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CONTRIBUTION OF RETROGRESSIVE THAW SLUMPS TO THE NEAR SHORE CARBON BUDGET ALONG THE YUKON COAST

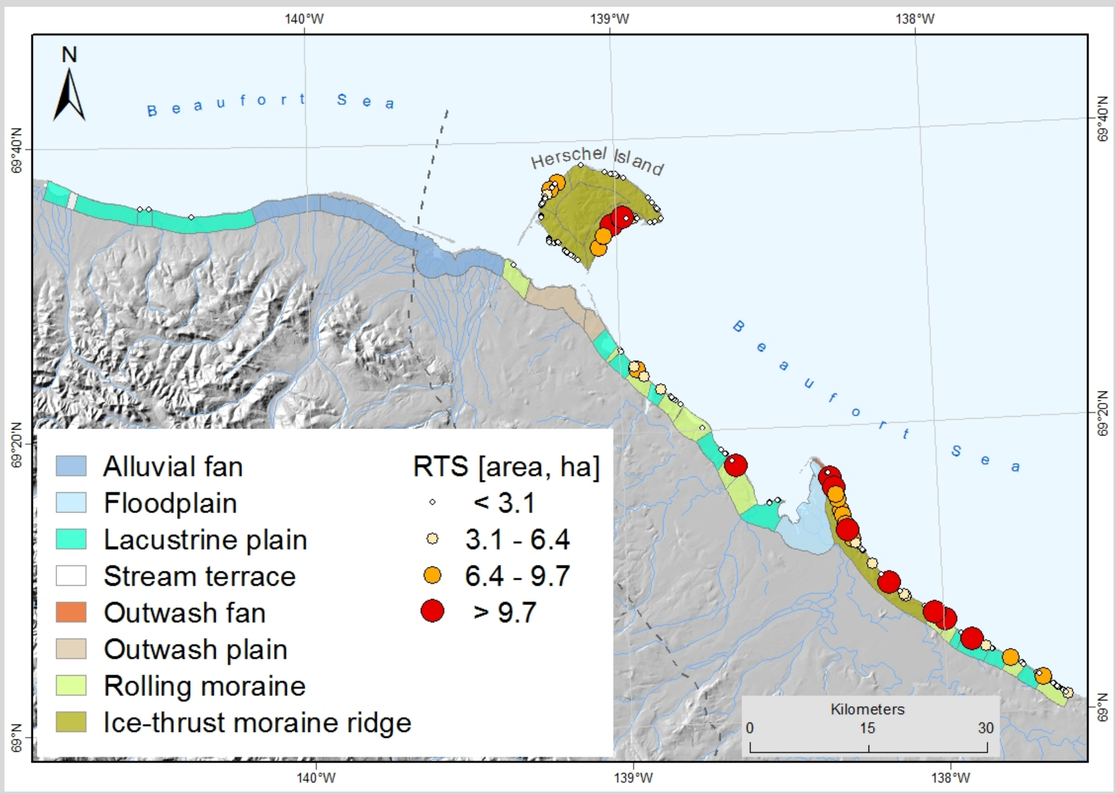
Introduction

The mechanism of carbon dioxide and methane release to the atmosphere in permafrost regions is not solely restricted to the progressive thawing of the upper part of the ground by warmer air temperatures. Organic carbon and nutrients are released to streams, rivers or coasts by abrupt processes such as thermokarst, thermal erosion and simply river bank or coastal erosion.

Retrogressive thaw slumps (RTSs) are one highly dynamic landform, which results from thermo-erosion of ice-rich permafrost and leads to the displacement of large volumes of sediments.

Thermo-erosion, as a mechanism of rapid permafrost thaw, reshapes Arctic coasts and has a clear impact on the **mobilization and distribution of carbon and nitrogen** in permafrost terrains.

There are currently no estimates of the contribution of these permafrost degradation landforms to the carbon budget, therefore thermo-erosional features are not yet accounted in the carbon models.



In our previous study, we show that the number of RTSs has increased by **42%** along the Yukon Coast between **1952 and 2011**.
It represents on average **2 new RTSs / year** throughout the period.

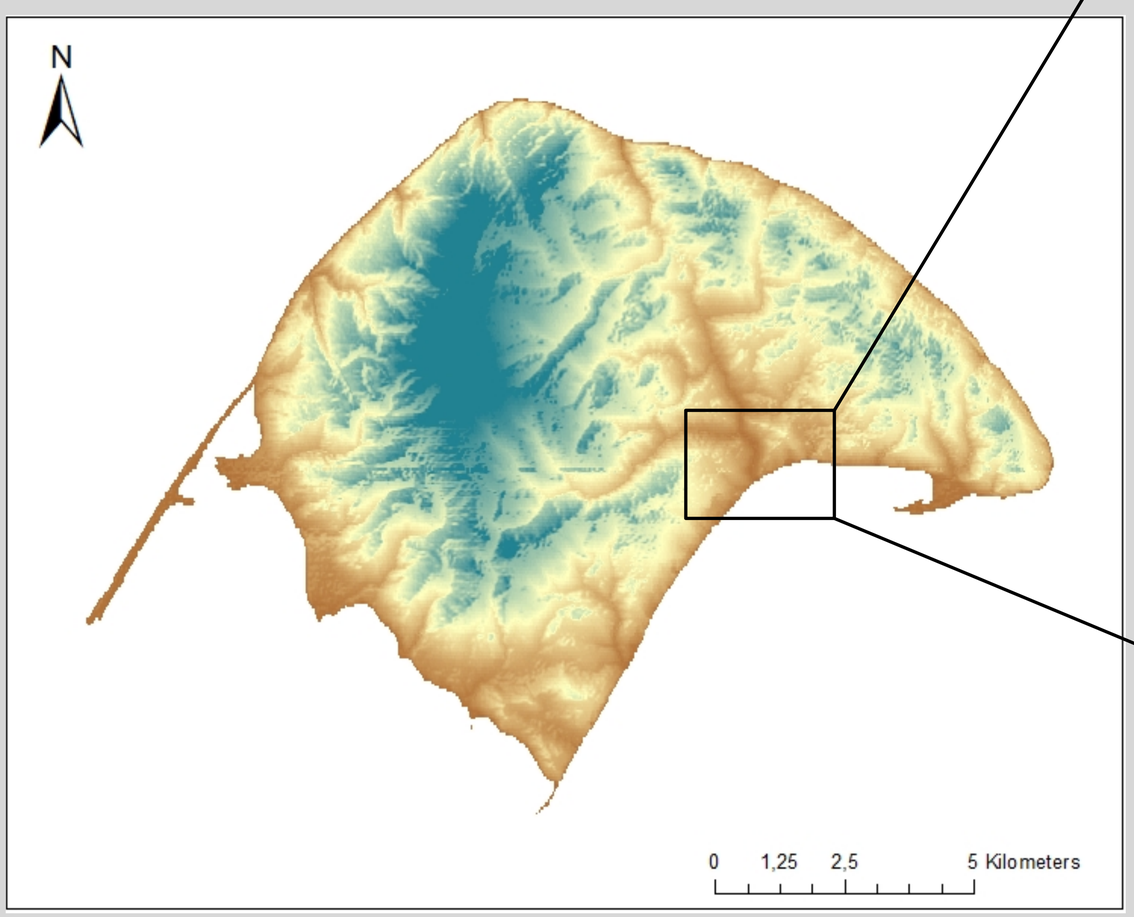
OBJECTIVES

With this study we want to:

1) calculate the amount of **sediments eroded** through the development of RTSs,
2) estimate the amount of **carbon mobilized** and potentially transported from the land to the nearshore zone of the Beaufort Sea.

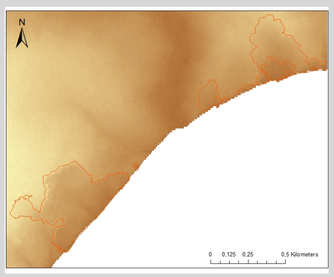
METHODS

Surface extrapolation methods



IDEM (2011, 12m resolution) of Qikiqtaruk - Herschel Island

1. IDEM, 12m resolution



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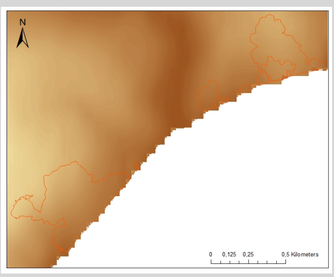
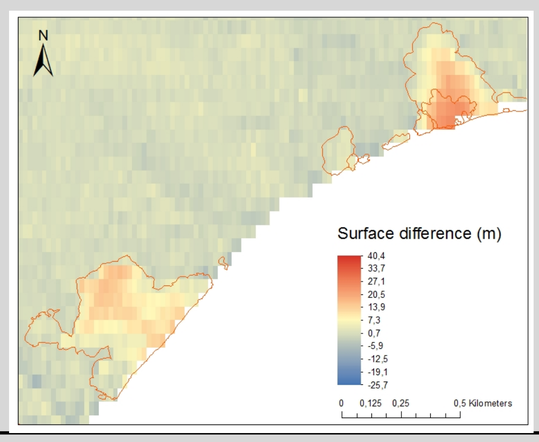
2. Surface extrapolation using Topo to Raster tool



Difference 2 - 1



Further Steps

Comparing different type of extrapolation methods and automatizing the process for the 394 RTSs along the Yukon Coast in order to reach our objectives and calculate the total amount of sediments released through slumping.

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