

Weather radar data requirements for climate monitoring

AOPC Task Team on the use of weather radar for climate studies

Member of TT Radar: Andreas Becker, Germany, Katja Friedrich, USA, Rainer Hollmann, Germany, Elena Saltikoff, Finland, Bernard Urban, France, Caterina Tassone, WMO

Overview of talk

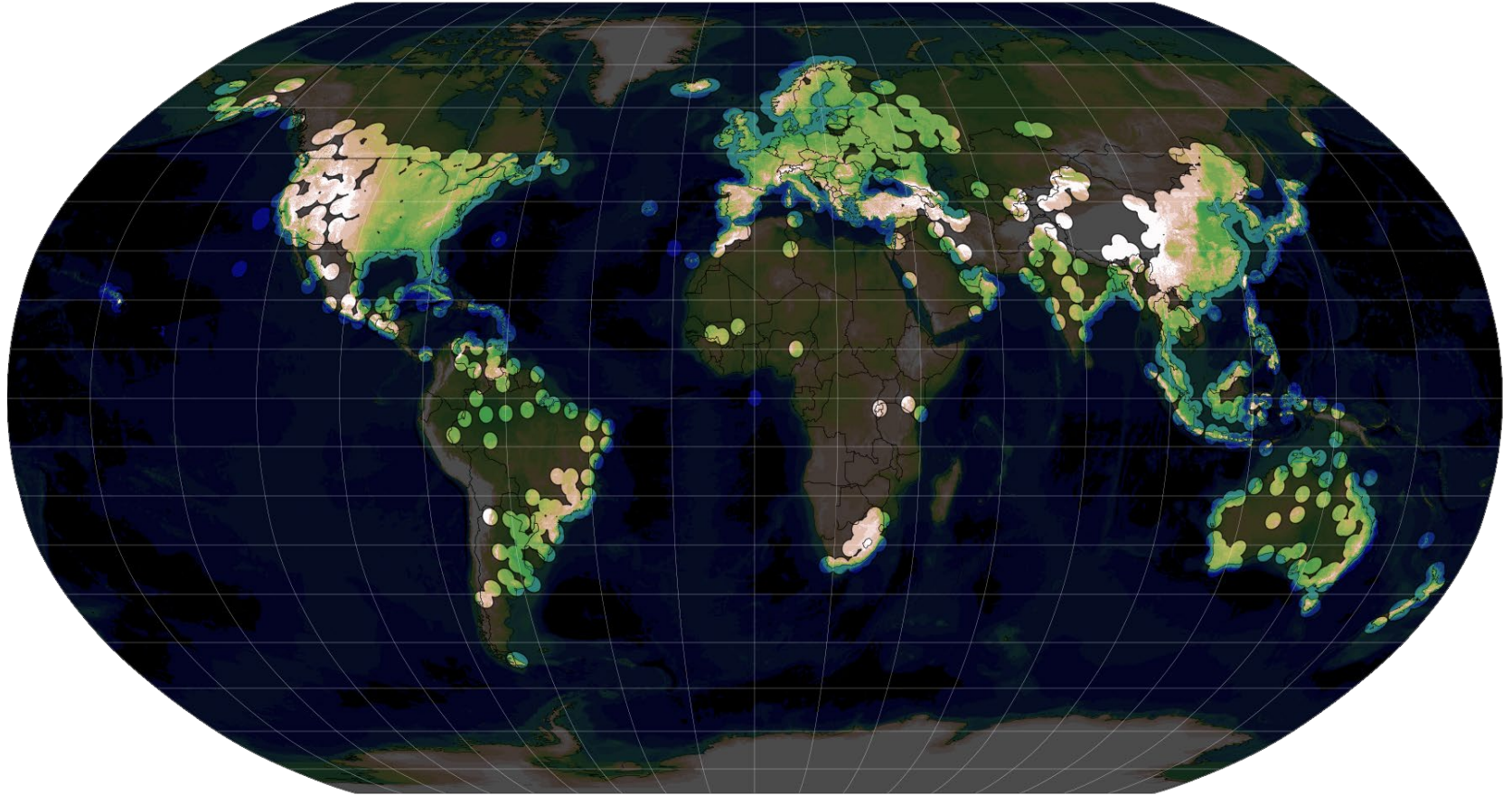
- Objectives of TT
- Recommendations
- Summary and next steps

TT objectives

Terms of reference for TT

- Define weather radar data requirements for climate monitoring, define relevant metadata, and define best practices. Propose key parameters to be used for climate monitoring. **Identify procedures** for quality control of radar data specifically **for climate applications**.
- Archives: Assess the status of **existing international and national archives**, including their accessibility, extent and quality.
- Provide guidance **how to organize** proper and standardized **storage and user interface of local radar data and metadata** for eventual reprocessing at a later stage to support climate monitoring.
- Suggest **procedures for handling historical data**.
- Raise awareness and promote co-ordination of use of radar data for climate monitoring.

weather radar coverage in the world



A map of weather radar coverage in the world (in Robinson projection). Most radar locations included in this map have been retrieved from a WMO database (WMO, 2019) Additional radar locations have been added for China (manually digitized from WMO, 2013), the Philippines, Vietnam, and Myanmar (personal communication).

Summary Results

The task team has working on several topics (GCOS-223)

- **What should be saved?**
- **Inventory of existing archives**
- **Guidance how to facilitate user access and preservation of data**
- **Recommendation how to handle historical data**
- **A manuscript for BAMS and or WMO Bulletin to raise awareness is being submitted**



Words from the comments of owners of log time series

Recommendations (I)

- 1. Key radar parameter:** the most important key radar parameter is horizontal reflectivity, ZH, which is the basis of precipitation estimates. The other key radar parameters are radial velocity (VRAD), spectrum width (WRAD), differential Reflectivity (ZDR), correlation Coefficient (RhoHV) and differential phase (PhiDP) and are important to improve the quality of precipitation estimates as well as independent variables related to mesoscale phenomena. It is recommended to save these key parameters as three-dimensional Level 2 data. This allows homogenization of the time series when more advanced methodologies are developed and supports studies related to three-dimensional structure of the atmosphere.
- 2. Metadata:** mandatory metadata parameters for radar data for use in climate are as defined by IPET-OWR (Annex 1). We recommend that metadata includes the history of hardware and algorithm changes so that data can be processed in the future;
- 3. Quality control:** quality control of radar data is mandatory for climate application and should be recorded in the documentation. We recommend that the radar community agrees on a terminology which also includes metadata elements and quality control terms.

Recommendations (II)

4. Historical data: when handling historical data, the goal is to preserve and document historic data for the next decades and make sure is usable to the current and next generation of researchers.

- Three tasks are important when handling historical weather radar:
 - Inventory
 - data rescue
 - analysis.

(We recommend an interdisciplinary team composed by a scientist, an IT specialist and a professional in digital archiving, for planning the entire project.)

Recommendations (III)

5. **We recommend to establish an international portal** to allow
 - harmonized access to radar data, metadata and documentation,
 - should start with a proof of concept structure.
 - adopt a standard open data format (e.g. ODIM, H5 or CfRadial) and a widely used data access protocol.
6. **Reprocessing and data rescue activities** should build on experiences and lessons learned from other similar projects, e.g. in the context of satellite data archives.

AOPC is invited to discuss recommendations and decide on way forward.

Next steps

AOPC is invited to discuss recommendations and decide on way forward.



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