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Theory and practice confront in the Antarctic

A TRAVEL GRANT from the Finnish Academy of Science and Letters played a key role when I ventured to set out with my cameras after the Finnish Antarctic Program's Expedition of 2018-2019. The 12-week journey resulted in a few hundred hours of video recordings, sufficient material for producing a documentary.

The documentary project under working title *The Outpost of Climate Change*, took one of its inspirations from discussion aroused a few years ago where scientists had been criticized aloud for providing constructive conclusions based on opinions rather than real material evidence. With a pinch of black humour, I thought of checking out this one particular opinion forming process in Antarctica.

The three scientists' principal object of study were the optical properties of snow and ice and their dependence on snow microstructure. Large-scale meteorological measurements were carried out, the most international of which were the World Meteorological Organization (WMO)

radiosonde soundings aimed at improving weather forecasting and climate modelling. The base was Finnish Antarctic Research Station in western Dronning Maud Land, where GPS devices, seismometers and other instruments have been installed in the course of the 30 years of the station's history to acquire long time series.

In order to study the snow albedo, a number of instruments were transported from Finland quite punctually on the opposite side of the globe, including one rare device: a spectroalbedometer with unprecedentedly high resolution. This unique apparatus constructed by the Finnish Meteorological Institute was in action for the first time in the Antarctic. To back these recordings up, the researchers made daily examinations of the snow pits. That's a lot of shovelling.

Even minor changes in the reflection of incoming radiation back into the space can have major effects on climate models. The knowledge of the reflectivity proper-



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ties of snow still leaves much to be desired – and Antarctica is a unique site for this albedo research. Human activity still has only small impact on the processes taking place on the ice sheets surrounding Aboa. Measurements are unaffected by interference from familiar factors encountered in the northern hemisphere such as conifer needles or hares – as there are only a few lichen species growing in the region and the fauna is restricted to two bird species, excluding the penguins, which do not venture so far inland. Snow researchers are in fact calling their Antarctic fieldwork sites as tantamount to laboratory conditions.

My documentary footage contradicts a number of general assumptions regarding the everyday work of scientists. Logically, of course, it would be difficult to imagine a more difficult place to carry out research work than Antarctica, but apart from the enormous distances involved and the continent's other exceptional features, the

documentary shows the bare nature of in situ research required from world-class science.

Everyday research work calls for constant vigilance and attention to accuracy, while it is necessary from time to time to depart from textbook solutions in order to adapt to situations which even an experienced researcher would be unable to foresee.

The schedules of newsrooms that I am more familiar with, are perhaps more frantic at times, but having shared the everyday rhythm of Antarctic researchers I reckon that the degree of grappling and adjusting required in scientific fieldwork is in a class of its own. We who are not engaged in research have a lot to learn from their efforts – and in the long term have a privilege to enjoy, as the general understanding of climate increases. What can be learned at a small site on a glacier of 14 million square kilometres will not be confined to Antarctica.



This page:

Finnish Meteorological Institute researchers Juho Vehviläinen (left) and Kati Anttila installing an albedometer on the glacier. The site is located 10 kilometres away from the Aboa Research Station.

Next page:

Kati Anttila operating a SnowMicroPen, an instrument for measuring the snow layer density.

