

Erosion rates double along portion of Alaska's coast

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Skyrocketing coastal erosion occurred in Alaska between 2002 and 2007 along a 64 kilometer (40 mile) stretch of the Beaufort Sea, a new study finds. The surge of erosion in recent years, averaging more than double historical rates, is threatening coastal towns and destroying Alaskan cultural relics.

Average annual erosion rates along this segment of the Beaufort Sea, which lies North of Alaska, had already climbed from about 6.1 m (20 ft) per year between the mid-1950s and late-1970s, to 8.5 m (28 ft.) per year between the late-1970s and early 2000s, the study's authors note. The most recent erosion rates reached an average of 14 meters (45 feet) per year during the 2002-2007 period, reported Benjamin Jones, a geologist with the U.S Geological Survey in Anchorage, and his colleagues on February 14 in *Geophysical Research Letters*, a journal of the American Geophysical Union (AGU).

Changing arctic conditions may have caused these recent shifts in the rate and pattern of land loss along this coastline segment, the authors propose. The changes include declining sea ice extent, increasing summertime sea-surface temperature, rising sea level, and increases in storm power and corresponding wave action.

"These factors may be leading to a new era in ocean-land interactions that seem to be repositioning and reshaping the Arctic coastline," Jones and his colleagues write. The authors also documented sections of Beaufort Sea coastline that eroded more than 24 m (80 ft.) during 2007.

The researchers caution that the recent patterns documented in their study may not be representative of the overall Arctic. However, they may well forecast the future pattern of coastline erosion in the region.

"This segment of coastline has historically eroded

at some of the highest rates in the circum-Arctic, so the changes occurring on this open-ocean coast might not be occurring in other Arctic coastal settings," says Jones. But Arctic climate change is leading to rapid and complex environmental responses in both terrestrial and marine ecosystems in ways that will almost certainly affect the rate and pattern of coastline erosion in the Arctic, the authors write.

Interestingly, there were no westerly storm events during the summer of 2007, traditionally believed to be the drivers of coastal erosion in this region the Arctic. However, 2007 did boast the minimum arctic sea-ice extent and the warmest ocean temperatures on record.

"The recent trends toward warming sea-surface temperatures and rising sea-level may act to weaken the permafrost-dominated coastline by helping more quickly thaw ice-rich coastal bluffs and may potentially explain the disproportionate increase in erosion along ice-rich coastal bluffs relative to ice-poor coastal bluffs that we documented in our study," Jones says. "Any increases in already rapid rates of coastal retreat will have further ramifications on Arctic landscapes - including losses in freshwater and terrestrial wildlife habitats, in subsistence grounds for local communities, and in disappearing cultural sites, as well as adversely impacting coastal villages and towns. In addition, oil test wells are threatened."

Jones and his coauthors verified in another recent study the disappearance of cultural and historical sites along the same stretch of the Beaufort Sea. Those sites include Esook, a turn-of-the-century trading post now buried in the sea and Kolovik (Qalluvik), an abandoned Inupiaq village site that may soon be lost. At another site, near Lonely, Alaska, Jones snapped a picture of a wooden whaling boat that had rested on a bluff overhanging the ocean for nearly a century. A few months later the boat had washed away to sea. The study was

published in the journal *Arctic*.

More information: "Increase in the rate and uniformity of coastline erosion in Arctic Alaska", *Geophysical Research Letters*, [dx.doi.org/10.1029/2008GL036205](https://doi.org/10.1029/2008GL036205)

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