



Project acronym: AirMiMiC

Project title: AirMiMiC - Airborne delivery vs. surface accumulation of Microbes, Mineral dust and black Carbon onto the Greenland Ice Sheet

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Discipline: Earth Sciences & Environment: Global change & Climate observation

Station(s): Sermilik Research Station (Greenland/Denmark)

The melting of the Greenland Ice Sheet (GrIS) is accelerating as a consequence of changing albedo, due to the presence of light-absorbing impurities (microbes, mineral dust, and black carbon). Quantifying the types, interactions, and variations in impurities across the GrIS is urgently needed. How individual types of impurities contribute to changing albedo across the GrIS is unknown. To fill this knowledge gap, we will combine aerosol and surface snow/ice samples collected over the last years from various locations across the GrIS (S, W, SW, centre) with the data obtained through this TA call and the parallel TA proposal for access to Villum to obtain a comprehensive Greenland-wide coverage in data.

We will sample both aerosols and surface ice and snow to assess particulate lode, type, mineral composition, black carbon, and microbial diversity. A Coriolis air sampler (Bertin Instruments) will be employed to collect high volumes of air (300L/min) into sterile waters, while surface ice and snow will be collected into sterile sampling bags or ashed glass jars and slowly thawed on-site at ambient temperatures. All samples will be processed on site for future analyses. We will analyse the composition of the microbial communities using Illumina sequencing, while the mineralogy, elemental composition, and speciation of the mineral dust and black carbon, as well as the organic carbon composition in the solutions and solids, will be assessed using high-resolution electron microscopy, nano-diffraction, and chromatographic and mass spectrometric techniques.