

COPERA: C budget of Ecosystems, Cities and Villages on Permafrost in the eastern Russian Arctic

Call: Arctic Observing and Research for Sustainability

Type of Project: Type 3 - Research Grant

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The eastern Siberian ecosystem is established on the largest and deepest permafrost region in the world, where much of the earth's carbon dioxide is sequestered. This unique permafrost-based ecosystem is currently threatened by global warming. In addition to the direct effects of this warming, permafrost degradation may cause further change in vegetation and carbon budget and greenhouse gas emission that may then feedback to the climate system. In this vulnerable region, considerable economic and demographic change is taking place as populations within the cities of the Republic of Sakha (Yakutia) expand and increase their carbon emissions, while smaller settlements decline and struggle to afford heating fuel due to rising costs associated with the urban demands for energy. The environmental impacts of population and emission growth in this environmentally vulnerable region and the need for viable low carbon energy solutions for Arctic residents drive the COPERA project. The research team will establish a permafrost, hydrological, and meteorological observing network in cooperation with local communities to estimate CO₂ sequestration by the permafrost ecosystem (tundra and taiga) and CO₂ emission from cities and villages. In this study, the carbon budget (CO₂ sequestration by ecosystem and CO₂ emission through human activity) is estimated as a measure of two different points of view. One is a measure of impact on climate and environment, and the other is that of living cost because more fuel combustion means higher cost for energy. Both of these measures have impacts well beyond the local effects in the Sakha region. Data gathered during this project will be translated into publicly accessible materials and shared with local residents and government to inform municipal, regional, or Republic governmental committees and/or council meetings.