READ ME document for JSU mobile datasets

Dataset Title: Mobile Surface Meteorology: Kayak

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Dataset Overview:
Surface meteorology parameters were measured by sensors mounted to a sea kayak which was paddled on waters within CHEESEHEAD core domain during Intensive Observing Periods (IOPs).

Time Period: 2019/07/08 15:00:00 to 2019/09/27 04:00:00

Area Bounding Box: 45.00 to 47.00 latitude; -91.00 to -89.00 longitude

Data Frequency: All data are logged at 2-s intervals. Primary time reference is UTC from GPS (not from datalogger).

Data Spatial Type: Consecutive point data

Dataset Description:
Data are primarily collected while mobile, but stationary data may also be collected for short periods.

Times in descriptive data log file are rounded to nearest minute. Min/max of temperature, relative humidity, and dewpoint are summarized for each leg.

Procedures:
The .dat files from CR23X logger are manipulated in Excel to separate logs and calculate derived parameters. Each leg is saved as separate .csv file compatible with QGIS, as well as a full day csv file.

File Naming Convention:
IOPx_boat_MMDDYYYY
where the x denotes the IOP (1-3).

Instrument Description:

- Campbell Scientific HygroClip HC2S
- Garmin GPS16X-HVS
- CR23-X datalogger
- 10-plate Gill radiation shield
- Campbell Scientific T107 water temperature probe

Description of parameters directly measured on mobile system

- Datalogger time: HHMM SS.S
- GPS time in UTC: HH MM SS
- GPS latitude: DDMM .MMMM
- GPS longitude: DDMM .MMMM
- GPS elevation (m)
- Number of GPS satellites
- GPS reception quality
- Datalogger panel temperature (C)
- Temperature in Gill shield (C)
- Relative humidity in Gill shield
- Battery voltage
- Water temperature (C): Not always able to maintain probe at constant depth in water due to speed of motion and hitting aquatic vegetation near shore.

Description of derived/calculated quantities

- Decimal GPS latitude
- Decimal GPS longitude
- Dewpoint calculated from Gill shield temperature and humidity (C)
- Vapor pressure calculated from Gill shield dewpoint (hPa)
- "Pseudospeed": Approximate measure of motion from difference of latitude/longitude over time interval (degrees of lat/lon)
- "Pseudodistance": Accumulation of pseudospeed since beginning of transect leg (degrees of lat/lon)
- Water body segment (text)

Formulas used for calculations:

Dewpoint: $T_d = (RH * 0.01)^{0.125} * (112 + 0.9 * T) + (0.1 * T) - 112$

Vapor pressure: $q_p = 6.112 * e^{\left(\frac{17.67 * T_d}{T_d + 243.5}\right)}$

Pseudospeed: $d = \sqrt[2]{(\varphi_i - \varphi_{i-1})^2 + (\lambda_i - \lambda_{i-2})^2}$