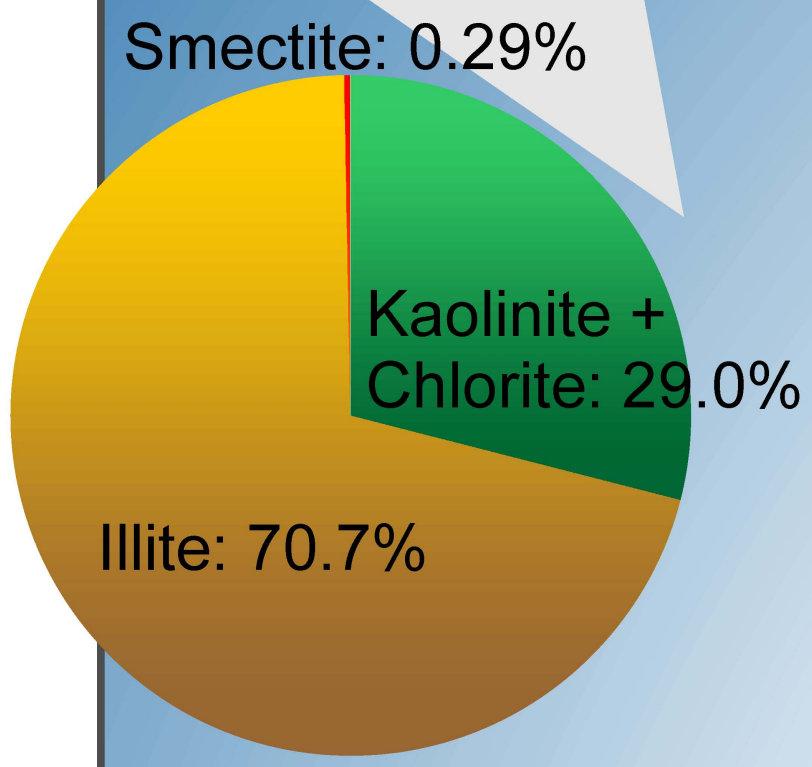
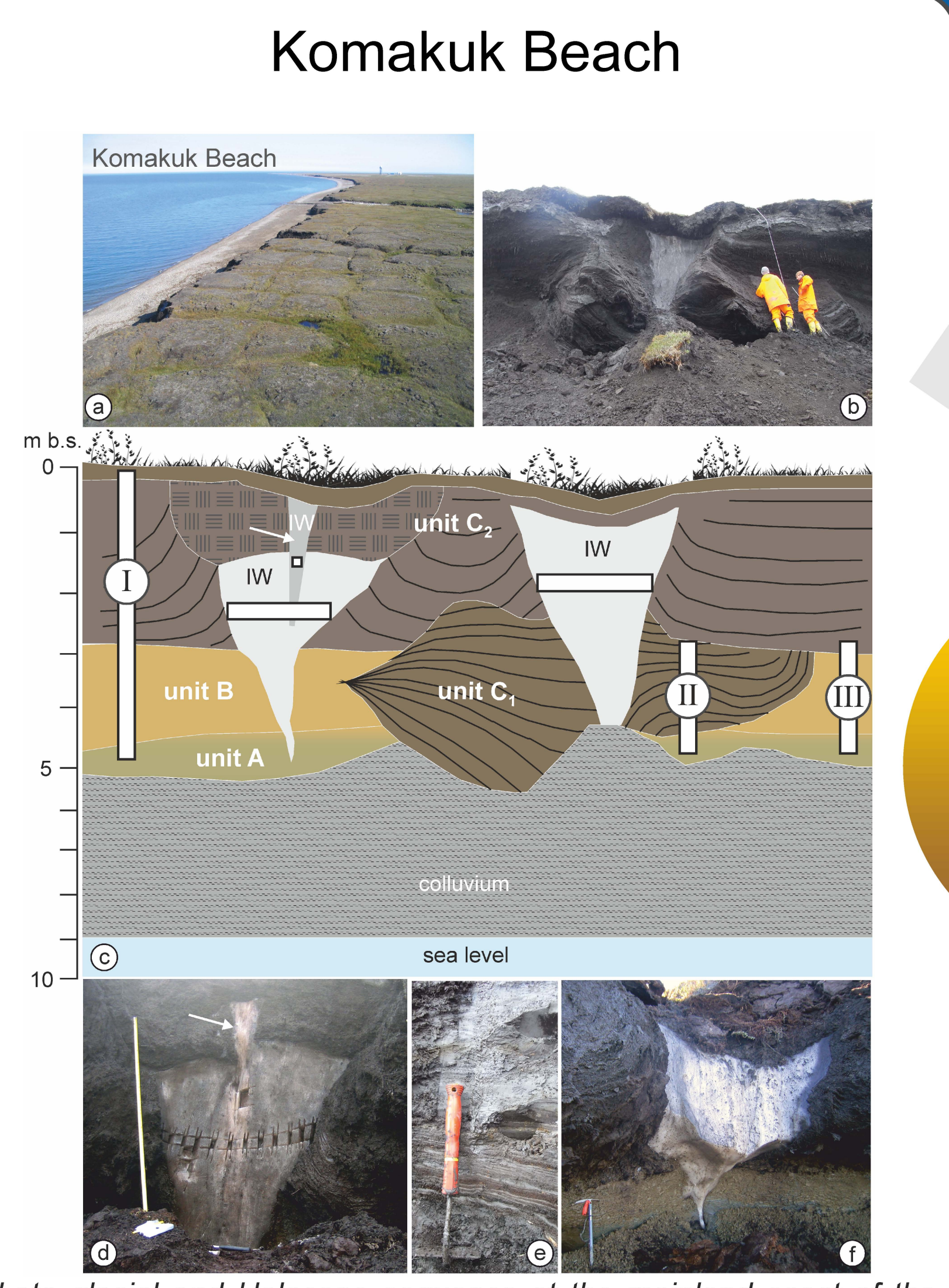


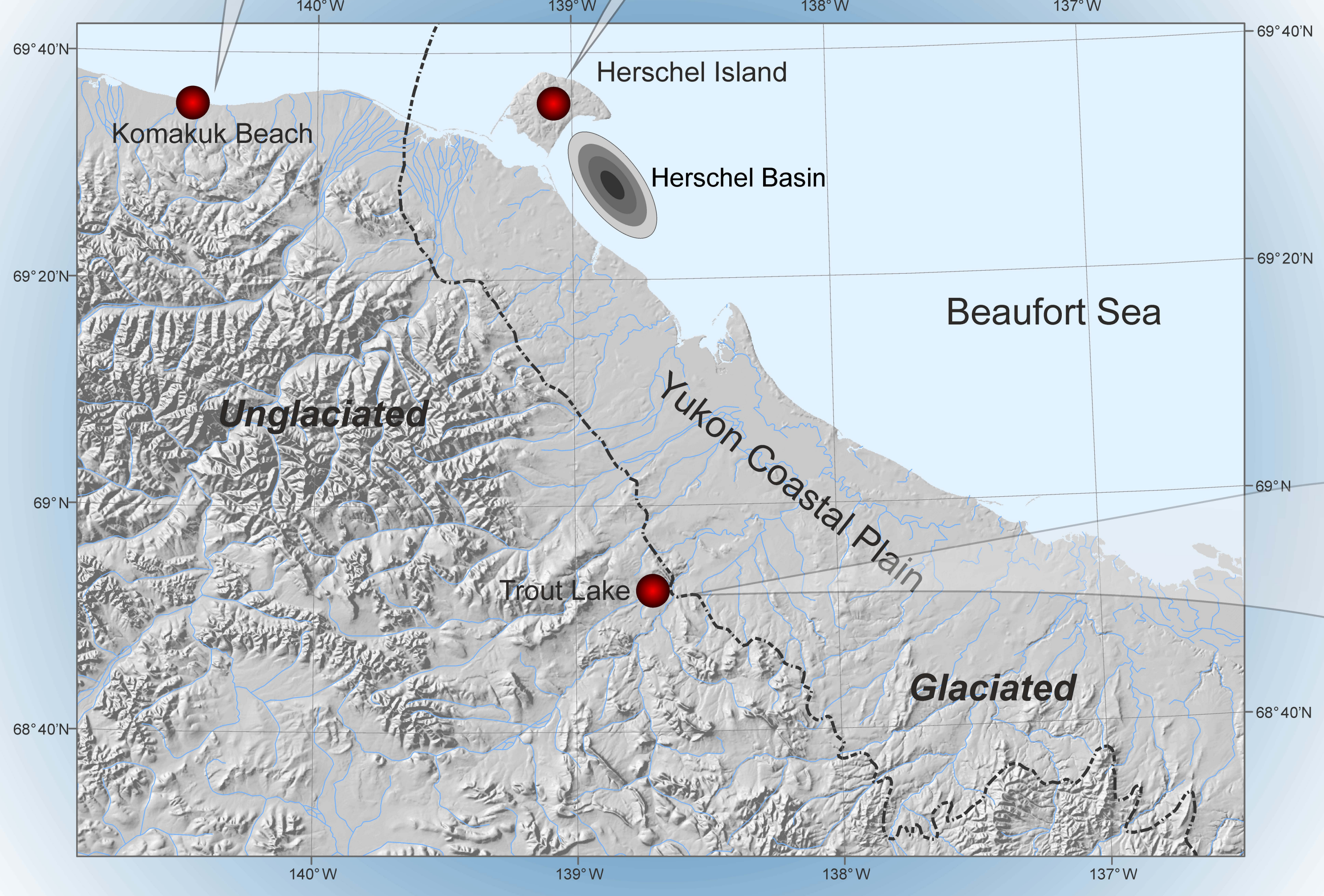
## Coastal permafrost landscape development in the southern Beaufort Sea area

Michael Fritz, Hugues Lantuit, Georg Schwamborn, Wayne H. Pollard, Hans-Wolfgang Hubberten

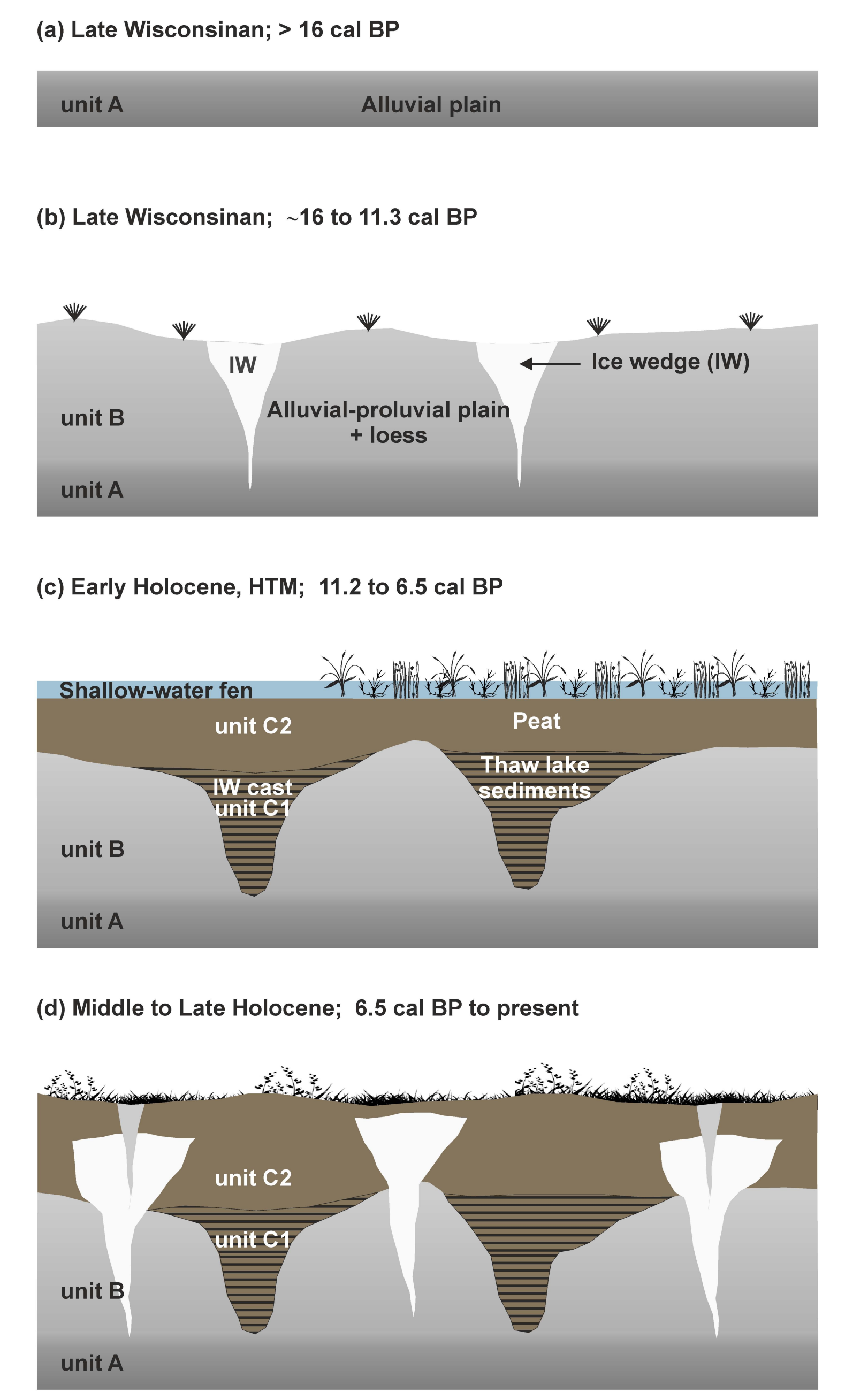


### Key Questions

- Postglacial sea-level history
- Offshore glacial margin
- Pre-MIS 2 environment
- Submarine permafrost distribution
- Where is the Gubik formation?
- Where is the Eemian?
- Herschel Basin: Pro-glacial lake vs. paleo-Babbage River Delta?



Late glacial and Holocene sequence at the mainland coast of the Yukon Coastal Plain near Komakuk Beach.



Scheme of Late Wisconsinan-Holocene landscape dynamics showing the main stages of sediment deposition, ground-ice formation, and degradation beyond the LIS maximum extent.

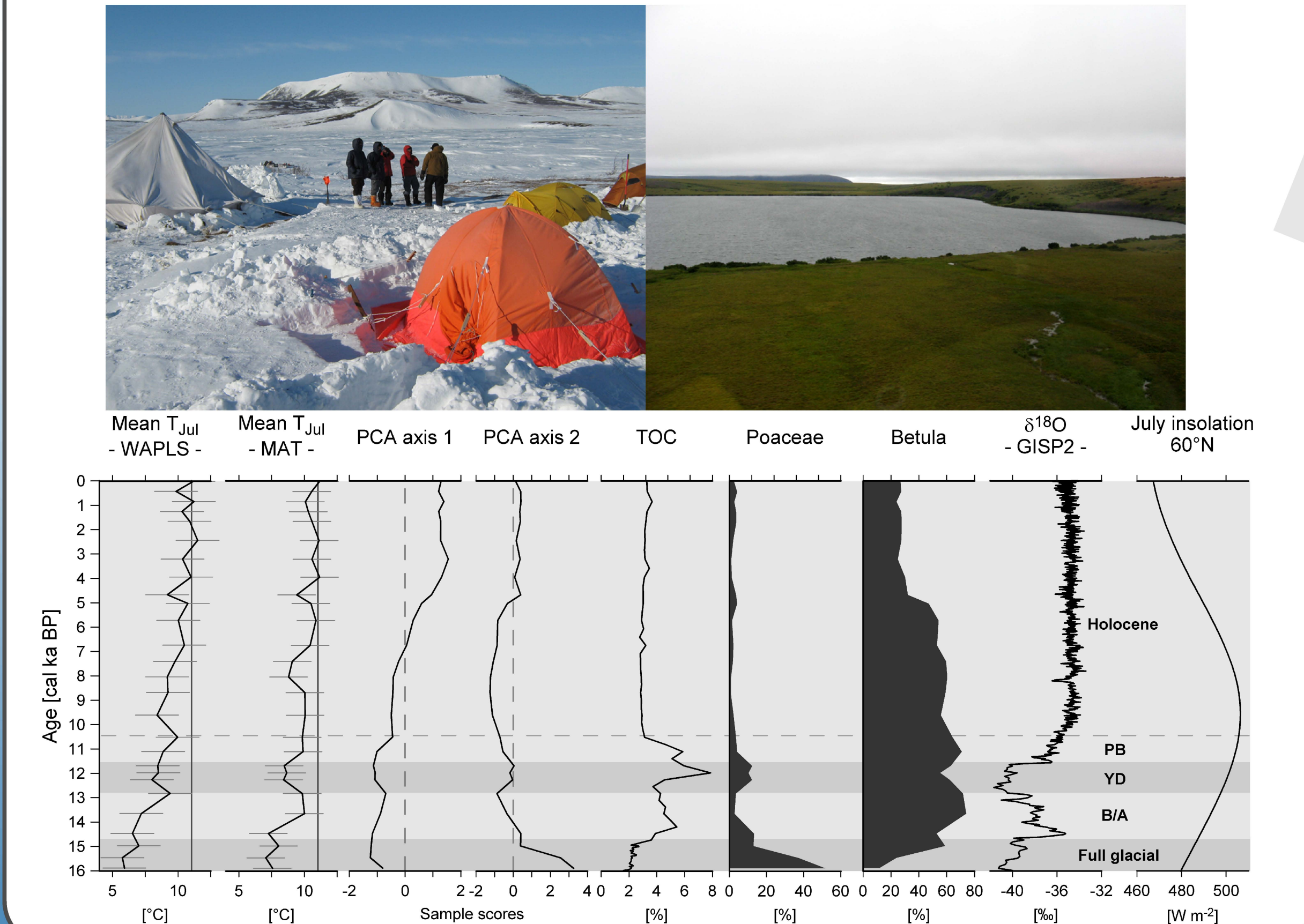
### What do we know?

- Yukon Coastal Plain is easternmost margin of Beringia
- Exposed sediments are terrestrial only
- Alluvial-proluvial plain in Late Wisconsinan
- Rapid climate warming in early Holocene (HTM)
- Extensive carbon sequestration
- Organic carbon stored as POC & DOC
- Middle/Late Holocene permafrost aggradation

### What do we know?

- Lakes formed directly beyond the glacial margin in Beringia 16 cal ka BP
- Pronounced Younger Dryas record
- HTM subdued
- Precipitation-limited vegetation spread
- Middle/Late Holocene paludification due to permafrost aggradation

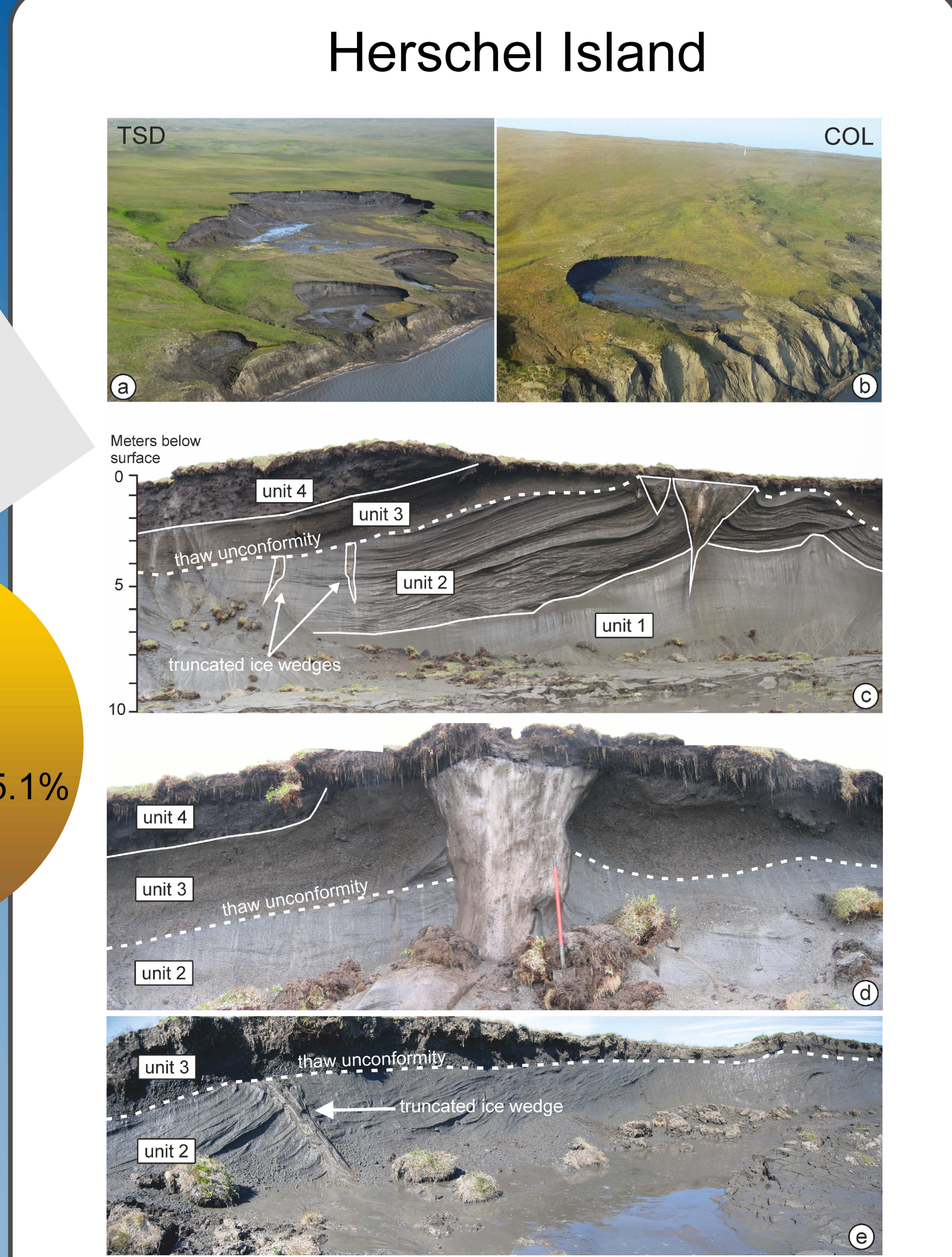
### Trout Lake (162 m asl)



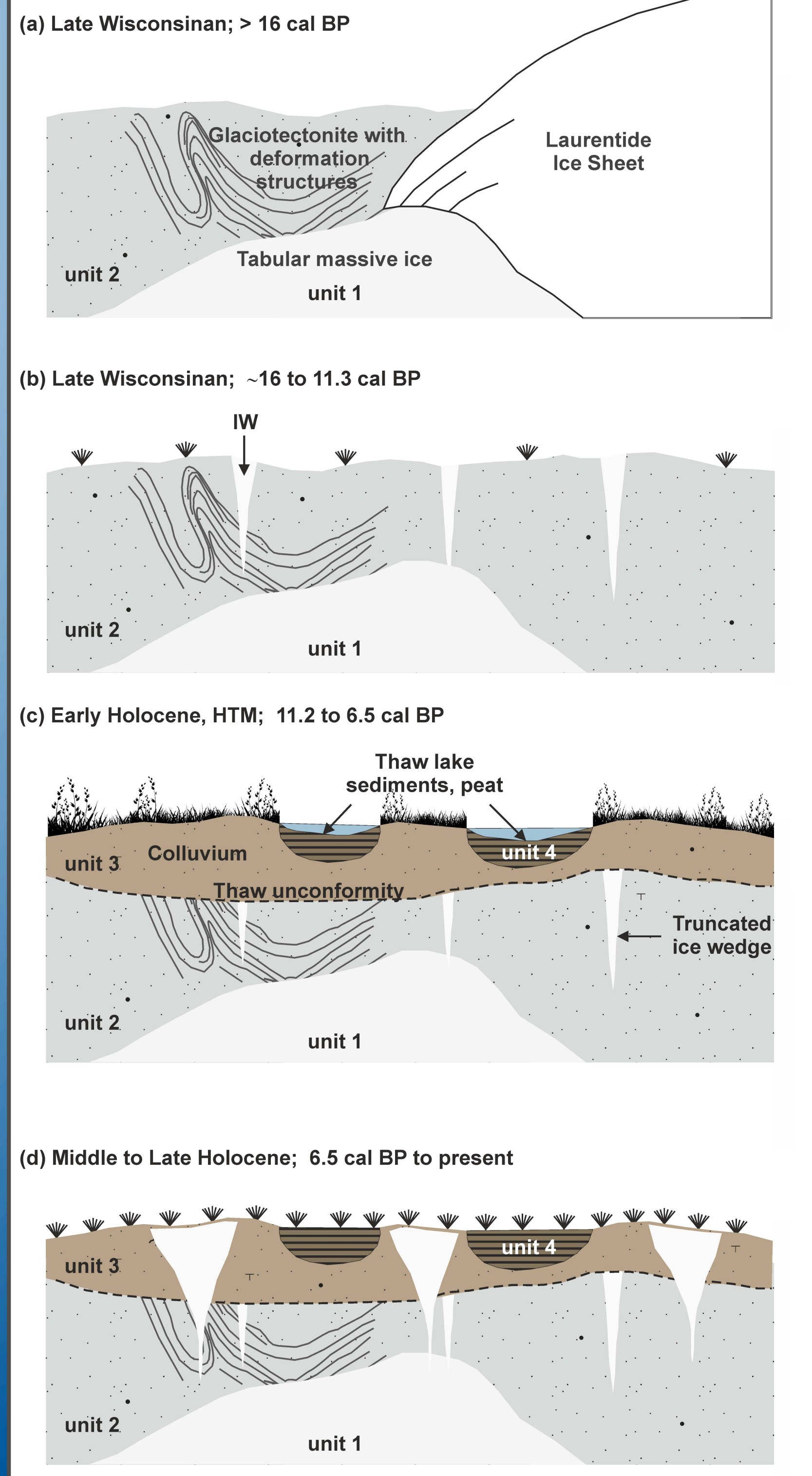
### Glacial landscape

### What do we know?

- Herschel Island is MIS 2 push moraine
- Likely late glaciation ~16.2 cal ka BP
- Large masses of buried glacier ice
- Late Wisconsinan ice wedges preserved
- Rapid climate warming in early Holocene (HTM) → Regional thaw unconformity
- Rapid coastal erosion



Retrospective thaw slumps (TSD and COL sites) on Herschel Island with position of thaw unconformity (dashed line). Large epigenetic ice wedge (d) penetrating thaw unconformity. Arrow points to a truncated ice wedge below the thaw unconformity.



Scheme of Late Wisconsinan-Holocene landscape dynamics showing the main stages of sediment deposition, ground-ice formation, and degradation within the LIS maximum extent.

### 16 ka lake record

Fritz, M., Wetterich, S., Schirmeister, L., Meyer, H., Lantuit, H., Preusser, F., Pollard, W.H. (in press). Eastern Beringia and beyond: Late Wisconsinan and Holocene landscape dynamics along the Yukon Coastal Plain, Canada. *Palaeogeography, Palaeoclimatology, Palaeoecology*. doi:10.1016/j.palaeo.2011.12.015.

Fritz, M., Herzsuh, U., Wetterich, S., Lantuit, H., De Pascale, G.P., Pollard, W.H., Schirmeister, L. (under review). Late glacial and Holocene sedimentation, vegetation, and temperature history from easternmost Beringia (Northern Yukon Territory, Canada). *Quaternary Research*.