

Arctic coast erosion revealed by drone images

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Coastal thaw on Qikiqtaruk - Herschel Island, Yukon Territory, Canadian Arctic.
Credit: University of Edinburgh

Extreme erosion of Arctic coastlines in a changing climate—up to a metre a day—has been revealed with drone surveys.

Storms in the Canadian Arctic are washing away increasing amounts of coastal permafrost—frozen ground—which is exposed when sea ice melts during the summer.

The results highlight the ongoing change in the region, as a warming climate leads to longer summer seasons.

Sea ice melts earlier and reforms later in the year than before, exposing the coastline and presenting more opportunities for storms to cause damage.

Arial cameras

An international team of researchers led by the University of Edinburgh flew drone-mounted cameras over a section of permafrost coastline on Herschel Island, also known as Qikiqtaruk, off the Yukon coast in the Canadian Arctic.

The team mapped the area seven times over 40 days in the summer of 2017.

Their results, from image-based computer models, showed that the coast had retreated by 14.5 metres during the period, sometimes more than a metre a day.

Comparison with surveys dating from 1952 until 2011 showed that the rate of erosion in 2017 was more than six times the long-term average for the area.

Landscape change

Around the Arctic, rapidly changing permafrost landscapes threaten infrastructure essential to local communities such as on Qikiqtaruk—Herschel Island, as well as significant cultural and historic sites.

The study, published in *The Cryosphere*, was carried out in collaboration with the University of Exeter, Alfred Wegener Institute, Germany, the GFZ German Research Centre for Geosciences, the Vrije Universiteit Amsterdam and Dartmouth College.

It was supported by the UK Natural Environment Research Council, the National Geographic Society, and Horizon 2020.

"As the Arctic continues to warm faster than the rest of our planet, we need to learn more about how these landscapes are changing. Using drones could help researchers and [local communities](#) improve monitoring and prediction of future changes in the region," says Dr. Andrew Cunliffe.

"Big chunks of soil and ground break off the [coastline](#) every day, then fall into the waves and get eaten away," says Dr. Isla Myers-Smith.

More information: Andrew M. Cunliffe et al, Rapid retreat of permafrost coastline observed with aerial drone photogrammetry, *The Cryosphere* (2019). DOI: 10.5194/tc-13-1513-2019

Provided by University of Edinburgh

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