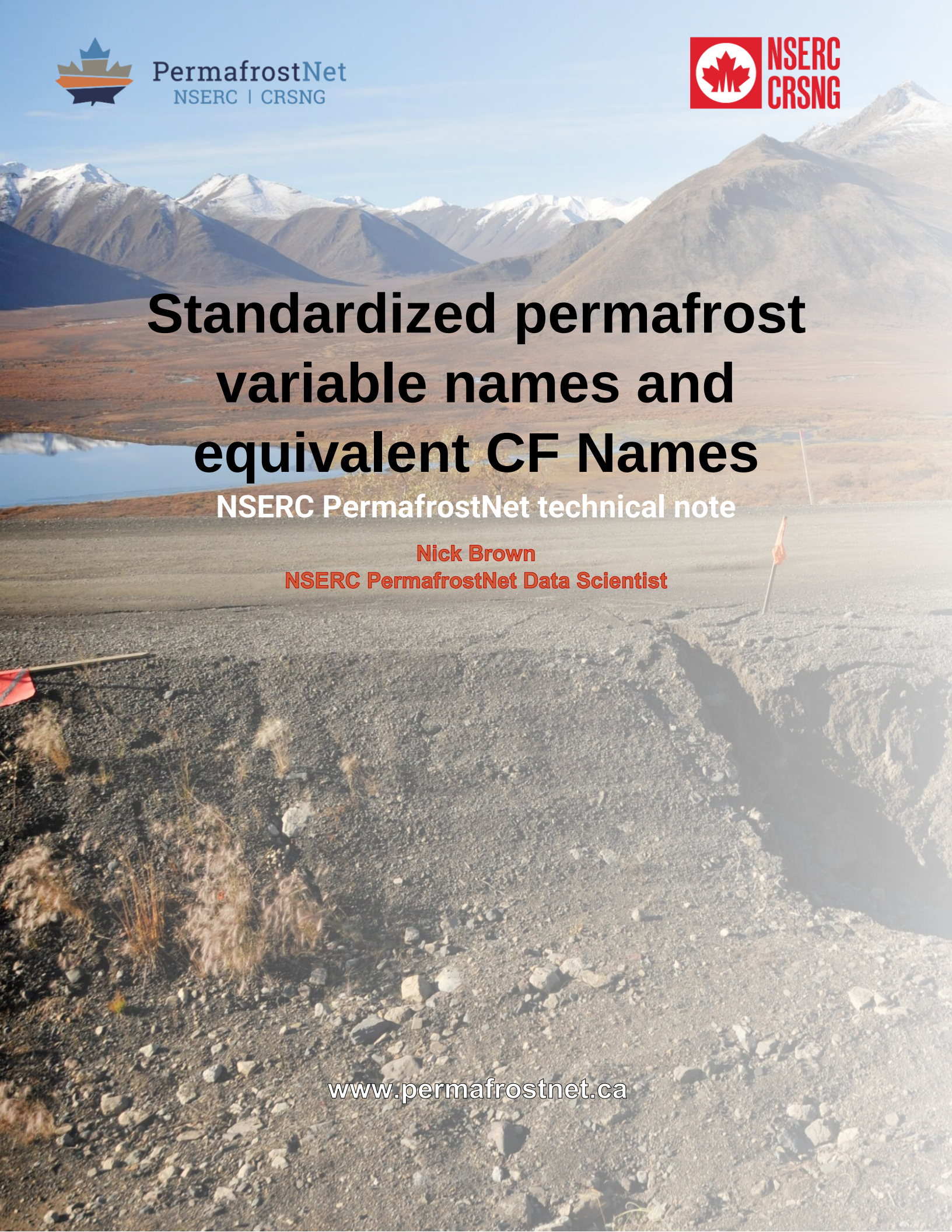

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Standardized permafrost variable names and equivalent CF Names

NSERC PermafrostNet technical note

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Last revision: 2022-06-14

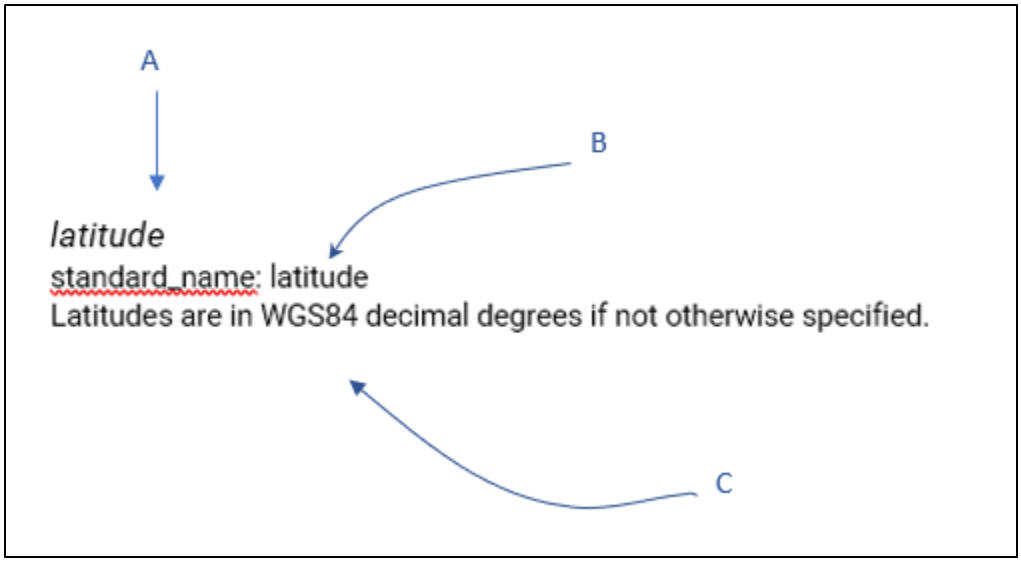
Summary

This note provides documentation for the variable names / column headings on the NSERC PermafrostNet ERDDAP server (https://data.permafrostnet.ca/erddap/). It can also be used as a guide for which CF standard_name to use for commonly-measured permafrost data.

NSERC PermafrostNet Variable Names

The variable names used on the PermafrostNet ERDDAP server are listed here with a brief description. Where available, the associated CF standard_name is also provided. The standard_name is a metadata attribute that uniquely identifies the kind of data that are measured. To see the full description of what each standard_name represents, visit the CF Standard Name Controlled Vocabulary. The standard_name value can be used by anyone accessing the data to search for data of a particular type. Other data providers can also adopt the standard_name to identify, in a machine-readable way, what data are represented in a spreadsheet column of their dataset.

The figure below shows the contents of each entry. The variable name (A) is what shows up as column headers in ERDDAP or in downloaded files. It has been chosen to be relatively short while still being descriptive, with no spaces or special characters. When available the CF standard_name is shown below (B). Finally, a brief description is included (C). This section may also contains information about additional metadata attributes attached to the variable that may be used to provide further information.



Coordinate variables

Each of these variables provide information about the identification or the spatial location of observations.

latitude

standard_name: latitude
Latitudes are in WGS84 decimal degrees if not otherwise specified

longitude
standard_name: longitude
Longitudes are in WGS84 decimal degrees if not otherwise specified

surface_elevation
standard_name: surface_altitude
Elevation of the ground surface at the measurement location.

profile
Used to uniquely identify the profile in situations where multiple datasets are combined and there is not a guarantee that the station name is globally unique. This is recommended to be a combination of the name of the original dataset and the station name.

time
standard_name: time
The time at which the observation was recorded, in ISO:8601 format.

depth_below_ground_surface
standard_name: depth
This variable represents the depth at the midpoint of a discretized measurement interval. The upper and lower bounds of the interval are provided in the depth_bounds variable (in the raw netcdf file) and using the two depth_to_top_of_interval and depth_to_bottom_of_interval on the ERDDAP data server. Note that these variables are also included in the raw netcdf file but are redundant because of the availability of the depth_bounds variable.

top_of_interval
standard_name: depth
This variable provides redundant information to the depth_bounds variable in the original netcdf file. It is provided for two reasons. Firstly, it increases the ease with which data users unfamiliar with netcdf conventions and the bounds attribute can reuse the data. Secondly, the ERDDAP data distribution server is not able to accommodate variables with dimensions that differ from the rest of the data such as the depth_bounds variable. To represent the interval extent on ERDDAP, the depth at the top and bottom of the described interval must be provided explicitly.

bottom_of_interval
standard_name: depth
This variable provides redundant information to the depth_bounds variable in the original netcdf file. It is provided for two reasons. Firstly, it increases the ease with which data users unfamiliar with netcdf conventions and the bounds attribute can reuse the data. Secondly, the ERDDAP data distribution server is not able to accommodate variables with dimensions that differ from the rest of the data such as the depth_bounds variable. To represent the interval extent on ERDDAP, the depth at the top and bottom of the described interval must be provided explicitly.

depth_bounds
This variable is not present in data on the ERDDAP server, but it does exist within the underlying netCDF files to represent the upper- and lower- limit of the depth interval on which geotechnical variables are recorded.

Last revision: 2022-06-14

Data variables

These variables contain observational data. The units of each variable are provided in the metadata.

excess_ice

standard_name:
ice_volume_in_frozen_ground_in_excess_of_pore_volume_in_unfrozen_ground_expressed_as_fraction_of_frozen_ground_volume
The excess ice content of a sample

sand

standard_name: mass_fraction_of_sand_in_soil
The fraction (or percent) of sand by mass. To increase precision, include two metadata attributes for the variable to specify the upper and/or lower limit of particle diameter in mm that are within the category (max_diameter_mm, min_diameter_mm)

silt

standard_name: mass_fraction_of_silt_in_soil
The fraction (or percent) of silt by mass. To increase precision, include two metadata attributes for the variable to specify the upper and lower limit of particle diameter in mm that are within the category (max_diameter_mm, min_diameter_mm)

clay

standard_name: mass_fraction_of_clay_in_soil
The fraction (or percent) of clay by mass. To increase precision, include two metadata attributes for the variable to specify the upper and lower limit of particle diameter in mm that are within the category (max_diameter_mm, min_diameter_mm)

gravel

standard_name: mass_fraction_of_gravel_in_soil
The fraction (or percent) of gravel by mass. To increase precision, include two metadata attributes for the variable to specify the upper and lower limit of particle diameter in mm that are within the category (max_diameter_mm, min_diameter_mm)

ground_ice_class

A classification of ground ice. To provide more detail, include a metadata attribute specifying which classification system is used (classification_system)

liquid_limit

standard_name: soil_liquid_limit
The Atterberg Liquid Limit

plastic_limit

standard_name: soil_plastic_limit
The Atterberg Plastic Limit

soil_ph

standard_name: soil_water_ph
The pH of soil water

materials
The primary classification of the material type (e.g. shale, reworked till, sandy loam). If a known classification system is used (e.g. USC), it is indicated using the 'classification_system' metadata attribute.

materials_description
A description of the materials in the interval. Equivalent to a geological log.

volumetric_moisture
standard_name: volume_fraction_of_condensed_water_in_soil
Volumetric moisture content of a sample measured as v_w / v_s where v_w is the volume of water in the sample and v_s is the total volume of the sample

gravimetric_moisture
Gravimetric moisture content of a sample measured as (w_s – w_d) / w_d where w_s is the weight of the sample and wd is the weight of the dry sample.

visible_ice
standard_name: volume_fraction_of_frozen_water_in_soil
A visual estimate of the volumetric ice content.