Speaking of the Antarctic always engenders images of vast planes of snow, glaciers and bearded explorers. One is tempted to think of ice-caught ships, storms, eternal darkness and an indomitable human spirit. It is after all one of the last wildernesses on earth, being the highest, driest, windiest and coldest place on this planet. So why do people go there? You can go either as a tourist, which costs a pretty penny. Then you can go as a visiting dignitary to one of the more than 40 stations of various countries currently on the continent. Lastly, you can go as part of a scientific research expedition and this is how I was able to visit Antarctica again this year.

I have been incredibly privileged in being able to have gone to Antarctica not only once but four times. I completed my M.Sc. on a landform near the South African station of SANAE IV and was given the opportunity to visit the continent twice during that time. After completing my M.Sc. I chose to continue my studies and during my PhD studies I have again visited SANAE IV twice. I work with a group (Landscape Processes in Antarctic Ecosystems) that researches how the landscape changes in the Antarctic. In particular we look at the active layer and permafrost (the portion of the ground that is permanently frozen) and the interactions that exist between these. We look at the interactions that exist between the landscape and biological activity, such as lichen, bryophytes and mites. It is exciting work and out team this year consisted of six people: Ian (our academic supervisor and team leader), Liezel, Cam, Gaby, Jess (M.Sc. students) and I (Figure 1). The last journey took place over the previous summer. We left Cape Town on December 4th on the Agulhas II (Figure 2).

Figure 1: The team: (l.t.r.) Liezel Rudolph, Garbielle Ayres, Ian Meiklejohn (team leader), C. Hansen, Camilla Kotze, Jessica Rosenfels. Photo: I. Meiklejohn.

Figure 2: The S.A. Agulhas II in port in Cape Town. Photo: C. Hansen.

Ship journeys can be long and uneventful but fortunately the Agulhas is a research vessel, meaning there is always something interesting going on. Oceanographers deploy buoys, CDTs (measuring conductivity and temperature with depth) (Figure 5), XPTs (an expendable bathythermograph – a smaller version of the CTD), argo floats (Figure 3), wave and underwater gliders (Figure 4) and do all kinds of strange and wonderful things.

Figure 3: Oceanographers and ship's crew readying to deploy an argo float. Photo: C. Hansen.

Figure 4: Two underwater gliders being calibrated in the helicopter deck of the Agulhas II. Photo: C. Hansen.

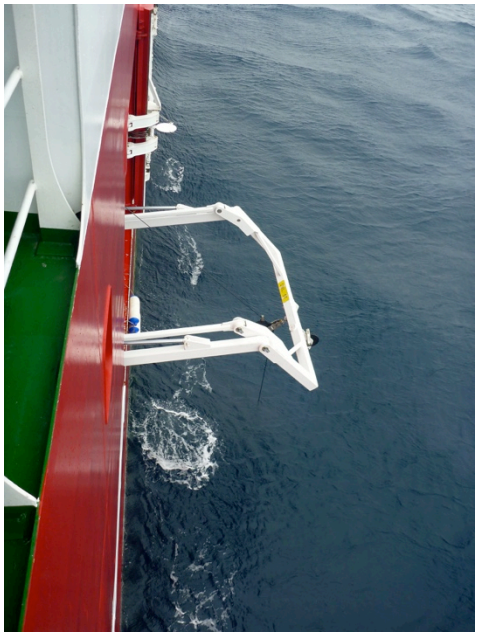

Figure 5: A CDT deployed for observation. CDTs can be deployed to 5km depth in the ocean, with only a crane, cable and winch securing it to the ship. Photo: C. Hansen.

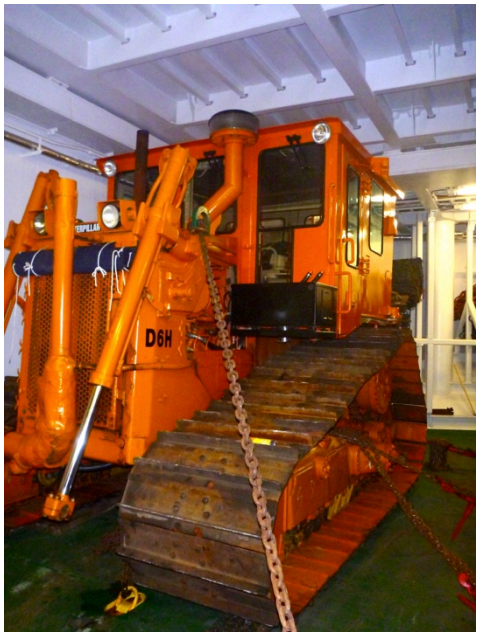

Figure 6: One of the bulldozers – used for clearing snow around the station –securely strapped down in the cargo hold. Photo: C. Hansen.

SAWS deploys weather balloons, which is always a sight! You also get to meet everyone who will be spending the summer at SANAE IV. These are employees of the NDPW who do the maintenance on the building, employees of DEA who manage and coordinate everything, drivers from the armed forces who are in charge of getting all cargo to the station, Starlite Aviation personnel who provide flight support, the team that will spend a year at SANAE (S54 for this year) and then of course all fellow scientists and researchers. Then there are the employees of Smit Amandla who run the ship. The ships' purser organised tours of various sections of the ship for us, such as the engine room and cargo hold (Figure 6), which was fascinating and gave me a new perspective and respect for the beauty that is the SA Agulhas II!

The journey to the ice takes about two weeks. On the way we stopped at Bouvetøya (Figure 7), the most remote island on the planet (Yes. Really!). Here we dropped off five researchers who were conducting mammalian studies for NPI (the Norwegian Polar Institute). Usually the Fifties are quite rough but we were blessed with calm seas and clear weather and were

able to drop the researchers plus cargo on the island within a few hours. We also had a mock-graduation ceremony for students. This originally started because the Stellenbosch and University of Cape Town students miss their graduation because they are on the ship at this time. Over the years this has expanded to include all students who graduated during the year (Figure 8). To keep with tradition we had the 'Crossing the Line' ceremony when we crossed the Antarctic Circle. This is a more than 50-year old tradition where everyone who crosses the Antarctic Circle is initiated as an. O.A.F (Order of Antarctic Fellows). During this ceremony King Neptune and his lovely wife come on board, he brings his herald and barber along and all Antarctic 'newbies' get to take part in the play. It's quite fun – I had to do it in 2010 during my first trip – and this year was especially fun since I was able to be part of King Neptune's court and to take part in the ceremony (just on the other side this time).

Figure 7: Bouvetøya. Photo: C. Hansen.

Figure 8: Graduates dressed up in their finest. Photo: H. Smith.

We also had to go through the 'boot washing' ceremony. South Africa adheres to the Madrid Protocol, which states that certain biological items may not be taken to the continent. To prevent seeds and any small biological organisms from making it to the ice the DEA organises this ceremony, where times that are taken off the ship are inspected for any biological matter. Shoes and boots are washed in a disinfectant solution to remove all soil, outer gear checked for plant matter and bags vacuumed. As we sailed south we saw an increasing amount of birds, such as the wandering albatross and snow, pintado, and storm petrels. There were whale sightings and the closer we got to the sea ice the more we saw seals and penguins. We were rewarded with beautiful sunsets and vistas of the sea (Figure 9 to Figure 12). Once we hit the sea ice we knew that our days on the Agulhas were short and true to form we were flown to SANAE IV on the 19th of December. But before we were flown off there was again, true to form of the Antarctic being a grumpy and difficult lady, some difficulties. We were unable to break through the last bit of bay ice to reach the ice shelf and were forced to offload our cargo directly onto the bay ice. That is something I have never seen before and I watched the proceedings with interest. The properties of ice and snow are really remarkable and the tensile properties of ice make bay ice perfectly safe to work on, as long as it is thick enough! Scientists from the German polar programme AWI (Alfred Wegener Institut für Polar- und Meeresforschung) tested the strength of the ice for us and once it was deemed safe the offloading operations began.

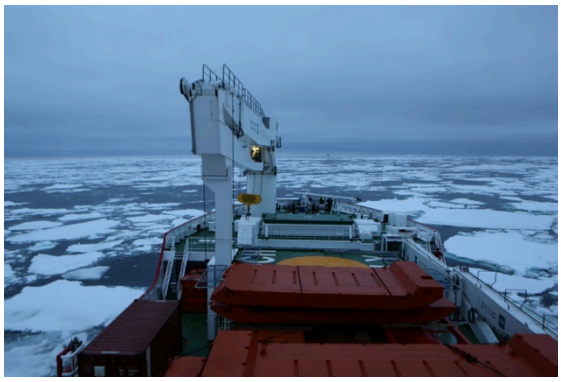

Figure 9: The Agulhas sailing through sea ice. Photo: C. Hansen.

Figure 11: An iceberg seen through a porthole on the Agulhas. Photo: C. Hansen.

Figure 10: An iceberg and beautiful skies seen from the heli-deck of the Agulhas. Photo: C. Hansen.

Figure 12: Sunset at sea over sea ice. Photo: C. Hansen.

The flight to SANAE takes you over great expanses of ice but soon enough mountains – or nunataks as they are known – become visible on the horizon. This is when your pulse starts truly racing and you cannot wipe that smile off your face! SANAE IV is built on the southern portion of the Vesleskarvet nunatak – a mountain that rises about 200m above the ice plane around it. You can see it on the horizon quite a while before you reach it and excitement grows as it become bigger and closer. Once at SANAE all those people on the flight that hadn't been to SANAE before were given an introductory and orientation tour of the base and the outside areas. The base is situated near a cliff (Figure 13) to allow for less snow build-up during the winter months and orientation is given to everyone to ensure people know where the safe and dangerous areas are. We were also given Ski-Doo (ice scooter) training, since we would use these vehicles to reach many of our study sites. Because the Antarctic is inherently dangerous we also spent a number of days on hazardous terrain traversal training, rescue and safety training, climbing training (Figure 14) and first aid training.

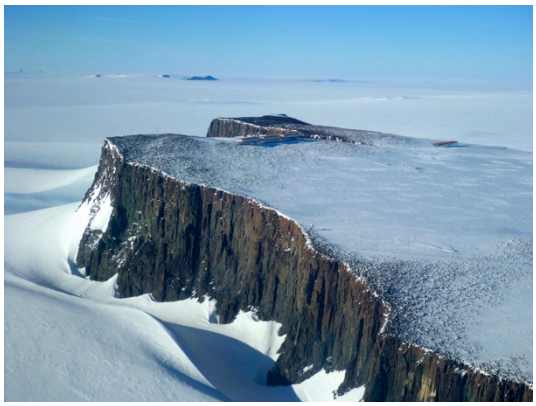

Figure 13: Vesleskarvet with SANAE IV visible. Photo: C. Hansen.

Figure 14: The team receiving safety training at SANAE IV. Photo: C. Hansen.

Once that had been completed and all our cargo had arrived we readied ourselves to be flown to Troll station, 200km east of SANAE across the Jutulstraumen (Figure 15). The Jutulstraumen is the second largest continental glacier in the world (with the largest one also being in Antarctic) and has crevasses large enough to swallow an entire helicopter! We were to spend two weeks near Troll station (Figure 16) to conduct geomorphological work in the region. A week was spent at the station itself in order for us to be able to conduct work at the rock glacier of Grjotøyra (Figure 17, Figure 19 and Figure 20). Another week was spent about an hour away at the rock glacier of Vassdalen, where we camped in tents on the ice (Figure 18).

Figure 15: Crevasses of the Jutulstraumen. Photo: C. Hansen.

Figure 16: Troll Station seen from Sofiatoppen. Photo: C. Hansen.

Figure 17: The glacier at Grjotfjellet above Grjotøyra. Photo: C. Hansen.

Figure 18: The tented camp at Vassdalen. Photo: C. Hansen.

Figure 19: The team walking to Klovningen across the ice plane of Troll. Photo: C. Hansen.

Figure 20: Working near Grjotøyra. Photo: C. Hansen.

Troll station is run by NPI and our visit there showed how important international collaboration is. The Norwegians were incredibly helpful, hospitable and forthcoming. We were able to finish all our work in the allotted time and treated those at Troll to a true South African braai as a thank-you, which they thoroughly enjoyed! Especially the braai broodjies were a hit, and the fact that our braai master braaied the South African way – in shorts – when it was -5°C outside. After our wonderful stay at Troll we were sad to leave for SANAE on the 12th of January in order to complete our work around SANAE. Once safely back at SANAE we started visiting one after another of our study sites. We were flown by helicopter to Valterkulten, Flårjuven (Figure 21 and Figure 22), Slettfjell and Schumacherfjellet, because it is too dangerous to cross to these nunataks overland. We did go overland with ice scooters to Robertskollen (Figure 23), Grunehogna and Lorentzenpiggen (Figure 24).

Figure 21: Looking east from Flårjuven. Photo: C. Hansen.

Figure 22: One of Starlite Aviation's B-212's picking the team up from a study site.

Figure 23: Ski-Doo's parked at Robertskollen. Photo: C. Hansen.

Figure 24: Ski-Doo's parked at the foot of Lorentzenpiggen. Photo: C. Hansen.

Robertskollen is a special site because it, due to being at a lower altitude, is so much warmer than the other sites. Due to this it looks almost like an oasis (for the Antarctic). We find many bryophytes (moss) and lichen here and these are the focus of one of our research projects. We also spent a large portion of our time on the Northern Buttress of Vesleskarvet, one of our main study sites in the region. We downloaded our loggers to obtain the previous year's data, maintained and repaired loggers, set up new experiments, did surveys, obtained sediment samples for cesium and fine particle analyses.

Working in the Antarctic is challenging. You only get to visit once a year and the field season is short. This year we had about six weeks on the continent but the season was marred by two bad storms. Due to bad weather we lost almost three weeks in the field as no outside work can be completed with high winds and snowfall. As a result you work extra hard when the weather is good and it can be incredibly exhausting. You also need to rely on your teammates, especially when crossing dangerous areas such as crevasses in order to reach study sites. The work is physically and emotionally exhausting but in the end you count yourself lucky and blessed for being there. Nothing compares to being out in the field in such a beautiful place! The landscapes of the Antarctic are stunning and it is an absolute privilege to be able to work in such a breath-taking place. It also doesn't have to be only hard work. For Christmas we had a lovely dinner and got to build a snowman (Figure 25) – a unique experience for those that had never seen snow before. The base has a table tennis and pool table, as well as a darts board so after work people challenge each other for games. As a result I got quite good at table tennis, mostly thanks to the time forced to spend inside due to bad weather. There are also many board games (Figure 26) and books on base so you will find something to entertain you.

Figure 25: Our Christmas snowman. Photo: C. Hansen.

Figure 26: Playing the board game 'Settlers of Catan'. Photo: C. Hansen.

You also form close friendships and bonds with others at base. All the different groups, be they there for science, base maintenance or logistical support, also help each other and it is the sense of camaraderie that makes these trips the life-changing experiences that they are. Although the Antarctic is incredibly challenging and can be very hard on you and it is ultimately the people that make the experience. So after six long weeks of hard work we departed SANE for the ice shelf. Most people got flown off in helicopters but because our work wasn't quite done due to the days lost to bad weather we were given a few extra days. Liezel, Jess and I ultimately left for the shelf on the last cargo train (Figure 27) and arrived there on the 2nd of February.

Figure 27: The cargo train - or CAT train as it is known - on the way to the ice shelf. Photo: C. Hansen.

Once all cargo had been loaded back on the Agulhas we headed back to Cape Town on the 7th of January. After a few days spent in stormy seas (Figure 28) we picked up the researchers from Bouvetøya and pointed our nose straight at Cape Town, where we arrived on a glorious and sunny day (Figure 29).

Figure 28: The Agulhas sailing through high seas. Photo: C. Hansen.

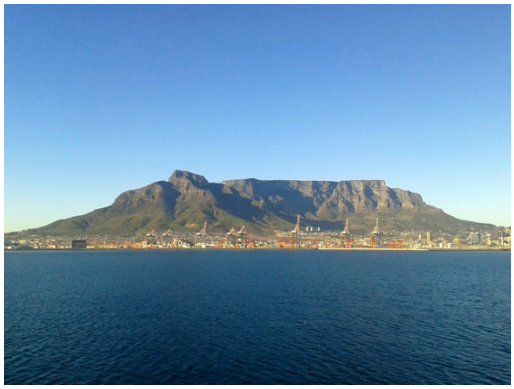

Figure 29: Hello Cape Town! Photo: C. Hansen.