SANAE 47

47th South African National Antarctic Expedition

NEWS

June 2008

Newsletter of the 47th South African National Antarctic Expedition Overwintering Team
SANAE IV Research Base, Antarctica Tel +2721 405 9428 Email sanae@sanap.ac.za

In this Newsletter

- **The Month in Focus** – we reached the depths of winter... but what did we get up to?
- **Really Cool Atmospheric Stuff! –** metereologist Santjie du Toit explains some of the fascinating and rare things that can be seen in the sky over SANAE IV, and even back home!
- **Water Generation at SANAE IV –** Our mechanical engineer, Anton van Zyl, explains how we generate and manage water for the base.
- **The Antarctic Wilderness: Birdlife at Vesleskarvet –** Daleen tells the stories of some of the birds which can be seen in our area during the sunnier months.
- **Birthday Celebrations –** June is 'management' birthday month, as both team leader Ross and deputy Neels celebrate on the ice.
- **Midwinter Celebrations**
- **To all who are applying to come to Antarctica... -** Neels issues a stern warning to future Antarcticans
- **The Amazing Adventures of Sastrugiana, Caboose, Arnold and Maya**
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- **Weather** – Statistics for June
- **Parting shot** – A taste of the beauty of Antarctica.

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.

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The Month in Focus

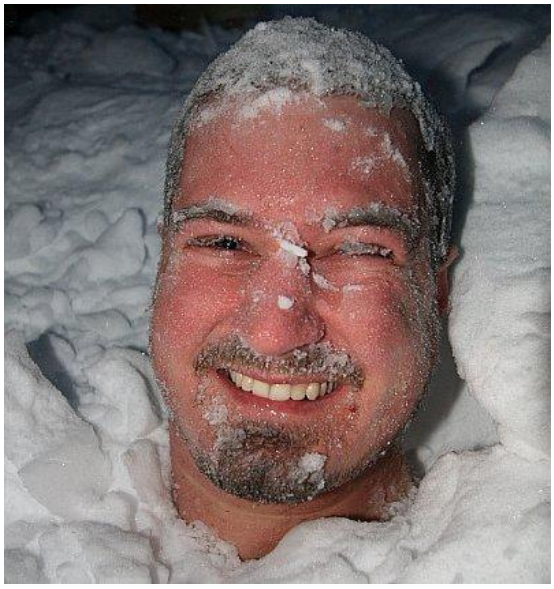
June has come and gone, and left us in the depths of winter in Antarctica. However, we're not the type to let the chill give us cold feet. Memorable moments in June include...

...the huge storm that saw the month in, broken doors, frozen pipes and all...

...Ross's birthday on the 2nd and the great 'Broadway' party thrown by the team...

...Richard's disappearing act while looking for the smelly hidden under the snow: picture no Richard, a Richard-shaped hole in the snow, and a voice accompanied by splashing sounds saying "I found it!"...

...the traditional birthday snow-bath at -20° for Ross, who also learnt valuable lessons about navigating ice in socks...



...pranks galore on Friday 13th June...

...the unseasonable WARM weather on the 13th – only -9°C and no wind. Santjie and Ross take advantage and ski to the depot and back (book and movie rights available for serious buyers)...

...the beautiful aurora of the 14th, which was gone very quickly, like us off the roof due to the freezing temperature...

...more cross-country skiing and rambles to Kleinkoppie in the calm weather of the 16th and 17th, followed by the official midwinter circumnavigation of Vesles on the 19th on foot...

...Midwinter on the 21st, with all the accompanying sports, dinner, toasts and greetings from around the globe...

...noctilucent and nacreous clouds on the 23rd...

...the coldest day at SANAE IV on record since 2000 on the 24th had us cavorting at -40.7°, and also celebrating Neels' birthday...

...the Hundred Degree Dash...

...Daleen, Morgan and Ross spending a night in a tent outside the base at -40°C...and then weathering 60 knot winds the next day...

...the coldest temperatures recorded in the base dropping to 3°C in the dining hall, prompting Santjie to eat dinner wearing gloves...

...epic movie marathons, watching all the Matrix movies in one night and all the Kill Bill movies in another...

...the greatest wind-strength since 2003 recorded at the base – 185 km/h – and the nights of lying awake listening to the base shake and the static electricity sizzle all around us...

...the huge storm that saw the month out in the same fashion that we saw it in.

Really Cool Atmospheric Stuff!

Photometeors are patterns in the atmosphere that you can see with your naked eye. Most of these are not confined to the polar regions, so you must just keep your eyes on the skies!

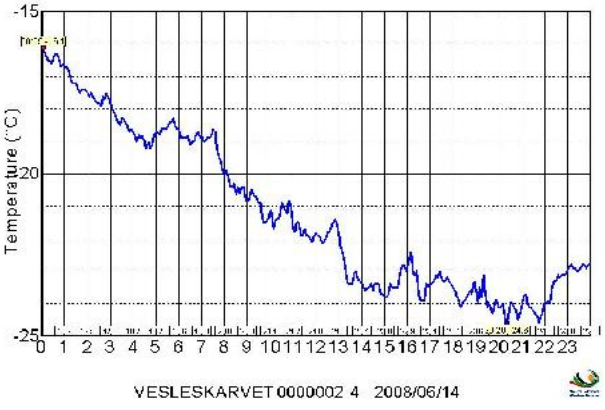
Phenomena produced by ice crystals

Diamond Dust

Technically this falls under the hydrometeor class and is precipitation in the form of solid particles. What makes diamond dust so interesting is the fact that it can be falling out of a clear sky.

Diamond dust forms when you get a layer of air with a higher moisture content above a thermal inversion (in other words: the temperature INCREASES with height). Once the inversion breaks, you will have mixing taking place between the the cold air and the relatively warmer air. The mixing will result in ice crystals forming and falling from the sky although there are no clouds visible.

So you can expect to see the temperatures drop quickly and steeply with the formation of diamond dust. This can be seen on the following graph:



Diamond dust sparkles in the sun- or moonlight (I really like the Afrikaans term “ysblinkertjies”) and is magical to observe.

Photo: Ross Hofmeyr (SANAE)

Halo

This is a broad term describing what happens when light gets reflected or refracted THROUGH ice crystals. Halo phenomena can be observed when cirrus clouds, diamond dust or ice fog are present. The following are examples of halos:

22º Halo:

A ring of light extending outwards from the sun or the moon at 22º (if you hold your hand out at arm's length and you spread your fingers, 22º will roughly be the distance between your little finger and your thumb).

Photo: Santjie du Toit (SANAE)

46º Halo:

This is much more rare than the 22º halo. We have not seen one here yet. It is the larger of the two rings on the photo.

Photo: Jon Oldroyd (Halley Station)

Tangent Arc:

A bright arc of light at the top or bottom of a 22º halo.

Photo: Bill Zenfolio (Canada)

Parhelia:

When a person, the sun and ice crystals are all on the same horizontal plane, two bright spots on either side of the sun can be observed. These can be coloured spots. They are also called 'sun dogs'. This phenomenon is called paraselene when observed with the moon.

Photo: Joe Starke (SANAE)

Sun Pillar

Unlike with halos, sun pillars form when light gets reflected or refracted OFF ice crystals. Depending on the height of the sun above the horizon, a pillar will either extend vertically upwards or downwards from the sun. Sun pillars are most often observed at sunrise or sunset.

Photo: Santjie du Toit (SANAE)

Phenomena produced by water droplets

Corona

This is a white or coloured ring that forms around the sun or moon (the photo is of the full moon). It is created by means of diffraction (the bending of light around water droplets). The water droplets are all of the same size and concentric circles appear.

Photo: Santjie du Toit (SANAE)

Iridescence

When diffraction takes place with water droplets of different sizes, the corona becomes distorted and is seen as patches of colour in a cloud.

Photo: Santjie du Toit (SANAE)

Glory

A glory is a set of coloured rings of light that surrounds the shadow of an object. The shadow actually has nothing to do with the formation of a glory, it merely makes it easier to see. The rings form around what is called the antisolar point. So with the sun behind you, when you look into a water cloud (cumulus, stratus/fog) the glory will form at the point directly opposite the sun from where you are.

Photo: Mila Zinkova (Canada)

Remember, many of these phenomena can be seen anywhere in the world, so keep your eyes on the sky!

- Santjie du Toit,

Meteorologist

SANAE 47

Water Generation at SANAE IV

Many of you out there may not have thought of how water is generated in Antarctica. Well, it's easy you will say: just melt ice and boom you get water!

Well it's almost as easy as that but with a bit more technology involved than one would think.

Ice is melted in the snow smelter, or "smelly" and then pumped up to the base.

There are two water tanks under the ice. One is the cold water tank and the other is the hot water tank. The cold water tank is open to the surface and the hot water tank is closed and under the ice surface. Both tanks are about three hundred meters from the base, to prevent pollution, so that no oils, fuels or sewage can get into the fresh water supply.

There is also a pipeline which connects the smelly with the base to fill up two sets of tanks in the hangar giving a combined storage of water of 40 000 litres when both tanks are full.

First there must be a stockpile of ice and snow down at the smelly to make water for the base. During takeover, with more than 85 people in the base, water consumption is very high and it is hard work to make seven to eight thousand litres of water a day every day for the duration of takeover, which is around 80 days.

At SANAE IV we use big Caterpiller D6H bulldozers (around 25 tons) to take ice and snow from an ice "quarry" about 50 meters away from the smelly. It is then dumped in and next to the cold water tank. With the help of team members the ice is thrown in the cold water tank. A pump sprays hot water from the hot water tank at about 30°C onto the ice which in turn starts to melt and fills up the cold water tank. At the same time the hot water temperature is dropping because of the

fact that the cold and hot water tanks are interconnected by pipes in the smelly room where the pumps and the PLC (electronic control board) are situated.

The cold and hot water tanks each have six elements which heat up the water to melt the ice. When all the elements are on (it takes about two hours controlled by the PLC) the smelly can draw up to 80 KW from the base making it a very expensive way to make water .

Unfortunately this is the only way of making water at SANAE so care must be taken not to waste water and to use it wisely.

In takeover time a second generator is started to compensate for the increase in power demand so that the base still can function on its own without tripping any of its circuits.

After takeover, when there are only ten team members in the base, the demand for water drops to around 1200 litres per day making life much easer and the power consumption much lower.

Because the hot and cold water tanks are on the same level and inter connected by pipes there levels are the same, once both hot and cold water tanks are full a float switch on the hot side gets the signal that it is 100% full. The full signal goes to the PLC which in turn switches a group of valves over from circulating hot and cold water to pumping water up to the base via the pipeline. The pipe line is heated and insulated all the way to the base, because of the extreme weather, if the pipeline was not heated and insulated the water will freeze on its way to the base blocking the pipe and bursting it as well.

On entry of the hanger the water goes through a set of filters (which get replaced every 30 days) and is then pumped in to the west (22000l) or east (18000l) tanks keeping it in storage ready for consumption. The storage tanks are made of fiberglass and also insulated, and there is a small pump which circulates the water in the holding tanks making sure that the water does not freeze and stays fresh. Every time the smelly is full about 1500 l of water enters the base so you can see how many times the smelly has to be filled to pump up eight thousand letters in takeover and take into consideration that the smelly will only pump when its 100% full and the water temp is above 5.4 degrees in the cold water tank.

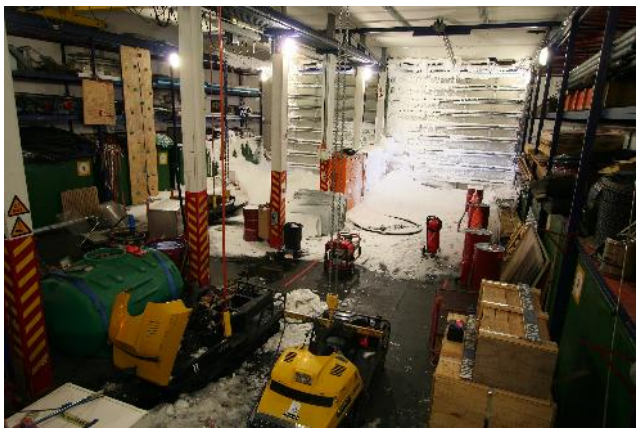
The cold and hot water tanks have a total capacity of 4600 l of which only 1500 l gets pumped to the base at any time. The rest of the water gets heated up to 30 degrees and is used to melt the next batch of ice and snow.

In the base the fresh water is split up in two circuits one being the cold drinking water circuit witch runs in a ring main to maintain a pressure of 3 bar. The return water is then heated a little and goes back in the storage tanks in the hanger. The other is the hot water circuit: an APV plate heat exchanger uses excess heat from the generators to heat the water to approximately 65°C, which is also fed into a ring main circuit at 3 bar through the base.

I hope people can see now that water is not something that is taken for granted here and hard work is needed to make even the smallest amount of water, but thanks to good hard team work we are able to enjoy a nice warm shower every night.

-Anton van Zyl

Mechanical Engineer



The hangar at SANAE IV, with the large green water tanks just visible along the east and west walls

The Antarctic Wilderness: Birdlife at Vesleskarvet

When thinking of a vast and beautiful white desert, with temperatures ranging from 0 to -40, the last thing that comes to mind is bird and wildlife. This ice-covered continent supports no terrestrial mammals, due to lack of moisture and low temperatures. Penguin and seal colonies exist along the ice shelf, but with SANAE IV located about 160km inland, the only other living creatures, excluding our team members, are of the Aves calibre.

A giant petrel in flight

There are approximately 45 known bird species active on the continent, of which seven of them are penguins. Of that 45, the SANAE 47 travellers to Vesleskarvet have been fortunate to see 3 species coming on regular visits.

A beautiful Snow Petrel in flight

One of the most beautiful birds in the world, and definitely on the continent, is the Antarctic Snow Petrel, or *Pagodroma nivea*. They are a striking pure white, approximately the size of a pigeon, and gracefully light up our skies above Veslevkarvet. When not doing aeronautical acrobatics during mating season, they can be found on breeding on nunataks, or feeding on krill, fish, molluscs or euphausiids near the ice shelf.

The closest nesting and breeding ground for snow petrels is Robertskollen, located 24 km from Vesleskarvet. Their nests are mainly under rocky outcrops, sheltering chicks from the elements and skuas hunting for lunch. Their self-defense system is spraying intruders with foul smelling orange oil, which reeks of fish and is deemed nigh impossible to remove.

Robertskollen from the west

The Antarctic Skua, or "raptor of the south", is a curious yet aggressive bird. The *Stercorarius maccormicki* is a member of the gull family, and is mainly found in Antarctica, with Japan, India, Macquarie Island and Southern Tasmania being the exceptions. Skuas don't nest, but lay their eggs in rocky, snow free areas, thus leaving nunataks as the only option inland on the continent. They will defend both their egg and chick with ardour, and attack is imminent if you don't walk away. They are aggressive, raiding nests and eating chicks from penguins and other species of birds. Many a dead snow petrel has been sighted on and around Vesleskarvet, victims of skua attacks. Skuas are also extremely intelligent birds, and not as shy of

humans as would be expected. We were paid a visit by a flock of four on 11 March 2008, where the predators were playing around on the airfield after our last Bassler paid a visit.

Skuas resting on runway, Vesleskarvet

Antarctic Petrels, the *Thalassoica Antarctica*, live and nest exclusively in the Antarctic, spending the winter in the pack-ice. These chocolate brown birds have white wings with broad white trailing edges, as well as a white tail ending in a black-brown tip.

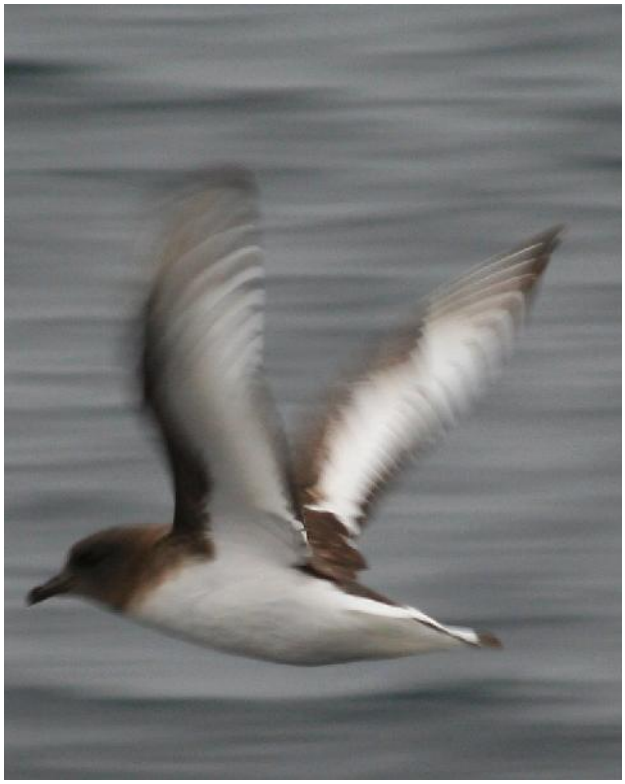
An Antarctic Petrel in flight, showing the characteristic markings

Their diet is similar to that of the snow petrel, feeding off krill, pteropods, amphipods euphausiids and small fish. The habitat is that of Antarctica, including pack-ice, ice floes, icebergs, the sea and the continent. Nesting takes place in clefts, crevices and ledges, also on nunataks. Their main predatory enemy is again the skua.

The biggest breeding colony of Antarctic petrels can be found at Svarthamaren Mountain, in Dronning Maud Land, located approximately 280km from us. A quick drive by Challenger, but unfortunately we have to cross the Juttelstraumen Glacier to get there. They are also spotted in the Ross and Weddell Sea areas, especially during the austral summer period.

– **Daleen Koch**

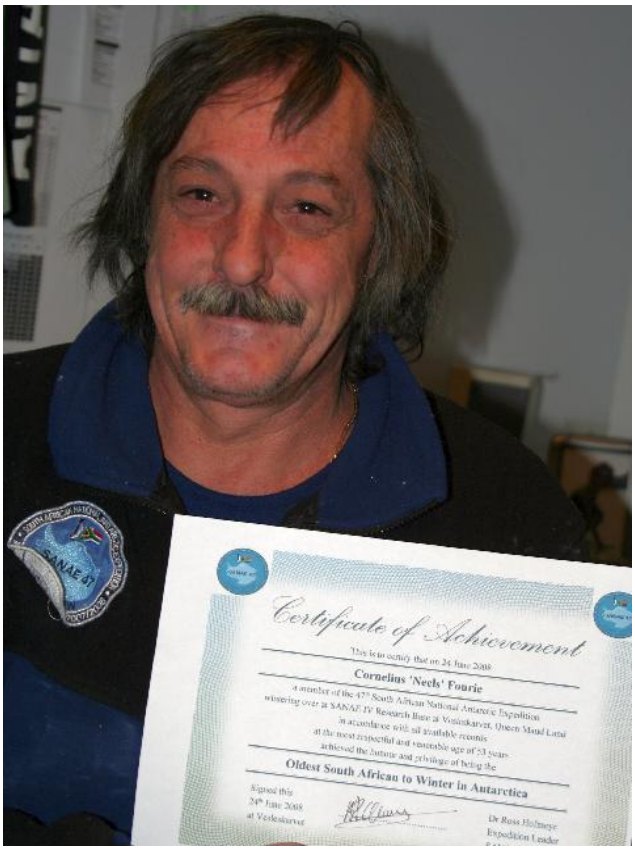
IPY Scientist



Birthday Celebrations

June saw the celebration of two birthdays at SANAE IV – expedition leader Ross Hofmeyr turned 27 on June 2 and his deputy, Neels Fourie, hit 53 on the 24th. According to the records available, this makes Neels the oldest South African to winter over in a base in Antarctica, and to commemorate the occasion we presented him with a specially produced certificate of his achievement. This will be a memorable day for all of us, as the temperature also hit a record -40°C!

Ross was treated to a 'Broadway' party on his birthday. Each member of the team dressed as a different character from a famous musical, and after being presented with his Phantom outfit, Ross had to guess each identity. The costumes were worthy of a genuine stage production, but a few of the characters were a challenge. Wrong answers were punished mercilessly... as were the correct ones! It was an occasion to remember, with good drink, hearty food and the best company for hundreds of kilometers in any direction.



Midwinter Party – Kicking it up, SANAE style!

The winter solstice is a very special time in Antarctica – the sun is at it's most distant, and all on the continent are experiencing the perpetual darkness of the austral winter. June 21st marks the turning-point; the moment at which we stop getting further away from the warmth of summer and begin turning the darkness into light. Of course, we won't see the sun for many, many weeks, but symbolically we feel it's return.

All over the continent Antarctic wintering teams celebrate Midwinter, and across the globe old Antarcticans celebrate with them. Here at SANAE IV, we had a day full of fun and team activities.

Throughout the day we held the Midwinter Games. With the weather outside precluding most types of sport, we competed by indoor challenges. The local champions are:

- Darts - Morgan
- Arm Wrestling - Llewellyn
- Table Tennis – Morgan
- Pool Singles – Richard
- Pool Doubles – Llewellyn & Daleen
- RockPaperScissors – Richard

Throughout the day and night greetings poured in from other national bases and individuals, and many calls via the internet and telephone.

After the Games we sat down to a splendid dinner created by the team's top cooks, replete with beverages from our kind sponsors, letting us sample some of SA's finest wines, port, beer and brandies (amongst others: Rosendal, JP Bredell, Kanu, Welgemeend, KWV, and Allesverloren). What an auspicious occasion!

THE AMAZING ADVENTURES OF

SASTRUGIANA, CABOOSE, ARNOLD AND MAYA

MIDWINTER 2008

The gang took full advantage of the sponsored wine...
... much to their regret the following day

SANKO

To all who are applying for the opportunity to come to Antarctica...

May God bless you and your families for you are in for a life time of experience.

Be prepared with what is to follow though:

There is a thing you inherit from the previous tribe that you are about to replace; they in turn inherited from the the previous Tribe called ***SANAE46,*** *now we are going through the same ordeal to take over the responsibility, above the duty that you were employed for is to look after our home for the next fourteen months from the tribe called* ***SANAE 47,*** *let me enlighten you, they call it;*

"***SKIVVIE DUTIES" !***

Man, what a drag, I mean a mop drag, right through this landing strip of a passage, it is not pain-staking long as it is breaking every bone in your body not to talk about the perspiring because of the night's before drinking, some of the nice sponsored drinks, and I mean nice when I say nice.

Then there is the dining room to clean, which nobody can get to perfection to everybody's liking: some moan about the toaster that has not being cleaned, the other moan that the table is not cleaned, the individuals don't wash there own cutlery so it goes on and on. Fun it is, never a dull moment in this vast country we are staying in with nobody around except your team members that you have to endure with. Love them, hate them, loose it or use it, get my drift.

Now we come to cleaning the bar, except that our dear leader had forgotten to mention in his Skive duty roaster that cleaning the bar also means cleaning the games room and smokers lounge. We can forgive him for that as he has a lot of other things on his mind (no further comment on things) but looking after us all.

The waste room is next, this is were you stock up all your own waste that includes the empty bottles and tins that you have enjoyed so much drinking, just keep in mind the more you consume the more work you have, for you have to remember that all of your waste must go back to South Africa and be sorted as to it's kind.

Kitchen, this is a place that has to be kept clean at all times, so apart from your normal skive you have a turn to prepare supper which you have to clean up after to leave it clean for the next tribe member to prepare his/her supper.

Now I suppose you have forgotten who is going to clean the toilet, shower and basin that you have splashed all over with toothpaste, paper towels, and you know what else, saying to your self, no bother the maid is on her way she can clean it. No, no my dear, you get your turn to, clean all the toilets even the one that you have left full of marks.

Good luck !

- Neels Fourie.

The endless passage... don't go towards the light, Neels!

Antarctic History

Looking back on the month of June

1868, June 6

Robert Falcon Scott was born

Scott was born on June 6, at Outland, UK. This dreamy boy first set foot on a ship at the age of thirteen, and then became one of the most well known Antarctic Explorers in history, in *The Race to the South Pole*.

1911, June 11

Wilson, Bowers and Cherry-Garrard leave to Cape Crozier

Before the trip to the South Pole started, three of Scott's compatriots, Wilson, Bowers and Cherry-Garrard, left for Cape Crozier to visit a colony of Emperor Penguins. Departing on 27 June 1911, it turned out to be 'The Worst Journey in the World', lasting five weeks in temperatures of -50°C, in the darkness of the polar night. On 2 August they were back in Cape Evans with the rest, with Emperor Penguin eggs as prize.

1928, June 18

Roald Amundsen dies

Amundsen, the first man to reach the South Pole and 'competitor' to Scott, made the trip of 3000km in 99 days. He survived, only to tragically lose his life in a plane crash. He disappeared on 18 June 1928, on a rescue mission, and his body was never recovered.

1961, June 23

Antarctic Treaty comes into effect

The Treaty, setting Antarctica as a scientific research continent and devoid of any military activity, was opened for signature on 1 December 1959. It officially came into effect on 23 June 1961. South Africa was one of the 12 original signatories.

– **Daleen Koch**

IPY Scientist

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:

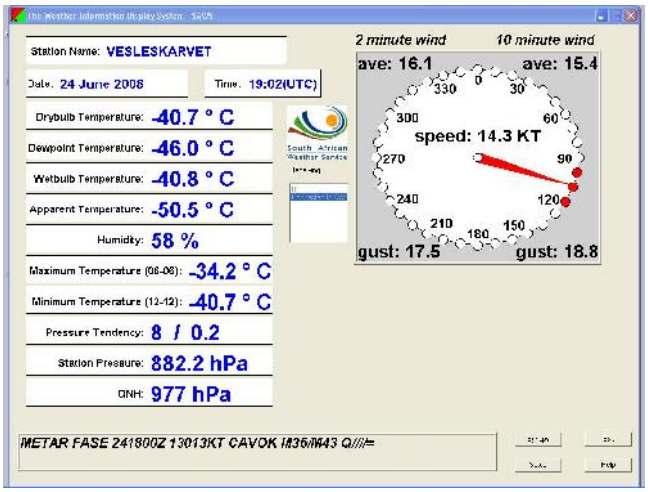
- Visit the official SANAE website at www.sanap.org.za and learn more about the base, the logistics, the science and the people.
- Email the team at sanae@sanap.ac.za with your questions or news.
- Email team-members directly, using the format below: firstname.lastname@sanae.sanap.ac.za
- Visit the websites of our sister projects at Marion and Gough Islands: marion.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 9428/9

Record winter weather in June at SANAE IV

The overwintering team experienced the coldest temperatures recorded at SANAE since the turn of the century this month. Dry-bulb temperatures went down to an incredible **-40.7ºC** on 24 June at 19h02 GMT.



The weather station information display showing a dry-bulb temperature of -40.7°C

Records prior to the year 2000 are not available at the base, but this is certainly the coldest temperature which has been measured in the intervening time. When humidity and wind-chill factors were included in the calculation, the apparent temperature plunged into the -50's. Overwintering team members immediately celebrated the icy weather by heading out to experience the biting cold, and by performing the Hundred Degree Dash, a tradition in true Antarctic form which sees participants running from a glowing sauna onto the frigid snow outside – a temperature difference of greater then 100°C.

Obscured by blowing snow in the air, six members of SANAE 47 brave -40.7ºC to say "Hi!". From left to right: Santjie, Daleen, Ross, Richard, Morgan, and Llewellyn.

Taking advantage of the cold but calm weather, a few intrepid team members pitched a tent in front of the base and settled in for a night at -40°C. Ensconced in double down sleeping-bags they enjoyed the experience despite the temperature in the tent dropping to -32°C and wind-speeds picking up to 60 knots.

This was a harbinger of things to come; a violent storm arrived at SANAE IV the next day, with furious winds. On June 28th the wind reached a five-year record level of **51.6 m/sec**, or more than **185 km/h**! For almost a week the base shook and rattled under the influence of the powerful gales, leaving every window and surface crackling with static. This is approaching the all-time record of 202 km/h, although on occasion in the past the wind-strength has been so strong as to blow away the anemometers. Fortunately, the base was designed to cope with winds of up to 300km/h, although few of us want to be around to see if it will live up to this claim!

- Daleen Koch & Ross Hofmeyr

WEATHER STATS: JUNE 2008

	Maximum		Minimum		Average
Pressure	893.4 hPa	14-Jun	848.9 hPa	30-Jun	877.9 hPa
Temperature	-8.6°C	13-Jun	-40.7°C	24-Jun	-23.3°C
Humidity	100%	1-Jun	17%	21-Jun	66%
Wind Gust	51.6m.s^{-1}	30-Jun			
	185.8km.h^{-1}				

Parting Shot – Vesleskarvet's Northern Buttress by Moonlight

photograph © Ross Hofmeyr 2008