

LEGACY OF AIRBORNE PARTICULATE CONTAMINATION ON NORWEGIAN GLACIERS



It is not difficult to find in the media news concerning global warming or glacier decline. There is no doubt as to the main environmental consequences of glacier melting: sea level rise and changes in the functioning of marine and terrestrial ecosystems. For human populations these changes result in coastal cities disappearing under water as well as dangerous consequences of glacier collapses resulting in floods and landslides. Much less known is the role that glaciers play in spreading of harmful substances produced and released to the environment by humans. These contaminants, among which are toxic organic substances, heavy metals and radioactive elements are transported in the global scale with the moving masses of the atmospheric air. Even the pristine and remote, at first glance, areas of polar and high mountain regions are not devoid of contamination and Norway is not an exception in this respect.

Glaciers do not store contaminants that fell to their surfaces forever. Glacier ice is in constant movement and sooner or later the contaminants deposited on ice are released and washed down with ice melt. Due to the fact more than a billion people use water from glaciers for drinking purposes and irrigation, the knowledge of the threats associated with glacier contamination is important. Despite the fact that glaciers in Norway are important component of landscape, source of water for rivers, unique ecosystems and place of exploration for tourists and alpinists, studies on their contamination are not well developed. In the project we are going to look at the sources of contaminants, processes of their bioaccumulation and the ultimate fate of artificial radionuclides and black carbon deposited on glaciers. The anthropogenic (artificial) radionuclides were released to the environment from nuclear weapon testing and nuclear accidents (Chernobyl, Fukushima and many other less severe cases). Black carbon deposited on Norwegian glaciers has a very specific source – ship cruises visiting the fjords.

Our research will be focused on the role of the **cryoconite - a peculiar kind of biogenic sediment formed by wind-borne particles and pigmented microorganisms. Dark-coloured cryoconite fills in glacier surface forming characteristic cryoconite holes. They constitute one of the most extreme freshwater ecosystems in the world and are considered sinks for pollutants on glaciers. We believe, that the cryoconite and the ecosystem of small organisms associated with it, are the key factor in understanding of contaminant behaviour on glaciers.** PhD student with our team of scientists plans to explore sources of contaminants on Norwegian glaciers and the fate of this contamination including its potential impact on the downstream ecosystems. We want to draw attention of the general public and of scientist to this underrecognized threat to the environment.