

Sea-air transfer measurements of marine carbohydrates in the Arctic

S. Zeppenfeld¹, M. Hartmann¹, M. van Pinxteren¹, F. Stratmann¹, and H. Herrmann¹

¹Leibniz Institute for Tropospheric Research (TROPOS), Permoserstr. 15, 04318 Leipzig, Germany

Marine polysaccharides in sea spray aerosol are being discussed as an important source of ice nucleating particles in the Arctic. They may enter the planetary boundary layer by sea-air phase transfer processes such as bubble bursting and breaking waves. In this connection, the sea surface microlayer (SML) may play a key role as the direct interface between the ocean and the atmosphere. To date, there are only very few concerted analytical measurements for carbohydrates in all these compartments in the Arctic available.

During the field campaign PS 106 aboard the German research vessel *Polarstern* during summer 2017 concerted sampling of aerosol particles, SML and underlying water was performed. The monosaccharide composition of these samples was determined via HPAEC-PAD, a very sensitive method for sugar analysis, before and after acidic hydrolysis. For avoiding analytical problems due to the high sea salt content in sea water samples a newly developed desalination step via electrodialysis has been applied.

The concentrations of neutral sugars, aminosugars and uronic acids in arctic sea water were determined in the low to middle μgL^{-1} range. Depending on the kind of monosaccharide enrichment in SML samples could be determined up to a factor of 2.0. Via enrichment factors in aerosol samples, sea spray aerosol will be discussed as an important local source of organic matter in arctic aerosol particles.

This work was supported by the DFG-funded TR 172 (Arctic Amplification).