

South African meteorological research in Antarctica

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South African involvement in the study of Antarctic Meteorology began several years prior to the first South African National Antarctic Expedition (SANAE 1) of 1959/60. The extent of this involvement is portrayed in the book *Meteorology of the Antarctic*, published by the Weather Bureau in 1957. Edited by M P van Rooy, this publication is representative of an era when South Africans were at the forefront of research into the meteorology of the then, highly spot-lighted, relatively unknown continent.

As far back as December 1949 J A King of the Weather Bureau journeyed with a Norwegian-Swedish-British expedition team to establish the Maudheim base. It is recorded that Mr King tried his hand at forecasting for the expedition, presumably after some research into Antarctic weather systems. Another South African meteorologist, J J (Hannes) la Grange, took part in the Fuchs Trans-Antarctic Expedition from 1956 to 1958 during which 3-hourly observations were made throughout. Messrs Artz and Bothma of the South African Weather Bureau (SAWB) were part of a Commonwealth team based at Halley Bay in 1959.

South Africa has obviously played — and continues to play — an important role in the continuous monitoring of the atmosphere of Antarctica. This operational data has become all the more important with the development of global atmospheric prediction models — and the basic need for detailed, accurate input fields.

Several Weather Bureau researchers into Antarctic meteorology had the opportunity to experience conditions there first hand. Thus in 1957, Harry van Loon, as analyst in the Southern Hemisphere project, was invited to the Antarctic Weather Central at Little America. Here 6-hourly hemispherical surface analyses and 12-hourly upper analyses were produced. During the International Geophysical Year (IGY) of 1957/58 the SA Weather Bureau was responsible for the analyses of surface and 500 hPa maps of the whole Southern Hemisphere south of 20° S, more than

1 000 maps were hand-drawn in this pre-computer era.

South African meteorologists featured prominently at the early symposiums of Antarctic research. Thus J J Taljaard was able to report on the 1959 Symposium on Antarctic Meteorology in Melbourne — at which one of the major sessions was entitled *Synoptic Analysis and Forecasting*. Taljaard served on the SCAR working group on meteorology for several years.

Taljaard edited the magazine *The Antarctic Bulletin* which was published from 1964 to 1976. In it several 'popular science' articles appeared, ranging from biometeorology to aircraft operation in Antarctica. The research described was often undertaken by SANAE members in their spare time — for example ice crystal photography by Von Brunn in 1960.

The weather satellite era was ushered in with TIROS I in 1960, but automatic picture transmission and an orbital inclination which would take in the polar areas, only came in in 1965. Today several nations make use of this information at their Antarctic bases — for synoptic weather and ice analyses. Some Antarctic stations and even some relief vessels have been equipped with high-resolution receivers for the NOAA AVHRR (National Oceanic and Atmospheric Administration Advanced Very High Resolution Radiometer) data to assist navigation through the ice.

Satellite communication links have been of great benefit in the area of unmanned observation platforms, on the Antarctic

continent and in Antarctic waters. The SAWB deployed an automatic weather station at Grunehogna in 1984 and the SA *Agulhas* has deployed several drifting buoys south of 60° S, all providing operational data via the Argos system.

Although not strictly a research activity, weather prediction will always involve an ongoing research by the forecaster into the behaviour of the particular environment. Antarctic weather can be extremely treacherous and accurate prediction for the many human activities on the continent is thus highly desirable. Several nations are involved in regular weather analysis and prediction over Antarctica. In 1991 the SAWB was twice called upon to provide forecasts for Ilyushin 76MD flights from Cape Town to Molodezhnaja. The accuracy of these predictions depended strongly on a knowledge of the local katabatic circulation.

Actual research into the weather phenomena of Antarctica seems to have reached a peak in the 1950s and early 1960s when the establishment of bases was at its peak and great pains were taken to produce accurate synoptic analyses of the area (South African participation via the Southern Hemisphere Project and the IGY Analyses was prominent). Even the major international journals on Antarctic research today reflect relatively little activity in this area. Perhaps it is time that meteorologists on the continent be encouraged to participate more fully in official research programmes — apart from their purely observational role.

Sun-dogs at SANAE

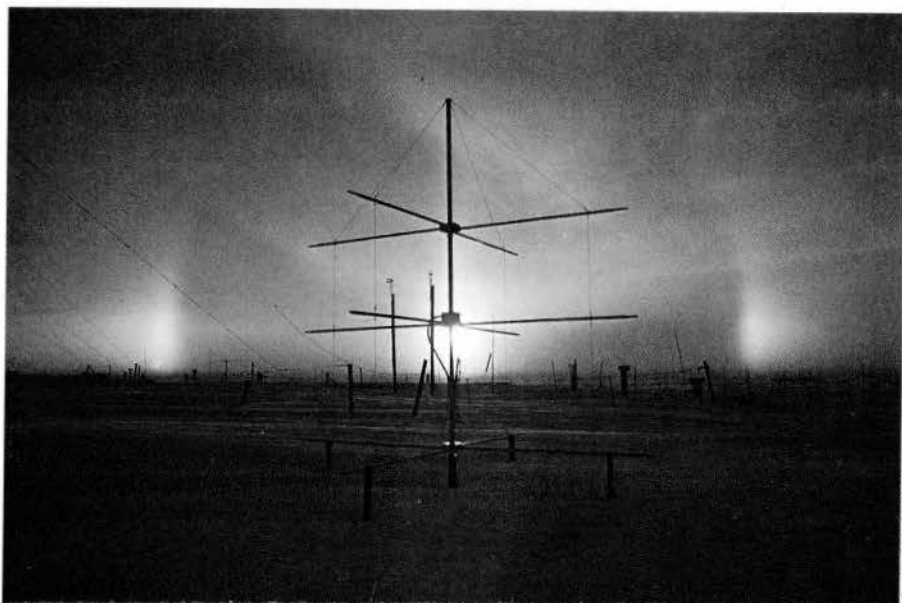


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