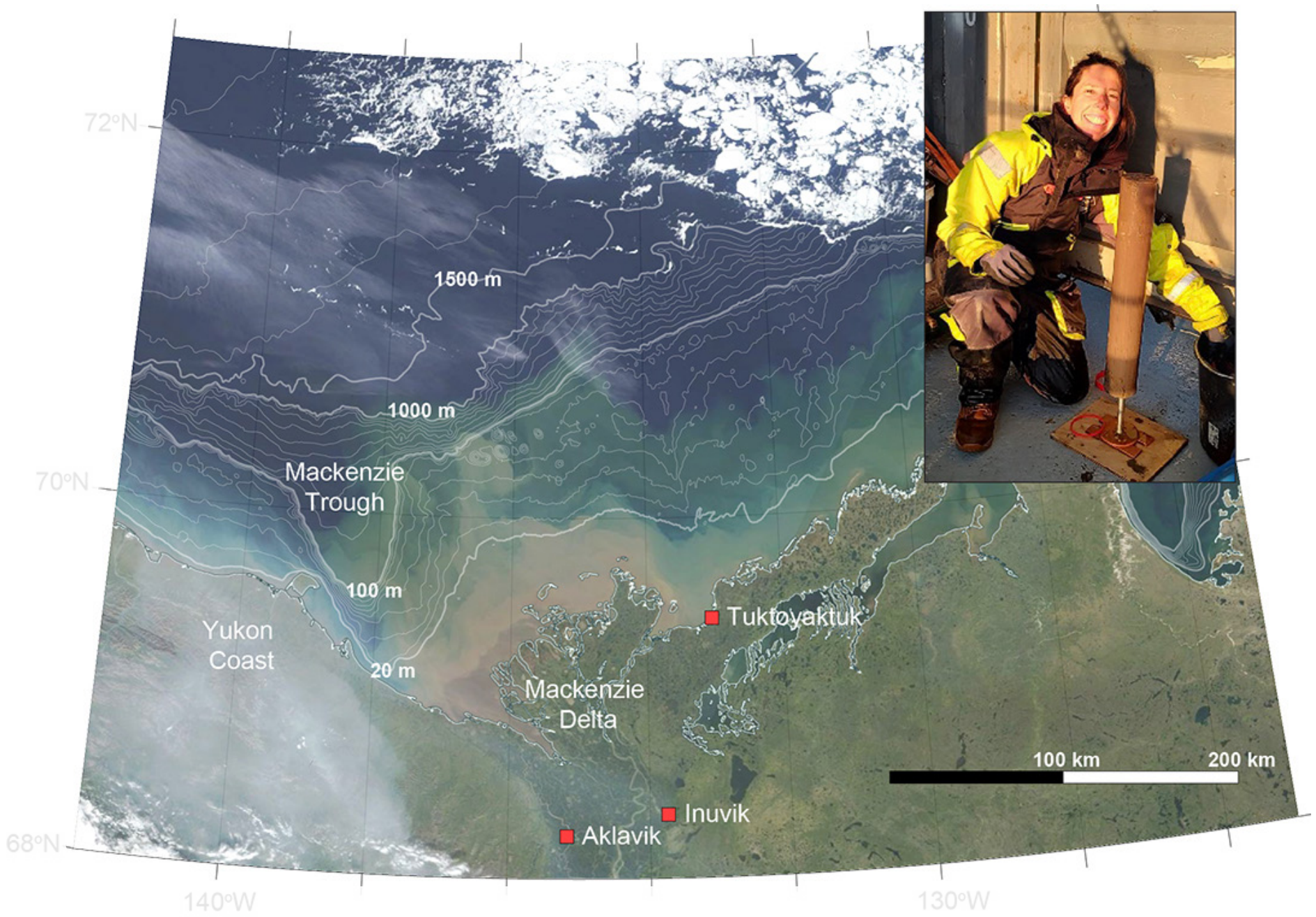

Paleoenvironmental reconstructions in the Canadian Arctic using biomarkers

Julie Lattaud | Department of Environmental Sciences, University of Basel, Switzerland
February 1, 2024 at 15h00 in William-Olsson lecture hall

Climate change is projected to significantly alter physical, biological, and socio-economic systems, particularly in high latitudes. The Mackenzie River Delta and near-shore Beaufort Sea region of Canada is one such area that is experiencing considerable changes in climate (temperature, precipitation) and associated impacts (sea ice cover, coastal erosion, carbon cycling). Understanding how environmental conditions have changed in the past and are changing now is key to anticipating and mitigating future impacts.
In a series of linked projects, we have collected sediment cores on several expeditions aimed to cover the land-to-sea continuum across different timescales. These include the Mackenzie River Delta lakes near Inuvik (68 °N) (expedition on land in winter 2009 and 2022) to the Beaufort Shelf and slope (72 °N) (expedition PeCaBeau in 2021 on board CCGS Amundsen), and planned expeditions to the near-shore coastal zone (FLO CHAR in 2024). One of the overarching aims is to deconvolute environmental variations caused by anthropogenic climate change from natural base-line variation in the Holocene.
Biomarkers are useful tools to realize such reconstructions as they are source-specific lipids that preserve on long time scales and can be indicative of important environmental conditions (i.e. temperature, salinity, sea-ice) and processes (i.e. bacteria metabolism). They can be extremely useful to reconstruct past environmental conditions, in particular when paired with high-resolution age models and sedimentological parameters. I will present two case studies: 1) reconstructing Holocene sea-ice cover in the Beaufort Sea and 2) tracing permafrost carbon incorporation into microbial biomass in the Mackenzie Delta lakes.

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