

# The Russian-German Research Station Samoylov, Lena Delta: A Key site for Long-term Observations of Permafrost Ecosystems in the Siberian Arctic

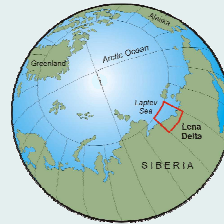
## RUSSIAN-GERMAN RESEARCH IN THE ARCTIC

The Lena River Delta is the largest delta in the Arctic and one of the richest ecosystems right at the interface of the Arctic Ocean and the vast Siberian mainland, where marine, freshwater, and terrestrial ecosystems, coastal dynamics and permafrost development can be studied in three main geomorphological units of different age. Since 1998, the Alfred Wegener Institute for Polar and Marine Research in Potsdam in collaboration with the Lena Delta Reserve in Tiksi has operated a research station in this key region for Arctic system science.

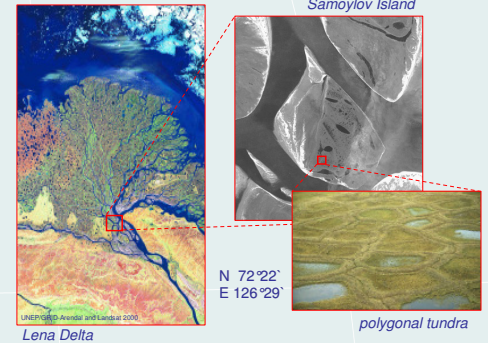
The station is located on Samoylov Island, 120 km south of the Arctic Ocean in the southern central Lena River Delta (72°22'N, 126°30'E), which is considered representative of the active modern delta. Samoylov Island has been the focus of a wide range of studies on surface-atmosphere gas and energy exchange from the plot to the ecosystem scale (Wille et al.; Boike et al.), soil science (Fiedler et al., 2004), microbiology (Wagner et al., 2007, Liebner and Wagner, 2007), cryogenesis, as well as geomorphology and paleoenvironmental (Wetterich et al., 2007) studies, and has contributed to a better understanding of the role of permafrost ecosystems with their distinct features within the Arctic system.

In addition to the biosphere-atmosphere interaction studies, many other investigations on Samoylov Island also have a long-term scope, such as the Russian hydrobiological studies of the seasonal cycle and inter-annual variability in zooplankton communities. These long-term data series allow for the detection of trends or oscillations in the species composition and dynamics of the ecosystem.

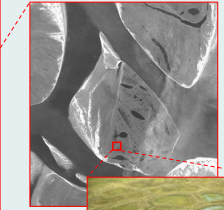
The wide range of studies, their interdisciplinary and comprehensive approach, the valuable long-term data series, and the potential this site still holds, make Samoylov Island a prime candidate for a Sustained Arctic Observatory.



Samoylov Island located in the Lena Delta, Siberia.



Samoylov Island



polygonal tundra

## SAMOYLOV RESEARCH STATION FACILITIES

The total area of the main building is about 175 square meters. About 140 square meters of it can be used by expedition parties. The available rooms include a kitchen, a sleeping room and two laboratories for scientific work. The universal lab has a size of about 15 square meters and is equipped with two working benches. The second laboratory is about 12 square meters and equipped with a gas chromatograph (FID, WLD) and a hydrogen generator for trace gas analyses. Distilled water for extraction and sample preparation is provided by the Lena Delta Reserve in Tiksi. The new annex has an area of 68 square meters, which is separated into three sleeping rooms and a living room.

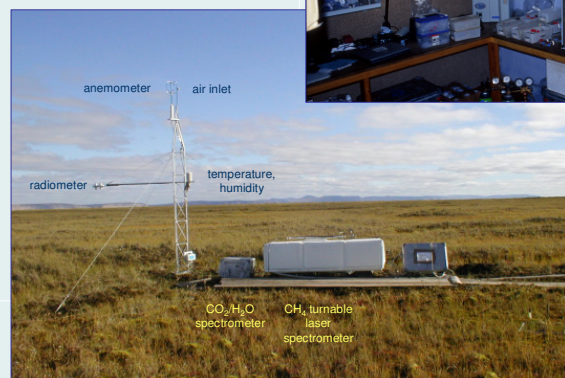
Laboratory for trace gas analyses (e.g. equipped with a gas chromatograph and a hydrogen generator) and sample preparation for microbiological and geochemical analyses (photo D. Wagner, AWI).



Samoylov Station on Samoylov Island (Lena River Delta) with the main building on the left and the new extension on the right side (photo G. Stoof, AWI).



Aerial view of the southern coast of Samoylov Island with the research station (photo J. Boike, AWI). The main building and the storages are situated at the coastline of Samoylov. The washing and sauna house is located close to the lake.



Micro-meteorological eddy covariance measurement system for the continuous high resolution analyses of turbulent fluxes of carbon dioxide, methane, momentum, heat and water in the atmospheric boundary layer (photo L. Kutzbach, AWI).

Altogether, the station provides living and working space for eight people during winter time and up to 16 people in the summer when tents can be used for accommodation. For power supply a diesel generator and a small wind generator are used. Drinking water is supplied by a pumping system from a nearby lake. There is a shortwave radio connection to Tiksi and a satellite link for email exchange when the station is in use.

Boike et al. (2007) The climatology, and summer energy and water balance of polygonal tundra in the Lena River Delta, Siberia. *JGR. Biogeosciences*, accepted.

Fiedler et al. (2004) Element redistribution along hydraulic and redox gradients of low-centered-polygons, Lena Delta, Northern Siberia. *Soil Sc. Soc. of Am. J.* 68, 1002-1011.

Kutzbach et al. (2007) The exchange of carbon dioxide between wet arctic tundra and the atmosphere at the Lena River Delta, Northern Siberia. *Biogeosciences*, 4, 869-890.

Wagner et al. (2007) Methanogenic activity and biomass in Holocene permafrost deposits of the Lena Delta, Siberian Arctic and its implication for the global methane budget. *Global Change Biology* 13, 1089-1099.

Wetterich et al. (2007) Arctic freshwater ostracods from modern periglacial environments in the Lena River Delta (Siberian Arctic, Russia): geochemical applications for paleoenvironmental reconstructions. *J Paleolimnol.*, DOI 10.1007/s10933-007-9122-1.

Wille et al. (2007) Methane emission from Siberian arctic polygonal tundra: Eddy covariance measurements and modeling. *Global Change Biology*, accepted.

<sup>1</sup>Lena Delta Reserve, Tiksi, Republic of Sakha, Russia

<sup>2</sup>Alfred Wegener Institute for Polar and Marine Research in the Helmholtz Association Research Unit Potsdam, Telegrafenberg A43, D-14473 Potsdam [http://www.awi.de/de/infrastruktur/stationen/samoylov\\_station](http://www.awi.de/de/infrastruktur/stationen/samoylov_station)