Process Study of a Retrogressive Thaw Slump on Herschel Island, Yukon Coast

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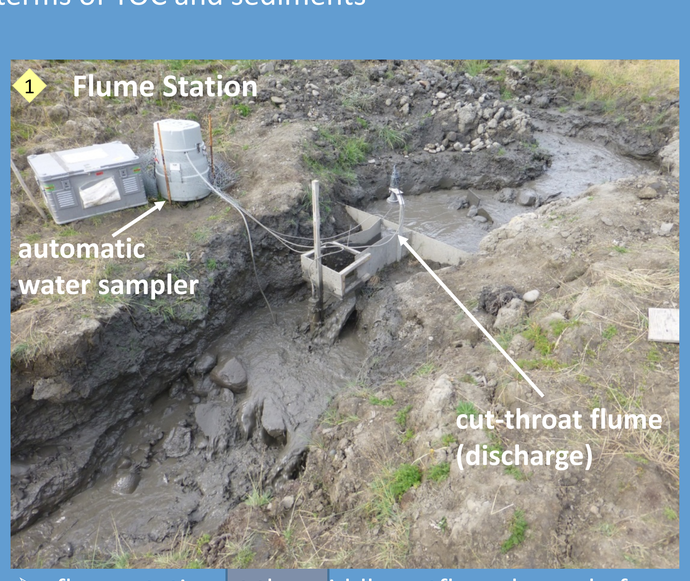
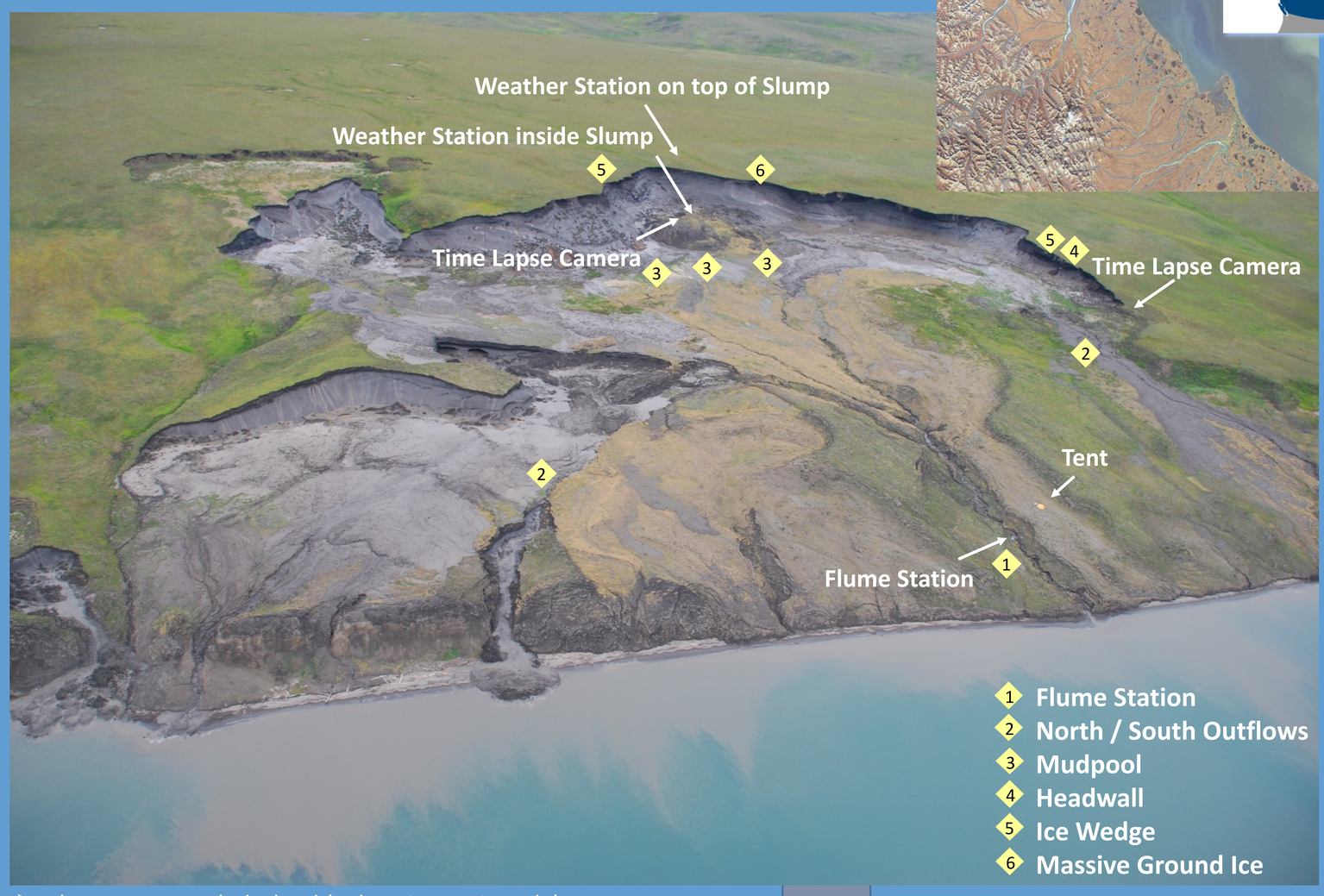
OBJECTIVES:

- to understand the relation between **climate forcing and sediment release** from a retrogressive thaw slump (RTS)
- to improve the knowledge on the **amount of total organic carbon** (TOC) stored and potentially released from thawing permafrost
- to quantify the **contribution of RTS to coastal erosion** in terms of TOC and sediments



➢ flume station at the middle outflow channel of slump



➢ slump on Herschel Island (Yukon Coast, Canada)
➢ headwall **435 m wide, 30 m high, retreat 2000-2012: ∅ 10m/yr**

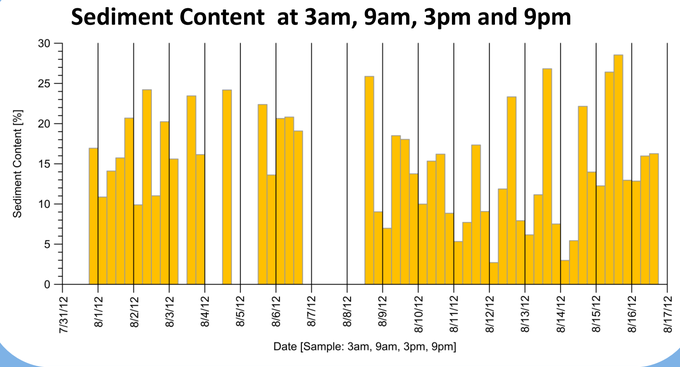
PRELIMINARY RESULTS:

❖FLUME SAMPLES:

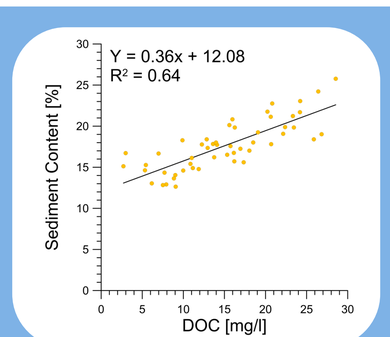
➢ flume samples taken up to **24 times a day** over a period of **18 days** with an automatic water sampler

• sediment content	3-34%
• dissolved organic carbon (DOC)	13-26 mg/l
• elect. conductivity	3.68-5.36 mS/cm
• bicarbonates (HCO3-)	141-260 mg/l
• pH	7.3-8.1

➢ **hydrochemical analysis** of flume samples

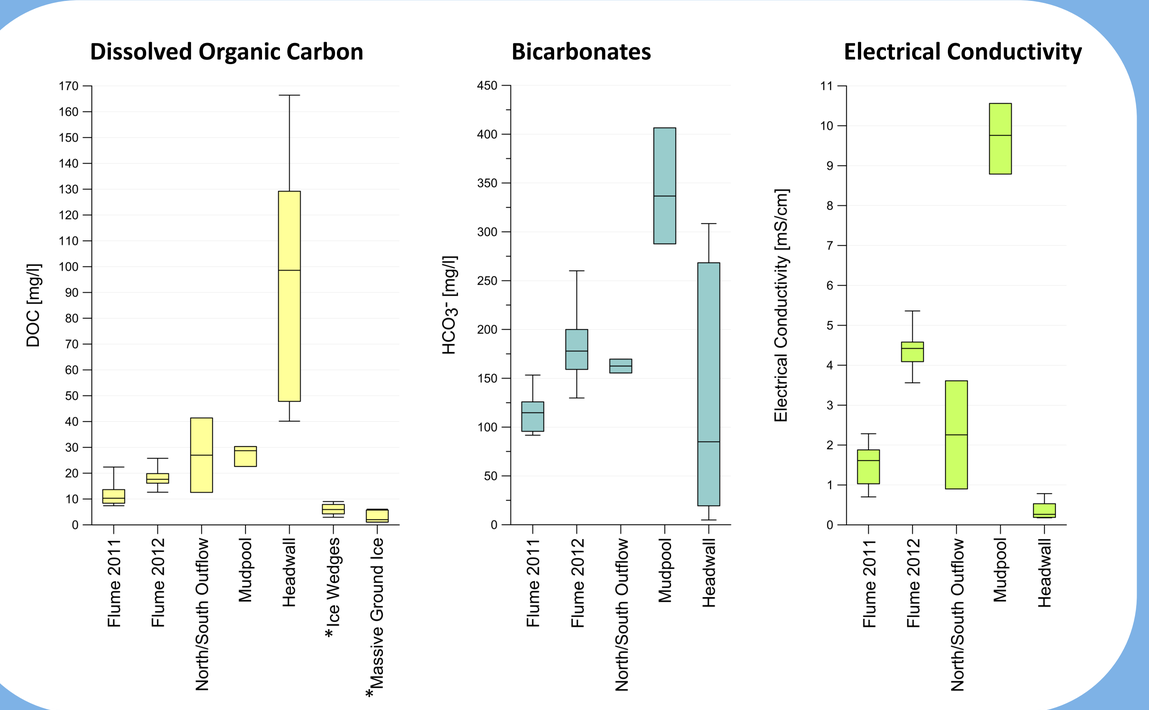


➢ flume samples show **variation of sediment content**



➢ **sediment content correlates** with **DOC**

❖DIFFERENT SAMPLING SITES IN SLUMP:



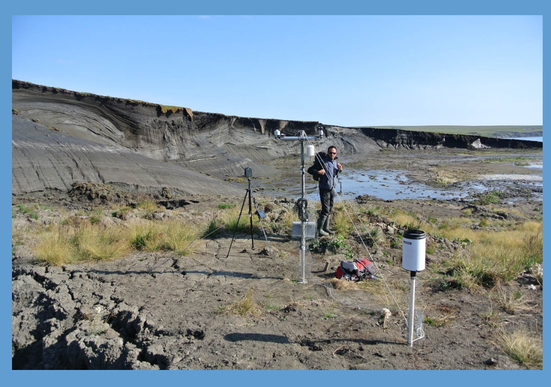
➢ highest DOC in organic-rich permafrost-headwall
➢ lowest DOC in massive ground ice & ice wedges
➢ flume: composition of different eroding permafrost units
➢ highest HCO_3^- in mudpool
➢ low HCO_3^- in organic-rich permafrost headwall
➢ highest conductivity in mudpool (marine sediment)
➢ lowest conductivity in organic-rich permafrost headwall

*Poster: Tanski, G. et al.

DATA OUTCOME 2012:

- **headwall retreat 2000-2012: ∅ 10m/yr**
- **water samples**
- **photo time series**
- **climate forcing (solar radiation, air & ground temperature, precipitation, wind speed)**
- **water discharge**

➢ **weather station on top of slump**



➢ **weather station inside slump**

OUTLOOK:

- **statistical evalution of weather and flume data**
- **sediment analysis (grain size, bulk density, TOC, CNS, $\delta^{13}C$)**
- **sample other RTSs**
- **DOC analysis from permafrost**
- **nitrogen and phosphorus analysis**

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