Project: Investigating potential use of an Energy Balance Snow Model (Utah Energy Balance UEB Snow Model) in CBRFC operations

Last update - November 1, 2018

UEB is an energy and mass balance snow accumulation and melt model that uses physically-based calculations of radiative, sensible, latent and advective heat exchanges to keep track of the water and energy balances. UEB is a one-layer, grid-based distributed snow model that advances the physical representation of snow processes with respect to temperature index approaches presently used in operational settings. It accounts for major snow processes without the complexity and added data requirements of multi-layer models. UEB also includes a vegetation component that deals with radiation partitioning, snow interception, sublimation and melt of intercepted snow, and turbulent fluxes. The model requires precipitation, temperature, humidity, radiation, and wind speed, and outputs snow water equivalent, bulk energy content, total surface water input from rain plus melt, and snow sublimation. Gridded precipitation and temperature are already being produced by the CBRFC, and solar and longwave radiation are parameterized based on temperature. Humidity and wind speed data are obtained from the North American Land Data Assimilation System (NLDAS) forcing datasets.

Goals:

1. Evaluate performance of the UEB in CBRFC operations within CHPS
2. Implement operationally if improvement is recognized

Status:

- We are currently receiving scripts RTI related to data assimilation procedures and implementing them into work flows on stand alone systems.
- Specifically, we are exporting air temperature grids and perturbing them.
- Calibration of Test Basins at RTI is complete - (using Snow-17)

Method:

- Physically based snow modeling accounts for energy and mass fluxes to and from a snowpack.
- Topographic and surface characteristics are assigned to each dem-based grid cell based on the characteristics in the center of the grid cell. This is a more probabilistic approach than trying to quantify an average grid cell value.
- Grid cells are ¼ HRAP or approximately 1 km for operation runs.
- Time step is 6 hrs
- Active test basins at this point include Dolores (DOLC2), Animas (DRGC2).

Outcomes, Findings:

TBD