SnowEx21 Prairie Station Cosmic Ray Neutron Sensor Snow Water Equivalent and Soil Moisture, Version 1 Technical Reference

1 DATA DESCRIPTION

These data contain raw and processed hourly observations from a stationary Hydroinnova cosmic ray neutron sensor (CRNS). Data were collected between 22 November 2020 and 08 May 2021 at the SnowEx Prairie site at the Central Agricultural Research Center (CARC) in Moccasin, Montana and represent a footprint area of approximately 171 meters radius around the instrument. Observations in the raw files include neutron counts, atmospheric pressure, temperature, and relative humidity and related correction factors. These observations were converted to snow water equivalent (SWE) and soil moisture in the processed data files using Desilets, 2017, methodology from Schrön et al., 2017, and in-situ soil moisture samples collected on 06 May 2021 (available as SnowEx21 Prairie Station in Situ Dielectric Soil Moisture and Soil Temperature, Version 1).

1.1 File Information

1.1.1 Format and Organization

The data are available as a single multi-file granule formatted as a compressed `.tgz` file, which contains two `.csv` files and an `.R` file.

1.1.2 Naming Convention

The two data files are named:

`SNEX21_CRNS_SWE_20201122-20210508_raw_v01.0.csv`, and
`SNEX21_CRNS_SWE_20201122-20210508_processed_v01.0.csv`,

where `SNEX21_CRNS_SWE` is the data set short-name, `20201122-20210508` represents the temporal range of data collection, `raw` indicates the raw data file, and `processed` indicates the processed data file.

The `.R` file contains the R code used in data processing. It follows the same naming convention as the date files:

`SNEX21_CRNS_SWE_20201122-20210508_reader_v01.0.R`.

1.2 Spatial Information

1.2.1 Coverage

The data represents a ~171 meters radius around the CRNS instrument, which is located at 47.059422˚ N, 109.955567˚ W.

2 REFERENCES

Desilets, D. 2017. Calibrating a non-invasive cosmic ray soil moisture probe for snow water equivalent, Hydroinnova Technical Document 17-01, https://doi.org/10.5281/zenodo.439105.

Schrön, M., Köhli, M., Scheiffele, L., Iwema, J., Bogena, H. R., Lv, L., Martini, E., Baroni, G., Rosolem, R., Weimar, J., Mai, J., Cuntz, M., Rebmann, C., Oswald, S. E., Dietrich, P., Schmidt, U., and Zacharias, S. 2017. Improving calibration and validation of cosmic-ray neutron sensors in the light of spatial sensitivity, Hydrol. Earth Syst. Sci., 21, 5009–5030, https://doi.org/10.5194/hess-21-5009-2017

3 RELATED DATA SETS

SnowEx at NSIDC | Data Sets

SnowEx21 Prairie Station in Situ Dielectric Soil Moisture and Soil Temperature, Version 1