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REDAKSIONEEL — EDITORIAL

Drie jaar gelede, in Januarie, 1964, het die eerste uitgawe van die *Antarktiese Bulletin* verskyn. Waar dit begin het hoofsaaklik as 'n nuusblad, het dit ontwikkel in 'n tydskrif, enersyds met artikels van streng wetenskaplike inslag, en andersyds om in die behoefte van die algemene leser to voorsien om inligting oor Antarktika in ligter trant aan te bied. Saam met dergelike tydskrifte van ander lande het dit in die afgelope drie jaar inligting gebring oor 'n vasteland waarvan min bekend was vir die algemene publiek. Dat daarin geslaag is, ly geen twyfel. Dit is duidelik uit die geweldige opflikkering in belangstelling van oor die hele Republiek en navrae wat weekliks vanuit die buiteland oor Suid-Afrika se Antarktiese en sub-Antarktiese aktiwiteite aankom.

Die Suid-Afrikaanse Antarktiese Vereniging sou in hierdie be hoefte nie namens Suid-Afrika kon voorsien het, as dit nie was vir die petroleummaatskappy *BP South Africa* (*Pty.*) *Ltd.* nie. Aan hom kom die erkentlikheid toe vir die dra van die hele koste van drukwerk. Deur die welwillendheid van *BP South Africa* word die *Bulletin* nie net gratis aan lede verskaf nie, maar word ook 6,000 eksemplare elke keer saam met die *Spectrum* aan skole gestuur. BP verrig hierdeur 'n belangrike diens aan 'n wye publiek en in besonder aan die jeug, by wie die belangstelling in Antarktika steeds styg. Hierdie diens is uniek in die opsig dat die *Antarktiese Bulletin* die enigste tydskrif in die Republiek is wat hom uitsluitlik aan publikasies oor Suid-Afrika se bedrywighede in *Antarktika* wei.

Die Kaapstadse Magnetiese Anomalie en Kosmiese Strale

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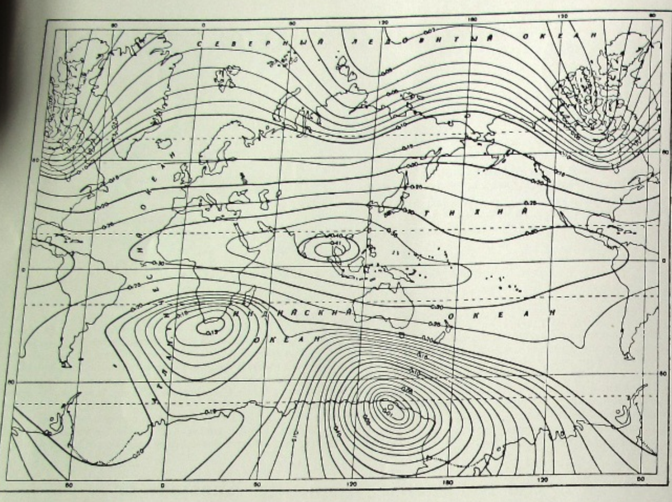
As elektries-gelaaide deeltjies uit die buitenste ruimte op ons aardbol en sy magneetveld aankom, word hulle deur die aarde se magneetveld afgebuig. Die deeltjies wat in die rigting van die pole beweeg, kruis minder veldlyne as dié wat op die ewenaar afbeweeg en word gevolglik minder beïnvloed. Deeltjies van heelwat laer energie kan dus by die pole die atmosfeer van die aarde bereik as by die ewenaar.

Die horisontale komponent van die aardse magneetveld toon 'n minimum waarde by die magnetiese noord- en suid-pole, onderskeidelik bo Noord-Amerika en suid van Australië. By Suid-Afrika se suidpunt het die horisontale komponent ook 'n minimum waarde van 0·13 gauss, wat weer 'n minimum waarde is ná die nulwaarde by die magnetiese pole. Hierdie verskynsel staan bekend as die Kaapstadse of Suid-Afrikaanse magnetiese anomalie. Hierdie afwyking in die aardse magneetveld beïnvloed die inkomende kosmiese strale van Kaapstad tot by SANAE, omdat die kosmiese strale hierdie magneetveld ook deurkruis om by SANAE te kom.

Wanneer die son se aktiwiteit met die elfjaarsiklus of met sonuitbarstings verander, word die aardse magneetveld buite die aarde ook gewysig. Die vraag is hoe dit dan deurwerk op die Suid-Afrikaanse magnetiese anomalie. Die intensiteitsverandering van kosmiese strale wat deur die magneetveld moet gaan, kan daarop 'n antwoord gee.

Die ingeslote kaart dui die oppervlakwaardes van die horisontale komponent van die aardse magneetveld aan. Satelliete maak momentopnames van die veld in 'n



World magnetic chart of the surface field: horizontal intensity (H) 1960. (Photocopied from *Geomagnetism and Aeronomy*, Tome 4, 1964).

bepaalde punt buite die aarde, omdat hulle om die aarde bly beweeg. Dit blyk egter dat die afwykings ver in die magnetosfeer in strek. Waarnemings met kosmiese strale monitor die magneetveld voortdurend veral waarnemingsapparatuur op die aardoppervlak. Die lugmassa bo 'n apparaat dien as filter sodat hoofsaaklik die vertikaal-inkomende strale 'n bydrae lewer. Deur apparaat met balonne op te stuur kan die hoekdistribusie van die strale bo aan die atmosfeer ook nagegaan word.

Behalwe die Suid-Afrikaanse anomalie in die horisontale komponent is die totale sterkte van die aardse magneetveld laer oor die gebied vanaf Brazilië in Suid-Amerika na Suid-Afrika en na die Antarktika. Hierdie verswakte magneetveld het tot gevolg dat protone en elektrone, wat in die magneetveld vasgevang is (die deeltjies van die Van Allenstralingsgordels) in hierdie gebied in die atmosfeer beland en aanleiding gee tot die stralingsanomalië, wat ook bo SANAE met satelliete waargeneem word.

Vir die werk op kosmiese strale is dit van uiterste belang dat ons goeie waarnemings van die magneetveld en sy variasies kry. Hierdie variasie moet ook korreleer met waarnemings op luggloed, aurora en die ionosfeer, wat almal saam 'n geheelbeeld van die aardse magneetveld en sy invloed op die strale wat by SANAE in die atmosfeer kom, gee.

Ons weet egter nog nie waarom die aarde se magneetveld hier die bekende afwykings toon nie. Wat wel bekend is, is dat die magneetveld hier vinniger verander as elders op die aardbol. Hierdie veranderings bedra nog 'n geringe persentasie per jaar sodat ons met ons waarnemingsbasis op SANAE dit oor 'n lang tydperk sal kan volg. Dit is dan ook van belang om die effek van hierdie veld op kosmiese strale te bly volg.

AURORAL OCCURRENCE AT SANAE, ANTARCTICA, 1964

G. T. Robertson, Hermanus Magnetic Observatory

Being the year of the quiet sun auroral activity during 1964 was not so marked than during other years of high solar activity. This fact, however, was no drawback as far as auroral observations were concerned but actually presented an opportunity for a better study of the aurora and related phenomena under these quiet conditions. This was also of importance for examining whether, as a result of the local magnetic anomaly, the auroral frequency was higher at SANAE than at similarly situated places.

It was found (1) that for 66·8 per cent of a total of about 2,770 nightly hours the possibility of aurora occurring was smaller than 0·5. For 15 per cent of the time aurora was definitely present in some part or other of the sky, usually above the south-eastern horizon. Aurora was visible (International brightness coefficient = 1; or comparable with milky way; or green 5577 A° line intensity = 1000 Rayleighs) in the zenith for about 5·3 per cent and had distinct forms (in zenith) for about 2·2 per cent of the nightly hours.

Fig. 1a shows the mean 3-hourly K_z-indices of magnetic activity (1 = 15 and 2 = 30 deflection of z-component) and fig. 1b the mean hourly auroral occurrence for the four winter months. The close correlation and the period of maximum activity is clearly noticeable.

Photometric observations of three characteristic "airglow" and auroral spectral lines i.e. the green 5577 A° [01], the red 6300 A° [01] and the blue 4278 A° (N_2^+) were done. The main contributors to the more constant but much weaker airglow night-sky emission are photochemical reactions as a result of the ultraviolet radiation from the sun. On the other hand, it was found useful to ascribe the excitation of the more intense auroral emission to particle influx only. Usually no definite line is drawn between airglow and aurora. The blue 4278 and also 3914 A° (N_2^+) lines are not easily excited photochemically (airglow) so that when they are detected one could talk about the influx of particles, i.e. auroral activity.

Usually the 4278 A° line only started to increase considerably when the green line exceeded an intensity of about 600 Rayleighs (2). During the South Atlantic Anomaly flights (3) with a Hercules C130 (October 1964) airglow observations showed enchancements of the green 5577 A° line in the anomaly regions while there was no increase in 3914 A° (N_2^+) intensity. Thus, there may well be a higher influx of particles in the anomaly regions than elsewhere under quiet conditions but not enough to excite the N_2^+ bands markedly or to cause a visible aurora. Under more disturbed conditions and periods of high solar activity it may however happen that the 3914 and 4278 A° lines are detected more easily.

From the observations at SANAE (4) it does not seem that the occurrence of aurora under quiet conditions is drastically influenced by the presence of the magnetic anomaly. Again, however, anomalous effects may be more marked during higher solar activity and for this reason it is now planned to install a photometer at Hermanus where auroral occurrence should also be affected by the anomalies.

As a result of the South Atlantic Anomaly regions South Africans may be able to see aurora more easily than they expected and should therefore be on the look-out during the next few years of sunspot maxima. Usually phenomena like these go by unobserved because they are not looked for.

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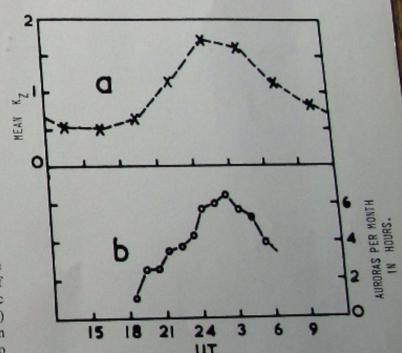

Fig. 1 (a) The distribution (with universal time) of the magnetic activity, K_z, of the vertical component of the earth's field and (b) the mean auroral occurrence (in hours with U.T.) for the four winter months during 1964. U.T. almost coincides with the local mean time at SANAE.

ANTARCTIC DRESS

A. le R. van der Merwe, CSIR, Pretoria

In this series of photo's, taken on board the *RSA* on its recent relief visit to SANAE base, Charles Kingsley, one of the geologists to SANAE VIII, demonstrates the consecutive layers of clothing which are necessary to protect one against Antarctic temperatures and blizzards.

1. Nylon socks under thick woollen socks prevent abrasion of the skin and help to ward off frostbite. The string vest (the bigger the holes and the thicker the cord the better) creates a layer of insulating air on the body surface.

2. The layer of air is trapped on the trunk by a thick woollen long-sleeved vest, and on the legs and feet by woollen underpants and seamen's stockings.

3. Further insulation is ensured by a third layer consisting of "inners" (loose felt inner boots), battle dress trousers and woollen shirt.

4. After that comes a thick "icelandic" jersey and woollen gloves.

5. The final outer wear: winter anorak and wind-trousers to ward off the chilling effect of the wind, canvas boots with rubber soles—"mukluks"—to keep moisture off the stockings, felt mittens over a pair of woollen gloves and mittens, a scarf, snow goggles to protect the eyes against the glare, end the furlined hood over the balaclava. The scarf prevents the escape of air from the body surface. It is protected against freezing up form the vapour of the breath by pulling the front of the anorak well up over it. Inside the mukluks are half-inch thick inner soles, consisting of stiff porous material, on which the feet rest. They ensure an insulating layer of air underneath the feet. Their absence immediately makes itself felt by the very cold feet, and when the feet are chilled the rest of the body feels it as well!

Even though thus fully protected against wind and cold, with only a small portion of the face exposed, an Antarctican will still not be able to stay warm and to survive for a long period outside, unless he keeps moving to stimulate blood flow and metabolic rate. For survival are necessary protection against ambient temperature, increased inner combustion, the will to survive, alertness, watchfulness, good physical condition and sufficient intake of calories through a balanced diet to be able to compensate for the high energy expenditure.

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