University of Wyoming Hotplate (TPS-3100) operated at the North Redfield Site during OWLES

AUTHOR(S):

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1.0 DATA SET OVERVIEW:

Introduction: University of Wyoming Hotplate measurements at the University of Utah's North Redfield site.

Time period covered by the data: OWLeS field program

Physical location: 43.6244 N, 75.8783 W Elevation: 385 m MSL

Data source if applicable (e.g., for operational data include agency): Not Applicable

WWW references:
http://journals.ametsoc.org/doi/pdf/10.1175/2010JTECHA1375.1 (Rasmussen et al, 2011)
http://www-das.uwyo.edu/~jsnider/wolfe_jamc_2012.pdf (Wolfe and Snider, 2012)
http://www.atmos.uwyo.edu/~jsnider/wolfe_jamc_2013.pdf (Wolfe and Snider, 2013)

2.0 INSTRUMENT DESCRIPTION:

Brief text:
The hotplate (Yankee Environmental Systems, www.yesinc.com) consists of a pair of stacked aluminum disks, one facing upward and the other downward. The plates are maintained at a constant temperature (90°C). When detecting snowfall (ambient $T < 0\ ^{o}C$), the particle catch efficiency is accounted for (Rasmussen et al., 2011), and the precipitation rate is reported as the liquid-equivalent value. For rain (ambient $T > 0\ ^{o}C$), no particle catch efficiency correction is applied.

Figures (or links), if applicable:
Please see links to WWW references

Table of specifications (i.e., accuracy, precision, frequency, resolution, etc.): These are provided in the WWW references

3.0 DATA COLLECTION AND PROCESSING:

Description of data collection:
Hotplate raw data were processed, the liquid-equivalent precipitation rate was derived, and accumulated over one hour interval. The one-hour accumulations were archived with averages of ambient temperature, wind speed, downwelling shortwave radiation and net longwave radiation.

Description of derived parameters and processing techniques used:
In the data processing step, the hotplate's top plate energy budget is modeled. This budget equation has six terms: 1) electrical power supplied to the plate, 2) sensible heat, 3) outgoing longwave, 4) incoming longwave, 5) incoming shortwave, and 6) the latent heat term. The latter is the basis for the derived the liquid-equivalent precipitation rate. Calibration constants applied in the processing were evaluated in our laboratory. The liquid-equivalent accumulation and meteorological parameters are plotted in the hotplate time series file .

Description of quality control procedures:
See below.

Data intercomparisons, if applicable:
We are working with Jim Steenburgh and Leah Campbell (University of Utah) comparing weighing-gauge derived accumulations to hotplate-derived accumulations. The comparison data comes from the OWLeS campaign. Comparison data from southeastern Wyoming are also being analyzed. The latter comparisons are analyzed in Adam Wettlaufer's MS thesis. An overall description of the calibrations and field comparisons will be submitted for publication.

4.0 DATA FORMAT:

Data file structure and file naming conventions (e.g., column delimited ASCII, NetCDF, GIF, JPEG, etc.):
ucar_processor_hourly_v02.txt (hotplate hourly file)
ucar_processor_hourly_v02.pdf (hotplate time series file)

Data format and layout (i.e., description of header/data records, sample records):
The hotplate hourly file has the following format:
The first three lines are informational
The data lines have the following format:
hotplate_raw_data_filename, mo (UTC), dy (UTC), yr (UTC), hr (UTC), mn (UTC), seconds (this is the number of seconds of 1 Hz measurements used to evaluate the hourly accumulation and the hourly averages), accumulation (mm liquid equivalent), TC_ave (oC), U_ave (m/s), SW_ave (W/m^2), LW_ave (W/m^2)

Note: The indicated UTC time is the end-of-hour time

List of parameters with units, sampling intervals, frequency, range:
See Above

5.0 DATA REMARKS:

PI's assessment of the data (i.e., disclaimers, instrument problems, quality issues, etc.):
Data quality is suspect prior to 20131218

Missing data periods:
Prior to 20131205
20131206 to 20131210
Christmas vacation 2013

Software compatibility (i.e., list of existing software to view/manipulate the data):
Excel – hourly data
Adobe Reader - hotplate time series file

6.0 REFERENCES:

List of documents cited in this data set description: See links to WWW References (above)