ALFRED-WEGENER-INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

Temporal and spatial variations in coastal dynamics along the Yukon coast, Canada

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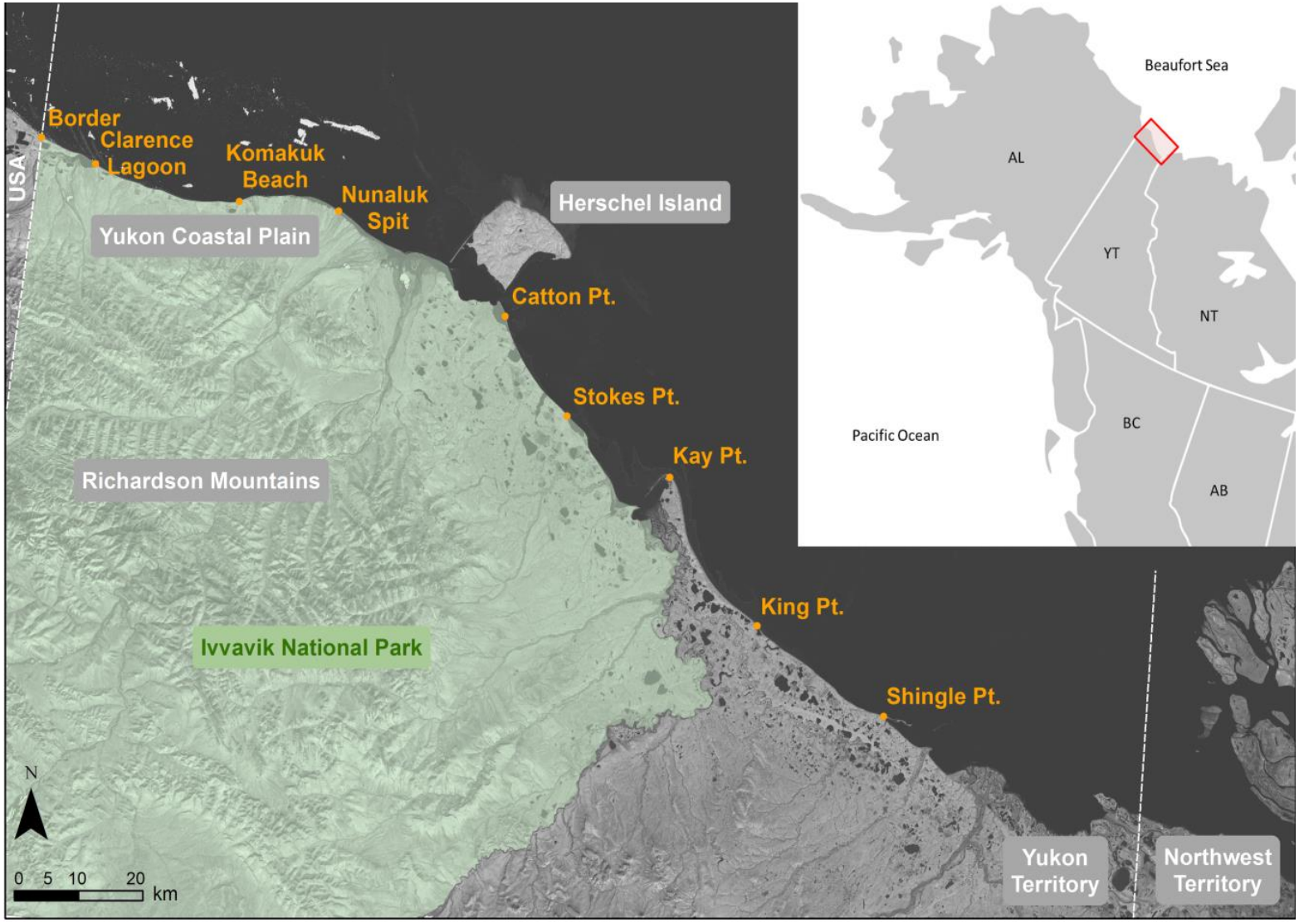
HELMHOLTZ GEMEINSCHAFT

Background

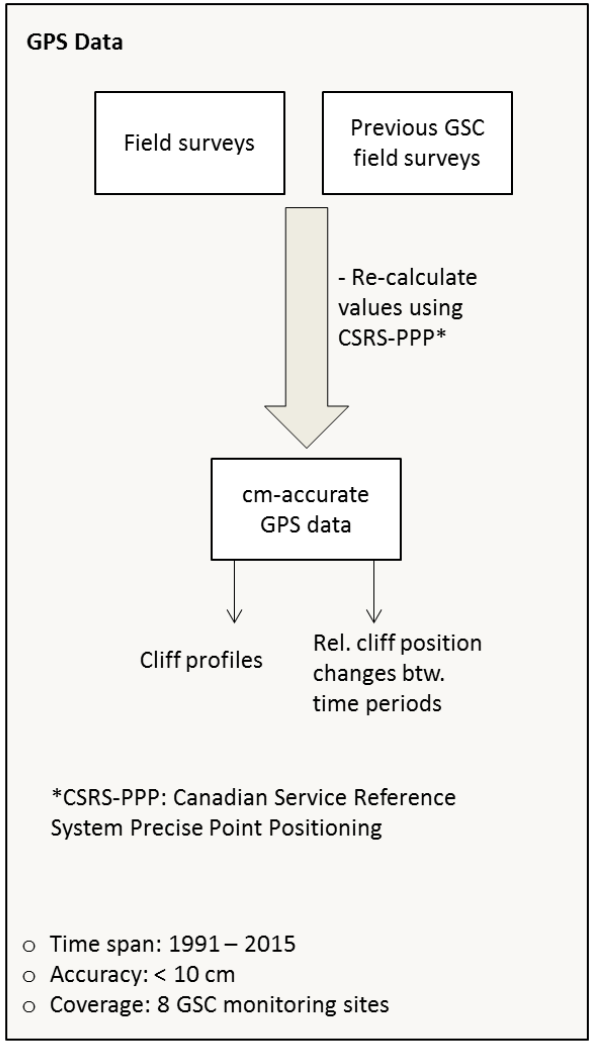
Source: International Permafrost Association, 1998. Circumpolar Active-Layer Permafrost System (CAPS), version 1.0.

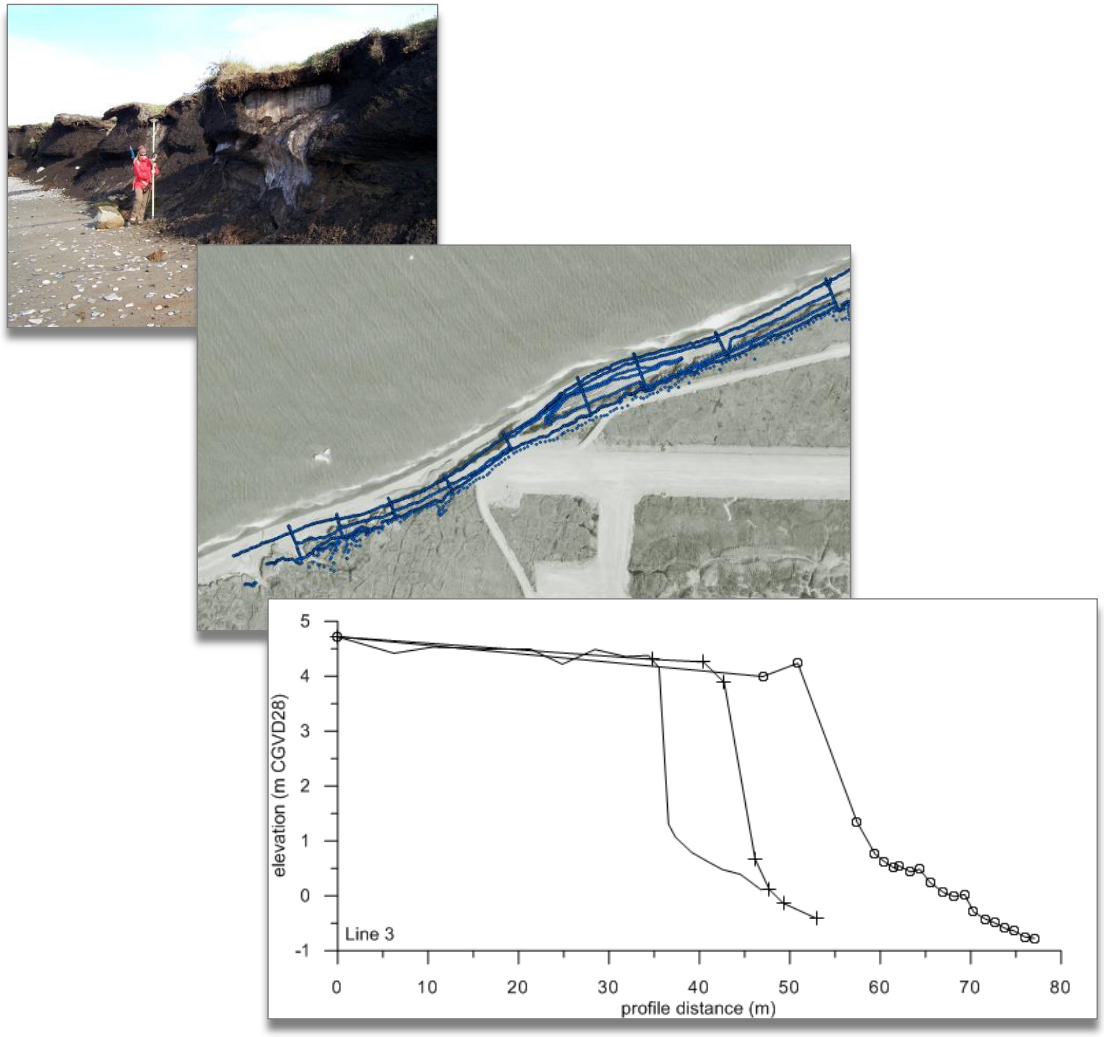
- **1/3 of all coasts worldwide** consist of permafrost
- Permafrost contains **2 x more carbon** as is circulating in our atmosphere
- Arctic coasts erode up to **30 meters per year**

Study Area

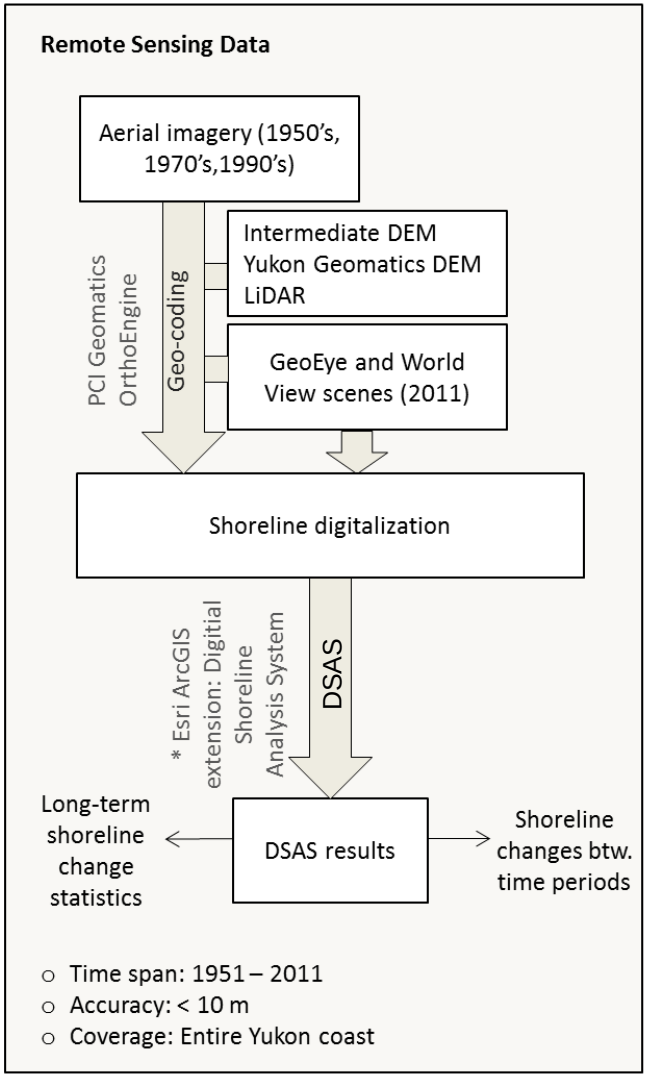

Border
Clarence Lagoon
Komakuk Beach
Nunaluk Spit
Herschel Island
Yukon Coastal Plain
Catton Pt.
Stokes Pt.
Kay Pt.
Richardson Mountains
Ivvavik National Park
King Pt.
Shingle Pt.
USA
N
0 5 10 20
km
Yukon Territory
Northwest Territory
Beaufort Sea
AL
YT
NT
BC
AB
Pacific Ocean

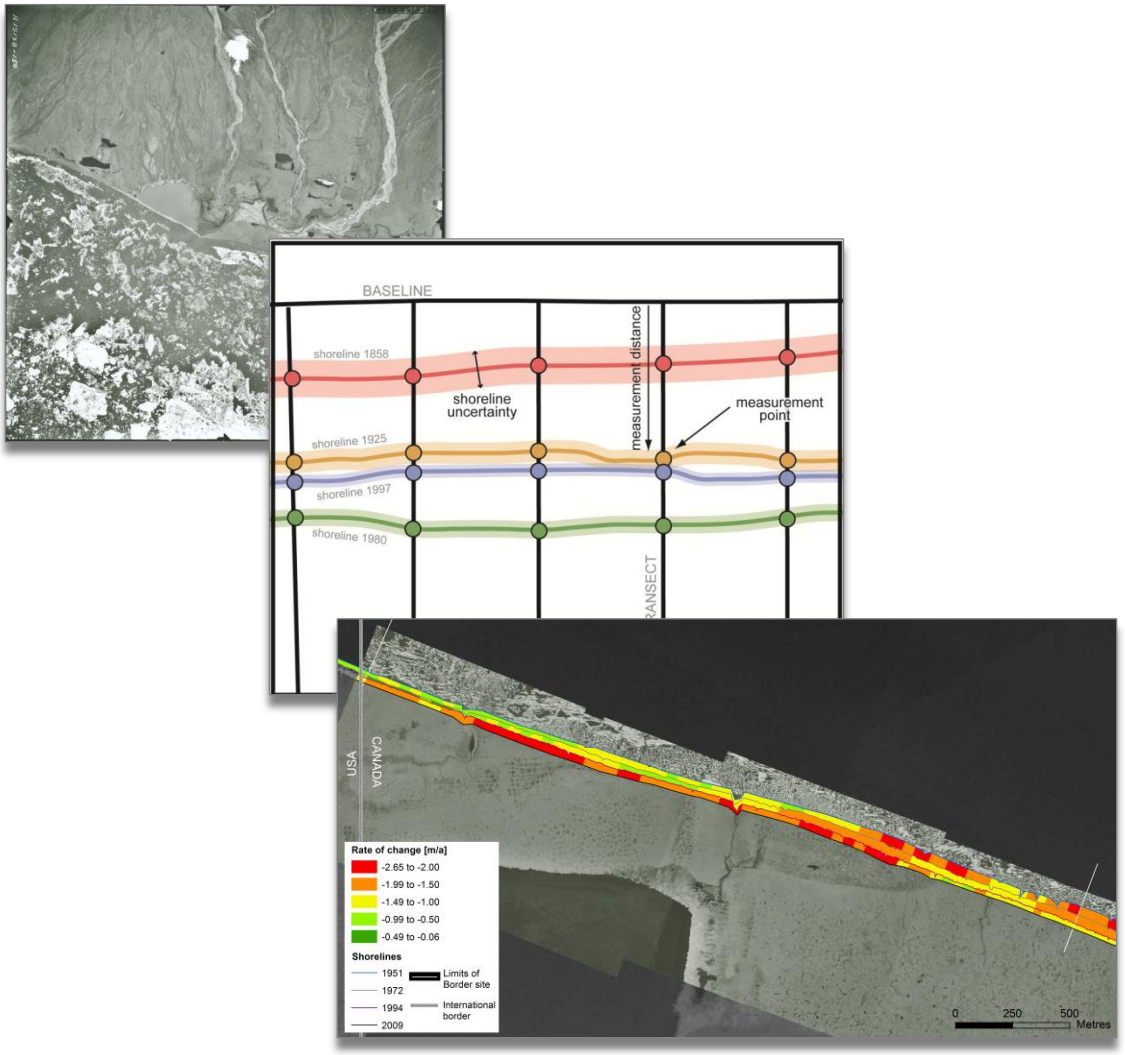
Methods: Field studies



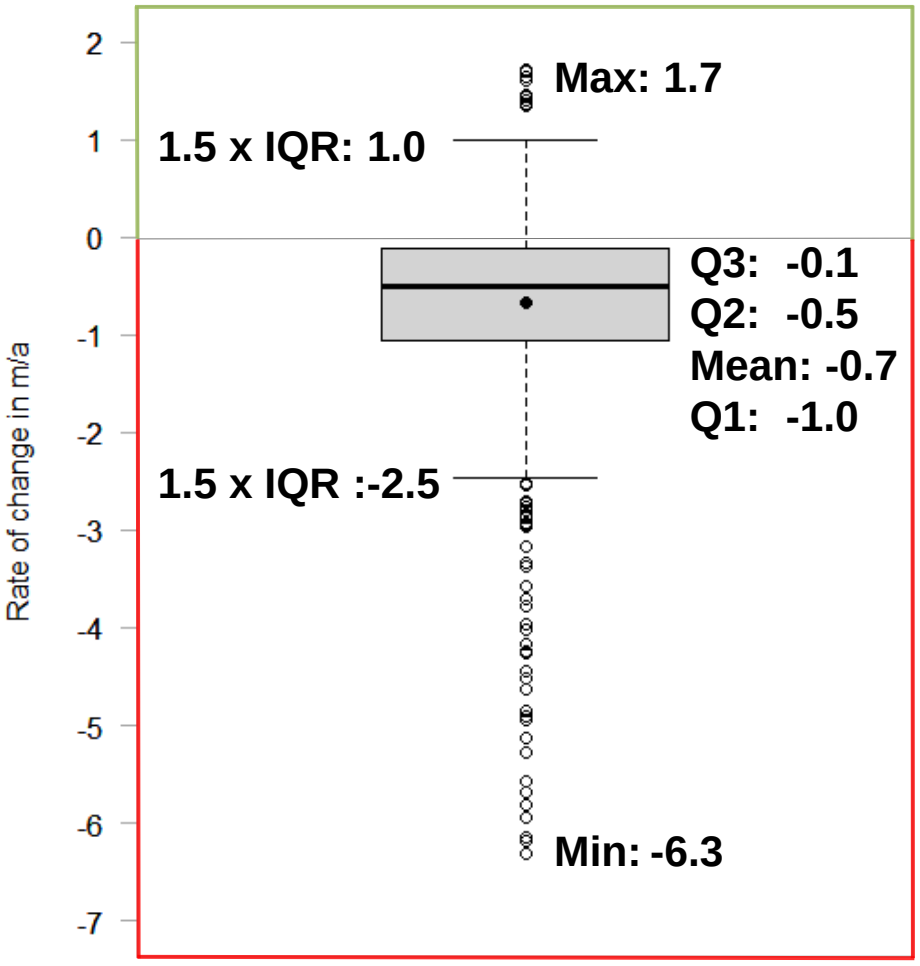


Methods: Remote sensing





Results: Whole coast



DSAS statistics show, that during the time period

1952 – 2011

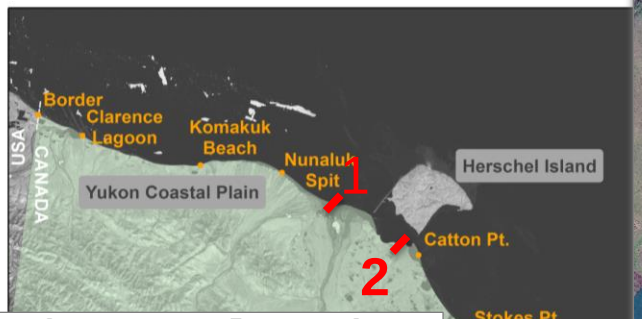
13 % of all transects recorded

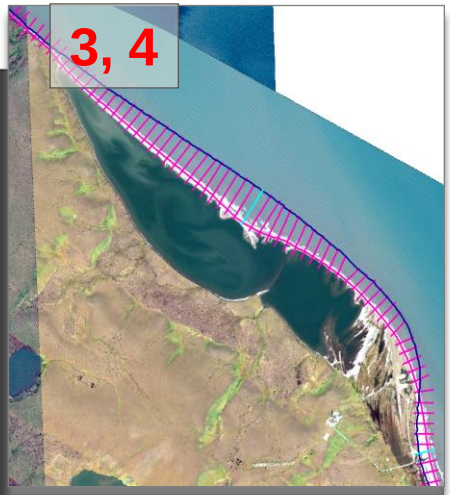
accumulation ⟶ 0.5 % > 1 m/a

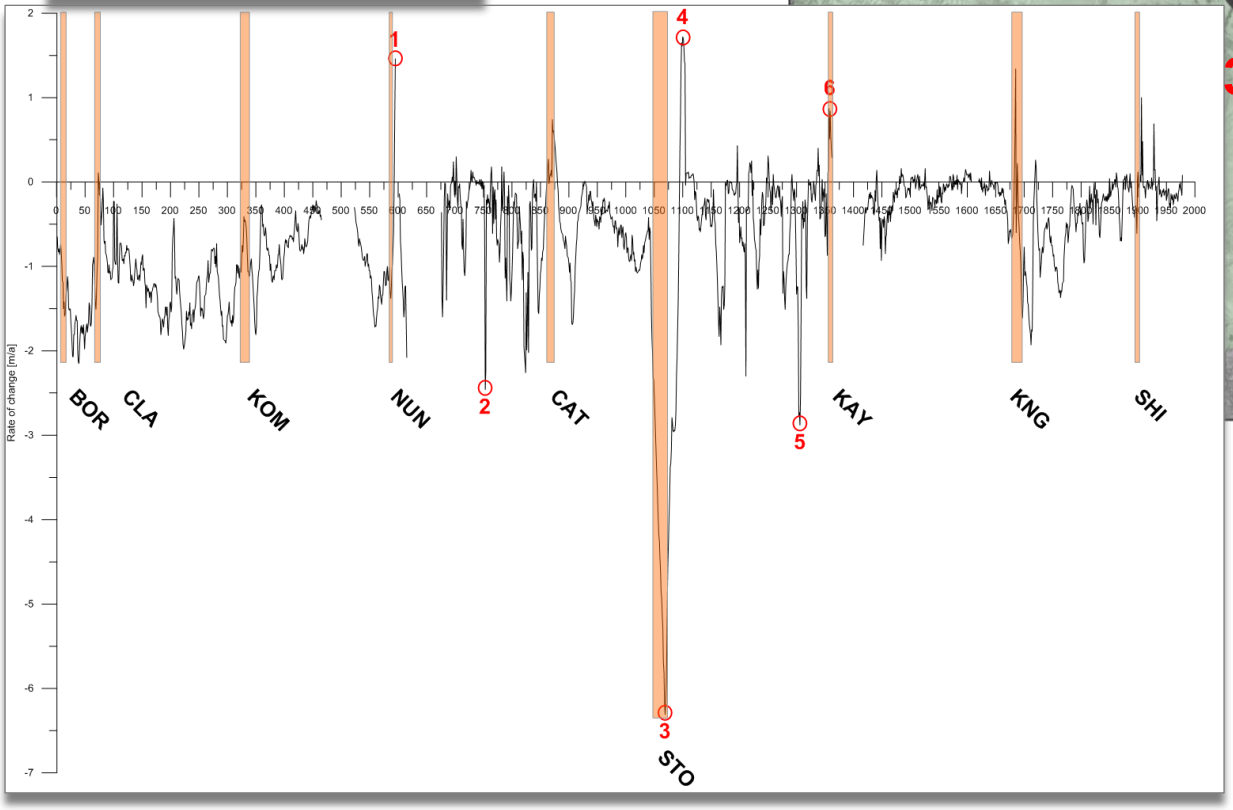
87 % of all transects recorded

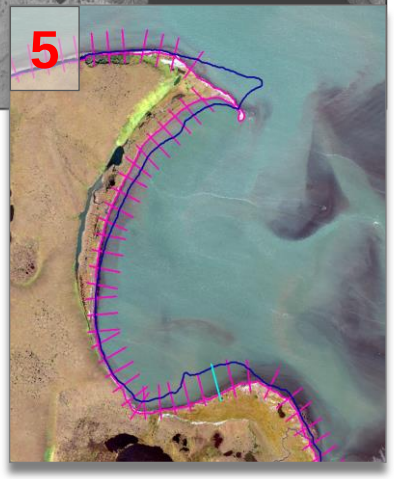
erosion ⟶ 28 % > 1 m/a

Results: Whole coast

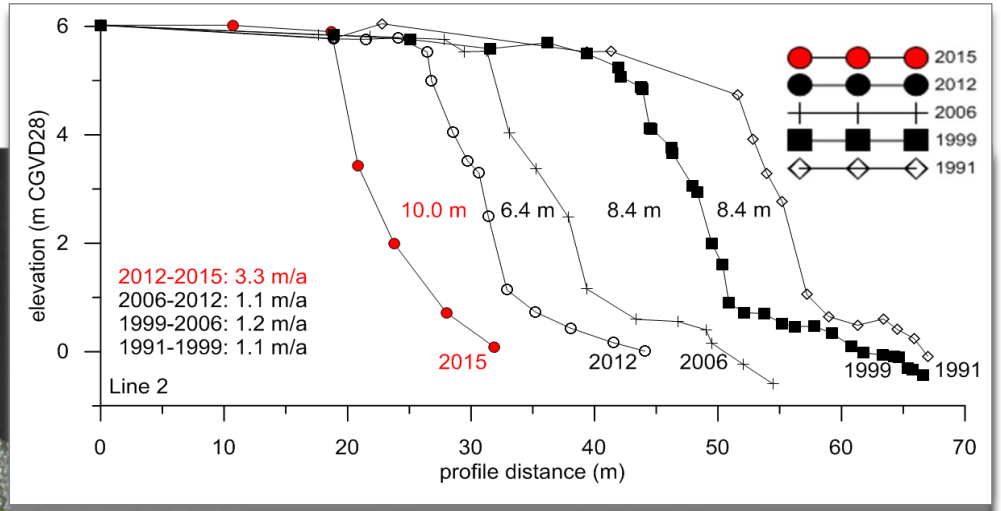






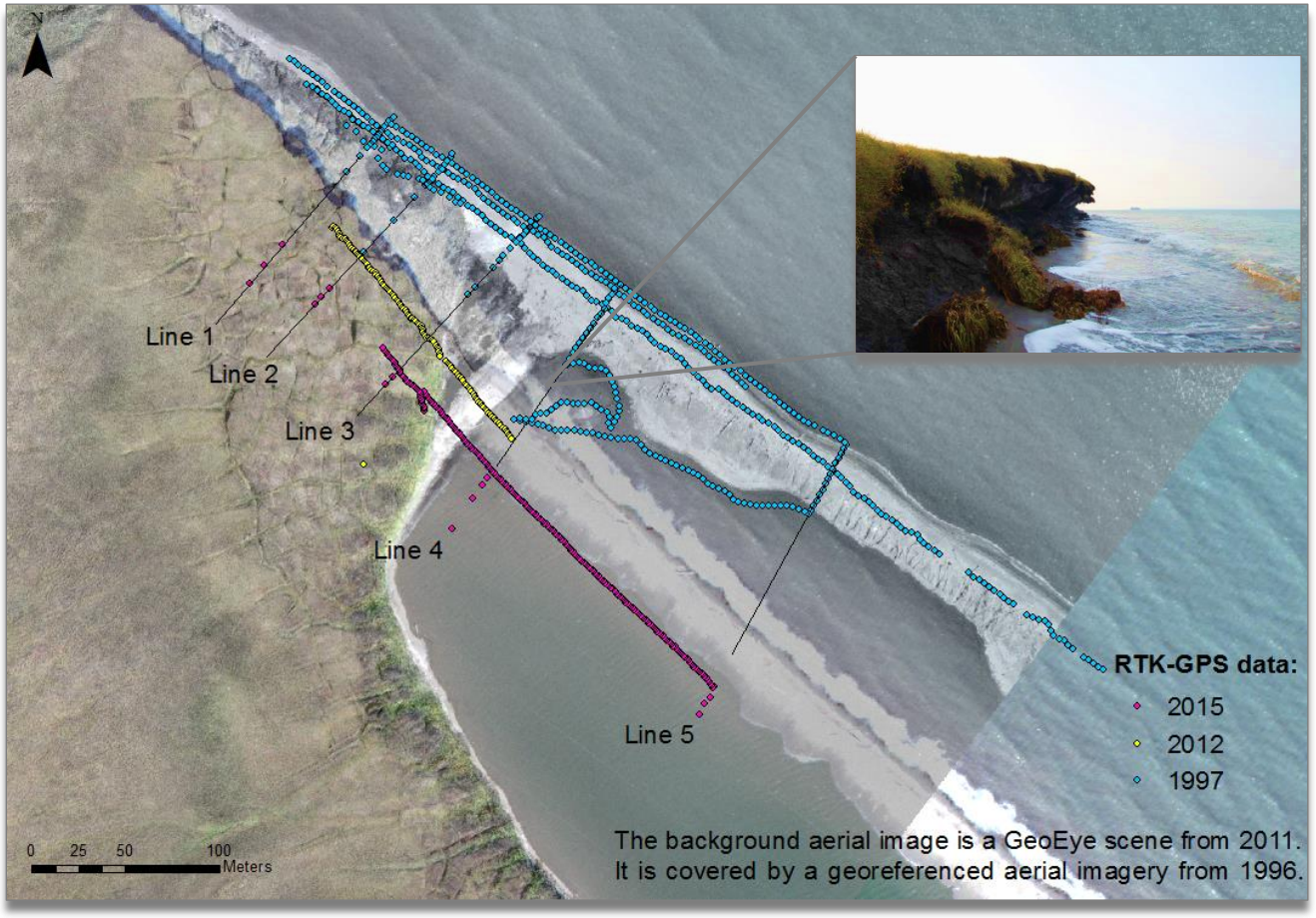


Results: Yukon-Alaska Border



Results: Stokes Point west

Time period	Erosion rate [m/a]
2004-2015	8.9
2007-2014	8.8
2006-2007	0.5
1999-2006	0.2
1997-1999	1.1



Conclusions

- Arctic coastal erosion shows **high spatial and temporal variability**

- The variability of erosion seems to be **multi-causal**. It cannot be solely explained by internal factors like exposure or ice-content

- The overall trend goes towards **accelerating coastal erosion**

Research funding: