THE RESPONSE OF ØSTRE SVARTISEN ICEFIELD, NORWAY, TO 20TH/21ST CENTURY CLIMATE CHANGE

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HIGHLIGHTS

- Accumulation area altitude important for controlling LIA glacier dynamics
- Disconnections from higher source areas common during recession
- Timing of moraine formation differs between glaciers (similar to Hardangerjøkulen – See Weber et al. (2019) The Holocene)
- Processes of sediment delivery to the ice margin reflect changes in glacier dynamics and topographic conditions

Papers in prep – working titles

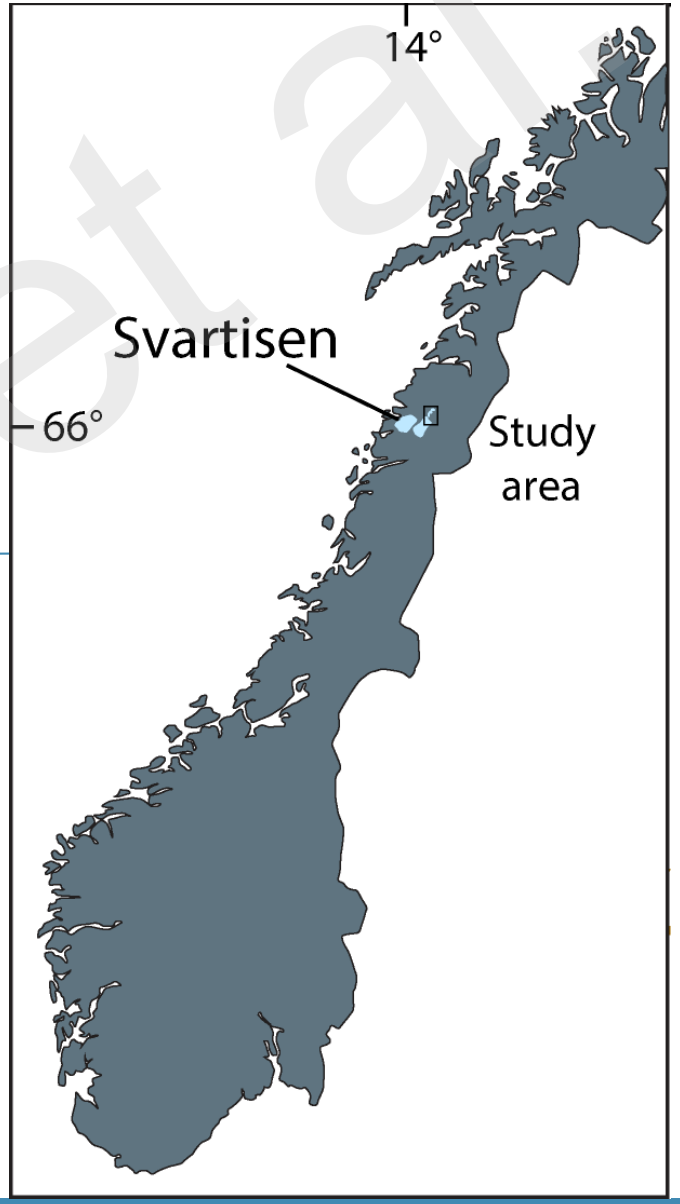
- Processes of subglacial to ice-marginal landform development at an active temperate glacier in Arctic Norway
- Glacier recession at the northern sector of Østre Svartisen, Norway, since the Little Ice Age

ØSTRE SVARTISEN, NORWAY

- Research focussed on northeastern sector of the plateau icefield, including two separate cirque/valley glaciers immediately to the north.

Aims:

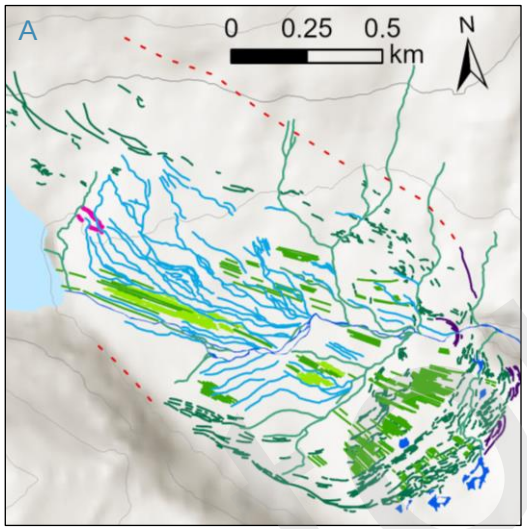
- To examine the glacial geomorphological and sedimentological record in the study area glacial forelands
- To examine spatio-temporal variations in glacier dynamics and processes of sediment deposition in response to climate warming since the Little Ice Age (c.1750)



GEOMORPHOLOGICAL RECORD (LIA to present)

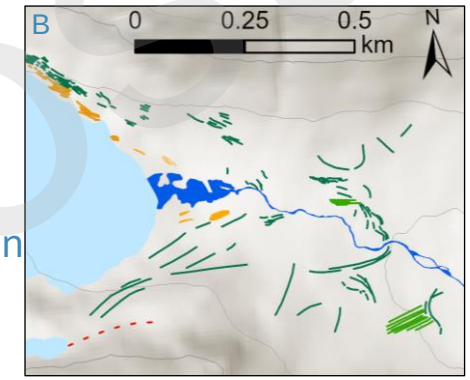
Most forelands:

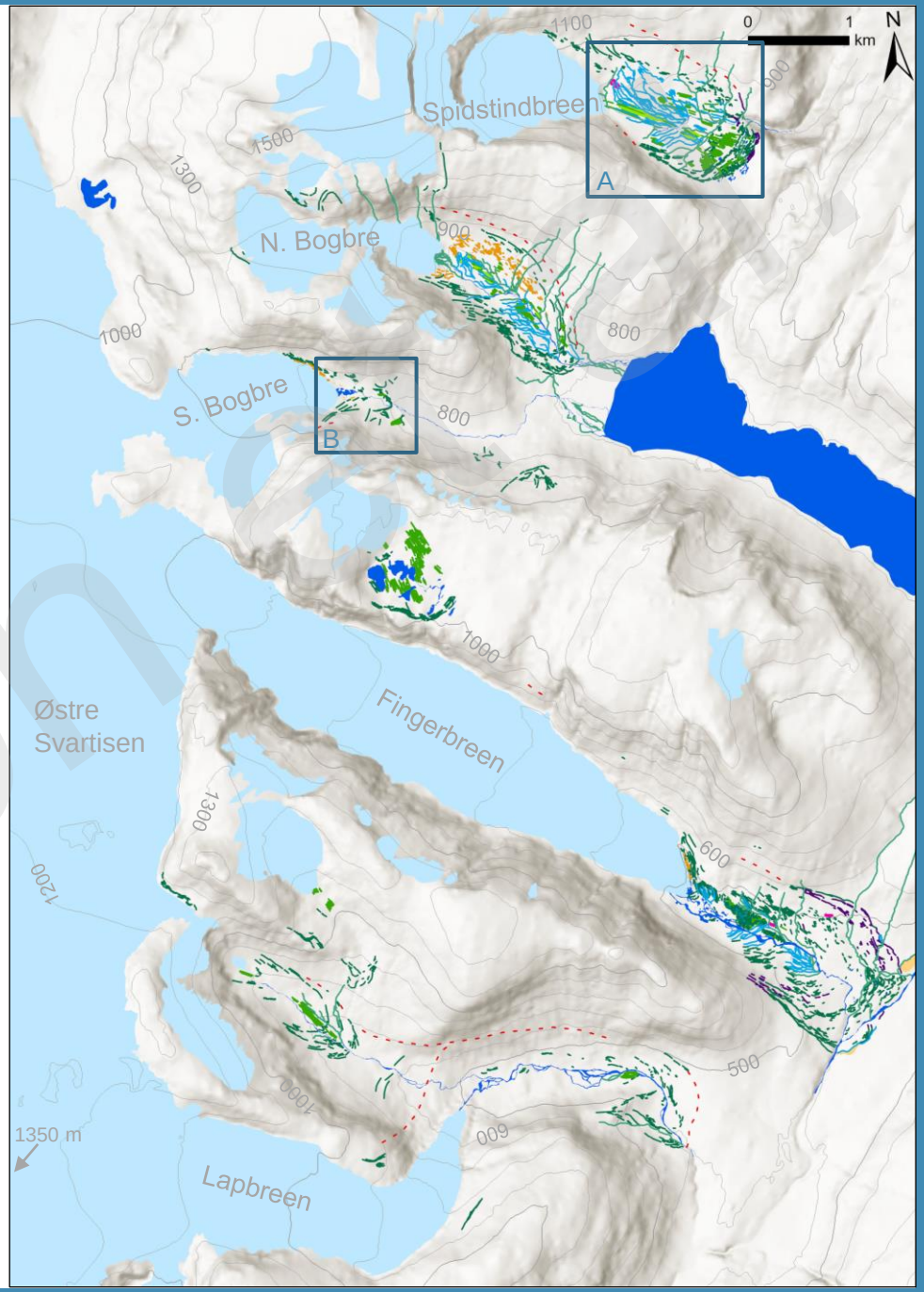
A wide range of landforms e.g. moraines, flutings, eskers, ice-moulded bedrock, former meltwater channels, indicative of a temperate glacier



Søndre Bogbre:

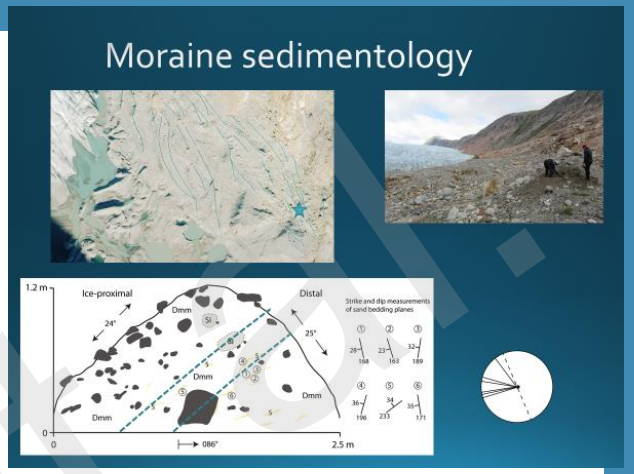
Some moraines & flutings. Temperate, but conditions for moraine/fluting formation/preservation lower – less dynamic system

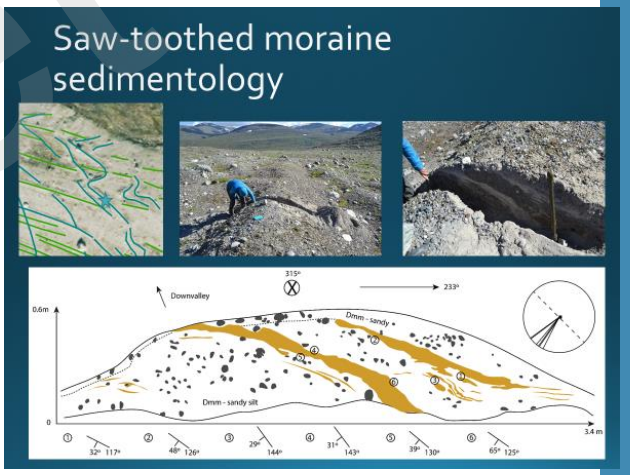


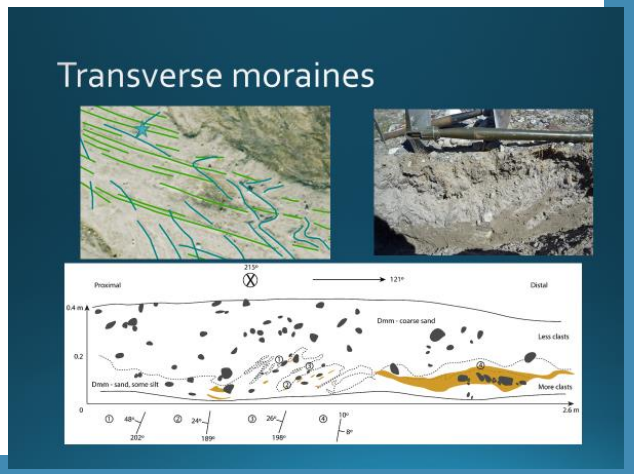


SEDIMENTOLOGICAL RECORD

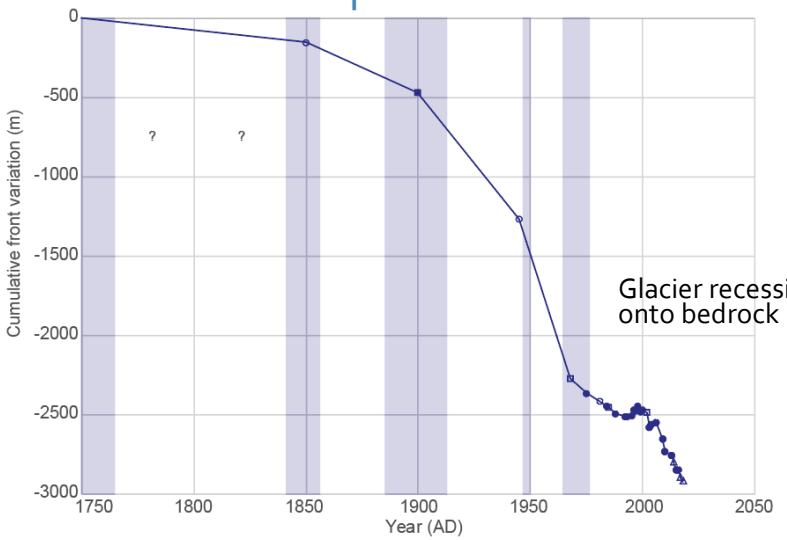
- Evidence for winter freeze-on of basal sediment slabs
- Evidence for ice-marginal squeezing of saturated subglacial sediments
- Changes in processes of sediment delivery to the ice margin as recession progresses due to changing glacier dynamics reflecting changes in climatic and topographic conditions
  - Similar to recent findings at Icelandic glacier margins (e.g. Chandler et al. (2020) Geomorphology)





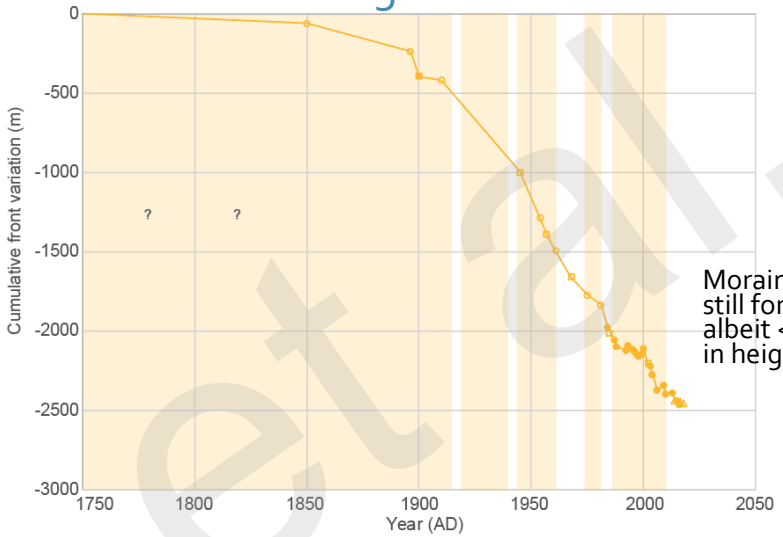


Lapbreen



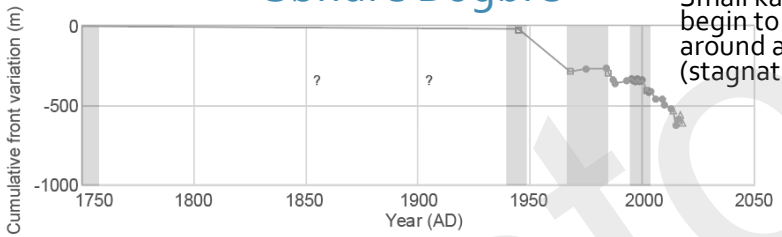
Glacier recession onto bedrock

Fingerbreen



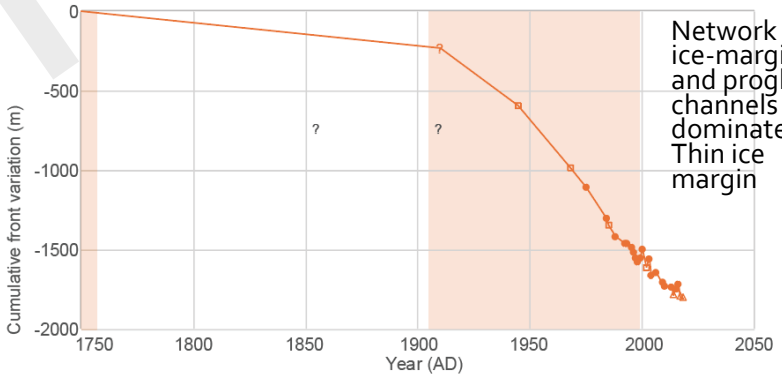
Moraines still forming albeit < 1 m in height

Søndre Bogbre



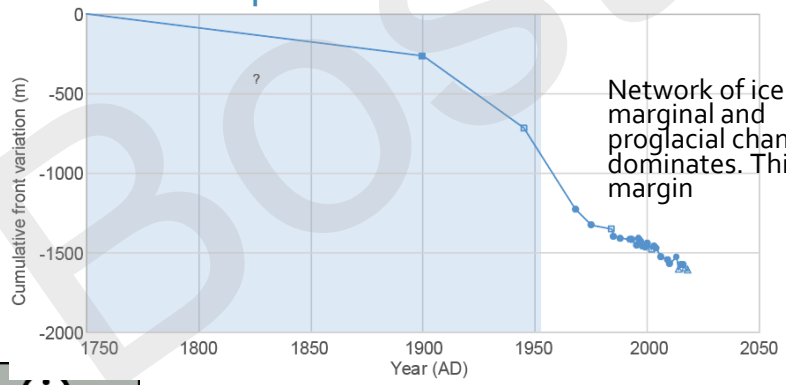
Small kame terraces begin to form on and around a thin (stagnating?) margin

Nordre Bogbre



Network of ice-marginal and proglacial channels dominates. Thin ice margin

Spidstindbreen



Network of ice-marginal and proglacial channels dominates. Thin ice margin

TIMING OF MORAINE FORMATION (shaded areas)