ARMIN SIGMUND: FIRST IMPRESSIONS OF ANTARCTICA



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Armin Sigmund is a PhD student conducting research at the Swiss Federal Institute of Technology in Lausanne (EPFL). During the 2020-2021 research season, Armin travelled to Antarctica to help maintain and upgrade several instruments for a long-term project EPFL is managing in the vicinity of the Princess Elisabeth Antarctica Station. Upon his return to Europe, he recounted the highlights of his first journey to Antarctica.

First impressions

My trip to Princess Elisabeth Antarctica Station was my first experience travelling to the Polar Regions.

Almost six hours after leaving the warmth of South Africa aboard a cargo plane, we arrived in the cold climes of Antarctica at the Russian Novolazarevskaya (Novo) Station at the coast of the Dronning Maud Land in East Antarctica. Here we were to await our connecting flight to the Princess Elisabeth.

My first impressions of the White Continent were exciting. The weather was clear and sunny. A strong, cold wind buffeted our faces. Drifting snow moved rapidly in a shallow layer above the surface of the snow and ice.

I was particularly happy to witness this last phenomenon because it was part of the reason why I came to Antarctica: to better understand how snow transport via the wind influences the surface mass balance of the Antarctic ice sheet - which, in turn, can have an important effect on sea level rise.

My colleagues at EPFL run simulations for the entire Antarctic ice sheet to quantify all processes that add mass to it (mainly snowfall) or remove mass from its surface (for example, snow sublimation and wind erosion). However, we need in-situ measurements to validate and improve our simulations, and taking these measurements is why my mission took me to Antarctica.

Discovering life in Antarctica

While the majority of the expedition team continued their journey to the Princess Elisabeth Antarctica Station on a Basler plane, I had to stay behind with a small group at Novo Station to wait for the Basler to come back to collect the rest of us. Unfortunately we had to wait. The second connecting flight for the BELARE team was postponed due to bad weather conditions.

The staff at Novo Station was welcoming. They offered us good food and a warm place to get some rest. As there is no sunset in this part of Antarctica in late November, the "nighttime hours" felt more like daytime. Nevertheless, I quickly fell asleep because I was tired after a long day of travelling and new impressions of Antarctica to absorb.

After two days at Novo, sunny weather allowed us to fly to our final destination: Princess Elisabeth Antarctica. It was fascinating to look out of the plane window during that journey to see a flat and endless snow surface with patches of ice below us, dotted occasionally with awe-inspiring mountains and crevasses.

After a smooth landing at Princess Elisabeth Antarctica, we were welcomed with a delicious meal.

The station offered everything that anyone would need: A nice and comfortable dining and living room, fresh and delicious food prepared daily, several corners with desks to work, enough bedrooms to accommodate us, and some space in the workshop for organising our scientific equipment.

Staring my mission

During the first few days of my three-week stay, the weather was perfect for field work. It was sunny with light winds and temperatures around -10 °C. I quickly realised that the UV radiation can be intense in Antarctica, especially during the exceptional austral spring of 2020. The use of sun screen was very important to avoid a bad burn.

The focus of my work was to maintain and upgrade two automatic measurement stations, which my colleagues installed in 2016 and have been collecting data ever since. The goal of our research is to obtain year-round measurements of the net accumulation of snow and individual processes such as snow transport and sublimation.

One of the automatic measurement stations is located only a few kilometres from the Princess Elisabeth Antarctica, while the other station is located at a colder and windier location about 40 kilometres away on the Antarctic Plateau. It was an adventure to visit this remote station by skidoo, especially the first time I went out there.

To reach the more distant station, we travelled through the nearby Sør Rondane Mountains, which are home to many fantastic landscapes. It was a special experience seeing all of this scenery at the "end of the world".

When we arrived, we had to lift the measurement station because approximately half a metre of snow had accumulated since the previous year. I was glad that the members of the BELARE team who accompanied me were there to provide very good help with digging into the snow, lifting the measurement station, and replacing the station’s batteries and solar panel.

After a long day in the field, it was always great to return to the warm and comfortable Princess Elisabeth Antartica.

Facing challenges

During the second week of my stay, the winds were much stronger, creating quite a lot of drifting and blowing snow. We had to wait for better weather before we could continue the work at the distant measurement station 40 kilometres away.

But my time was not wasted. I had enough to do in the vicinity of the Princess Elisabeth, including relocating the nearby measurement station, installing additional instruments on it, improving the power supply system, and regularly sampling surface snow to study stable water isotopes.

Luckily, the wind calmed and the sun returned during the third week of my stay. After a week of howling winds, I was more conscious of the fact that it was completely quiet in this part of Antartica when the wind was calm. The only noise I heard came from human activity at the station.

With the weather on our side, we were able to visit the distant measurement station to replace its wind generator and a broken fuse. Unfortunately, an unexpected electrical issue kept me occupied most of the day, so in the evening, we had to return to the Princess Elisabeth without having solved the problem completely.

I discussed the problem with a few members of the BELARE team, and I received valuable advice about what to do. The following day when I returned to the distant measurement station, I was able to solve the problem by connecting a wire differently. I was relieved. Now, all the instruments were powered up and working!

Wrapping up

I spent the final days of my time in Antarctica taking advantage of the nice weather. I took photogrammetry measurements of the area using a professional mapping drone. These measurements allow us to determine short-term and long-term changes in surface elevation over a large area.

Overall, my trip was a wonderful and unique experience. I am thankful for the excellent support from the expedition team!