



Project acronym: NIRA

Project title: Nanoplastics In Remote Air: types, concentrations and size distribution

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Discipline: Earth Sciences & Environment: Other - Environment

Station(s): Sonnblick Observatory (Austria)

Plastic pollution has been recognised to be a global problem, as particles of various sizes have been detected in water, soil and air, from urban to remote arrears (Allen et al., 2019; Dris et al., 2016; Ivleva et al., 2017; Materić et al., 2020; Ter Halle et al., 2017). Smaller the particles are their toxicological importance becomes more concerning (Lehner et al., 2019).

Nanoplastics (NP) are reported to have various adverse effects in numerous studies where organisms or cells have been artificially exposed (da Costa et al., 2016; Ferreira et al., 2019; Lehner et al., 2019). However, environmental analysis remained challenging, as close to no data is available so far revealing the nanoplastics loads we are exposed (Mintenig et al., 2018; Schwaferts et al., 2019). I recently developed a chemical method to selectively quantify the nanoplastics of different types with the highest reported sensitivity (Materić et al., 2020). With this novel method, we already measured nanoplastics deposited in high-altitude Alps, close to the Sonnblick Observatory, Austria (Materić et al., 2020). Although we identified different types of micro- and nanoplastics in the surface snow and in the snow cores, no direct measurement of nanoplastics in the air has been performed yet. The main objective of this project is to systematically sample air for a subsequent analysis of nanoplastics for its concentration, polymer type, and size distribution.

Sonnblick Observatory has a unique geographical position, and with the high-resolution meteorological data available from the station, we will be able to understand the atmospheric transport of NP. The air passing the site can originate from urban areas of nearby European countries, which provides a unique insight into the nanoplastics pollution origin. We have no similar infrastructures that can be used for this project in the country of our affiliation (The Netherlands).