

## Radiation Climatology at Plateau Station

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The U.S. Army Natick Laboratories (NLABS) conducted a radiation climatology program at Plateau Station throughout the 1966 winter. Mr. Martin Sponholz, of the U.S. Weather Bureau, ESSA, was responsible for the maintenance of the instrumentation, which Mr. Leander Stroschein of NLABS installed during the 1965-1966 austral summer. Continuous measurements were made throughout the year of net and total global radiation and, throughout days with sunshine, of shortwave and reflected shortwave radiation. The net and total global radiation were measured with the so-called Funk radiometer, made in Australia, and the shortwave and reflected shortwave radiation were recorded by Kipp solarimeters, made in Holland. Continuous strip-chart recordings were made throughout the year, with the exception of a short period in July and August 1966 when the main generator at the station was inoperative.

NLABS has initiated a program to reduce all strip-chart data, and this should be completed by the time this article is published. A computer program is being prepared to handle the radiation climatology data, monthly summaries of which will be available by the end of 1967. The analysis program, a joint effort of ESSA and NLABS, involves the application of some data on inversions obtained by radiometersondes. The collection of data at Plateau, which will continue through 1968, is now being carried on by Mike Kuhn of the University of Innsbruck.

In addition to the Funk and Kipp instruments installed at Plateau, the first Davos-made four-component radiation balance meter was put in operation there by Kuhn during the 1966-1967 austral summer. This is the first instrument placed in Antarctica that has comparable thermopiles which enable it to measure both incoming and outgoing shortwave and longwave radiation. A comparison will be made between the Funk, Kipp, and Davos radiometers to determine their relative merits. In addition, the University of Melbourne installed a series of radiometers in the snow during the same austral summer. As a result, Plateau probably has the most complete set of devices for measuring radiation ever available at a high-latitude station. At least one new instrument, an ultraviolet radiometer,

will be added to this battery of instruments in the coming year.

It is expected that the total global and shortwave radiation for the midsummer months of December 1966 and January 1967 will reach new highs. On January 10, 1967, Kuhn, using the Kipp normal incident pyrhelimeter with filters, obtained a series of readings which resulted in a computed value of 1.76 cal/cm<sup>2</sup>/min. If this is substantiated after recalibration of the instrument, it will be the highest known value ever obtained on Earth for normal incident radiation.

## Meteorological Observations at Palmer Station, 1965-1966

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A program of surface meteorological observations has been conducted in conjunction with a glaciological program at Palmer Station, Anvers Island, since February 1, 1965. These observations are currently being analyzed, and a two-volume report is being prepared for publication.

Palmer Station is located at 64°46'01"S. 64°04'39"W. and at an elevation of 15 m on Norsel Point, a small rocky peninsula on the northern side of Arthur Harbor. Waters of the Gerlache and Bismarck Straits and the open ocean lie adjacent to Norsel Point from the south through west to northwest. From the northwest through east to south, the station is backed by the Anvers Island ice cap, which rises to an altitude of 850 m. To the east, at a distance of 23 km, the mountains of Anvers Island rise to 3,000 m.

*Table 1. Meteorological instruments operated at Palmer Station*

| Instrument   | Height Operated (feet) |
|--|------------------------|
| Maximum thermometer, liquid-in-glass (Wexler)*   | 6                      |
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| Exposed Spirit thermometer, liquid-in-glass (Wexler)*                                      | 6                      |
| Psychrometer, liquid-in-glass (Wexler)*  | 4                      |
| Thermograph, 7-day (Bendix Friez)*   | 5                      |
| Hygrothermograph, 7-day (Bendix Friez)   | 5                      |
| Anemometer, portable (U.S. Navy)   | 7                      |
| Wind recorder, mechanical, 31-day (Lambrech model 1482)                                    | 30                     |
| Barograph, 4-day (Bendix Friez)*   | 5                      |
| Barometer, precision aneroid (Wallace and Tiernan)   | 5                      |
| Precipitation gauge, 8 inch, unshielded*   | 3                      |
| Precipitation gauge, 12 inch, automatic weighing, shielded, 7-day (Belfort Instrument Co.) | 12                     |
| Pyrheliograph, 7-day (Belfort Instrument Co.)  | 3                      |

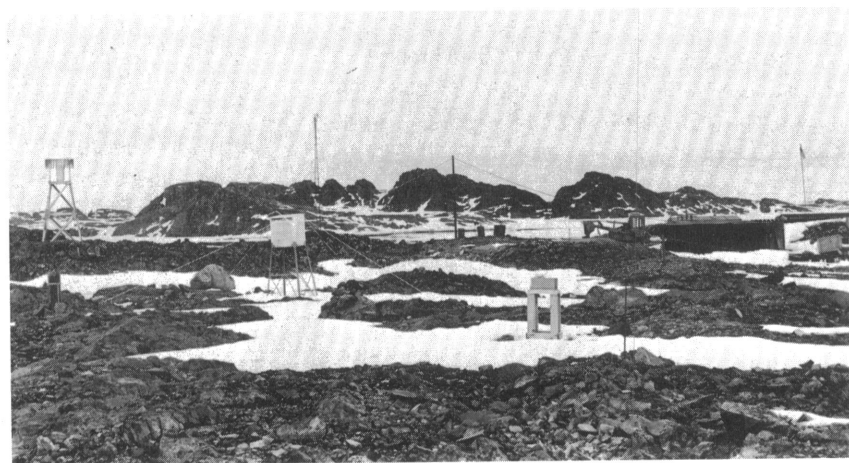
\*Standard U.S. Weather Bureau Equipment.

Table 2. Meteorological conditions at Palmer Station, 1965.

| Conditions  | Feb     | Mar     | Apr     | May       | June    | July      | Aug       | Sept      | Oct     | Nov       | Dec       |
|---|---------|---------|---------|-----------|---------|-----------|-----------|-----------|---------|-----------|-----------|
| Average air temperature (°F.)                           | 35.3    | 35.7    | 28.0    | 27.5      | 23.5    | 16.7      | 13.1      | 24.8      | 18.1    | 30.0      | 31.8      |
| Days with rain and drizzle or freezing rain and drizzle | 6       | 16      | 1       | 5         | 3       | 1         | 0         | 5         | 0       | 6         | 5         |
| Days with snow and sleet                                | 5       | 10      | 17      | 15        | 20      | 18        | 8         | 22        | 18      | 19        | 16        |
| Average cloud cover (tenths)                            | 8.61    | 7.98    | 8.28    | 7.79      | 8.14    | 7.17      | 4.36      | 8.26      | 8.48    | 9.29      | 8.41      |
| Average wind speed (knots)                              | 4.9     | 8.0     | 7.2     | 5.9       | 9.3     | 4.6       | 2.1       | 10.5      | 6.6     | 6.4       | 5.6       |
| Peak gusts (knots)                                      | 42<br>N | 46<br>N | 42<br>N | 45<br>NNW | 46<br>E | 45<br>NNW | 46<br>NNE | 55<br>NNE | 47<br>E | 45<br>NNE | 45<br>NNE |

Table 3. Meteorological conditions at Palmer Station, 1966.

| Conditions  | Jan       | Feb  | Mar      | Apr       | May       | June       | July    | Aug       | Sept       | Oct      | Nov       | Dec       |
|---|-----------|------|----------|-----------|-----------|------------|---------|-----------|------------|----------|-----------|-----------|
| Average air temperature (°F.)                           | 35.5      | 32.9 | 32.0     | 27.9      | 24.3      | 21.9       | 07.2    | 14.7      | 18.5       | 23.9     | 29.6      | 32.0      |
| Days with rain and drizzle or freezing rain and drizzle | 3         | 3    | 9        | 13        | 1         | 2          | 1       | 1         | 1          | 1        | 4         | 4         |
| Days with snow and sleet                                | 1         | 2    | 20       | 15        | 14        | 17         | 18      | 20        | 17         | 24       | 16        | 15        |
| Average cloud cover (tenths)                            | 8.10      | 7.03 | 9.07     | 8.44      | 7.83      | 8.17       | 7.65    | 7.97      | 8.36       | 9.10     | 8.39      | 8.13      |
| Average wind speed (knots)                              | 5.4       | 3.6  | 5.5      | 7.0       | 7.3       | 9.8        | 6.3     | 8.8       | 7.7        | 6.5      | 4.6       | 3.6       |
| Peak gusts (knots)                                      | 25<br>ENE | —    | 40<br>NE | 50<br>NNE | 40<br>NNE | 60+<br>NNE | 50<br>N | 60<br>NNW | 60+<br>NNE | 40<br>NW | 28<br>NNE | 40<br>NNE |



(Photo by author)

Palmer Station meteorology facility. The 8- and 12-inch precipitation gauges are at left, the instrument shelter and anemometer tower at left of center, and the pyrheliograph at right of center.

The climate in the area of Palmer Station, which is situated in the subpolar low-pressure belt, exhibits predominantly cyclonic characteristics, with frequent, short-lived, though often violent, storms. Precipitation is high, and low-level stratus clouds dominate the sky. The occurrence of sunshine is low, and during some months not one clear day has been recorded.

With the exception of the installation of an auto-

matic-weighing, shielded, 12-inch precipitation gauge in January 1966, the instrumentation of the meteorology facility has not changed since the station's commissioning in February 1965 (Table 1). A summary of meteorological conditions is given in Tables 2 and 3.

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