



Contribution ID: 44

Type: **Poster presentation**

Targeted observations using dropsondes

Dropsondes are small sensor packages, which are released from aircraft to provide targeted observations for pressure, temperature, humidity, and winds, for operational forecasting and research. The vast majority of dropsondes are launched into severe storms, where they provide essential observations about the state and development of the storm. These observations have a significant impact on the forecast quality of these systems, since a number of other remote sensing instruments do not provide adequate observations and models are poorly constrained in these extreme situations.

Due to data formats and metadata restrictions, some information content is lost and may affect the use of the observations in models, which is a problem shared with radiosondes and some other in situ sensing instruments. The transition to the BUFR format is a significant improvement, but some limitations remain.

The development of dropsondes is heavily driven by forecasting needs, yet little information is available about these needs. The development of instrumental uncertainties as part of the data products has been pioneered by the GCOS Reference Upper Air Network for radiosondes and is an essential tool to characterize the quality of observations. Developing these uncertainties is very resource intensive and may, in parts, be justified by the added value for models and forecasting. Systematic biases such as dry bias issues seen in the past on radiosondes and dropsondes may negatively affect models. Closer cooperation between models and instrument developers may reduce the occurrence of instrumental issues.

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Track Classification: Workshop: Observational campaigns for better weather forecasts