

Coastal Monitoring Parson's Pond

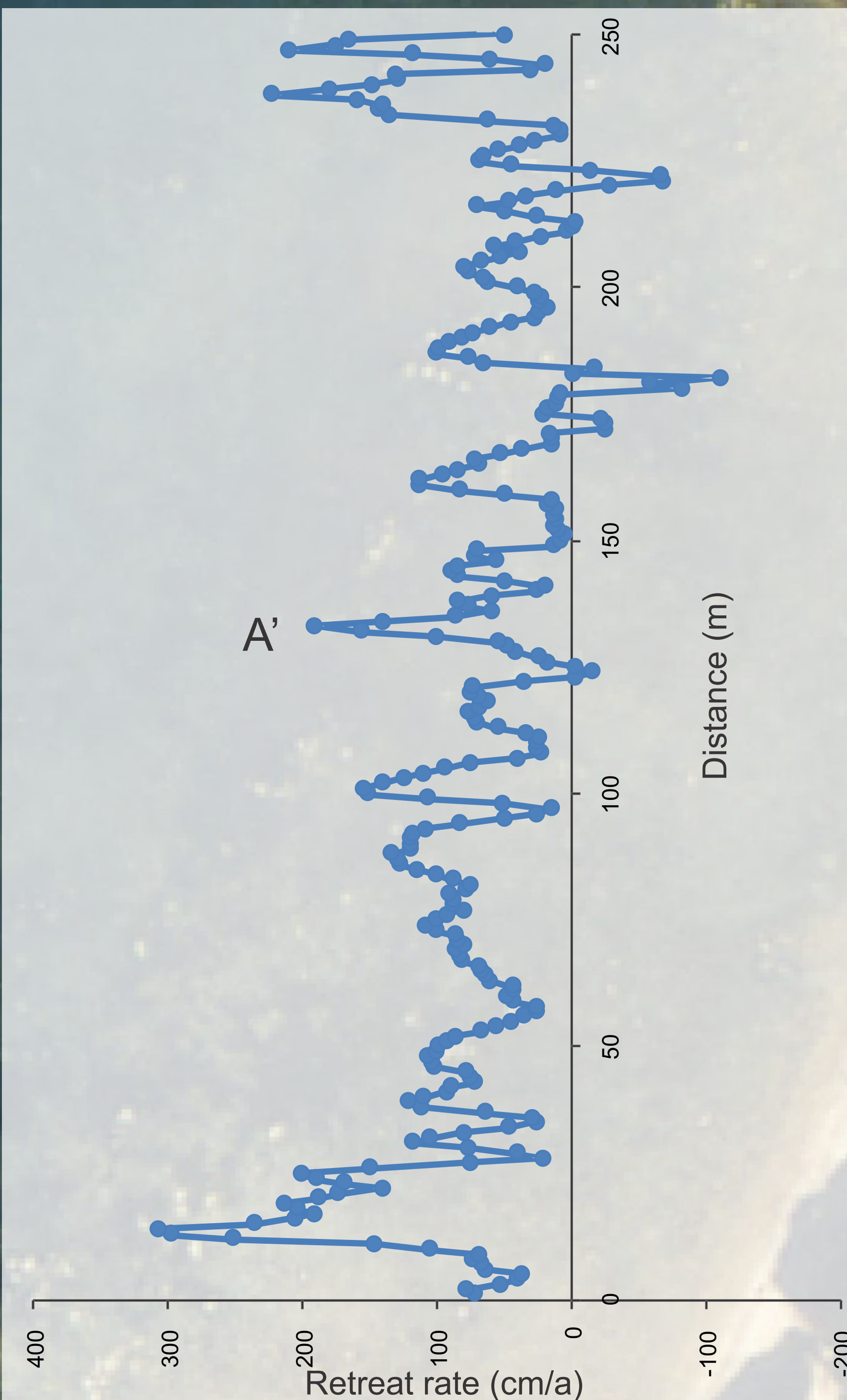
Site

Parson's Pond is on the eastern shore of the Gulf of St. Lawrence, western Newfoundland. The site has an exposure to the west, southwest and northwest with a fetch greater than 600 km to the west. There is a cliff of unconsolidated glaciomarine gravel, sand, and silt, which ranges in height from 11 to 16 m and is non-vegetated. In front of the cliff is a narrow beach composed of sand, pebbles, cobbles, and boulders.

Overall, between 2013 and 2014 the area underwent erosion. The average recession rate of the surveyed interval was 73 cm, ranging from -100 cm (indicating advance) to 300 cm (blue line on graph below). Areas of accretion (negative retreat-rate values) are likely the result of slumping along the cliff edge. Surface run-off and groundwater flow are causing gullying in the permeable sediment. The cliff is exposed to the wind, which is removing sediment from the cliff face.

Coastal change measurement

Using topographic survey data, cliff-top positions were measured and are shown as lines colour-coded by year on the airphoto. To determine annual retreat rates, the change of the shoreline position was calculated along shore-normal transects spaced every metre along the cliff-top. Retreat rates are shown on the line graph below, with the circles on the graph corresponding to the location on the cliff-top of the shore-normal transects. For instance, point A on the cliff-top corresponds to A' on the graph, and the retreat rate is 192 cm/a. Retreat rates were smoothed using a moving average for three adjacent shore-normal transects. Positive values on the graph's y-axis denote erosion while negative values denote accretion (deposition).



As seen in the above photo, gullying is occurring in the coastal bluffs, which are composed of silt and clay (darker sediment with a steep slope angle) and sand and gravel (lighter sediment with a shallow slope angle). Sand and gravel are highly susceptible to erosion from water and wind. Silt and clay are more resistant, but may fail when saturated.



View along the edge of the cliff looking south in 2013. The coast is exposed and waves can rework the beach sediment.



Surveying the edge of a large gully at Parson's Pond in 2013.