Research Package 1

Connecting the glacial and sub-glacial hydrology with the periglacial hydrological system on a landscape scale

University of Copenhagen

(University of Montana -> next presentation)

GAP and GRASP sites near Kangerlussuaq, Greenland

Background

Previous investigations within the Greenland Analogue Project (GAP) and the Greenland Analogue Surface Project (GRASP) resulted in:

- Data from the ice sheet, and from under the ice sheet
- Data related to terrestrial hydrology and geochemistry
- Models for terrestrial hydrology and flow in fractured rock below and in front of the ice sheet

Connect the pieces of the landscape

- Ice sheet controls on periglacial hydrologic system
- Groundwater in taliks
- Groundwater – surface water interactions

Structure of work

- Periglacial (cryo)hydro(geo) modeling:
  - 3-year PhD project at University of Copenhagen
  - supervisors Ylva, Emma, Aart Kroon

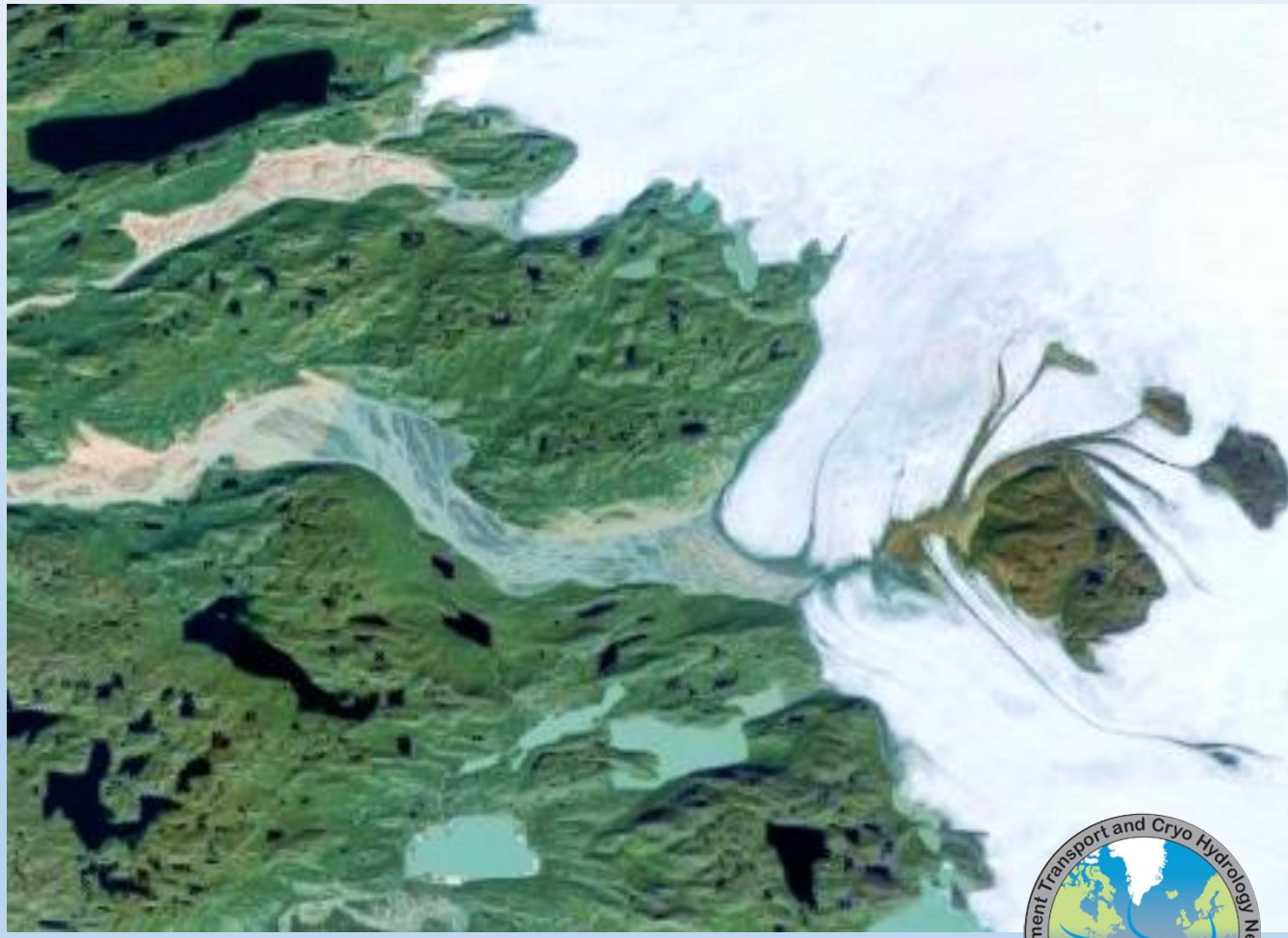
- Subglacial conditions: Toby and Joel (University of Montana)
- Other ongoing projects/people?

Step 1 – taliks in meltwater stream valleys?

- Q: under what conditions will we develop taliks?
- Cryohydrogeo modeling
- Tool: Advanced Terrestrial Simulator

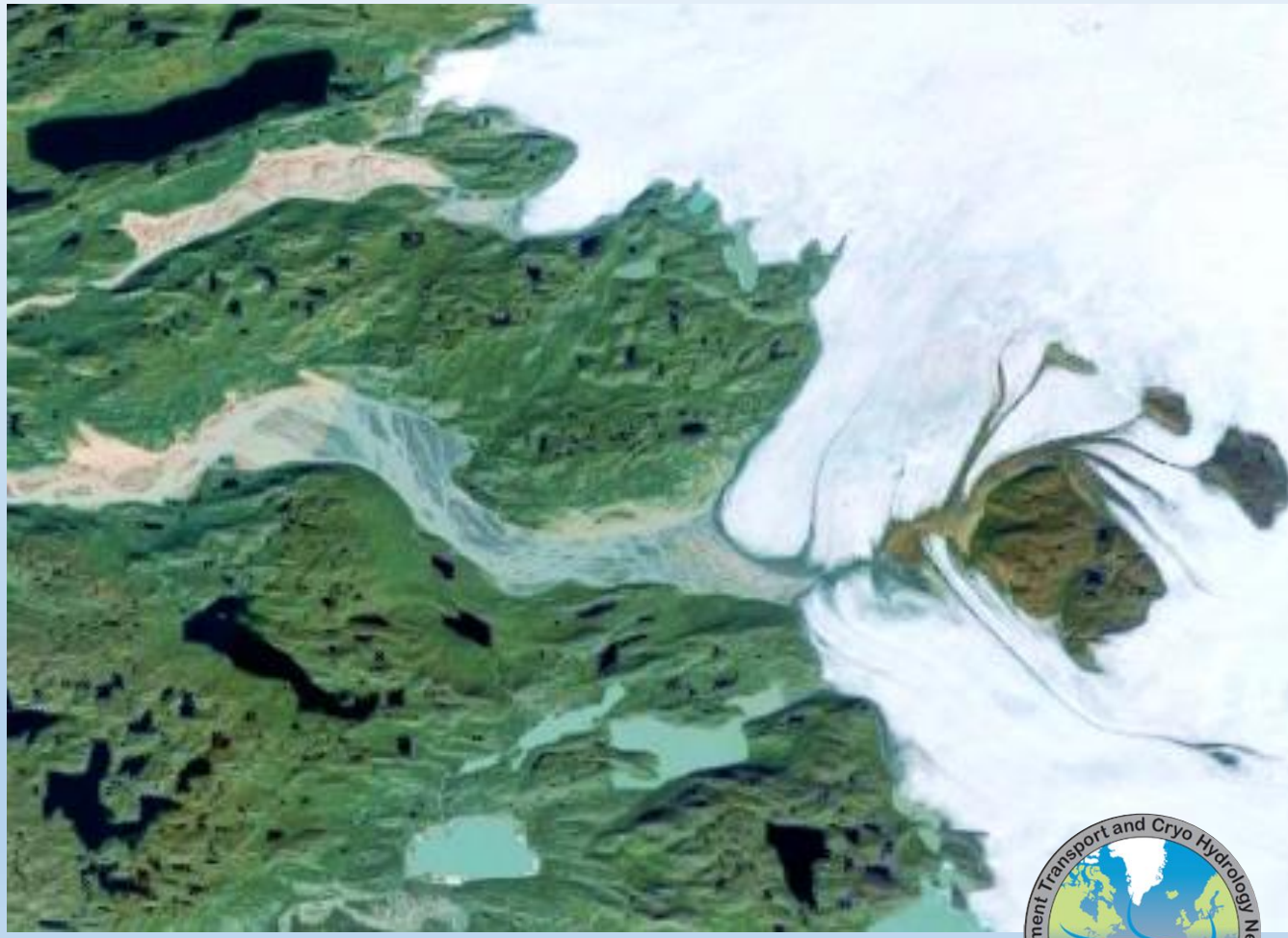
Step 2 – Regional groundwater model

- Q: what are the main flow pathways from groundwater to surface systems?
- Hydrologic modeling, prescribed permafrost
- Focus: flow in unconsolidated material



Step 3 – regional system conceptual model (together with UM)

- Bring together outcomes from periglacial hydro modeling with subglacial analyses/ice sheet dynamics to conceptual model of landscape hydrology over glacial timescales.



Discussions

- What are the big unknowns in our conceptual understanding today, and are we targeting these properly in current plans?
- How best connect Copenhagen and Montana efforts?
- Other relevant work we should be aware of?