Submarine Landslides at the Siberian End of Lomonosov Ridge, Arctic Ocean

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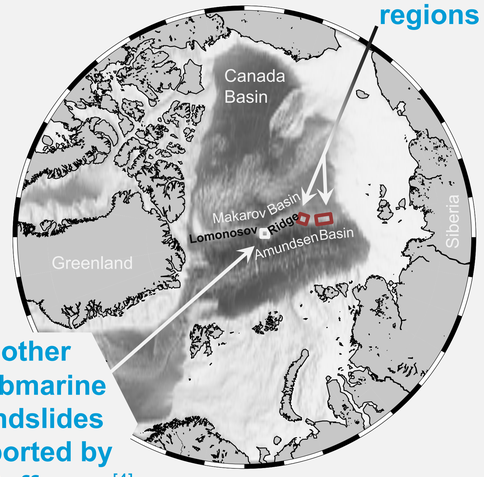
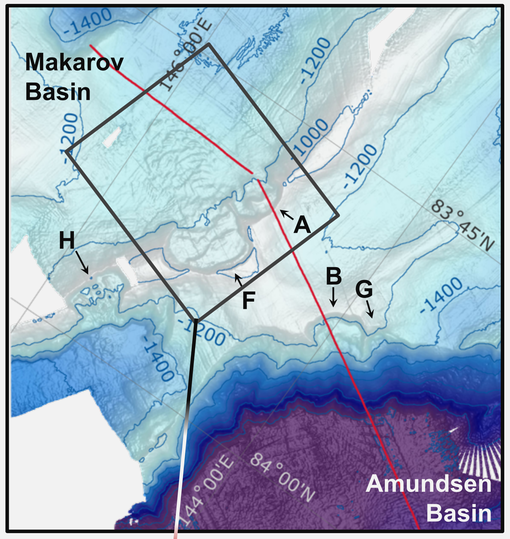
Introduction:

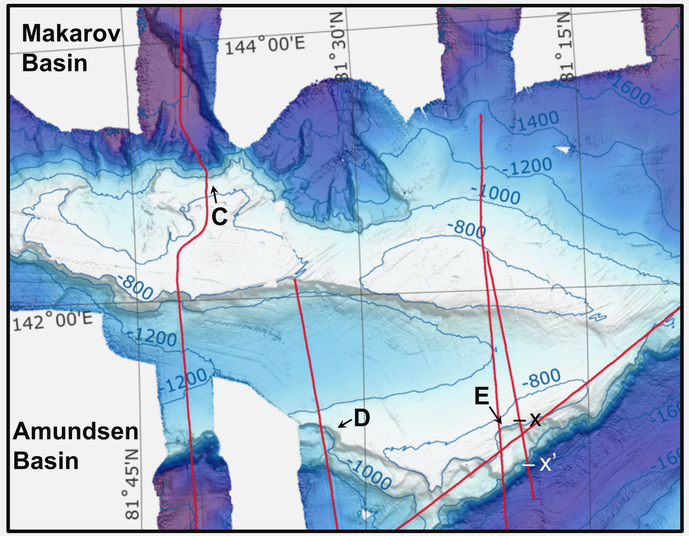
The Lomonosov Ridge is a topographic ridge in the Arctic Ocean. It rises several kilometres above the adjacent abyssal plains and, therefore, influences ocean current systems[1] and its shallow parts (<1200m) were affected by glaciogenic processes[2].

Due to difficult sea ice conditions prevailing in the Arctic Ocean sparse high resolution data exists from Lomonosov Ridge to describe its topography and subsurface geology. This contribution presents systematic swath bathymetry, sediment echo sounder and multi-channel seismic data from the Siberian end of the Lomonosov Ridge[3]. The data fully imaged submarine landslides on the ridge's crest.

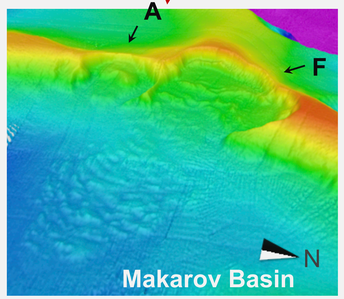


Results:



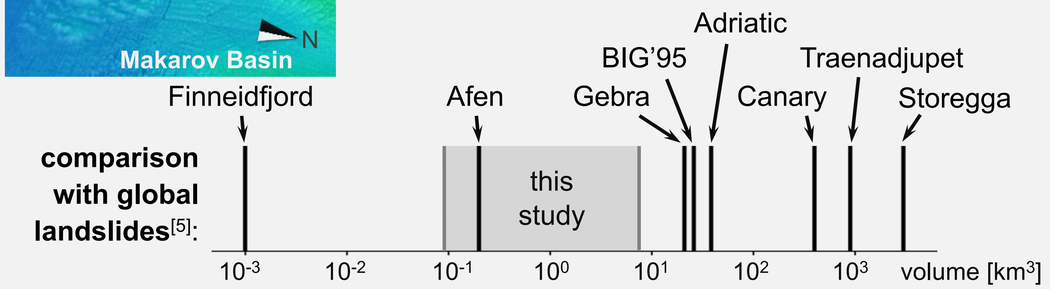


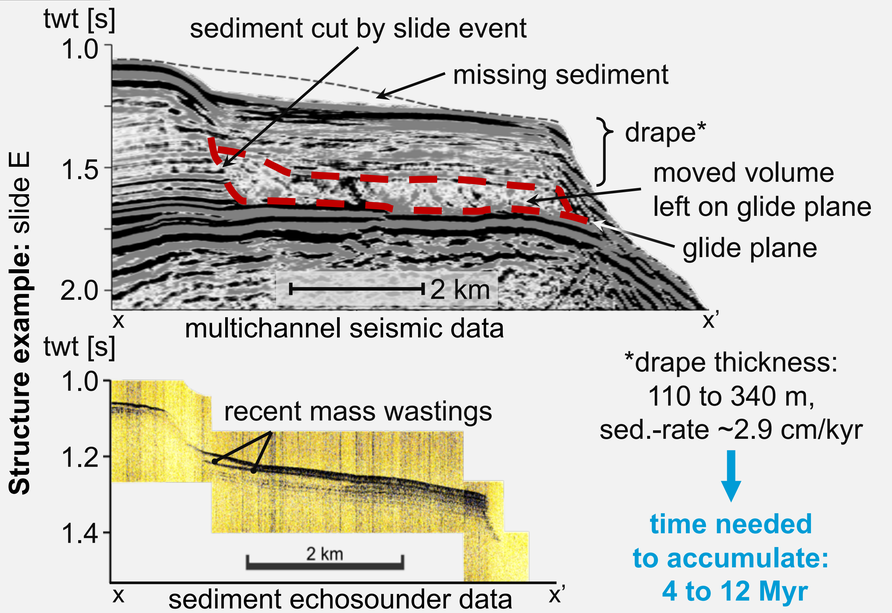
New swath bathymetry data with identified submarine landslides A to H:
red lines mark collected seismic reflection & sediment echo-sounder profiles



Geometries of the submarine landslides:

width:	2.1 – 10.2 km
length:	1.7 – 8.2 km
height:	125 – 851 m
mobilized sediment:	0.09 – 7.58 km^3





*drape thickness: 110 to 340 m, sed.-rate ~2.9 cm/kyr

time needed to accumulate: 4 to 12 Myr

Conclusion:

- Submarine landslides with this spatial extent seem common on the ridge.
- Submarine landslides occur on both sides of the ridge's crest. They are 2.1 – 10.2 km wide, 1.7 – 8.2 km long and 125 – 851 m high.
- Mobilized volume (0.09-7.58 km^3) are at the lower end of global existing submarine landslide sizes
- They are draped by 110 - 340 m of sediment that needed 4 - 12 Myr to accumulate.
- Smaller deposits within the drape indicate younger mass wasting events.

References:
[1] Woodgate et al., https://doi.org/10.1016/S0967-0637(00)00091-1
[2] Stein et al., https://doi.org/10.1038/ncomms11148
[3] Stein, https://doi.org/10.2312/BzPM_0688_2015
[4] Kristoffersen, Y., et al., https://doi.org/10.1016/j.margeo.2007.04.012
[5] Canals, M., et al., https://doi.org/10.1016/j.margeo.2004.10.001

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