

## STUDY ON THE MECHANISMS AND PATHWAYS OF SPREADING SURFACTANTS BY ATMOSPHERIC PRECIPITATION AND DEPOSITION (A NEW SOURCE OF INFORMATION ABOUT THE SPREAD OF ANTHROPOGENIC POLLUTANTS) TO THE ARCTIC TUNDRA ECOSYSTEM IN THE HORNSUND FIORD, SVALBARD

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### ABSTRACT

Surfactants (surface active agents, SAAs) are a group of compounds characterized by specific physicochemical properties, which makes it possible to use them in many areas of human activity. The use of surfactants and their incomplete biodegradation cause the emission of pollutants into the environment, where they may undergo various physical and chemical transformations. Therefore, specific properties of surfactants cause their increased mobility and free circulation in the environment. Additionally, SAAs present in the various components of the environment, through their lipophilic nature, readily accumulate in living organisms (bioaccumulation), which is very dangerous.

We present information about the distribution and migration of SSAs in an Arctic catchment, devoid of the influence of local pollution. We report concentrations of the surface active agent in surface water samples from the Arctic river Revelva catchment (Svalbard), in the context of chosen physicochemical parameters (pH, electrical conductivity [EC] and total organic carbon concentration [TOC]). The Revelva catchment in the summer seasons of 2010-2015 was characterised by highly variable concentrations of cationic and anionic surfactants. We have tracked the changes in SSAs concentrations in particular elements of the water cycle within the catchment, from atmospheric precipitation through springs, rivers and lakes. As a result, it was shown that the long-range transport plays an important role in shaping the surfactants concentration profile of this Arctic tundra environment.

Moreover, the occurrence of surfactants in the abiotic environment might disturb equilibrium of its different compartments. Surfactants are able to form films on aqueous surfaces and decrease the surface tension. This possibly delays water evaporation and gaseous transportation across the aqueous interface. Those compounds can also increase the solubility of organic compounds in the aqueous phase (increasing mobility of toxic agents in ecosystems). At the sea surface surfactants play a role in the recycling and long-range transport of pollutants via marine aerosols.

Recognition of the processes of pollutant distribution in the atmosphere is an issue of top priority. Thanks to this it will be possible to learn about the mechanisms that affect the pollutant on a global scale

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