SANAE 50 Newsletter

APRIL 2011

Southern Lights

Tradition...

Lekker verjaar Kevin

Hardly a Summer Picnic

SANAE IV COFFEE & TEA HOUSE
Importers Of The Finest Roasted Coffee
&
Eclectic Spiced Teas On Ice

Most people, when thinking of the Polar regions, will think of freezing ice, intense wind, penguins and polar bears – and the Aurora. But what is the Aurora?

An Aurora is a natural light display in the sky, visible during the hours of darkness. It is produced by particles in the upper atmosphere giving off energy in the form of light. This energy is derived from the Sun, or more precisely, from the "Solar Wind". The solar wind is a stream of energised particles continuously given off by the Sun, made up of electrons (negatively charged particles) and protons (positively charged particles). These energised particles collide with nitrogen and oxygen atoms in the upper atmosphere, causing these atoms in turn to become energised. The energy created is seen by us as light. Depending on the effect of the collision – ionisation, excitation or dissociation – and on the atom struck – oxygen or nitrogen – the wavelength of the emitted energy, which means the colour, will change.

An endless stream of charged particles or photons sleeting down into the Earth's atmosphere would destroy all organic matter were we not protected from this barrage of radiation by the Earth's magnetic field. The Earth can be regarded as a large bar-magnet (Diagram 1) with the poles orientated at right angles to the Sun and solar wind. Magnetic field lines flow from South to North. Charged particles or "photons" cannot cross through the magnetic field, but have to move parallel to them. Most of the particles are deflected past the Earth, but some are accelerated along the magnetic field lines and enter the Earth's atmosphere at the magnetic poles (which are located close to but not exactly on the geographic poles) (Diagram 2). This explains why aurora are located mostly around the polar caps, in an "auroral oval" (diagram 3). The Aurora are commonly visible between the latitudes of 60 and 72 degrees north and south, which place them in a ring just within the Arctic and Antarctic polar circles. In the northern latitudes (Arctic Circle) they are called the Aurora borealis (northern lights), and in southern latitudes (Antarctic Circle) the Aurora australis (southern lights).

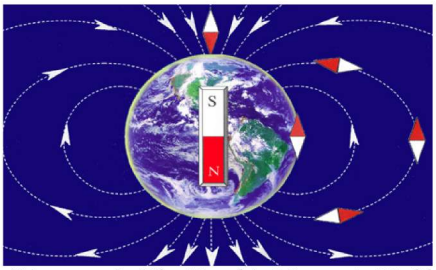


Diagram 1: The Earth's Magnetic Field. The field is strongest at the Poles, thus the field lines converge at the Poles.

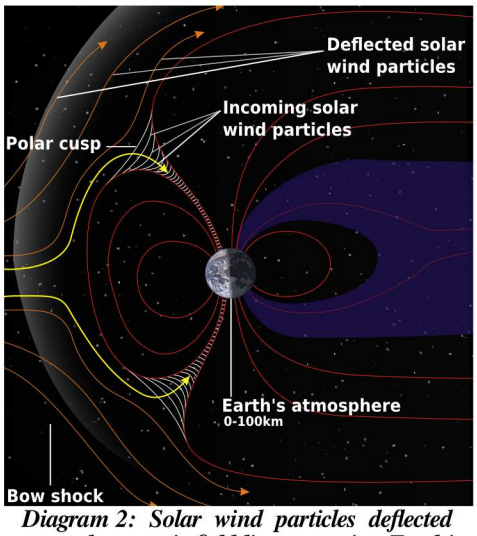


Diagram 2: Solar wind particles deflected around magnetic field lines, entering Earth's atmosphere at the Poles

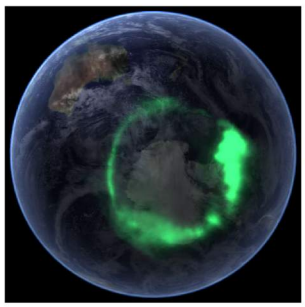


Diagram 3: Auroral oval

The occurrence of Auroras is not constant, but is related to solar activity: that is, the number and size of solar flares, which increase the solar wind. This activity runs in cycles over a 11 year period, and the Aurora are most frequent during the peak of activity and for the three years following it. There are also peak periods through each year when activity is at its highest. Typically the number of solar flares peaks during the earth's equinoctal seasons in April and October, although they may occur at any time during the year. The intensity of light varies (see Table 1 overpage), but is never intense enough to be visible in daylight, so the continuous daylight during the Antarctic

summer means that we cannot see Aurora for the four month period around the (Southern Hemisphere) Summer Solstice 21-22 December.

Table 1. International Brightness Coefficient (IBC)

IBC	Description
I:	Faint, brightness of milky way. No colour apparent
II:	Brightness of thin moonlit cirrus cloud.
III:	Brightness of moonlit cumulus cloud.
IV:	Bright as the full moon. Casts shadows. Very rare.

The Aurora vary not only in intensity but also in appearance and colour. The appearance depends on the amount of energy present and the interaction of electrical currents and magnetic field lines in the upper atmosphere. Bands or ribbons are the most common, with rays extending upwards from them as energy levels increase. Table 2 lists the symbol classification of common shapes and structures.

Table 2. Symbol Classification of Auroral Shapes & Structures

SHAPE	STRUCTURE
A - arc	D - diffuse
B - band	F - glowing
C - corona	H - homogeneous
D - drapery	P - pulsating
G - glow	R – rayed
R – ray(s)	

The colour varies according to the amount of energy emitted and the type of atom releasing the energy. The amount of energy released depends on the initial interaction between the relevant atom and the solar wind particle. Once struck by a charged particle, an atom achieves a state of ionisation, excitation or dissociation. The return to ground state from these higher energy states will result in the emission of energy - that is, the release of a photon of light. Frequently the energised atom will collide with another atom, causing either lose of emission energy, or the emission of a weaker energy.

Solar wind particles interact with atoms in the upper atmosphere, between 80 and 160 km above the Earth. The atoms with which they most frequently collide are nitrogen and oxygen. These two atoms emit different colours. Oxygen emissions are green or brownish-red, depending on the amount of energy initially absorbed. Oxygen is unusual in terms of its return to ground state: it can take three quarters of a second to emit green light and up to two minutes to emit red. Collisions with other atoms or molecules will absorb the excitation energy and prevent emission. The very top of the atmosphere has a higher percentage of oxygen, and is so thin that such collisions are rare enough to allow time for oxygen to emit red. Collisions become more frequent progressing down into the atmosphere, so that red emissions do not have time to happen, and eventually even green light emissions are prevented. Nitrogen emissions are blue or red: blue if the atom regains an electron after it has been ionized, red if returning to ground state from an excited state.

There is a colour differential with altitude. At high altitude oxygen red dominates, then oxygen green and nitrogen blue/red, then finally nitrogen blue/red when collisions with other atoms prevent oxygen from emitting anything. Green is the most common of all auroras. Behind it is pink, a mixture of light green and red, followed by pure red, yellow (a mixture of red and green), and lastly pure blue.

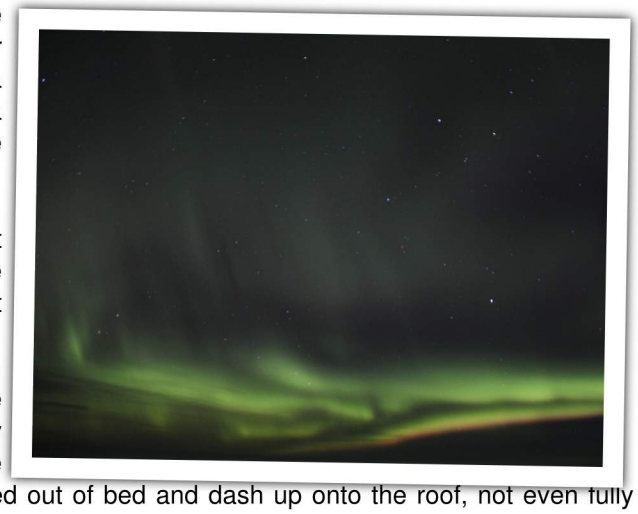
Aurora Studies at SANAE IV

Apart from their other duties, the Space Weather scientists at SANAE monitor the Aurora. This year it is the particular domain of Beatrice van Eden, who observes and records every Aurora visible. Various space weather internet sources such as www.Space weather.com indicate the presence and position of sun spots and solar flares, from which we can predict the likelihood of an Aurora occurring. Luckily there is an Aurora Alarm, so it is not necessary to maintain an all-night vigil, on the off-chance. Unfortunately good Aurora conditions in the upper atmosphere do not predict good weather conditions on ground, so Beatrice has frequently been woken by the Alarm, only to be greeted by complete cloud cover.

Diagram 4. The Narrow Angle Camera in the Aurora Lab upstairs in the SANAE Base.

Aurora are monitored using the Narrow Angle Camera set up in the Aurora lab. The lab also has a Wide Angle Camera, but this is currently non-functional and is awaiting upgrade or repair. The Aurora Camera used to be under the management of the North West University (NWU) in Potchefstoom. They are not using this system any longer and the Hermanus Magnetic Observatory (SANSA Space Science) will be taking over this system, and will pave the way forward for this system.

In the meantime, the rest of the team has also been eagerly “recording” Aurora. For most of us the decision to come to this benighted lump of frozen rock was strongly influenced by the possibility of seeing the Aurora. From our science books in Junior School to the adventure stories of our teenage years to the action thrillers of our twenties to National Geographic magazines, the Aurora has gripped our imaginations. "Aurora Borealis", "Aurora Australis" - the very words roll off the tongue with the promise of magnificant adventure.

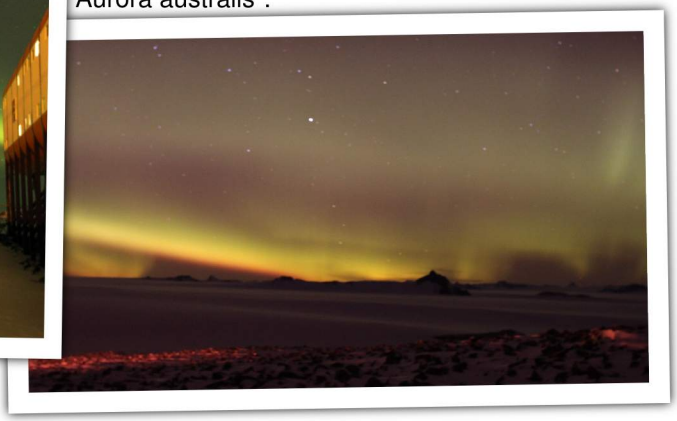


April is not only High Season for Aurora, it is also the first month in which we could reasonably expect to see Aurora. We were finally getting darkness during the night hours, not just an inferior quality of daylight.

The 1st of April. We're in luck. Beat shakes the entire mob awake at 01h30 in the morning. By each sleepy bedside she proudly displays the photographic evidence that there, outside, is our first Aurora. We are galvanised out of bed and dash up onto the roof, not even fully kitted. And there it is. A gently undulating greenish ribbon, floating dreamily in the South East sky. Rays rise like smoke from it, until they are lost in the glittering clouds of the Milky Way.

We stare, breathless with delight. After five minutes of staring, breathless with delight, we nip downstairs again and this time, kit up properly. Why is it that in all these incredible adventure stories and all these magnificent pictures, they never, ever reveal the full truth? It's FREEZING out there. And there's this wretched little gale usually idling around through one's cold weather gear and one's gloves and one's balaclava... .

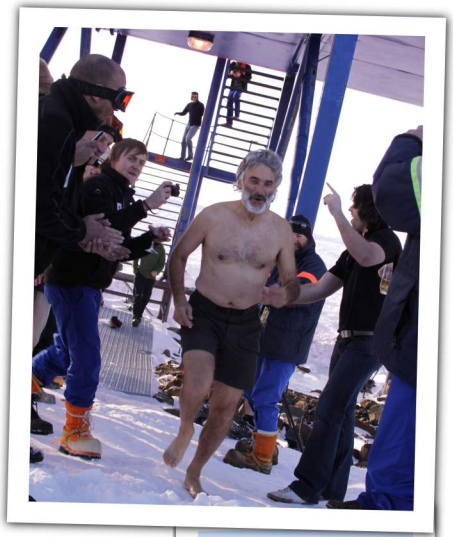
The weather conditions (mild, in fact, by Antarctic standards, but that is relative) didn't hold us back. We poured out onto the ice, cameras gripped in a series of heavy duty mitts and tripods tangling between legs, to capture the spectacle floating and folding and reforming above us. Both the glory and the nuisance of the Aurora is that it constantly shifts and changes. You may have to watch for an hour as it flutters and wanes and resurges, before you see a really large one, or before the colours start to shift from the ubiquitous greeny-white to a flash of red or yellow. And remember, folks - the cameras lie. That sweeping palate of colours glowing across the sky that we see on TV or in National Geographic - well, that's not quite what the cold and shivering human eye sees at 2 o'clock in the morning. No. What you see is a misty milky ribbon, endlessly changing. What you really see is a lifetime's ambition, "This is me, standing here, in the Antarctic, watching the Aurora australis".



The Spanish have a saying, “Take what you want and pay for it, says God”. You pay for privileges. Ultimately, no matter how good the circumstances, Privilege presents the bill. We are privileged to be in Antarctica, privileged to be part of the miniscule proportion of people who ever get to spend a Winter on this continent. And, as with any exclusive club, there are rites and traditions which must be adhered to – the payment for our privilege. A few of these are highly enjoyable, such as the Mid-Winter's Day Feast; most are highly unenjoyable, such as the Birthday Bath. SANAE teams have a series of traditions which we try to uphold and pass on year by year. This article should help explain the what, if not the wherefore, of these traditions.

Birthday Snow Bath

Every person at SANAE (Team, Take-Over personnel, what-have-you), on his or her birthday, is taken outside to where a howling crowd of barbarians has dug a pit in the snow. The privileged birthday celebrant then lies down in the pit, gets covered by loose snow, and is fed a bottle of beer / cider / fizzy beverage of personal preference through a long, flexible funnel (hygienically washed for each new occasion, we assure you), while the barbarians howl out the long version of “Happy Birthday to You”, or “Lekker Verjaar”. Only when the victim has been satisfactorily subjugated is s/he allowed to gallop inside to warm towels, congratulations and a hot shower. Clothing is optional. During Take-Over and for mixed teams, thermals and boxer shorts tend to be the dress of choice. Shoes are still an unresolved bone of contention, with most authorities accepting that the dash down the link stairs may include foot cover, but shoes are to come off before actual burial. For concerned citizens and loved ones back home: we can reassure you that the actual date of the Birthday and the day of the snowbath may not coincide, for the usual “In Antarctica there is no time, only weather” reasons. High winds tend to cause a postponement of the bath, mostly because it's just too miserable for the howling barbarians to dig holes and hang around singing songs while somebody else guzzles the beer.



S 50, keen as mustard on maintaining these traditions, sent Kevin out on the 15th of April for his snowbath. Photographs will attest to our dedication: near white-out conditions, pelting snow, screeching winds... more will than wisdom [see page 5]. We rapidly decided that Bath Day didn't HAVE to be today, and shuttled hurriedly inside for vodka jellies (another albeit lesser known SANAE tradition). Kevin's turn will come.

100 Degree Dash

It will hardly surprise the reader that most of our traditions revolve around the extreme environment. Another ceremony traditional to the Base is the 100 Degree Dash. You wait

for a day of intense cold: at least minus 35 degrees. You fire up the sauna to plus 65. You go and roast yourself in the sauna. You then charge outside: a temperature difference of 100 degrees. For some inexplicable reason this is neither illegal nor does it require a doctor's certificate of health. As yet this Base has recorded no fatalities. The 100 Degrees Dash is, concerned readers will be relieved to hear, a voluntary activity – unlike the snow bath.

Dozer Run

Another elegant tradition involving adverse temperature exposure is the "Round the Dozers" run required of anybody who loses a game of Pool or Fooseball without scoring at all. If your opponent pots the black while all your balls are still on the table, then off you have to go on a jog down the link stairs, across the sastrugis, around the dozers, and back again. Usually unclad. In poor weather conditions your opponent, if he realises he is going to whitewash you, can be relied upon to do the decent thing and "accidently" miscue, or, as Renier did on one desperate and unusual occasion, sink one of Ruan's balls for him. In good weather, a glass of something cheering seems a useful addition to a noble tradition.

Mid-Winter's Day

The final tradition needing elucidation is the "Mid-Winter's Day" feast. This is not unique to SANAE (we somehow suspect the "Dozer Run" is!), but is a ceremony common to all polar stations, South and North. This tradition, as the name implies, is highly enjoyable to all involved in it. Greetings and good wishes are exchanged amongst all the Antarctic Bases.

Mid-Winter's Day for Antarctica is on the Winter Solstice, the 21st of June. Briefly stated, it is the day that the Sun begins its return journey towards the Pole. In South Africa, this is the longest night of the year. For us, our longest night will begin on May 16th and end on July 28th. When the Sun sets in the middle of May, we shall not see it again until the end of July. In fact this does not mean 24 hours of darkness every day: we still have a few hours of dawn/dusk each day, decreasing until for a couple of weeks around Mid-Winter it is almost pitch dark the entire time. Mid Winter is therefore a celebration of the return of the light, a return of the diurnal rhythm which governs human behaviour, a return of the natural source of energy and heat that gives life to the planet. Hence this is a significant day. Traditionally teams take the day off. It is a holiday, minimal routine work is done, and instead everybody crowds into the kitchen to prepare a spectacular meal planned and debated for weeks beforehand.

Apart from Kevin's birthday, we have not had a chance to exercise these traditions. Mid-Winter's Day will be our first opportunity. July sees a flurry of four birthdays, and August should present us with the odd minus 40 degree day. And every evening, when the pool balls start clicking, the possibility of a Dozer Run hovers over the table... .

Lekker Verjaar, Kevin ! - by Beat

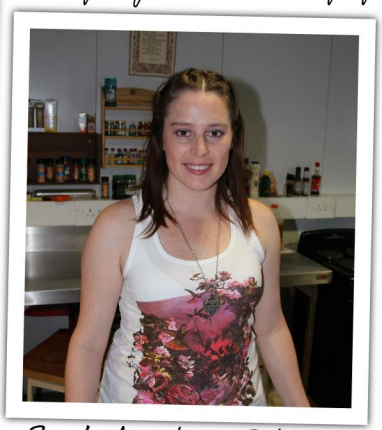
On 15 April 2011 Kevin van Eden celebrated his 29th birthday. He was marked as the first team member to be buried in snow and down a drink. He made a noble attempt at facing the elements but the storm was too hectic and he ran outside for a few seconds only.

Daai ou SANAE tradisie, Vodka Jellies !

Ja, dit IS Kevin ...

The theme of the party was fast cars in movies and each team member got assigned a car on their invites to inspire them to dress like their character. Team Leader Paul made a great entrance dressed as John Travolta in "Grease". Doctor Abi dressed as Charlise Theron in "The Italian Job" and the Radar engineer Ryan, well I will just say he got the movie back to the future.

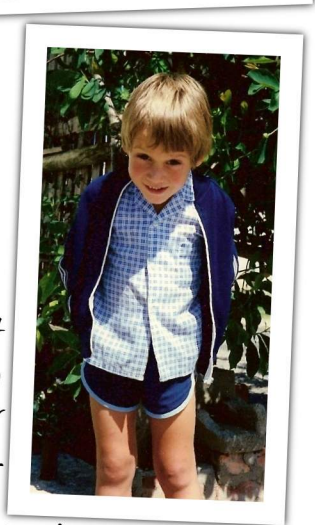
We enjoyed the day and since it was a Friday we did not feel guilty for over indulging.



Beat: Angelina Jolie in "Gone in 60 Seconds"

Kevin skraap moed bymekaar voor hy moet uitgaan in die "howling gale"

(When Kevin was a sweet little boy. It sucks when you've married and your mom supplies your wife with photos of your childhood.)



Blou baadjie, blou baadjie - Klein Kevin en Groot Jammer ! Ek bedoel Ou) Kevin

It is said that when the wind stops blowing in Antarctica, the penguins fall over. Friday night was windless, so I grabbed the opportunity to put up my tent and sleep on the ice, something I love to do when the weather permits (the Team looks on indulgently and says, "Oh, Paul's off his rocker again!"). It's the fresh air, the black night, the aurora (if you're lucky!) and the brilliant stars. Mostly it's the silence that comes off the ice. Packing up at 6 am on Saturday the temperature was 22 degrees below zero. I hurried inside, ate as much breakfast as I could fit into me and then, with some of the rest of the team, set off for a 13 km hike around Vesleskarvet, our flat topped mountain (Vesles is Norwegian for "flat-topped mountain"). We last did the hike 2 months ago in the late summer / early autumn, and you can see us dressed in T shirts. Today - minus 17.9 degrees - we had to have

all our kit on to keep warm. Just compare photos. It is quite difficult to hike in so much paraphernalia. You feel like the bloody Michelin Man, all puffed up. You are restricted to about 3 degrees of vision through your goggles. Breathing is half the battle - it is impossible to prevent the goggles from misting up, and a pee is out of the question! Talking is an effort and you sort of hike along in your own world of silence and thoughts, pushing through soft snow and battling the head winds. Somewhere along the way you choose a spot of ice that looks the same as all the other ice spots and sit down on your bum, back to the howling wind to brew a cuppa... And then, as a kindly finale, you have to hike up 200 metres in 2 kilometres, against a driving wind of 50 km/h. And all this, not only fully kitted up, but with backpacks containing emergency ropes and rescue equipment and weighing more with every uphill step. You reach the home stretch more "plod" than "walk". And then arrive home, panting heavily and saying what fun it was and we must do it again - sometime.

In a land where extremes of weather and terrain keep us inside or very close to Base most of the time, the chance of an outing is a real treat. For safety reasons half of us had to stay in Base while Paul and his fellow hikers did their thing through nearly 50 km/h winds and biting temperatures of minus 18 degrees. There was a chance – there always is in this place - of even foul (ler) weather arriving, but we hoped to do the walk the following day. So there we were. Winds barely trickling along and a "mild" minus 19 degrees. Weather predictions lying, as usual. It was so gentle that

Renier, intrepid survivor of the first day's walk, elected to trail-blaze for the second team's effort. A light stroll down past the diesel bunkers, a rock-strewn scramble around the far side of Klein Koppie (please note that we may have had to stick to the original Norwegian names for the larger geographical features around Vesles, but didn't pause in stamping our South African authority on the smaller outcrops closer to home!), and down onto the ice plains below the Vesles buttresses.

This team had kept its emergency equipment to a minimum. We were travelling light: not even any coffee. The doctor's medical knapsack was all that was needed – it held the whisky. Talisker's. The half-way stop, and we debate whether it is acceptable to dilute one of the World's top single malts with ice, if it is centuries-old Antarctic ice!

It is a standard rule of Nature that whenever you are faced with some serious uphill walking, the wind will cut in. We went from conditions of balmy little 20 km/h breezes to a rather more decisive 40 km/h wind, head-on, up the side of the Southern buttress. The body glows red-hot even while the hands and face freeze...
No - hardly a summer picnic, but it is still a great day out.

SANAE IV COFFEE & TEA HOUSE

Importers Of The Finest Roasted Coffee & Eclectic Spiced Teas On Ice

by Paul

In sunny Cape Town, an excursion to Origin for cappuccino is a social event where excellent coffee is enjoyed in the aroma and ambiance of the cosmopolitan Cape Quarter under the blustering southeaster cloth. But when the warmest temperature is 20 degrees below zero and the Antarctic wind is not blustering but blizzarding, coffee is not a want but a need! We have 40 kg of the finest that Origin Coffee Roasting CC can produce, both roasted and raw. Kindly donated by owner and director Joel Singer. To ensure freshness, Joel also loaned us a roasting machine, to guarantee that the dedicated adventurers and scientists would be able to produce a fresh cuppa throughout the long dark days of Winter.

Origin coffees are not just the usual mass-commercial beans from Brazil, Vietman or Columbia. The company makes a point of seeking out and supporting the much smaller plantations from mostly our own continent. From the deeper reaches and quiet corners in Africa, the beans are harvested and carefully dispatched to Cape Town. And in Cape Town even more lovingly packaged and brought down to South Africa's southern-most outpost – that little corner of Queen Maud Land where the SANAE IV Base sits. The breath of warm African skies blows faintly to us here as we sit around the coffee plunger or snuff up that most glorious of smells - freshly roast beans.

Paul bean hunting in Kenya. Mt Kenya looks a tad barren!

From Cape Town to Kathmandu; from the aroma of roasted coffee to the fragrance of spiced Nepalesian teas. On a recent visit to climb in the Himalayas, Paul Lee, Sanae 50 Team leader, took time out to visit a tea shop and sample the varied masala brews. Aniseed, cinnamon, cardamom, cloves, black pepper - the choice is endless. Nepalese and mostly the whole sub-Indian region of the Himalayas enjoy their tea a tad stronger than the usual English brew with a dash of milk. In the high altitudes with their cold and rarefied air, the locals say the tea heats you and the spices carry strength to aid you over the high passes and peaks of the lofty mountains.

Paul bean hunting again in Nepal. Mt Everest is also a no-bean zone.

Paul brought not only the memories with him to SANAE, but also the spices. The tang of the exotic tropics drifts through the base of an evening as the last soothing cup of Chai tea is brewed prior to bedtime. A hint of cardamon, a murmur of cloves, the underlying prickle of pepper... . The Team is now entering the 4th month of solitude on the loneliest and wildest continent on earth, and the sun is never high above the horizon; sunshine hours are reducing daily and by next month it will be permanently dark. Temperatures are down to 30 below and the wind can reach gusts in excess of 150 kph. We stand at the windows peering out at the swirling snow and dusky light and “alluring” or “exotic” are not exactly words that spring to mind. But lying promisingly in our Pantry are the gifts of the fabled Indies and mysterious Africa, the riches carried by endless camel caravans across ancient routes from magical There to prosaic Here, bringing to our Ice Lands a waft of romance. Even our sturdy little ship the S.A. Agulhas, and our lumbering Cat trains from the coast to Base, form part of this Spice Route of legend, bringing the coffees, the teas, the spices and other exotica across measureless miles to the SANAE table.

The Great Coffee Bean Hunt. A story in four pictures.

Paul finally reaches the freezing wastes of the Antarctic. Mt Lorentzenpiggen raises its icy head in the background. In cold despair he confronts the fact: no coffee beans.

But then ! Luxuriating idly at a nearby tent is Renier. Smile on face. Cup in hand. And beans at feet.

Paul edges across, wistful, hopeful. Will Renier do the Decent Thing? Oh, the smell of those beans...

Yes !! At last, from Africa to the Alps to Antarctica, Paul finds the Perfect Cuppa.

AWESOME TOOLS CC

OUTWARD Ventures

first Ascent
PERFORMANCE TESTED GEAR

RAM
MOUNTAINEERING GEAR

ORMS
PRO PHOTO

MATRIX
WAREHOUSE
COMPUTERS

GRAHAM BECK
WINES

EXCLUSIVE BOOKS

ROTARY INTERNATIONAL
Rosebank

HERON RIDGE

VILLIERA
STELLENBOSCH

NEETHLINGSHOF
ESTATE

CREATION
Creating Wines of Distinction
www.creationwines.com

JUNO
WINE COMPANY

ORIGIN
COFFEE ROASTING

Le Manoir de Brendel
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SOUTH AFRICA

Hazendal
ANNO 1699
HAZENDAL

JORDAN
STELLENBOSCH

BOUCHARD FINLAYSON

Beacon®

Climate Stats: April 2011

Pressure

Maximum	899.6 hPa
Average Maximum	886.2 hPa
Average	882.6 hPa
Average Minimum	878.6 hPa
Minimum	862.3 hPa

Temperature

Maximum	-7.4 °C
Average Maximum	-14.3 °C
Average	-17.1 °C
Average Minimum	-20.0 °C
Minimum	-24.7 °C

Humidity

Maximum	99 %
Average	67 %
Minimum	8 %

Wind

Maximum Gust	74.1 m/s (267 km/h)

Sunshine

Average Day Length	8:07 hrs

16 days to go until the last Sunset.

SANAE 50 team members:

Abigail Paton - Doctor

Alan Daniels - Diesel Mech (Generators)

Beatrice van Eden - Scientist (Spaceweather)

Gerard de Jong - Electrical Engineer

Johan Hoffman - Radio Tech (Dep. Teamleader)

Kevin van Eden - Scientist (Spaceweather)

Paul Lee - Meteorologist (Teamleader)

Renier Fuchs - Scientist (Particle Physics)

Ruan Nel - Scientist (HF Radar)

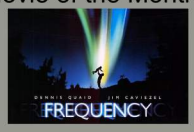
S'celo Ndwalane - Diesel Mech (Vehicles)

Tiki Jordaan - Mechanical Engineer

Series of the Month:

Sorry nothing this month.

Movie of the Month:



Quote of the Month:

Why does the sky always get so complicated just before a [weather] obs.?
- Paul Lee