

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