Nov.25.
9:00-13:00h, Knight Hall

AK Permafrost – Orals

9:30 – 9:50h
Achievements and challenges of multi-year frequent sampling of Arctic rivers

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Current warming, shifting hydrological regimes and accelerated permafrost thaw in the catchments of the Arctic rivers will profoundly change their water biogeochemistry. The PARTNERS (Pan-Arctic River Transport of Nutrients, Organic Matter, and Suspended Sediments, since 2002) and ArcticGRO (Arctic Great Rivers Observatory, since 2003) programs have established a baseline of interannual estimates of changing water composition for a set of circumpolar rivers draining into the Arctic Ocean. Access to Arctic rivers is challenging, especially during ice break-up and the critical freshet period and often especially at their mouths. Sampling frequency of existing programs (less than 7 samples per year) risks missing short-term events such as extreme meteorological and abrupt permafrost thaw events, which are becoming more frequent. The Lena River monitoring program at Research Station Samoylov Island, located about 80 km upstream of the river mouth, started sampling at higher frequency (1-7 day intervals) in 2018 to fill this gap. The success of the monitoring program depended on a simplified sampling protocol, dynamic partnership with research station staff and broad support across a number of partners for logistic and analytical support.
A number of publications highlight the strong seasonal variations of all biogeochemical parameters analyzed and streamflow partitioning among different sources. The data were also used as a crucial ground truth to develop a new algorithm for satellite-derived flux estimates of dissolved organic carbon. Some analyses are ongoing and, as the data set becomes publicly available, users find new applications to new research questions.The Lena River water sampling terminated in September 2022 after more than four years. We are now developing plans for transferring our scientific approach and experience with high-frequency river water monitoring to another Arctic river system.

9:50 – 10:10h
Morphology and dynamics of thermokarst lakes in the Tavvavuoma palsa mire, northern Sweden

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Permafrost in sub-Arctic peatlands is vulnerable to thaw due to climatic changes, initiating thermokarst landforms such as lakes which cover about 7 % of the northern circumpolar permafrost region. Thermokarst lakes are significant sources of carbon because previously in permafrost locked carbon becomes available for decomposition upon thaw. Since thermokarst processes contribute to global warming, it is important to study the morphology and temporal dynamics of these lakes as it allows projections of future developments. In the Tavvavuoma palsa mire, located in the sporadic permafrost zone of northern Sweden, lake dynamics have been monitored between 1963 and 2003. However,