

## Coupled surface energy balance – snowpack model

Here we will study the results from a coupled SEB and snowpack model for two different years at the Austfonna ice cap, Svalbard.

Download the matlab-files from Fronter

**SEB2004.mat**

**SEB2008.mat**

**exercise2.m**

Make sure that the MatLab working directory is the same folder as you have downloaded the files.

Use the **exercise2.m** file to load and plot daily SEB-results for 2004 and 2008.

- 1) Study the SEB-fluxes through the season in Figure 1.
  - a) Which SEB-flux seems to be most important for melt?
  - b) Comment difference between the two different years.
  - c) Use the Melt flux to compute the melt rate (m w.eq. pr day) and the total melt over the seasons
- 2) Figure 2 shows air temperature, albedo and modeled runoff and refreezing.
  - a) Why do you think there is such a great difference in runoff and refreezing between the 2004 and 2008 seasons?
  - b) Comment the correlation between albedo, snow depth and refreezing.
  - c) Why does the runoff differ from the melt you computed in a)?
- 3) Plot all components of the radiation balance along with the net radiation flux for one of the years. How does it evolve over the season? How do clouds apparently affect the radiation balance?
- 4) Can you calculate the mass balance over the hydrological years 2003/04 and 2007/08 with the available data?