

During this year, the DADS reached its design criterion and became independent of dedicated field support. After receiving instruction, U.S. Geological Survey personnel unpacked the DADS recorder from its traveling cases and installed it in the LC-130 in Greenland. U.S. Geological Survey personnel also operated the device in flight for a successful series of missions without any data loss.

In summary, the DADS is proving to be a reliable airborne recording system with increasingly flexible data-display capabilities. Inquiries about future use, scheduling, or system capabilities of the DADS should be directed to Hap Terry (206) 543-7684. A user's instruction manual is available. The DADS is supported by the University of Washington by National Science Foundation grant DPP 85- 07730.

Antarctic automatic weather stations: Austral summer 1987–1988

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The United States Antarctic Program (USAP) automatic weather station project places automatic weather station (AWS) units in remote areas of Antarctica in support of meteorological research. Stearns and Weidner (1986) describe the AWS system.

The USAP AWS units support the following studies:

- Barrier windflow along the Antarctic Peninsula and the Transantarctic Mountains,
- Katabatic windflow down the slope to the Adélie Coast, Reeves Glacier, Byrd Glacier, and Beardmore Glacier,
- Mesoscale circulation and the sensible and latent heat fluxes on the Ross Ice Shelf, and
- Climatology of Byrd, Siple, and Dome C stations. Stearns and Wendler (1988) reviewed the results from the above studies. The data are used for support of air operations at Williams Field, Antarctica, and of oceanographic work in the Ross Sea.

Table 1 gives the AWS unit location, identification number (ID), latitude, longitude, elevation, start date, and stop date. AWS 8903 at Byrd Station operated continuously from February 1980 until stopping 27 March 1988. The AWS unit will be replaced in austral summer 1988–1989. Plans were made to remove AWS 8916 at D-57 during austral summer 1987–1988 so the same ID was installed at Scott Island. Then, the AWS unit at D-57 started up resulting in the same ID at two locations. The data from the two units can be separated and D-57 is included in table 1.

Figures 1 and 2 are maps of the AWS sites in Antarctica. Monthly mean data for March 1988 are included on both maps.

The field work during austral summer 1987–1988 started with C.R. Stearns boarding the ice breaker, *Polar Star*, at Punta Arenas, Chile, for the trip to McMurdo Station, Antarctica. One AWS unit with batteries and tower sections was unloaded at Palmer Station for pick up by the British Antarctic Survey (BAS). This unit is for possible deployment along the east side of the Antarctic Peninsula. The present AWS units along the east side of the Antarctic Peninsula are in need of repair. Due to aircraft problems, the AWS units were not repaired in austral summer 1987–1988.

On 24 December 1987, the *Polar Star* reached Scott Island. On 25 December 1987, AWS 8916 was installed on the island with the able help of two marine-science technicians from the *Polar Star*.

The *Polar Star* reached Terra Nova Bay on 27 December 1987. The Manuela site aerovane had been destroyed by the wind. The AWS unit was returned to the *Polar Star* for repairs. AWS 8909 was installed on the Reeves Glacier for D. Bromwich and T. Parish. Two marine-science technicians from the *Polar Star* did the hard work of digging the anchoring holes in the wind-packed snow. On 28 December 1987, AWS 8929, provided by Bromwich, was installed near the Snow Cave on Inexpressible Island. AWS 8905 and a new aerovane were installed at Manuela site.

The *Polar Star* arrived near Martha I site on 1 January 1988. AWS 8923 was removed for installation at another site. Martha II site was not visited. The *Polar Star* arrived at McMurdo Station, Antarctica, on 3 January 1988.

On 15 November 1987 Lee Powell, using the Twin Otter aircraft, replaced the aerovane at Lettau Site and raised the lower temperature difference sensors at Lettau and Elaine sites.

Bill Trabucco (Antarctic Services) found that the positive lead of the power cable for the Siple AWS was shorted to the tower. New batteries and power cable were installed, and the AWS unit operated properly beginning 10 December 1987.

The first task at McMurdo Station was to dig out the radioactive thermal generator at Ferrell site. The radioactive thermal generator was encrusted in ice and a great deal of ice chipping was needed. The work was completed in 1 day because of the help of the helicopter crew, LCDR Fanday, LCDR Bronsink, AMAC Karo, and AMH2 Gisey. The helicopter lifted the radioactive thermal generator from the hole to the snow surface. The radioactive thermal generator will be taken to McMurdo Station in austral summer 1988–1989.

On 8 January 1988, C.R. Stearns and Rabindra Basnyat went to the South Pole to remove the AWS units from Allison and Patrick sites. At the clean-air site, six gel cell batteries and a solar panel were added to AWS 8918, and the boom was raised approximately 0.75 meters. Two sets of batteries with independent solar panels will reduce the possibility of failure for the entire battery set if one cell fails. Experience is showing that at least nine 40-ampere gel cell batteries are needed at South Pole for the winter night. Seven 5-foot tower sections were left at South Pole so that the station anemometer and wind vane could be raised to a height of 10 meters.

George Weidner visited Marilyn site installing a new set of six batteries. One battery cell of the nine battery set had failed preventing the solar panel from charging the battery set above 10.5 volts of direct current. The unit would run while the Sun was charging the batteries. At Schwerdtfeger and Gill sites the

Table 1. Automatic weather station locations for 1988.

Site name	ID	Latitude	Longitude	Elevation (in meters)	ID start date	ID stop date
Purpose: Katabatic wind flow; G. Wendler, University of Alaska						
D-10	8912	66.70°S	139.80°E	240	15 Jan 84	
D-47	8914	67.38°S	138.72°E	1560	13 Nov 85	
	8916	68.18°S	137.52°E		17 Nov 85	1 Oct 87
				2103	2 Jan 88	
D-80	8919	70.02°S	134.72°E	2500	11 Dec 85	
Dome C	8904	74.50°S	123.00°E	3280	13 Jan 83	
Purpose: Climatic record; C. Stearns, University of Wisconsin						
Byrd Station	8903	80.00°S	120.00°W	1530	5 Feb 80	27 Mar 88
Siple Station	8910	75.90°S	83.92°W	1054	10 Dec 87	
Clean air	8918	90.00°S		2836	28 Jan 86	
Purpose: Naval Support Force Antarctica (NSFA) support network						
Marble Point	8906	77.43°S	163.75°E	120	5 Feb 80	
Ferrell	8907	78.02°S	170.80°E	45	10 Dec 80	
Whitlock	8913	76.24°S	168.70°E	275	23 Jan 82	
Buckle Island	8928	66.87°S	163.24°E	520?	20 Feb 87	
Scott Island	8916	67.37°S	179.97°W	30?	25 Dec 87	
Purpose: Ross Ice Shelf network; C. Stearns, University of Wisconsin						
Marilyn	8915 U,T ^a		165.03°E	75	16 Jan 88	
Schwerdtfeger	8924 U,T	79.94°S	169.83°E	60	24 Jan 85	
Gill	8925 U,T	80.00°S	179.00°W	55	24 Jan 85	
Elaine	8911 U,T	83.15°S	174.46°E	60	28 Jan 86	
Lettau	8908 U,T	82.59°S	174.27°W	55	29 Jan 86	
Martha II	8900 U,T	78.38°S	173.42°W	18	11 Feb 87	
Purpose: Reeves katabatic flow; Bromwich and Parish, Ohio and Wyoming						
Manuela	8905 U,T	74.92°S	163.60°E	80	15 Feb 87	27 Jun 87
					28 Dec 87	
Shristi	8909 U,T	74.70°S	161.57°E	1200	28 Dec 87	
Sushila ^b	8921 T	74.30°S	161.30°E	1431	20 Jan 88	16 Mar 88
Sandra	8923	74.49°S	160.49°E	1525	19 Jan 88	23 Feb 88
Lynn	8927 U,T	74.23°S	160.37°E	1772	19 Jan 88	
Purpose: Barrier Wind, Antarctic Peninsula; C. Stearns, University of Wisconsin						
Larsen Ice	8926	60.97°S	66.55°W	17	1 Jan 86	
Dollman Island	8917	70.58°S	60.92°W	396	18 Feb 86	
Butler Island	8902	72.20°S	60.34°W	91	1 Mar 86	18 Jul 87
Uranus Glacier	8920	71.43°S	68.93°W	780	6 Mar 86	
Purpose: Testing						
Jimmy	8901	77.87°S	166.81°E	200	12 Jan 88	

^a U denotes that AWS unit has relative humidity sensor. T denotes that AWS unit has vertical temperature difference sensor.

^b Sushila site is not equipped with a pressure gauge.

towers were raised and the aerovanes replaced. Both aerovanes had failed after 3 years in the field.

Lynn and Sandra sites were installed on 19 January 1988 using the Twin Otter aircraft for transportation and navigation. The next day Sushila site was installed in the same manner. The Twin Otter crew helped in the installation of the AWS units at the three sites. The AWS units were in support of T. Parish and D. Bromwich. David Bromwich directed the installations.

In January 1986, two AWS units were installed near South Pole Station, and one was installed about 100 meters from the clean-air building in the clean-air sector (Stearns 1987). The purpose was to determine the possible influence of the South Pole Station on the local climate. The means for the period 1

February 1986 to 31 December 1986 are shown in table 2. The South Pole data is published in the *Antarctic Journal of the U.S.* 21, (2), (3), (4), and 22, (1/2). The reported monthly mean wind speeds for South Pole for February, March, and April 1986

Table 2. Means for period 1 February 1986 to 31 December 1986.

	Patrick site	Clean air site	South Pole
Temperature, °C	-51.2	-52.5	-52.1
Pressure, millibars	679.9	679.9	680.0
Wind speed, meters/second	3.2	4.2	4.7

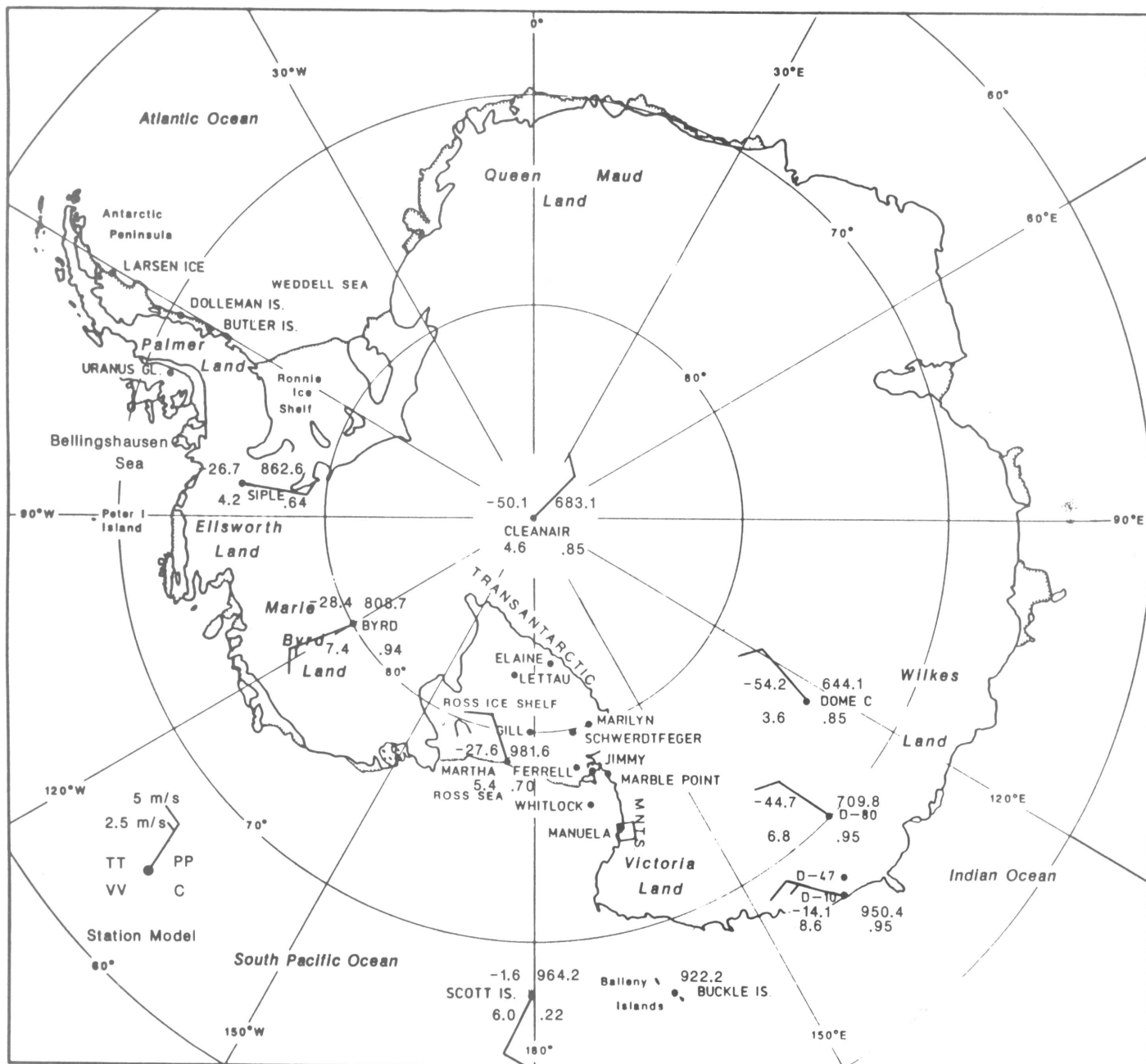


Figure 1. Map of Antarctica showing the locations of the AWS units for 1988. The units in the rectangle around Manuela site are shown in figure 2. The meteorological data are mean values of temperature, pressure, scalar wind speed, constancy, resultant wind direction, and speed for March 1988. (The station model is: TT denotes air temperature, °C; PP denotes air pressure, millibars; VV denotes scalar wind speed, meters per second; C denotes resultant wind speed/scalar wind speed.)

were converted to meters per second. The agreement between the clean-air AWS unit and the South Pole Station data is excellent for air temperature and pressure. The AWS units measure wind speed at a nominal height of 3 meters and the South Pole wind speed is adjusted to a height of 10 meters. When the AWS wind speed is extrapolated to 10 meters height, the wind speed difference between South Pole Station and the clean-air AWS is reduced to 0.1 meter per second.

Patrick site is approximately 25 kilometers northeast of South Pole Station. The comparison between Patrick site and clean-

air site shows that Patrick site is 1.1°C warmer, the pressure is within 0.1 millibar and the wind speed is 0.9 meters per second lower than clean-air site.

Comparisons of Patrick site and Allison site (25 kilometers from South Pole along 60°W) with clean-air site for other time periods confirm that clean-air site has wind speeds about 1 meter per second higher and air temperatures about 1°C colder than Patrick and Allison sites.

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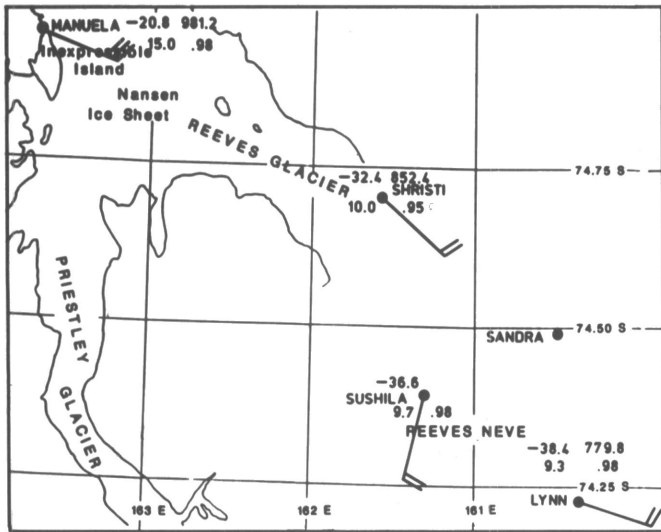


Figure 2. Map showing the locations of AWS units in the Reeves Glacier area. The meteorological data are mean values for March 1988. The station model is given in figure 1.

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