A Late Holocene palaeoenvironmental lake record from the Yukon Coastal Plain, NW Canada

Wolter, J., Herzschuh, U., Lantuit, H.
High resolution palaeoecological record of the last centuries in the subarctic tundra of NW Canada

Aim

• Little Ice Age
• Recent warming
The Yukon Coastal Plain

Subarctic
The Yukon Coastal Plain

Subarctic
Treeless tundra
Arctic Ocean
British Mountains
The Yukon Coastal Plain

Subarctic
Treeless tundra
Arctic Ocean
British Mountains
Continuous permafrost
Unconsolidated sediments
Tussock tundra
• *Eriophorum* tussocks
• Dwarf shrubs (*Betula glandulosa, Salix sp., Ericales, Rubus chamaemorus, Dryas integrifolia*)
• Mosses
Lake-shore vegetation

- Shrubs
- Forbs (*Chrysosplenium, Petasites, Polygonum, Ranunculus, Rumex, Stellaria,..*)
- Cyperaceae (*Carex, Eriophorum*)
- Grasses (*Poa, Arctagrostis, Hierochloë*)
- Mosses
Ice-wedge polygons (mires)
- Cyperaceae (*Carex*, *Eriophorum*)
- Mosses
- Dwarf shrubs (*Salix*, *Betula*, Ericales, *Rubus chamaemorus*, *Dryas integrifolia*)
Lake sediment short core (49 cm)

- Biogeochemistry: TC, TOC, TN, $\delta^{13}C$
- Grain size distribution
- Geochronology: $^{210}\text{Pb}/^{137}\text{Cs}$, AMS $^{14}C$
- Pollen
Results

No significant splits
Results

No significant splits
Results

No significant splits
Results

No significant splits
Results

Lake signal

Lake marginal vegetation signal
Results – oscillating lake water level

Change in water level (draining and refilling)

Change in basin depth (thermokarst)

2012

Pre 1900

3.7 m
Results – oscillating lake water level

Change in water level (draining and refilling)

Change in basin depth (thermokarst)

Pre 1900

2012

3.7 m
Little Ice Age?

Recent warming?
Herschel Island (Yukon Coast)
1899-1905 compared to 1999-2005:
MAAT +2.6°C       MJanT +5.8°C
**Herschel Island** (Yukon Coast)

1899-1905 compared to 1999-2005:

MAAT $+2.6^\circ\text{C}$

MJanT $+5.8^\circ\text{C}$
Conclusions

• No regional vegetation change during the last 300 years
• Slight increase in *Alnus* pollen in the last century – approaching Alnus shrubline
• Local hydrological change: lower and variable lake water level pre 1900
Thank you for your attention!