

Sedimentological analysis of Siberian yedoma

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“Yedoma” is a general term applied to widespread permafrost loess deposited and frozen during the Pleistocene in north-eastern Siberia. A large percentage of the yedoma contains ice lenses that can rapidly melt and form thermokarst lakes. As these lakes form and the yedoma thaws, high quantities of methane and carbon dioxide may be released into the atmosphere. Because of its connection to greenhouse gas emissions and continued warming in the circumpolar arctic, it has been of interest to researchers in recent years.

This study begins to identify a source area for the yedoma by looking for commonalities between the yedoma and surrounding deposits. Sediment samples were collected from the Kolyma and Omolon Rivers, forested areas, Mt. Rodinka, and other low-lying spots near Cherskii, Yakutia. I carried out a sedimentological and petrographic analysis that included a granulometric analysis, optical mineralogy, X-Ray diffraction, and imaging with the scanning electron microscope (SEM).

All sediments are dominated by a fine grain size with mean size classes of fine to coarse silt. No granulometric yedoma signature became obvious during the study. Preliminary results do not show any significant differences between the mineralogy of the yedoma and the surrounding sediments or the Jurassic sedimentary rocks in the area. None of the sediments showed mineralogical similarities with the volcanic rocks in the area. Striking textural differences between yedoma collected at Davony Yar, a rapidly eroding ice lens complex, and non yedoma sediments were found using the scanning electron microscope.

Further sampling in a methodical, unbiased manner would improve the results of this study. I include strategies and suggestions for a better experimental design in addition to preliminary comparisons of the yedoma to surrounding bedrock and other sediments.