Cataloguing Lightning as Natural Hazard: the view of WMO

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DRR at WMO: past and present
### WMO DRR Roadmap - linked with Sendai Framework

<table>
<thead>
<tr>
<th>Core NMHS functions / operations and capacities</th>
<th>Thematic areas of the DRR Programme</th>
<th>Sendai Framework Priorities for Action</th>
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<tbody>
<tr>
<td>Observations, monitoring, data assessment, data management and exchange, data processing, modelling and forecasting (and where possible seamless prediction from nowcasting to decadal projections)</td>
<td>1) Long-term risk assessment (hazard and risk identification, analysis and evaluation) for different scenarios</td>
<td>Understanding disaster risk (Priority 1)</td>
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<td>2) Prevention and mitigation to reduce risks in sectors through structural and non-structural measures</td>
<td>Investing in DRR for resilience (Priority 3)</td>
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<td>3) Preparedness for effective response and recovery through MH-EWS* (impact-based early warning for slow-onset hazards)</td>
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<td>4) Assistance to humanitarian planning (preparedness and recovery)</td>
<td>Enhancing disaster preparedness for effective response, and to “Build Back Better” in recovery, rehabilitation and reconstruction (Priority 4)</td>
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<td>6) Engagement of NMHSs and WMO in DRR governance at different levels</td>
<td>Strengthening disaster risk governance to manage disaster risk (Priority 2)</td>
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**Enablers such as regulatory work (standards, manuals, guidelines, quality management, etc.), capacity development (demonstration projects, training, etc.), partnerships / cooperation and coordination**

*MH-EWS*: Multi-Hazard Early Warning System
Technical Comission Governance

INFCOM

SERCOM

RB

MG

Other SC

SC DRR

SG

MTG

WCM

MIE

GMAS

CHE

GSD
Purpose (ToR from SERCOM to SC-DRR)

✓ **Development and maintenance of WMO normative material** and recommended good practices related to the delivery of services to the general public and government authorities to support informed decision-making related to disaster risk reduction, the protection of life, livelihood, property and environment as well as welfare and well-being of the population as specified in WMO Technical Regulations.

✓ **Assistance to Members** in enhancing their service delivery capabilities and enabling effective implementation and compliance, including through the development of cooperative and supportive frameworks such as the Global Multi-hazard Alert System (GMAS), the WMO Coordination Mechanism (WCM) to better support humanitarian action which will also provide them more visibility and recognition for their contributions in the global agendas;

✓ **Contribution to the science-infrastructure-service value chain** by integration of innovation and progress made by science, including social science, and the application of frontier technologies into enhanced service design and delivery, especially from developing countries - and the integration of this perspective in various WMO Programmes, while also identifying and gathering user requirements possibly needing targeted research and infrastructure development.

✓ **Cooperation and partnerships with external partners** as needed to support Members, in close collaboration with Regional Associations;
Expected Outcomes from Cg-18
14 outcomes were defined and approved by SERCOM at its April 2020 session (five are listed below)

✓ Guide(s) on the Support of National Meteorological and Hydrological Services to their National Multi-hazard Early Warning Procedures, Coordination Mechanisms, Systems and Services - Resolution 16 (Cg-18)

✓ Implementation plan for the WMO-CHE, Resolution 12, (Cg-18)

✓ GMAS framework implementation strategy and plan, Resolution 13 (Cg-18)

✓ Strengthening multi-hazard early warning services in areas prone to all flooding types and severe weather - (Resolution 15 (Cg-18))

✓ Develop WMO Coordination Mechanism (Resolution 14 (Cg-18))
Cataloguing of Hazardous weather, climate, water and space weather events

- The importance of a common and updated terminology on disaster risk reduction was highlighted in The Sendai Framework for Disaster Risk Reduction 2015-2030:

  “to support the implementation, follow-up and review of the this framework through ...leading, in close coordination with States, the update of 2009 Terminology on Disaster Risk Reduction in line with the agreed terminology by States;...” (paragraph 48 c) and “…recommends that the Working Group [comprising experts nominated by Member States] considers the recommendations of the Scientific and Technical Advisory Group on the update of the 2009 UNISDR Terminology on Disaster Risk Reduction by December 2016,...” (Sendai Framework, paragraph 50).
Lightning and Wildfires from the DRR Perspective

Disaster and Disaster Risk

Disaster ➔ Impact

Disaster Risk ➔ Probability

Hazard
LIGHTNING AS A HAZARD
Average yearly counts of lightning per square kilometer

Source: NASA Lightning team
Impacts

Deaths due to lightning/year in Brazil

Source: ELAT/INPE
Lightning over the São Paulo metropolitan area (black polygon).

Maximums are over the urban area of the city.
But....

Lightning can also be used as a framework for disasters monitoring
Ex: Occurrence of floods and flashfloods in Brazil
Storm Detection: 1900 UTC
Start of flood records by CGE: 1950 UTC
Lead time between initiation and flooding: 50 minutes

Microfísica da tempestade
12 de março de 2018

Higher concentration of flooding points in a shorter period of time... maybe convection decreases and liquid precipitation processes predominate
intensification of the updraft between 0300 and 0310 UTD
Jump of flash: from 110 to 310 in 10min. 
jump anticipates the severe event

decrease in updraft: lesser support of hydrometeors within the cloud.
Important questions will help and guide our next steps:

➢ Are data on the lightning impacts useful for policy makers and managers?

➢ How can we effectively disseminate information, and incorporate this knowledge into policies and practices?

➢ What Guides should be developed for Support of National Meteorological and Hydrological Services to their National Multi-hazard Early Warning Procedures?