

CHEESEHEAD 2019 Project Documentation

The following documents describe various components of the CHEESEHEAD19 field experiment that occurred from June-October 2019 in Northern Wisconsin, USA.

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This folder was organized by PI Ankur R Desai and based on contributions from CHEESEHEAD investigators submitted to the Google Drive.

Further updates and characterizations of sites can be found at:

<http://cheesehead19.org/>

Data repository is located at:

https://www.eol.ucar.edu/field_projects/cheesehead

CHEESEHEAD was focused on intensive characterization of land-atmosphere interactions in surface energy balance, atmospheric thermodynamics, and carbon cycle across a 10x10 km area surrounding the WLEF-TV tall tower transmitter (447 m tall) near Park Falls, WI USA. WLEF has operated as a NOAA greenhouse gas tall tower observatory (WLF) and Ameriflux eddy covariance flux tower (US-PFa) since 1996.

During the field campaign, 19 additional canopy-height flux towers (17 from NCAR ISFS and 2 from Paul Stoy) were deployed in a quasi-random pattern. Biological characterization and phenology plots were located throughout, too. Atmospheric profiling by SODAR-RASS, LiDAR, microwave profilers, doppler Wind lidars, and various radiometers occurred at the tall tower (via KIT IMK-IFU and UW SSEC SPARC), and at a field 1 km to the west (NCAR ISS and NOAA), and at two locations to the west and east of the domain by NOAA. The University of Wyoming King Air flew 30-km eddy-covariance transects at 100m and 400m above ground for 72 flight hours spread across three intensives in July 8-13, August 19-24, and September 23-28, to characterize fluxes in morning and afternoon. The Wyoming Cloud LiDAR and the Compact Raman lidar were also flown for boundary layer profiling. High-resolution land surface remote sensing of land surface temperature, canopy height, elevation, hyperspectral Vis-NIR reflectance were also acquired by drone and aircraft. A number of additional measurements on surface and atmosphere meteorology and ecology were made by various teams.

Additional details are documented in:

Butterworth, B.J., Desai, A.R., Metzger, S., Townsend, P.A., Schwartz, M.D., Petty, G.W., Mauder, M., Vogelmann, H., Andresen, C.G., Augustine, T.J., Bertram, T.H., Brown, W.O.J., Buban, M., Cleary, P., Durden, D.J., Florian, C.R., Ruiz, E.G., Iglinski, T.J., Kruger, E.L., Lantz, K., Lee, T.R., Meyers, T.P., Mineau, J.K., Olson, E.R., Oncley, S.P., Paleri, S., Pertzborn, R.A., Pettersen, C., Plummer, D.M., Riihimaki, L., Sedlar, J., Smith, E.N., Speidel, J., Stoy, P.C., Strickling, M., Thom, J.E., Turner, D.D., Vermeuel, M.P., Wagner, T.J., Wang, Z., Wanner, L., White, L.D., Wilczak, J.M.M., Wright, D.B., and Zheng, T., 2020. Connecting Land-Atmosphere Interactions to Surface Heterogeneity in CHEESEHEAD19, Bulletin of the American Meteorological Society, doi:10.1175/BAMS-D-19-0346.1

A brief run-down of documents are provided here:

documentation/

Contains experimental design, proposal narrative, airborne operations summary, data variable summary, main data sources, teleconference notes, instrumentation tables

flux_towers/

Information related to the flux towers include site metadata, site characterization and imagery, quicklooks of wind roses, flux footprints, quality control metrics, and eddy fluxes

hyspex_logs/

Field logs from HySPEX hyperspectral imaging flights

iop_notes/

Field notes from investigators during intensives

maps/

Google Earth KML and PDF maps of tower and site locations

mobilemet/

Documents and logs related to Jackson State mobile meteorology transects

noaa_atdd_drone/

Field notes from NOAA ATDD drone sampling of meteorology and land surface temperature

phenology/

Protocol documents and datasheets from autumn phenology observations

photos/ (separate file)

Curated collection of contributed photos and those taken by University of WI communications

uwyo_kingair/

Flight catalog, recorded waypoints, flight track screenshots, and experimental protocol documents related to U Wyoming King Air eddy covariance flights