

Glacial Geology

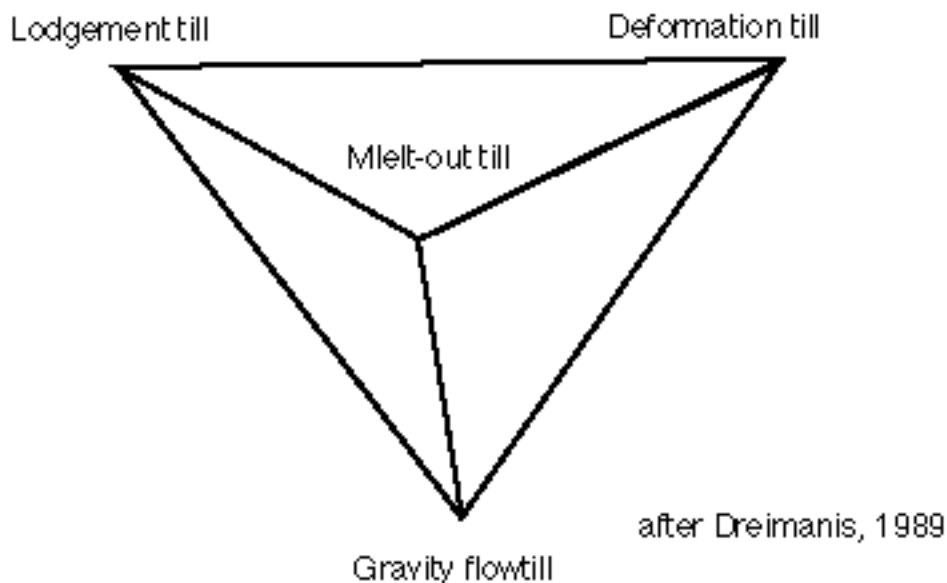
Subglacial Module

Objective:

Hone Field observation and interpretation skills

Background:

Subglacial processes produce some of the most complex sediments we can deal with. Thus, they offer the best chance to assure we can make subtle separations in the field. Till is an overused word, here we restrict it to "those sediments deposited directly by glacial ice with no significant reworking". Diamictons are sediments with a wide range of grains sizes, but this term carries no genesis implication. These definitions took over ten years to sort out. Tills are problematic because the processes that emplace them overlap. Basically, we have four choices (see figure)- All processes on the top plane can occur in the subglacial setting whereas the flowtill processes are more common in the ice-margin or supraglacial setting. This is just a first order rule of thumb.



More detailed information can be found in the readings.

Resources:

Be familiar with sections 5.5-5.7, 10.1-10.3, and 11.2 in Benn and Evans.

Handouts:

[Summary Table of Till Properties \(PDF\)](#)

[Detailed Table of Till Properties \(PDF\)](#)

Tasks:

We BEGAN these at Caldwell Park on Monday.

1. Decide how to describe diamictons so that you will have the information needed to distinguish between the three types. You will be recording part of what you need on the data sheets, but you will need to develop a check list covering any additional important properties of diamictons.
2. Expose a ~meter wide swath of the outcrop.
3. Using your check list describe the exposed diamictons at the site. Record all properties as well as take sketches of the geometry of any units and lots of photos!

Questions:

Define/ describe for 5 pts each

Diamicton

Lodgment till

Melt-out till

Gravity flow till

Deformation till

Till Tetrahedra

Sediment-Landform associations

Glacitectonite

1. 10 pts - Discuss the conceptual difference between the till tetrahedra and Figure 10.6 in Benn and Evens.
2. 20 pts - Study images on the following links - Discuss any relationship between cavities and flutes. What type of till is in the tail of a flute ?

[Plastic Glacier Flow, Hargreaves Glacier, BC, Canada](#)

				
Flutes, Bear Glacier, Alaska	Flutes, Saskatchewan Glacier, Banff Park, Canada	Flutes at the Equilibrium Line, Iceland 1	Flutes at the Equilibrium Line, Iceland 2	Small Moraine and Flutes, AK

3. 20 pts At Caldwell Park, outcrop 1 exposed three units. Unit 1, the lower 2-3 m of stratified sand, Unit 2, the middle complex, unit, and Unit 3 the upper massive unit. Using the layout and properties of the **Till properties** handout - describe units 2 and 3.
4. 20 pts From your descriptions, make an educated guess as to the origin of these two units. Support your view.