CGMS-49

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WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

WMO Unified Policy for the International Exchange of Earth System Data

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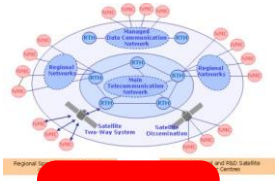
World Meteorological Organization
Organisation météorologique mondiale

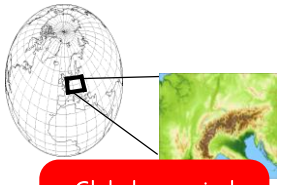
The meteorological value chain

Activities underpinning all weather and climate-related activities; this can ONLY be implemented globally

Weather and climate observations



International exchange of observations



Global numerical weather predition (NWP) for weather and climate

All links in the chain must operate effectively in order to yield success

Activities implemented and undertaken primarily at a national level

Effective decision-making based on climate services

Dissemination and outreach to people and sectors

Weather forecasts, early warnings and climate products and services to users

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Global numerical weather prediction (NWP) for weather and climate

NWP: Enabling USD 132B annual world-wide economic benefits of weather prediction (*Kull et al., 2021*)

- **Assessing NWP quality:** Both skill (forecast quality) and range (useful future extent of prediction) objectively defined and measured
- Rule of thumb: Each hour of forecast range worth USD 800M/year to global economy
- **Global NWP** systems used also for reanalysis: Reprocessing of multi-year sequences of past weather events using historical observations
- **Reanalysis:** Primary source of information about **climate, climate change; basis for climate prediction, projection and adaptation**
- **Reanalysis quality** measured same way as weather prediction quality, i.e. **same observations needed** to improve both climate monitoring and weather prediction

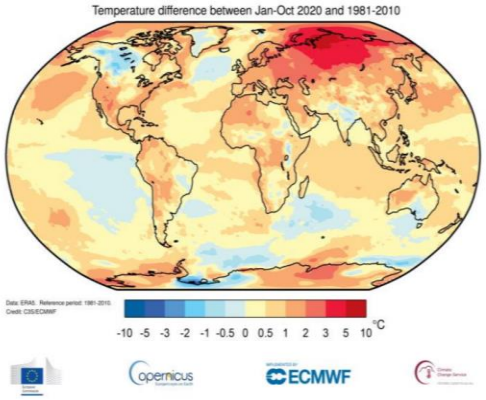

Figure 2: Temperature anomalies relative to the 1981-2010 long-term average from the ERA5 reanalysis for January to October 2020. Credit: Copernicus Climate Change Service, ECMWF.

International exchange of data is a major purpose of WMO
(WMO Convention, Art. 2 b)

What does it take to do this?

I. **Requirements and gap analysis;**
   - *WMO Technical Commissions and their working structures; RRR*

II. **Outreach and advocacy** – analyzing and explaining benefits of data exchange to stakeholders;
   - *All of WMO; Experts, TCs, RAs, EC, Congress, SG,…;*

III. **Data policy** – general commitment of national governments to exchange certain data for certain purpose(s);
   - ***E.g. WMO Res. 40, 25, 60; new draft WMO data policy resolution;***

IV. **Regulatory material** – agreement on specifics of data exchange (what, when, where, how, …);
   - *E.g. GBON provisions, approved by WMO Infrastructure Commission last week;*

V. **Financial and technical support if needed**; capacity development;
   - *E.g. CREWS, SOFF; WMO with development and climate finance institutions, ….*

Structure of draft data policy resolution

(Annex to draft Recommendation 3.1(4)/1/EC-73)

I. Preamble

- *(Noting …, Considering …, Acknowledging …,)*

II. Action section *(”Congress decides to …,”)*

- **Policy statement;**
- **Practice to be adopted;**
- Requests to Technical Commissions, Regional Associations, Secretary General, …

III. Annexes

1. Discipline and Domain-specific Practice for *Core* and *Recommended* Data (weather, climate, hydrology, ocean, atmospheric composition, cryosphere, space weather);
2. Guidelines to Members on Application of WMO Data Policy
3. Guidelines on the Application of Data Policy in Public-Private Engagement
4. Terms and Definitions

Current (May 2021) draft of core policy statement

The Congress {…}

- **Agrees to have one unified data policy for all WMO domains and disciplines**;
- **Decides** that the scope of the data policy shall cover Earth system data exchanged among Members under the auspices of the WMO Convention and decisions of the Congress, as described in Annex 1 and Annex 4 of this resolution and specified in detail in the WMO Technical Regulations;
- **Adopts the following policy on the international exchange of Earth-system data:**
- ***As a fundamental principle of the World Meteorological Organization (WMO) and in consonance with the expanding requirements for its scientific and technical expertise, WMO commits itself to broadening and enhancing the free and unrestricted international exchange of Earth-system data;***
- **Agrees further** to maintain a two-tiered approach to the international exchange of Earth-System data, via the following practice:

(1) Members shall provide on a free and unrestricted basis *core* data that are necessary for the provision of services in support of the protection of life and property and for the well-being of all nations, at a minimum those data described in Annex 1 to this resolution which are required to monitor and predict seamlessly and accurately weather, climate, water and related environmental conditions,

(2) Members should also provide the *recommended* data that are required to support Earth system monitoring and prediction activities at the global, regional and national levels and to further assist other Members with the provision of weather, climate, water and related environmental services in their States and Territories. Conditions may be placed on the use of recommended data;

- **Agrees also** that Members should provide without charge access to all recommended data exchanged under the auspices of WMO to public research and education communities, for their non-commercial activities;

Key changes from Resolution 40

Resolution 40; 1995

1. Covers weather data only;
2. Two main categories of data:
- *Essential* (*shall* be exchanged);
- *Additional* (*should* be exchanged);
3. Specific "*essential*" datasets listed directly in Annex I to the resolution (with some reference also to RBSN);
4. "*Free and unrestricted*" exchange (term not defined in the Resolution);
5. Covers exchange of data between NMHSs

Draft recommendation 3.1(4)/1

1. Covers all WMO Earth system data: weather, climate, hydrology, ...
2. Two main categories of data:
- *Core* (*shall* be exchanged);
- *Recommended;* (*should* be exchanged);
3. Specifics on *core* and *recommended* data referred to Technical Regulations, primarily Manuals on WIGOS, GDPFS;
4. "*Free and unrestricted*" exchange (term defined directly in the Resolution, literal interpretation);
5. Addressed to Members, but covers exchange of data between all partners, inclucing private sector, academia, etc.

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"Free and unrestricted exchange"

- **What does it mean?**
  - Per Annex 4**:** *"Free and unrestricted means available for use, re-use and sharing without charge and with no conditions on use[1]";*
- **Background**
  - Programs and systems such as WIGOS, WIS, GCW, GAW, S-GDPFS, that include both users and data providers outside the NMHSs, cannot be implemented via a "closed" data exchange;
  - Socioeconomic benefits of open data exchange fully demonstrated in many studies; only way to ensure maximum benefit to all Members, including protection of life and property;
  - Emergence of global NWP as core underpinning capability has demonstrated the need for fully global exchange of both observations and model output;
  - Research and operational communities are inextricably linked; two-way data exchange is essential;
  - Private sector now major data user and data provider; clear rules needed for public and private sectors to thrive and benefit mutually;

[1]*Requests for attribution not considered a condition; attribution recommended*

Expected benefits for WMO Members

- Access to a vastly increased pool of Earth system data (observations, model fields and other types of data) from other Members and partners
  - Increased data exchange will result in improved data quality, both models and observations;
  - Opportunity for all Members to improve and extent the range of their services to national constituencies:
- Expectation to increase exchange of their own data with other Members and external partners
- Opportunity to strengthen national role in coordination around acquisition and use of Earth system data
- Better defined and mutually beneficial relationship between public and private sectors

Expectations on Members if/when Unified Data Policy adopted by Congress

- **The WMO Unified Data Policy will not in and of itself lead to any immediate new obligations to exchange large volumes of data; this will only happens a Technical Regulations are amended and updated, subject to approval by future Congress sessions;**
  - However, the groups of users with whom data are exchanged will be broadened significantly;
- Safeguard for Members ("Acknowledging" in draft Congress resolution):

  7) *The right of governments, having done their utmost to implement the decisions of Congress, to, based on their national laws and policies, choose the manner by, and the extent to which, they make data available domestically or for international exchange, while still understanding that without reciprocity, international data exchange cannot be sustained,*

Per INFCOM-1(III), draft recommendation 5.1.5/1

- **Members will be kept informed about consequences of new Data Policy and any changes to Technical Regulations prior to adoption by Congress:**

{… the Commission}

- ***Decides*** *to develop an initial list of Earth system data to be exchanged as core data under the new policy, and to provide this list to WMO Congress along with the draft WMO Unified Data Policy,*
- ***Decides further*** *to, in consultation with SERCOM and other relevant WMO bodies, develop a process to maintain and update the list of Earth system data to be exchanged as core data under the data policy, according to the further development of WMO regulatory material,*

Specifically on satellite data in the draft WMO Data Policy Resolution:

- Vital importance of satellite data to WMO now clearly recognized in draft text (this was not prominent in Res. 40);
- The concept of ***core satellite data*** is framed primarily in terms of importance to global NWP, consistent with guidance from CM-14 and CGMS-47, and for nowcasting and related warnings and advisories;
- No specific satellite datasets are listed as neither core nor recommended in current draft of policy; this is referred to the Manual on WIGOS;
  - Work to be done in collaboration with satellite operators, after the adoption of the policy resolution by Congress;
- No particular position regarding provision of observational data by private sector (the policy is addressed to national governments of WMO Members and cannot dictate what private sector entities should or should not do);
- Reflecting guidance provided by the WMO Data Conference, exchange of ***core data is*** considered mandatory, irrespective of data origin;

WMO Data Policy versus WMO Regulatory Material

- **Data policy** establishes purpose and scope of data exchange; broad agreements and guidelines
  - Approved by Congress, and discussed in detail by Congress;
  - Aimed at governments, NMHSs and external partners in academia, private sector and elsewhere;
  - Infrequent updates (e.g. Res. 40, adopted in 1995);
  - Relatively little technical detail on which datasets or how;

- **Regulatory material** (WMO Technical Regulations, including Manuals) specifies how data policy is implemented;
  - Proposed by Technical Commissions, approved by Congress, but not typically discussed in detail by Congress;
  - Aimed at technical implementers (e.g. NMHS Obs. Departments);
  - Routinely updated, typically every Congress;
  - Detailed specifications of standard and recommended practices for observations and other data covered by the policy;

For some of the data types listed in Annex I to the draft data policy resolution, detailed Technical Regulations already exist, but for many data types these still need to be developed as requirements and agreements mature.

Next steps

- EC-73 *(June 2021);*
- Distribution of draft text (six languages) to all Members for comments *(July 2021);*
- **WMO Extraordinary Congress *(October 2021);***

- Activities outlined om Data Policy outreach plan developed by SG-DIP and Secretariat to be pursued in parallel
  - Development of communication and outreach material
  - Data Conference follow-up (Stakeholder consultations);
  - Regional consultations (August/September)
  - Bilateral discussions with Members (as requested);