

# Antarctic aerosol size distributions, fog events, and fine dust levels at station Marambio

A comprehensive understanding of ice nucleation formation and the advancement of climate models hinges upon obtaining precise measurements of aerosol number size distributions. These measurements provide invaluable insights into the intricate processes governing atmospheric dynamics.

Suitable for such research is the ground-based **Cloud Droplet Analyzer (CDA)**, equipped with a high-resolution aerosol size spectrometer including a heated Inlet and weather station for temperature, pressure, humidity, wind direction, wind speed, precipitation type, and precipitation intensity.

During a three-month interval from December 2022 to March 2023, a comprehensive campaign led by the Finnish Meteorological Institute FMI and the University of Helsinki was undertaken in the Antarctic summer. The installation site was Marambio base, situated in the Antarctic Peninsula region (64°150'S, 56°380'W, 200 m above sea level). Besides the Cloud Droplet Analyzer, Condensation Particle Counters and Samplers for ice nucleating particles were installed.

On sunlit and windy days, the landscape comes alive with fine and coarse dust particles that often embark on transcontinental journeys propelled by the wind. Carrying over vast distances, dust particles sometimes find their resting places in permanent ice and glacier regions. This migration of particles is not only a testament to the remarkable mobility of aerosols but also underscores the potentially far-reaching impacts of their presence.

Conversely, days veiled by cloud cover and fog usher in different atmospheric dynamics. Here, the interplay between aerosols and the cloud formation process takes center stage. The initiation of ice nucleation and the onset of fog are intricately linked to the local aerosol composition. The aerosols act as catalysts, influencing the phase transition of water vapor and ultimately shaping the microphysical characteristics of clouds.

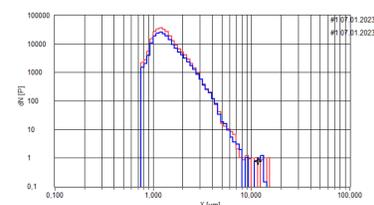
Further data will also be available on [my-atmosphere.cloud](https://my-atmosphere.cloud).



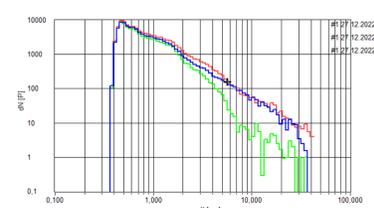
Measuring principle	Optical light scattering on single particle
Measurement range (number concentration)	0 – 200 P/cm <sup>3</sup>
Measurement range (size)	0.6 – 40 μm 0.8 – 100 μm
Volume flow	5 l/min (full flow analysis)
Interfaces	USB, Ethernet (LAN), RS232/485, Wi-Fi
Power supply	110 – 230 V
Temperature range	-30 to +40 °C
Dimensions (W x H x D)	Approx. 600 x 1000 x 270 mm
Weight	Approx. 35 kg
Accessories	Heatable Inlet Weather Station



## Aerosol background distribution



## Coarse dust



## Cloud events & ice crystals

