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*Documentation for NRC **Bulk Properties: Nevzorov Probe Data** release in the WINTRE-MIX flight campaign 2022*

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Ver. 1.0

Data level: 2 (“Derived geophysical variables with limited corrections applied”)

Data from the NRC Nevzorov hot-wire probe, acquired on NRC M300 data acquisition system at 1 Hz rate, processed and packaged in NetCDF format.

Data Usage Disclaimer: Data distribution and data use for publications follow the data policy agreed upon by the NRC and the University of Albany. We request that the NRC is notified for any data distribution to 3rd parties before the public release date.

Nevozorv Instrument description:

The Nevzorov (Figure 1) provides bulk water content quantities. The LWC sensor of the Nevozorv is cylindrical and foreward facing. The solid ice particles break away but liquid droplets will create a film and evaporate on contact. The TWC sensor of the Nevzorov has a cone geometry, allowing all water to be captured and evaporated.

The Nevzorov has reference wires with similar aerodynamics to the aforementioned LWC and TWC sensor wires, but these are shielded from both liquid water and ice.

Figure 1. The Nevzorov, installed on NRC Convair-580 aircraft in starboard scalar boom (ssb) location.

General notes:

Nevzorov hotwire probe was installed on NRC's Convair-580 research aircraft to collect bulk cloud properties data during the WINTRE-MIX flights. The data accompanying this document includes processed measurements. This document provides information about the time of operation, and an estimate of collected data quality.

- The release contains datasets from the following instrument:
  - Nevzorov hotwire cloud water content probe: sensor head #301, (Korolev et al., 2003)
- Data acquired in February-March 2022 during the WINTRE-MIX campaign, based out of Ottawa International Airport.

Nevzorov data acquisition during the WINTRE-MIX campaign

Table 1. Summary of data quality per flight

IOP #	NRC flight #	Nezorov
IOP1	F01	
IOP3	F02	
IOP4	F03	
IOP5	F04	
IOP7	F05	
IOP8	F06	
IOP9 (1st flight)	F07	
IOP9 (2nd flight)	F08	
IOP10	F09	

Good, **Questionable**, **Bad**, **instrument OFF**

Data files

Format: Dataset is provided in the NETCDF4 format.

Variables:

- Liquid water content of clouds in [g/m3] from the NRC Nevzorov LWC and TWC sensors.
- Total (ice plus liquid) water content of clouds in [g/m3] from the NRC Nevzorov LWC and TWC sensors.

Processing:

Nevzorov probe data was processed with NRC Nevzorov Processing code, as outlined below.

1. Clear air baseline of dissipated power ('dry term') on each collector wire was calculated via an estimation from ambient parameters (pressure, temperature, air speed), with fitting per flight. Uncertainty of baseline calculations is estimated to be within 0.01 [g/m3].
2. Upon removing the baseline, conversion from power units to LWC and TWC was implemented according to Nevzorov user manual (SkyPhysTech Inc.). Corrections on cloud phase and residual effects of ice or water have been applied in this version. Corrections on collection efficiency have not been applied.
3. No data quality flagging is provided in this version.

Data Quality: No filtering or corrections have been applied to the data. This includes, but is not limited to, ‘dry term’ baseline, collection efficiency, artifacts due to icing on the probe etc.

Examples of bulk measurements during the WINTRE-MIX campaign

Figure 2 shows examples of bulk measurements made between 02:00 and 06:29 during flight 1 (IOP01) on Feb. 03, 2022. The blue and red lines indicate Nevzorov total water content and Nevzorov Liquid water content, respectively.

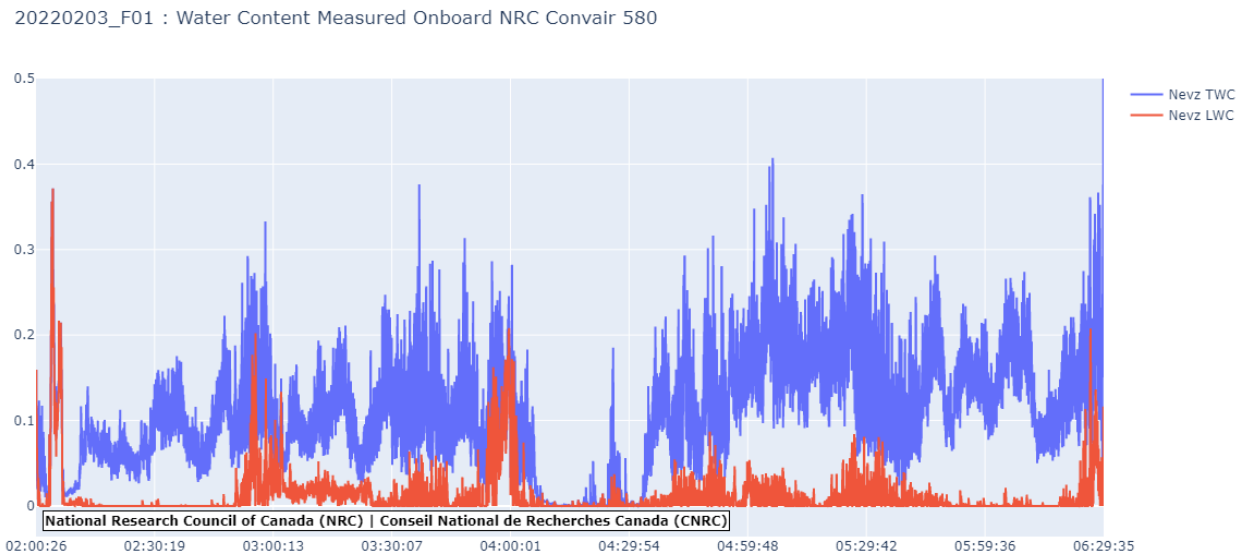

Figure 2: Nevzorov total water content (blue) and liquid water content (red) during flight 1 on Feb. 03, 2022.

References

- Korolev, A.V., Isaac, G.A., Cober, S.G., Strapp, J.W. and Hallett, J., 2003. Microphysical characterization of mixed-phase clouds. Quarterly Journal of the Royal Meteorological Society: A journal of the atmospheric sciences, applied meteorology and physical oceanography, 129(587), pp.39-65.