

The files in this data set contain data that is presented and discussed in a paper in review at *Water Resources Research*, titled:

The Influence of Snow Depth Observation Timing and Uncertainty on Data Assimilation Improvements to SWE

The data is organized as follows:

- 1) "SNOTEL_NLDAS.mat": A matlab data file containing the following variables
 - a) STATIONS: Snow Telemetry (SNOTEL) station ID, name, state, and elevation for each of the 49 sites used in the study
 - b) VAL: Snow depth (SD) and snow water equivalent (SWE) measured at the 49 sites, along with time steps for each data point
 - c) NLDAS: North American Land Data Assimilation System phase 2 (NLDAS) meteorological data, latitude/longitude, UTC coordinates, and elevation for grid cells containing each of the 49 sites

- 2) "MASTER_BASE_full.mat": A matlab data file containing particle filter (PF) and open loop (OL) model outputs, assuming a monthly snow depth observation interval and 10 cm sampling error (see sections 3.6 and 4.1 of the manuscript)

The file contains one structure for each site (e.g., SITE_1045, see station IDs above)
Each site-structure contains several variables for each year evaluated in the study, where the naming convention is:

[variable]_WY[year]

- a) Weighted average modeled snow density for each year in the study (RHO)
 - i) First column is PF, second column is OL
- b) Weighted average modeled SD for each year (SD)
 - i) First column is PF, second column is OL
- c) Weighted average precipitation correction factors at each assimilation timestep (PRE)
- d) Weighted average compaction parameters (COMP)
- e) Weighted average temperature (TEMP), shortwave (QSI), and longwave (QLI) adjustments
- f) Weighted average SD standard deviation over time (stDevSD)
- g) Weighted average SWE standard deviation (stDevSWE)
- h) SD estimates for every particle over time (SDplot)
- i) SWE estimates for every particle over time (SWEplot)

- 3) 24 other matlab data files, containing PF and OL model outputs from a set of experiments with different snow depth observation timing intervals and sampling errors (see sections 3.6 and 4.2 of the manuscript)

The file naming convention is:

MASTER_[observation interval name]_[sampling error]cm.mat

The observation interval names are CA, pSWE, pSWEplus1, and INTVLS (see Figure 2 in the manuscript)

The CA, pSWE, and pSWEplus1 files contain the following:

One structure for each site (as above), containing the following variables:

- a) Weighted average modeled snow density for each year in the study (RHO)
 - i) First column is PF, second column is OL
- b) Weighted average modeled SD for each year (SD)

- i) First column is PF, second column is OL
- g) Weighted average SWE standard deviation (stDevSWE)

The INTVLS files contain the following:

- a) One CONTROL structure, which contains the OL model runs for all 49 sites and 9 years
- b) One structure for each regular observation interval scenario (1-12 weeks)
Each structure contains the PF model runs for the 49 sites/9 years
See the order of station IDs above