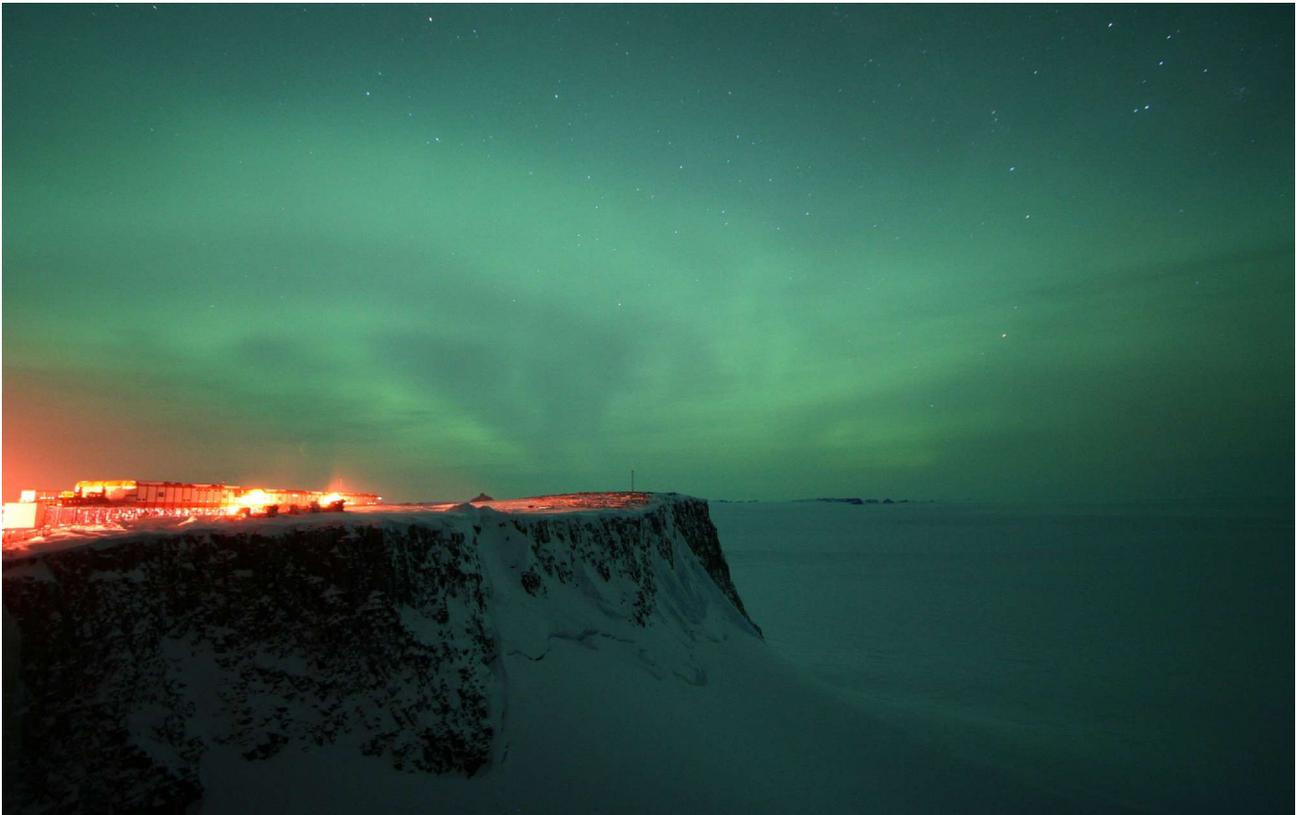




SANAE 47

47TH SOUTH AFRICAN NATIONAL
ANTARCTIC EXPEDITION

NEWS



SEPTEMBER 2008

In this Newsletter...

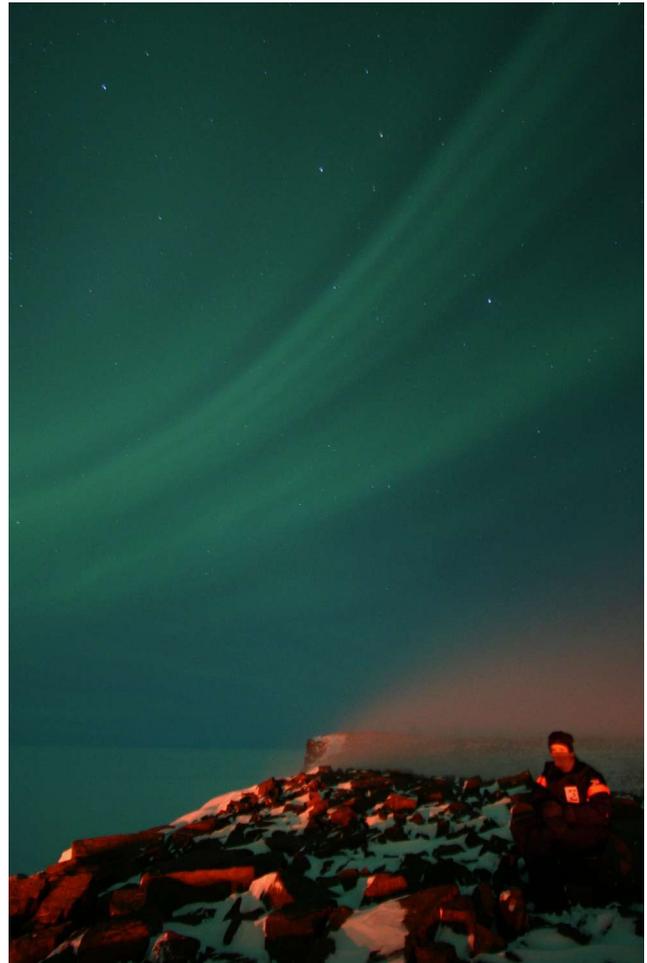
- **The Month in Focus** – Antarctic Antics and Polar Pictures from September to keep you amused and up-to-date
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Cover photo: Aurora over SANAE IV, © Ross Hofmeyr 2008



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This newsletter reflects the experiences of the individuals in the overwintering expedition team. Opinions may not reflect the official policies of the SA Government, Department of Environmental Affairs and Tourism or the Directorate: Antarctica and the Islands.



The Month in Focus

September brought the promise of Spring, and then didn't really live up to it! Strong winds, stormy days and burst pipes aside, however, we still had great times and even got some work done. Memorable moments were...

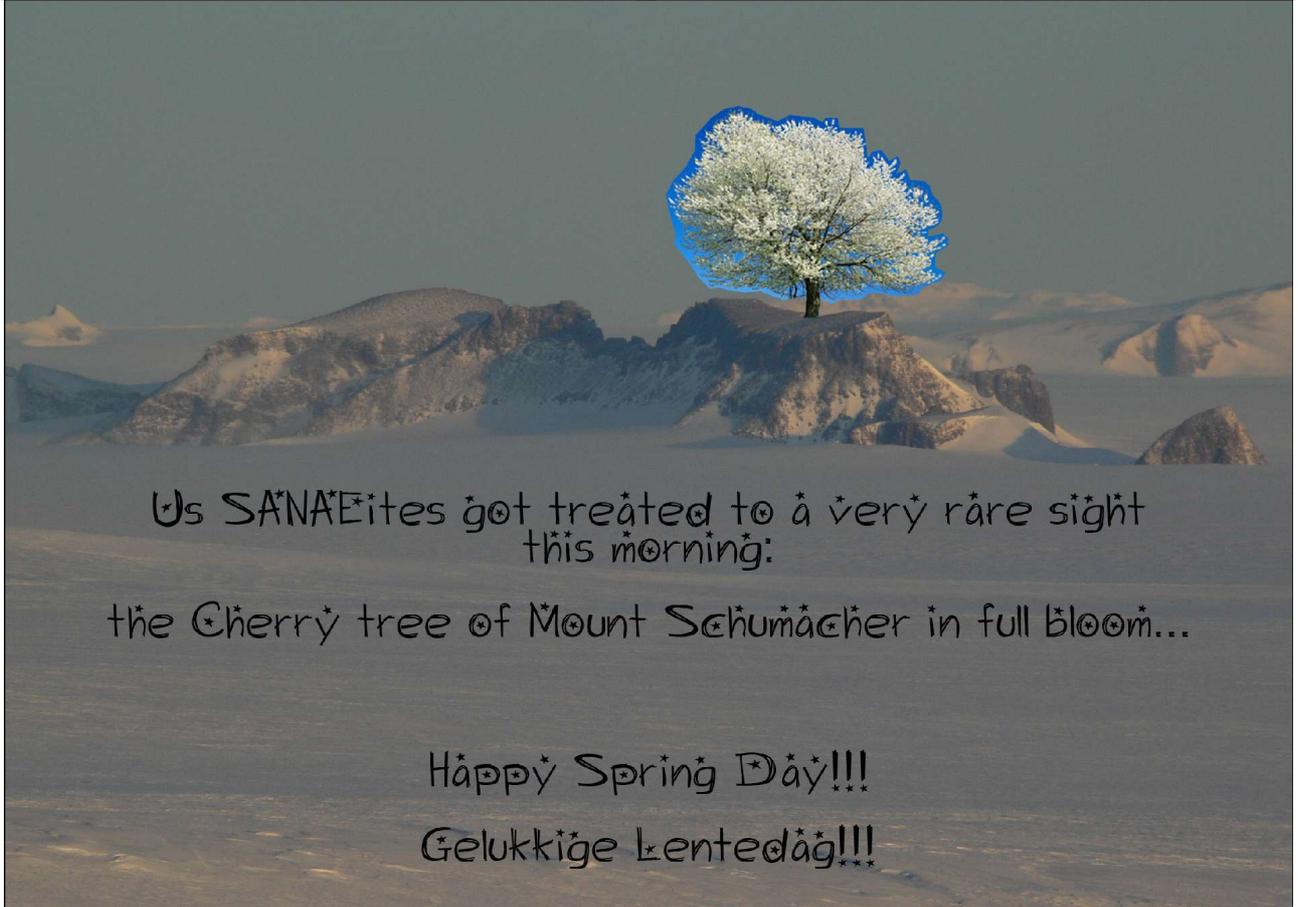
...Spring Day on September 1...

...the best aurora of the whole year on the 3rd (see the cover photo and parting shot as well!)



...clearing the waste room of all the full drums and containers which we've been accumulating since March...

...bringing one of the cabooses into the hangar (tough work manoeuvring an 8-ton sled!) and then making many, many repairs to get it ready for summer...



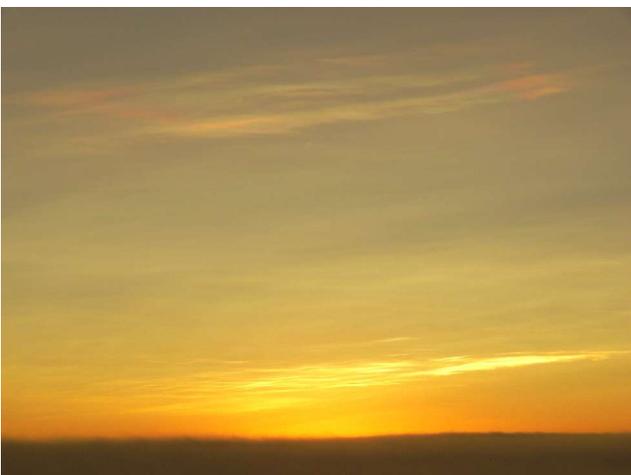
...the first beautiful spring day on the 6th, which allowed us to get out and about ('only' -30°C with no wind, hence 'lovely')...

...the Spring Braai on the 9th, which warmed our hearts and stomachs...

...cross-country skiing and snow-boarding again in the lengthening days...



...THE awesome weather day on 17 September, with noctilucent clouds at dawn and then a 222km/h wind gust later in the day...



...Equinox Games from the 19th to 21st, where Richard took the Pool championship, Llewellyn won at Darts, Morgan dominated in Table Tennis and won Pool Doubles with Sanki, and Ross was victorious at Bowls and Bokdrolletjiespoeg...

...finding a box of apples in which some had miraculously escaped the rot, and enjoying a juicy bite of (albeit 10-month-old) fruit again...



...lovely aurorae on the 21st and 22nd...

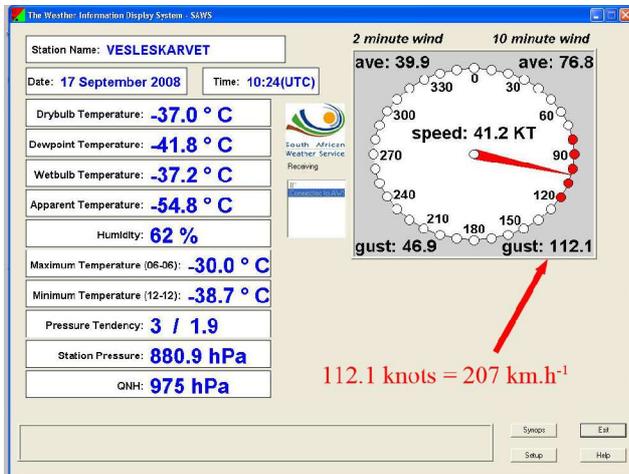
...the frozen and burst waste-water pipe that had us on water restrictions for 8 days from the 23rd, working until 23h00 at night on the 24th, and slaving in blowing snow on the 26th...



...MORE beautiful aurorae on the 25th and 30th...

...and what will October hold in store?

Highest Recorded Wind Gust at SANAE IV



On 17 September we recorded the highest wind gust ever at SANAE IV. The anemometer clocked in at a whopping 222.8 km.h⁻¹.

For those at home who have images of the base ripping apart and 'dozers being flung around – RELAX! A wind gust is a sudden increase in wind speed that lasts for a short period of time (a few seconds to about a minute). Sometimes wind gusts coincide with slight changes in wind direction, which frequently occurs here. Often when we have relatively light southerly winds, the cliff of the Southern Buttress (on which Base is built) will act as a “wind block” and we will have almost no wind at Base. Should the wind direction shift slightly more easterly, the wind will then miss the cliff and come racing up the ice slope towards Base.

This change in wind direction coupled with a katabatic wind led to the events of 17 September.

What is a katabatic wind?

Some of you might remember from school geography that we learned about katabatic and anabatic winds, or mountain and valley breezes. Note the use of the word “breeze”. I don't think in anybody's mind katabatic winds in Antarctica can be seen as a “breeze”. Therefore, generally

(and rightly so) katabatic winds are used to refer to winds of much stronger magnitude than plain mountain breezes.

What makes it special?

Katabatic winds are also referred to as gravity, fall or drainage winds because they are propelled downwards by gravity and will follow the contours of the slopes and not just synoptic scale weather patterns.

How does it work?

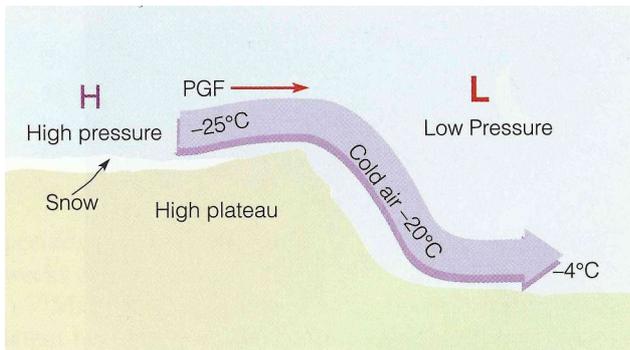
Firstly one needs to have an area of higher elevation and add some cold temperatures. Exactly what we have here with the huge Polar Plateau. Antarctica rises from sea level to 4897m at the summit of the Vinson Massif and much of the continent is above 2000m (the average altitude of the continent is 1860m – the highest on Earth). The following image shows the topography of Antarctica. Notice how sharply the elevation change close to SANAE IV. In 500km (from the coast) the land rises from sea level to 3000m.



The air just above the Plateau is constantly cooled by the snow and ice on the surface. The large Polar high pressure system (synoptic scale) that is usually present also results in clear sky conditions over the Plateau. Most of the

incoming radiation is therefore never absorbed, but bounced right back into the atmosphere, adding to the cold layer above the surface. The cold air is very dense – and therefore heavy – and will flow down the slopes towards the lower lying areas. Two things are responsible for this:

1. The pressure gradient force. Horizontal differences in temperature lead to horizontal differences in pressure. The pressure gradient force will then make air flow from a higher pressure (cold temperatures) to a lower pressure (warm temperatures). The next figure explains how the pressure gradient force works.



2. Gravity. The reason we all have our feet planted firmly on the ground. Gravity applies to air too and is the reason why katabatic winds rush downwards from the Plateau.

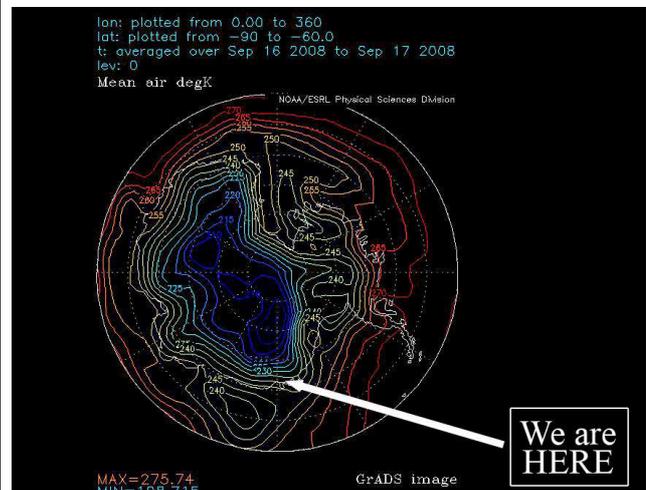
At the Plateau itself, the wind that gives birth to the katabatic wind is called an inversion wind. This is usually a pleasant and light breeze. Once the wind gets going down the slope, it will accelerate and can reach the lower areas at hurricane force. Due to friction, the wind at the surface is usually slower than the wind about 100m higher up, but it is enough to lift up loose snowflakes that are lying on the ground. A wall of blowing snow creates white-out conditions in a few minutes. As the air moves downwards, one would also expect it to heat up. Of course, “heating up” is a relative term. Depending on

how steep the slope is and how far the air has travelled, it is possible that the wind can cause colder temperatures at lower altitudes.

Some parts of Antarctica are more prone to receive katabatic winds than others. The Australian base Casey have regular (almost daily) katabatic winds that normally exceeds 25 knots (around 46 km.h⁻¹). The French base of Dumont d'Urville have recorded wind gusts of 324 km.h⁻¹ (I cannot find an official confirmation for this, but can definitely believe it to be true. www.gdargaud.net/Antarctica/MeteoDdU.html).

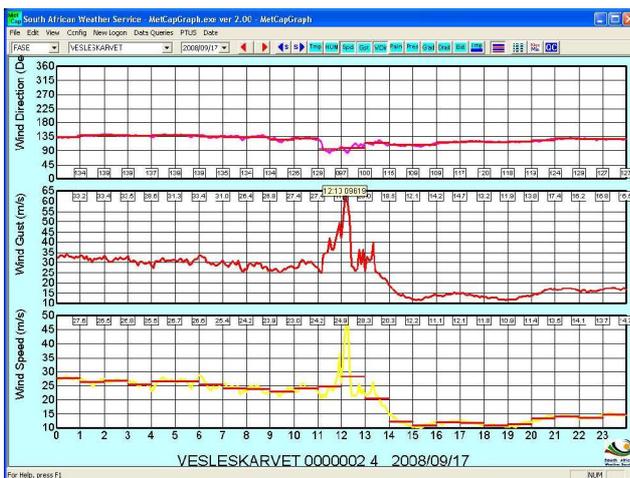
What happened at SANAE on 17 September?

To claim a katabatic wind, we must show that a pressure gradient force existed. Below is the NCEP reanalysis data for 16 and 17 September. The temperatures given are averaged values in Kelvin. The values range from -74.3°C to 2.7°C. The temperature at Base hovered around the -30's for the same period. So it is safe to say that it was indeed colder on the Plateau then here at our cosy home.



The wind at Base for 17 September averaged between 20 and 30 m.s⁻¹ (72 to 108 km.h⁻¹) during the morning with a wind direction of 135° (south-easterly). Suddenly at about 09h30 (local time) the wind picked up to 37 m.s⁻¹ (133 km.h⁻¹) and then made a massive leap to 49 m.s⁻¹ (176 km.h⁻¹). This all occurred in the space of one hour. The corresponding wind gusts went from

30 to 50 to 62 m.s⁻¹ (108, 180 and 222 km.h⁻¹ respectively). On the graph below notice how, during the period of high wind speeds, the wind direction has shifted easterly. The top graph shows the wind direction (degrees), the middle graph is the wind gust (m.s⁻¹) and the bottom graph shows the wind speed (m.s⁻¹). Also note that the graphs are in South African Standard Time, so minus two hours to get SANAE local time (GMT).



'Clouds' of blowing snow on the horizon more than 30km away sweep towards SANAE IV in the pre-dawn light

Our temperature at Base dropped from -30°C to -39°C in five hours. The lowest temperature occurred roughly 30 minutes after the highest wind speed. Those of us that kept an eye outside the window, noticed that we went from visibility of more than 50 km to a complete white-out during this hour long period.

Experiencing a true Antarctic katabatic wind was amazing and something we'll all remember and talk about for a long time.

- Santjie du Toit

I used the following resources to write this article:
Ahrens, C. Donald; *Meteorology Today*; Brooks/Cole, 2000.
Dargaud, Guillaume; www.gdargaud.net; 2008.
Figure 2 obtained from www.clearlyexplained.com.
Figure 3 obtained from *Meteorology Today*.
Figure 4 obtained from NOAA-ESRL Physical Sciences Division, Boulder Colorado; www.cdc.noaa.gov.
Natural History New Zealand; *Antarctica. An Encyclopedia from Abbott Ice Shelf to Zooplankton*; David Bateman, 2002.
Parish, Thomas R. and Bromwich, David H.; *A Case Study of Antarctic Katabatic Wind Interaction with Large-Scale Forcing*; Monthly Weather Review; January 1998.
Turner, J and Pendlebury, S; *The International Antarctic Weather Forecasting Handbook*; 2001.



Another 'cloud' of blowing snow approaching under otherwise clear skies. When this one arrived at the base the wind speed went from 10 to 45 knots within minutes, dropping visibility to less than 50 meters.

Waste Management at SANAE IV Research Base

Back in South Africa refuse is collected at regular intervals by municipal workers and disposed of in the appropriate manner, while here at SANAE there are no municipal workers, only us. So, how is waste handled, and how do we manage it?

Firstly, all waste is categorized according to type: paper/plastic, glass, metal, medical, food, sewerage, chemical and oil. All these different types of waste have different color codes (yellow = food, white = used oil, brown = chemicals, red = medical, orange = paper/plastic, black = sewage, blue = metal, green = glass) to distinguish between the different types, to mark all the waste drums so that they are visible to everyone, and to make sure that the right type of waste ends up in the correct container.

Every Monday is our beloved skivvie day where it is expected from everyone on the base to pitch in and help with the general domestic house-keeping at SANAE IV. As the base gets cleaned all full bags and drums end up in the waste room situated in B-block. Here a team of people will sort the waste and start to process it.



The waste-room at SANAE IV - containers with bales of paper/plastic waste and cardboard are visible on the right, while the drums used for other waste are visible to the top left.

All glass bottles and jars are dumped in an empty drum and shattered with a steel pole; the shattered glass takes up less space so more glass bottles and jars can fit into a drum.

The metal is mostly empty food tins, which is squashed with a hand operated mechanism to a flat disc and placed into a drum. Once again by squashing the tins more space is generated at the end of the day.

Food waste is normally old or stale food from the kitchen, dining and cold rooms. The food in the black bags is taken to the waste room and thrown in 210 litre drums. The drums have a square hole cut into them, and after the drums are full they are sealed with a bigger square metal plate riveted and sealed with silicon sealer to prevent spillage and bad odours.

Chemicals such as cleaning fluids which cannot be disposed of in the sewage system are dumped in normal drums and sealed to make sure that they do not leak. Cardboard boxes are torn open and flattened after which they end up in a small square container and are recycled into paper back in South Africa. Paper and plastic from the kitchen, offices and labs are placed in a garbage compactor and pressed into a bale in a strong black bag and tied with tape to keep them closed.

Oil is from servicing our generators and this oil is dumped in 210 litre drums and sealed. The same procedure is followed for medical waste and processed sewage. All the full drums, bags and containers are taken back to South Africa where they are opened, sorted and processed in the proper manner. At no time may any waste be littered in or outside the base.

We must all look after Mother Earth - after all, she is the only one we have.

**Anton van Zyl
Mechanical Engineer**

THE AMAZING ADVENTURES OF

SASTRUGIANA, CABOOSE, ARNOLD AND MAYA



$$\left(\sigma \nabla_p^2 + f_0^2 \frac{\partial^2}{\partial p^2} \right) \omega = -f_0 \frac{\partial}{\partial p} \left[-\mathbf{v}_g \cdot \nabla_p (\zeta_g + f) \right] - \frac{R}{p} \nabla^2 \left[-\mathbf{v}_g \cdot \nabla_p T \right] - \frac{R}{p c_p} \nabla^2 H$$



*All this talk of katabatic winds made Caboose think.
But it just made Arnold hungry.*

SANAE

SANAE 47 Supporters

The team of has been privileged to have enthusiastic support of individuals and companies back home in South Africa, who have shown their personal and social commitment to furthering scientific knowledge through applied research. Although the team's necessities are met by the Department of Environmental Affairs and Tourism's Directorate: Antarctica and the Islands, under which SANAE falls, we have had many personal donations of comfort items, specialised clothing and equipment to make our long year of isolation more enjoyable. In no order of importance, our supporters include:



First Ascent (www.firstascent.co.za) are a South African company who have a long history of making top quality mountaineering and outdoor clothing used by many of SA's top climbers and outdoor enthusiasts. They were delighted to support the team as we expanded on our already extensive wardrobes of issued clothing, making sure that we'll all be warm, dry and comfortable while working in the world's harshest environment.



Specialist suppliers **RAM Mountaineering** (www.rammountain.co.za) gave us incredible support in acquiring outdoor equipment of the highest quality, from headlamps through to crampons.

BondiBlu (www.bondiblu.co.za) make eyewear

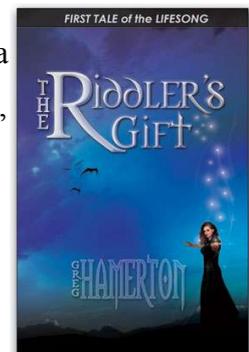
strictly for the adventurous, and have a strong tradition of supporting the Antarctic teams. They donated a pair of high-quality sunglasses to each team member...and then threw in sun and skin-care products as well, keeping our eyes and skins safe from the intense radiation in summer.

Adventure film-makers **Fresh Air Crew** gave each member of the team a peak cap, warm fleece beanie (a real favourite) and a t-shirt in support. See some of their prize-winning work at www.freshaircrew.com.



Kanu Wines are a well-known wine farm between Cape Town and Stellenbosch, and have won several awards for their produce. They donated wonderful wines, including the sublime Limited Reserve Merlot which has blown off our woolly socks.

Cape Town author **Greg Hamerton** kindly donated a copy of his new fantasy novel "The Riddler's Gift" to the team, which will be added to the SANAE IV library. The book, published by Eternity Press (www.eternitypress.co.za) is the first in the Lifesong trilogy, an epic fantasy tale.



Previous SANAE expedition leader and doctor **Farouk Parker** (SANAE 40) contacted us out of the blue with a donation of hundreds of movies and many hours of music, which has been added to the base library to be enjoyed in the dark winter months.

Businessman **Tom Cook** donated a new set of weights and exercise equipment to the base, to supplement the excellent gym. Hopefully by the time summer comes around again we'll be fit enough to lift all the boxes of new supplies ;)

ORMS

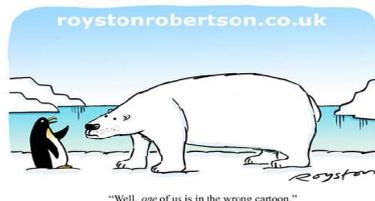
MIKE ORMROD PRO PHOTO WAREHOUSE

Orms ProPhoto in Cape Town has a longstanding relationship with the Antarctic Expedition, and honoured this as usual with very competitive rates on all types of camera equipment for the team. Considering some of us spent several month's salary making sure we have the best kit to record our expedition for posterity, the generosity of Mike Ormrod and his excellent team was well appreciated. They can be found online at www.orms.co.za

Pepperdew Piquanté Peppers make something special, a fruit somewhere between a tomato and a red pepper. If you haven't tasted pepperdews, you don't know what you are missing. Perfect on pizza, we despaired at the thought of leaving them behind, until Pepperdew donated enough peppers and pepperdew sauce to last us through the year. Awesome!



Allesverloren Wine Estate is well-known in the Cape, and jumped at the opportunity to donate wine to the team, which has been a firm favourite.



Cape Town artist and graphic designer **Jacob Krynauw** of **K2 Design** produced the wonderful SANAE 47 logo *pro bono*, and then went on to design the striking expedition t-shirts which have become very sought-after. The shirt, of course, would be incomplete without the perfect Antarctic cartoon, supplied by freelance cartoonist **Royston Robertson**. See more of his work at www.royston.dircon.co.uk

JP Bredell Wines donated some of their fine wines and incredible John Platter 5-star port to

the team. Their dark label brings immediate smiles to the dinner table.

An entire box of **new books** was donated by the **Kane Book Club**, which has been added to the base library to be enjoyed by teams for years to come.

Caturra Coffee is behind many of the best cups of coffee you've tasted at restaurants around SA, and now they are helping us wake up with a smile in Antarctica as well. With 100kg of their finest coffees, we'll be warm in the darkest winter months, ensuring 'a lifestyle with taste'.



KWV is a well-known South African cellar who have supported the Antarctic teams many times in the past, and we were luckily no exception. To stave off the cold they donated some of their excellent 5-year brandy and sweet Red Muscadel.

Peninsula Beverages made a very kind donation of cases of soft drinks including Coke, Fanta, Sprite, etc. Although we have large supplies of food and drink, there is something wonderful about opening a cold Coke so far from home – it becomes a real treat.

You can always trust **South African Breweries** to come to the party – they donated cases of assorted beers to the team, for the end of those hot days out in the blazing sun...uh, well, you get the idea.

Ask any South African to name things unique to our beautiful country, and it won't be long before they mention **Mrs Balls Chutney**. Mrs Balls is an institution of its own, and has spread around the world. When they heard of the expedition they immediately sent hordes of chutney and personalised Mrs Balls tops to show their support.



Weltevreden Wine Estate jumped at the opportunity to provide some fine wines for the team, which have complemented our dinners and brought warmth and mirth. I imagine I can taste the smells of Africa...



The **Overberg Paragliding Club** gave each team-member a long-sleeved shirt, perfect for wear around the base or as a base-layer when venturing out into the cold. Find out more about paragliding and the club at www.overbergparagliding.com

Rosendal Private Cellar are best known to our team for their beautiful rosé wine, but came to the party and donated many wonderful bottles.



Martingraphix (www.martingraphix.co.za) are a Cape Town company specialising in graphic design, advertising and promotional items who were absolutely indispensable in getting the

shirts, badges, stickers and banner done for the team, at discounted rates. We couldn't have done it without them!

Clinique very kindly donated skincare products to the team, to keep our mug's healthy and hearty.



McGinty's Pub in Benoni were so taken with the idea of the project that the owner immediately pledged his support – thanks guys, we'll have one on you!

(Please, if I've omitted you from this list, contact me immediately so that I can rectify my egregious mistake. Mail Ross on ross.hofmeyr@sanae.sanap.ac.za)

How Can I Find Out More About the Expedition?

The Antarctic Expedition is full of interesting aspects, encompassing the scientific work we do, the logistics of working in such a distant and isolated location, and the human factors of being alone for so long. We love to hear from you and grow public awareness of the projects, and for you to be involved. Here are some ideas to learn more:

- Visit the official SANAE website at www.sanap.org.za and learn more about the base, the logistics, the science and the people.
- Email the team at sanae@sanap.ac.za with your questions or news.
- Email team-members directly, using the

format below:

- firstname.lastname@sanae.sanap.ac.za
- Visit the websites of our sister projects at Marion and Gough Islands:

Marion and Gough Islands:

- marion.sanap.org.za, and gough.sanap.org.za
- Many of the organisations involved have their own pages, and some team-members have personal blogs.
 - The links page on the official SANAP website has plenty- <http://www.sanap.org.za/links.html>
 - The Scientific Committee on Antarctic Research (SCAR) – www.scar.org
 - The Hermanus Magnetic Observatory - www.hmo.ac.za
 - Ross' blog about living in Antarctica - www.doctorross.co.za

Finally, you can CALL US at normal South African telephone rates by dialling:

021 405 9450

Note that the number has changed!

WEATHER STATS: SEPTEMBER 2008

	Maximum		Minimum		Average
Pressure	886.9 hPa	30-Sep	863.6 hPa	20-Sep	878.0 hPa
Temperature	-8.7°C	3-Sep	-37.9°C	17-Sep	-22.0°C
Humidity	83%	5-Sep	14%	13-Sep	56%
Wind Gust	61.9m.s ⁻¹	17-Sep			
	222.8km.h ⁻¹				

Parting Shot – Aurora Panorama**A beautiful 'Omega Formation'
stretches across the sky**

photograph © Morgan O'Kennedy 2008