

## **The distribution of Contaminants of Emerging Concern in North-Western Spitsbergen: a journey from the atmosphere to the Arctic snow cover**

MARIANNA D'AMICO<sup>1</sup>, ANDREA GAMBARO<sup>1</sup>, ROLAND KALLENBORN<sup>2,3</sup>, FEDERICO SCOTO<sup>1,4</sup>, JEAN CHARLES GALLET<sup>5</sup>, ANDREA SPOLAOR<sup>1,6</sup> AND MARCO VECCHIATO<sup>6</sup>

<sup>1</sup>Ca' Foscari University of Venice

<sup>2</sup>Norwegian University of Life Sciences

<sup>3</sup>University Centre in Svalbard

<sup>4</sup>Institute of Atmospheric Sciences and Climate ISAC-CNR

<sup>5</sup>Norwegian Polar Institute

<sup>6</sup>Institute of Polar Sciences ISP-CNR

Presenting Author: marianna.damico@unive.it

The presence of contaminants in the Arctic has been investigated and described in numerous studies over the past decades. However, a new group of contaminants is raising concern among the scientific community. During the past years, both the European Commission and the Arctic Monitoring and Assessment Programme highlighted the importance to improve the research and the monitoring of the Contaminants of Emerging Concern (CECs) to implement effective regulations in Europe and worldwide. In this work, concentrations of a selected group of CECs were investigated in north-western Spitsbergen including the Gruvebadet Snow Research Site (GSRS, Ny-Ålesund) and five selected glaciers. We focus on the presence of Fragrance Materials (FMs) and organic UV-filters (UVFs) in the Spitsbergen snow and their spatial, altitudinal, and seasonal distribution. Furthermore, we aim to assess if they derive from either local or long-distance sources.

In Spring 2021, snow samples deposited both on land (GSRS) and on glacial ice (Edithbreen, Midtre Lovenbreen, Austre Brøggerbreen, Kongsvegen and Holtedahlfonna) were collected. The first four sites are in the Brøggerhalvøya peninsula, while the last two sites are inland. The location of the sampling points allows to compare areas close to human settlements and more isolated areas. The elevations of the tops of the glaciers range between 400 m and 1120 m. The contaminants' distribution is studied at different elevations to understand the atmospheric transport processes involved. To cover the whole accumulation season, snow was collected at the surface and in snow pits dividing these in three parts: Autumn, corresponding to the first snow at the bottom; Winter, the middle layer; and Spring, the upper part.

The collected snow was filtered to have comprehensive data on concentrations associated with particles and in the dissolved phase. The samples were prepared in stainless steel clean-room laboratories for organic analyses at the Ca' Foscari University. The instrumental analysis was conducted by GC-MS/MS instrument.

The results of this study give a new insight into the deposition