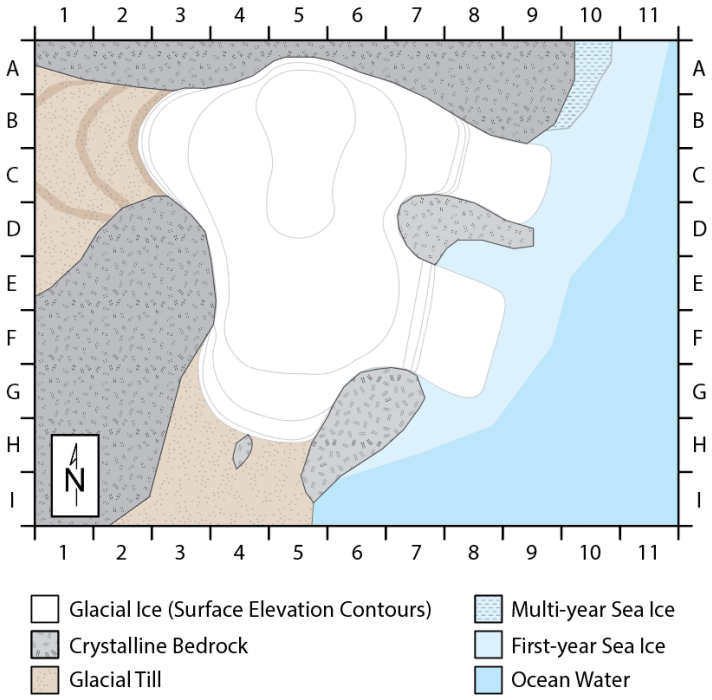
EARTH AND SPACE SCIENCES **Autumn 2017**

431 *PRINCIPLES OF GLACIOLOGY* 4 Credits, SLN 14841

505 *THE CRYOSPHERE* 4 Credits, SLN 14862

Final Exam Practice Questions: Glacial Erosion, Paleoclimate, Sea Ice, and Permafrost

The final exam is designed around this idealized ice cap with four outlet glaciers, two land terminating and two terminating in the ocean. Surface contours are provided to give you a sense of the 3D geometry of this ice cap system. I'm not an artist, so I didn't draw any parts of this figure for fun. ***I.E. If there are funny details drawn in the figure, they are probably in a test question.*** If you don't understand the drawing, or don't know how to read a contour map, ask me about it before the exam.



The test is divided into four topics: Ice Dynamics, Glacial Erosion, Ice Core Science, and Sea Ice. One of these will have a calculation problem. You are expected to know the material from the first half of the class, but the exam is focused more on the second half.

New vocabulary, ideas, and equations you should be able to talk about intelligently:

1) Driving stress (why the surface slope drives ice flow)
2) Avalanche dynamics
3) Ice core site selection
4) Bubble close off / brittle ice / clathrates
5) Ice core dating methods
6) Δ Age
7) Temperature controlled isotope fractionation
8) Typical values for climate proxies in ice cores
9) Typical values for climate proxies in sea floor cores
10) Eccentricity, Obliquity, Precession (periods)
11) Net effect of Milankovitch cycles
12) Mid-Pleistocene transition
13) Possible mechanisms for 100 kyr glacial cycles
14) Moraine dating and glacial history
15) Postglacial features (Cirques, Roche Moutinee, etc)
16) Property controls on glacial erosion
17) Mechanisms for glacial erosion (+ their physics)
18) U-shaped valley development
19) Sea ice characteristics in the Arctic and Antarctica
20) Historic sea ice trends
21) Density of sea vs. fresh water as a function of T.
22) Brine pocket properties and evolution
23) Thermodynamic modeling of Sea Ice
24) Ice-albedo feedback