

3.11 POTENTIAL FOR USE OF RADAR DATA FOR CLIMATE MONITORING

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Many NMHSes have now archives of over 10 years of radar data, and there is growing need to use this data also for climate monitoring. This implies an additional archival and documentation requirement on top of those that had been addressed for the canonical use of radar systems for real-time purposes like warning.

Through WMO and GCOS a Task Team has been initiated leading discussions between climate researchers and radar experts, and preparing recommendations for mandatory and suitable data and metadata to be archived for climate monitoring purposes. This serves the baseline information to develop accepted guidelines and standards, with a view on the rather limited lifetimes of radar systems being shorter than those of stations and the characteristic climate time scale of 30yrs. Therefore it is essential to keep not only the metadata describing the latest hardware and processing, but also a history of important hardware changes such as from non-Doppler to Doppler radars to allow for a full retrieval of the essential information also decades after the measurements had been taken and to avoid false interpretations of apparent trends which come from changes in equipment, not changes in climate.

The phenomena to be monitored with weather radars include in addition to precipitation also severe mesoscale phenomena such as hailstorms and tornadoes e.g., Becker 2013, Brimelow 2004, Chen 2012, Grams 2012, Lukach 2017, Nisi 2015, Punge 2016

The central parameter is horizontal reflectivity, ZH, which is basis of precipitation estimates. The other key parameters have importance for improving the quality of precipitation estimates and as independent variables for process and climate studies. As for the extreme precipitation, radar systems are the only instruments that can claim to fully resolve and fetch the scale of such meteorological events giving their unique capacity to study their developments during the first decades where climate change impacts the hydrometeorology.

The team is proposing a recommendation to save the Level 2 data (dBZ, not mm, and volumes, not images) to allow later reprocessing with more advanced methods. For this, the team prepared also example tables for metadata parameters.

References

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