

This manuscript by Günther et al. presents observations of coastal retreat using historic and contemporary high resolution remotely sensed imagery for Muostakh Island, Laptev Sea from 1951 to 2012. Recent mean retreat rates of the coast at this small island are 1.7 times higher between 2010 and 2012 relative to mean retreat rates measured from 1951 to 2012. The authors compare current (2010 to 2012) patterns of annual and seasonal erosion to various environmental variables thought to impact erosion of arctic coasts and show that the increase in erosion at Muostakh is likely in response to increases in air temperature and increases in the open water duration period. This is an important manuscript that provides information on recent erosion rates for a site in the south central Laptev Sea. Currently few studies have reported on heightened erosion rates in the Arctic in response to increases in air temperature and open water duration.

While the manuscript is generally well written, it could be better organized. The real strength of this paper lies in the image processing methods that the authors used to ortho-correct and analyze the remote sensing data. However in the methods, results, and discussion sections the presentation of this data always comes after the presentation of the environmental and local parameter data. I suggest that the authors reorganize each of these sections to highlight first the methods and findings associated with the image processing and coastal retreat rates and secondarily the environmental and local parameter data. The connection to the variability in environmental and local parameters is a nice touch to this paper but it is definitely weaker than the detailed remote sensing change detection analysis. Further, it would be interesting if the authors provided a more focused discussion on the comparison of the historic and current DEMs for measuring subsidence. These methods and findings are not only very interesting at this site but have wide ranging applicability for permafrost terrain change in the circum-Arctic.

Here are also a number of other general comments and questions:

- The introduction could be shortened and better organized. This would help the flow and structure of the paper.
- Be consistent with the terminology used to describe the permafrost at Muostakh Island. In some cases it is referred to as yedoma, in other cases as Ice Complex or Late Pleistocene ice-rich permafrost.
- The authors should explain in detail why they chose to use a different approach for determining erosion rate measurements in this study relative to their other 2013 study. Are the results from this study comparable to rates determined elsewhere using the transect method?
- It is a bit unclear from the text and figures whether the erosion rates represent the average for the entire island area or if they just represent the average rate for those sections considered to be erosional. Please add text in the methods to clarify this.
- Analysis of the wind data is fairly cursory. The authors should strengthen this section or remove it. Is there a particular wind direction that tends to elevate water levels so niches can form? Why did the authors choose 24.5 m/s to represent effective storm events when several other studies that deal with arctic coastal erosion analyze events that range from 5-10 m/s?
- Do a spell check throughout the manuscript and fix incorrectly spelled words.

And more detailed comments, questions, and edits:

Page 4102, first sentence: add mention of wind data that was also analyzed in this study

Page 4102, line 10: change photographies to photographs

Page 4102, line 12: does coastline retreat here refer to TA or TD or both?

Page 4102, line 13: provide the years for the historical period in this context

Page 4106, line 24: provide the easting minutes for the location of Muostakh

Page 4108, line 11: identified is spelled incorrectly

Page 4109, section 3.1.1: why only analyze the SSM/I data from 1992 to 2012? The dataset extends back to 1979.

Page 4110, line 11: what is meant by synchronous Tair data from 1999 until present?

Page 4110, line 22: what was the reason for selecting 24.5 m/s as effective storm events? Atkinson (2005) considered 10 m/s as effective and Overeem et al (2011) considered 5 m/s as effective.

Page 4110, line 25: calculated is spelled incorrectly

Page 4113, line 11: how were the elevation data adjusted to sea level?

Page 4114, last paragraph: please explain why the authors chose to use a different approach for determining erosion rate measurements in this study relative to their early 2013 study. I.e. are the results from this study comparable to rates determined elsewhere using the transect method?

Page 4116, line 26: change photographies to photographs

Page 4117, line 19: remove Geo

Page 4122, lines 21-24: sentence is confusing as written

Page 4123, line 26: extra the in this sentence

Page 4127, line 1: coastline is spelled incorrectly

Page 4217, line 4: there are two erosions in this sentence and occurred is spelled incorrectly

Page 4127, section 4.4.2: please state the dates for the erosion periods in the text in this section

Page 4129, section 5.1: should it be 'changes in' instead of 'changes of'?

Page 4130, line 9: I don't think that the data presented in Overeem et al (2011) dealt with centuries...

Page 4132, section 5.2.1: please discuss the hourglass shape further. Why are these syngenetic ice wedges configured in this manner?

Page 4133, line 28: remove the word obviously

Page 4134, lines 4-6: please expand on this topic. This comes out of nowhere.

Page 4136, section 5.3: since this is the discussion section the authors should add a short section on the ramifications of the disappearing islands in the Laptev Sea shelf. Will erosion on the mainland be enhanced? Will larger and more hazardous storms develop in the Gulf? Etc...

Figure 2: what is the width of the island in the left frame? Please add this to the figure.

Figure 4: what is meant by superelevation?

Figure 5: diagram is spelled incorrectly in the figure

Figure 6: please add the outline of the island to this figure

Figure 13: what is meant by, note the seasonal shift of summer air temperatures and open water period? Relative to what?

Figure 15: this graph is somewhat confusing since there are three different bar colors.

Figure 20: how does this figure relate to this study? I don't remember seeing it referenced in the text.