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% -- Niwot Ridge Subalpine Forest AmeriFlux Data (site ID: US-NR1) --
%
% File Name: niwot_USNR1_Ttc_YYYY.csv
% File Created by: Sean Burns (sean.burns@colorado.edu)
% File Created for: urquell website
% Date: 24-Sep-2026
% -----
%
% The vertical profile of the thermocouple data from the US-NR1
% AmeriFlux tower is available at:
%
% https://urquell.colorado.edu/data_ameriflux/data_supplemental/data_thermocouple_profile/
%
% the data files are:
%
%-rw-r--r--. 2706092 Sep 24 10:28 niwot_USNR1_Ttc_2004.csv
%-rw-r--r--. 2696851 Sep 24 10:28 niwot_USNR1_Ttc_2005.csv
%-rw-r--r--. 2782617 Sep 24 10:28 niwot_USNR1_Ttc_2006.csv
%-rw-r--r--. 2681721 Sep 24 10:29 niwot_USNR1_Ttc_2007.csv
%-rw-r--r--. 2891962 Sep 24 10:29 niwot_USNR1_Ttc_2008.csv
%-rw-r--r--. 2886318 Sep 24 10:29 niwot_USNR1_Ttc_2009.csv
%-rw-r--r--. 2888239 Sep 24 10:29 niwot_USNR1_Ttc_2010.csv
%-rw-r--r--. 2914025 Sep 24 10:29 niwot_USNR1_Ttc_2011.csv
%-rw-r--r--. 2902855 Sep 24 10:29 niwot_USNR1_Ttc_2012.csv
%-rw-r--r--. 2933301 Sep 24 10:29 niwot_USNR1_Ttc_2013.csv
%-rw-r--r--. 2902102 Sep 24 10:30 niwot_USNR1_Ttc_2014.csv
%-rw-r--r--. 2902006 Sep 24 10:30 niwot_USNR1_Ttc_2015.csv
%-rw-r--r--. 2911298 Sep 24 10:30 niwot_USNR1_Ttc_2016.csv
%-rw-r--r--. 2811247 Sep 24 10:30 niwot_USNR1_Ttc_2017.csv
%-rw-r--r--. 2819483 Sep 24 10:31 niwot_USNR1_Ttc_2018.csv
%-rw-r--r--. 2818714 Sep 24 10:31 niwot_USNR1_Ttc_2019.csv
%-rw-r--r--. 2715862 Sep 24 10:31 niwot_USNR1_Ttc_2020.csv
%-rw-r--r--. 2707514 Sep 24 10:31 niwot_USNR1_Ttc_2021.csv
%-rw-r--r--. 2741422 Sep 24 10:31 niwot_USNR1_Ttc_2022.csv
%-rw-r--r--. 2703058 Sep 24 10:32 niwot_USNR1_Ttc_2023.csv
%-rw-r--r--. 2685295 Sep 24 10:32 niwot_USNR1_Ttc_2024.csv
%-rw-r--r--. 2689479 Sep 24 10:32 niwot_USNR1_Ttc_2025.csv
%
% Notes:
%
% * The reference to use for the thermocouple data is:
%
% Burns, S.P., P.D. Blanken, A.A. Turnipseed, J. Hu, and R.K. Monson,
% 2015: The influence of warm-season precipitation on the diel cycle of
% the surface energy balance and carbon dioxide at a Colorado subalpine
% forest site. Biogeosciences, 12, 7349--7377,
% https://doi.org/10.5194/bg-12-7349-2015
%
% * the thermocouples were originally setup in summer of 2003 in collaboration
% with Jielun Sun from NCAR. Jielun kindly donated these thermocouples and the
% CR23X data logger (NCTC logger) to the US-NR1 site.
%
% Installation Notes:
%
% Tuesday, September 23rd, 2003 Visit:
% -----
% At the site : SpB
%
% * Straightend up the Thermocouples...new hts (measured from the ground):
%
% Niwot Thermocouples:
%
%   Nom.Ht   logger
%   (m)      channel   Note/Change....
%   -----
%   22       12        not changed
%   19       10        Old Location ~ 31cm below current ht.
%   16       11        Old Location ~ 57cm below level.
%   13       9         about the same (no sag)
%   10       4         Old Location, sag ~ 10cm
%   8        3         Old Location, sag ~ 5cm
%   6        2         New ht. ~ 590cm (same as old)
%   4        6         Old ht. ~ 396cm (adj to 400cm)
%   2        5         Old ht. ~ 186.5cm (adj to 200cm)
%   1.46     1         not changed
%   0.96     7         not changed
%   0.49     8         not changed
%
% Also,
```

% Tuesday, September 30th, 2003 Visit:

% -----

% At the site : SpB, BB

%

% (Nominal)

ht (m)	logger channel	Measured Ht (cm)
22	12	2198
19	10	1950 (old level is ~31cm below current)
16	11	1650 (old level is ~57cm below new level)
13	9	1298
10	4	993 (saggin ~10 cm)
8	3	806 (sagging ~ 5cm)
6	2	592
4	6	396
2	5	186.5 --> adjusted to 200 cm
1.46	1	138
0.96	7	90 --> adjusted to 91cm
0.49	8	45 (sagging to ~ 36cm)

% * other details (and photos) of the thermocouples can be found
% on the US-NR1 calendar and logbook webpages:

% <https://urquell.colorado.edu/calendar/>

% https://urquell.colorado.edu/logbook/type_site_visit_entries.html

% * the heights of each sensor for years 2004-2025 is:

% 40cm 91cm 138cm 200cm 396cm 592cm 806cm 993cm 1298cm 1650cm 1950cm 2198cm

% * It is important to realize that the thermocouple temperature is
% NOT the same as air temperature (due to radiative effects on
% the thermocouple measurements). The thermocouple temperature is
% close to the air temperature, but they are not equivalent. Also
% the error will not be constant with elevation (depending on wind
% speed, radiation reaching the sensor, etc). No correction has been
% applied for radiation errors.

% -----

% Columns are:

% 1-6. Year, Month, Day, Hour, Minute, Sec -- in MST, Time Stamp Corresponds to center of Averaging Time Period

% 07. Decimal Day of Year (MST)

	W/m2	25.5m	Incoming Shortwave Radiation	Kipp and Zonen CNR1
% 08. Rsw_in_25m_KZ	degC	21.5m	Aspirated Air Temperature	Vaisala HMP-35D
% 09. Ta_21m	percent	21.5m	Relative Humidity	Vaisala HMP-35D
% 10. RH_21m	degC	0.40m	Thermocouple Temperature	type-E, 0.254 DIA Bare wire.
% 11. T_tc	degC	0.91m	Thermocouple Temperature	type-E, 0.254 DIA Bare wire.
% 12. T_tc	degC	1.38m	Thermocouple Temperature	type-E, 0.254 DIA Bare wire.
% 13. T_tc	degC	2.00m	Thermocouple Temperature	type-E, 0.254 DIA Bare wire.
% 14. T_tc	degC	3.96m	Thermocouple Temperature	type-E, 0.254 DIA Bare wire.
% 15. T_tc	degC	5.92m	Thermocouple Temperature	type-E, 0.254 DIA Bare wire.
% 16. T_tc	degC	8.06m	Thermocouple Temperature	type-E, 0.254 DIA Bare wire.
% 17. T_tc	degC	9.93m	Thermocouple Temperature	type-E, 0.254 DIA Bare wire.
% 18. T_tc	degC	12.98m	Thermocouple Temperature	type-E, 0.254 DIA Bare wire.
% 19. T_tc	degC	16.50m	Thermocouple Temperature	type-E, 0.254 DIA Bare wire.
% 20. T_tc	degC	19.50m	Thermocouple Temperature	type-E, 0.254 DIA Bare wire.
% 21. T_tc	degC	21.98m	Thermocouple Temperature	type-E, 0.254 DIA Bare wire.
% 22. T_tc				

% * Missing data are set to NaN.

% * the number of missing samples for each year and level is:

	40cm	91cm	138cm	200cm	396cm	592cm	806cm	993cm	1298cm	1650cm	1950cm	2198cm
% 2004:	6	6	6	6	6	6	6	8	6	6	6	6
% 2005:	13	13	13	13	13	13	13	13	13	13	13	2751
% 2006:	619	4016	619	619	619	619	619	619	619	619	619	619
% 2007:	870	7274	870	871	872	871	871	871	870	870	870	870
% 2008:	4	4	4	4	4	4	651	4	5	4	4	4
% 2009:	0	179	0	0	0	0	0	0	0	0	0	0
% 2010:	0	1590	0	0	0	0	0	0	0	0	0	0
% 2011:	0	746	0	0	0	0	0	0	0	1	0	0
% 2012:	0	0	0	0	0	0	0	0	0	825	1	0
% 2013:	0	0	0	0	0	0	0	0	0	0	0	0
% 2014:	18	18	20	17	18	19	128	21	17	17	19	17
% 2015:	45	6	6	6	6	6	278	6	6	902	6	6
% 2016:	0	0	0	0	0	0	3524	1	966	149	0	0

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[illegible]