WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

Status and adequacy of data exchange and data policy for atmospheric composition data

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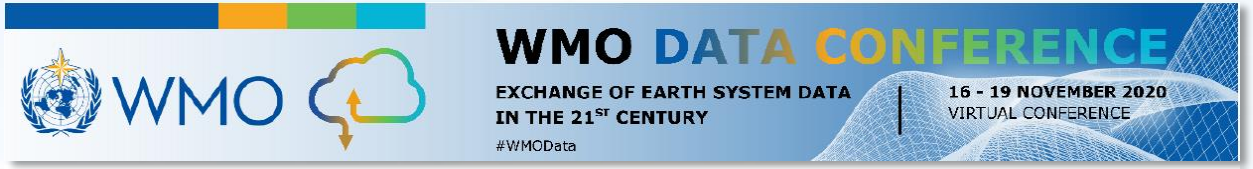
WMO OMM
World Meteorological Organization
Organisation météorologique mondiale



Theme 2 Online Stakeholder Consultation-2: Research data and WMO Data Policy

21 October 2020 - 14h00 to 16h00 CET

Origin of atmospheric composition data

- Observations
  - Satellite-based
    - NASA, ESA, JAXA, …
  - Surface-based
    - In-situ, land-based, ships, aircraft
    - Remote-sensing

- Models
  - Global, Regional, Local
  - Assimilation, reanalysis, verification
  - Weather, climate
  - Chemistry/transport
  - …

Satellite-based observations

- Generally very open data policies
- NASA

Data and Information Policy

NASA promotes the full and open sharing of all data with research and applications communities, private industry, academia, and the general public.

https://earthdata.nasa.gov/collaborate/open-data-services-and-software

- ESA Sentinel
  - Requires acknowledgment of source

https://sentinel.esa.int/documents/247904/690755/Sentinel_Data_Legal_Notice

- JAXA/NIES/MOE on GOSAT/GOSAT-2
  - free for non-commercial use
  - Requires acknowledgment of source

☑ Any publication of outcomes obtained in consequence of the use of the data must be accompanied by any one of the following indications.
JAXA/NIES/MOE
Japan Aerospace Exploration Agency / National Institute for Environmental Studies / Ministry of the Environment
Check here to indicate that you agree to the GOSAT/GOSAT-2 Data Policy.

If you agree with the above, the GOSAT data does not require any offers of co-authorship.

Download

Surface-based observations

- Data ownership complex
  - Inter-governmental organizations
    - WMO, EEA, EMEP, ICOS, ACTRIS, …
  - National governmental institutions
    - EPAs, NADP, NOAA ESRL, NASA, …
  - Other public and academic institutions
    - AGAGE, TCCON, NDACC, EANET, Aeronet, Shadoz, …
  - Private/commercial activities
    - EarthNetworks, …
- Data stewardship distributed
  - GAW World Data Centres
  - Program-specific data archives
  - Regional and national data archives
- Data policies for publicly funded observations generally fairly open

Example: Global Atmosphere Watch

- Program-wide, open and fair use policy, to which all providers and users must agree
  - Co-authorship in case of substantial use
  - Acknowledgment is required
- Applicable to all GAW WDCs, displayed on WDC websites

Box 11. Data-use policy of Global Atmosphere Watch

Use of data obtained from one of the WMO/GAW World Data Centres is subject to the following statement endorsed by the WMO Executive Council/Committee on Atmospheric Sciences (EC/CAS) Panel of Experts Working Group on Environmental Pollution and Atmospheric Chemistry [*WMO*, 2001a]:

"For scientific purposes, access to these [GAW] data is unlimited and provided without charge. By their use you accept that an offer of co-authorship will be made through personal contact with the data providers or owners whenever substantial use is made of their data. In all cases, an acknowledgment must be made to the data providers or owners and to the data centre when these data are used within a publication."

Source: GAW Report No. 172

Assertion

Open data policy in combination with data licences *enable rigorous scientific inquiry* and *maximize the value of data* for use in services in support of very many social benefit areas.

Corollary

WMO needs to engage systematically in making meteorological, climatological, hydrological, environmental data as F.A.I.R. as possible.

Data Policy vs. Data Licence

- «**Data policies are norms** regulating management and publication of [research] data. They range from recommendations to enforcements. There is much variation in their scope and content across countries and across disciplines in single countries.»
  http://www.ifdo.org/open-accessdata-policies/
- «A **licence agreement** is a **legal arrangement** between the creator/depositor of the data set and the data repository, signifying what a user is allowed to do with the data.»
  https://www.cessda.eu/Training/Training-Resources/Library/Data-Management-Expert-Guide/6.-Archive-Publish/Publishing-with-CESSDA-archives/Licensing-your-data

F.A.I.R. Data Principles

- 15 principles to make data
  - **F.indable,**
  - **A.ccessible,**
  - **I.nteroperable**
  - **R.e-usable**
    - […]
    - R1.1. (meta)data are released with a clear and accessible data usage license.
    - […]
- Published 2016 in https://www.nature.com/articles/sdata201618
- Developed to support data-intensive applications

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→ Gaining traction, leading to more wide-spread use of licenses

Boundaries of openness

viii. Open data should be the default position for publicly funded science. Exceptions should be limited to issues of privacy, safety, security and to commercial use in the public interest. Proposed exceptions should be justified on a case-by-case basis and not as blanket exclusions.

Reference: Science International (2015): Open Data in a Big Data World. Paris: International Council for Science (ICSU), International Social Science Council (ISSC), The World Academy of Sciences (TWAS), InterAcademy Partnership (IAP), www.icsu.org/science-international

Conclusions

- Atmospheric composition observations range from legally required to scientifically driven, but almost exclusively publicly funded
- Ownership of data divers
- Different but similar data policies in place
  - Mostly based on ‘open and fair exchange’
  - Data licences dominated by Creative Commons (CC)

- An updated WMO policy must endorse F.A.I.R. principles and support licences to protect IPR.
- GAW supports an open, fair use data policy.
- Atmospheric composition research needs free access to hi-res weather data!

Does the community have access to the operational data that it needs to carry out its work?

- Atmospheric composition data are not always available
  - In particular, LDCs (least developed countries) often lack the monitoring capacity.
  - AQ or climate data from more sensitive regions can still be restricted.
- Meteorological data of sufficiently high temporal resolution are not always easily available.
- Both types of data are not always F.A.I.R.
  - Not all data are published to international data archives, or only with great delays.
  - Data are available in different formats at different archives, which raises the bar on their useability.

What research data are required by the diverse services providers to further advance their services and [what] data policy [should be] associated with such exchange?

- Data on greenhouse and reactive gases; aerosols; ozone precursors; radiation; clouds and total deposition data … with higher spatial and temporal resolution and adequate metadata.
- Access to high resolution meteorological information to drive atmospheric transport and process models.

- Data policies should be F.A.I.R. and include licenses to protect IPR.

How is the current WMO Data policy accepted/perceived within the research community and how to create incentives for more harmonized/compatible data policy between research and operational communities?

- Current policy is well accepted, but missing clear guidance on licences
- Community policies are already fairly well aligned with WMO policy

- Incorporate the F.A.I.R. principles and licences into WMO data policy
- Substitute the existing GAW data policy with the (new) WMO policy
- Some researchers rely on a «first user» paradigm to data to get funding based on their publication record. Data citations may help to alleviate concerns to «give away» their data.