

Antarctic Automatic Weather Station Field Report:
1993-1994

Robert E. Holmes, George A. Weidner, and Charles R. Stearns
Space Science and Engineering Center
1225 W. Dayton St.
Madison, Wisconsin 53706

Introduction:

The original plans for the 1993-1994 included a trip to Antarctica for George Weidner and Robert Holmes between 15 November and 15 December 1993 to install eight automatic weather station (AWS) units on the Siple Coast of West Antarctica. The trip was canceled because we were not ready. Weidner and Holmes went to Antarctica in January along with Mark Seefeldt and John Cassano. We planned to install the AWS units along the Siple Coast. One Twin Otter aircraft was damaged and unavailable. The second Twin Otter aircraft was busy recovering a camp that the LC-130 was having difficulty pulling out and then supported us for work on the Ross Ice Shelf and at South Pole. The Siple Coast AWS units are planned for installation during the 1994-1995 field season.

Table 1 gives the AWS unit's site name, ARGOS identification number, latitude, longitude, elevation above sea level, site start date, and WMO number for the Global Telecommunications System for AWS units in operation as of 1 March 1994. Figure 1 shows the locations of widely spaced AWS units in Antarctica, Figure 2 shows the AWS locations near Terra Nova Bay, and Figure 3 shows the AWS locations in the vicinity of Ross Island.

Field Season:

The 1993-1994 Antarctic field season started on 29 December 1993 when G.A. Weidner, M. Seefeldt, J. Cassano, and R.E. Holmes left Madison, Wisconsin for McMurdo, Antarctica, arriving on 4 January 1994.

The following separate trips were made by USCG helicopters.

A flight was made to Minna Bluff site on 8 January 1994. The aerovane had broken off at the mast, and was found on the surface next to the station. The antenna was also damaged. AWS 8915 was removed and the aerovane and antenna were returned to McMurdo for repair.

Willie Field and Pegasus North sites were visited on 10 January 1994. AWS 8927 and the aerovane were removed from Pegasus North and returned to McMurdo for repair. AWS 8901 was also removed from Willie Field and returned to McMurdo for repair.

A flight was made to Linda site on 11 January 1994. AWS 8915 was replaced with AWS 8909. A flight was made to Minna Bluff site on 12 January 1994. AWS 8988 was installed with a new antenna and an R.M. Young wind system.

On 13 January 1994, Marilyn and Schwerdtfeger sites were visited using the Twin Otter aircraft. Marilyn site was in good condition. The lower vertical temperature difference sensor was raised to 1 meter above the snow surface and two boxes of three 40 amp hr batteries were also installed. The malfunction-

ing aerovane at Schwerdtfeger site was replaced.

A USCG helicopter flight was made to Pegasus North site on 14 January 1994. AWS 8927 was reinstalled. The existing 1.8 m boom was replaced with a 0.9 m boom and an R.M. Young wind system was installed. The solar panel and power junction box were replaced with new components, and the lower vertical temperature difference sensor was raised to a height of 1 meter. One box of three 40 amp hr gel cell batteries was also installed.

A Twin Otter flight was made to Lettau site on 17 January 1994. One 1.5 m tower section was added to the station. A new antenna and another aerovane were also installed. Two new boxes of three 40 amp hr batteries were installed as well.

Willie Field site was revisited by truck on 18 January 1994. AWS 8901 was reinstalled. A Campbell Scientific CR-10 data logger with an Ultrasonic Depth Gauge was installed in support of S-186. The lower vertical temperature difference sensor was raised to a height of 0.7 m. An R.M. Young wind system was also installed.

An LC-130 flight was taken to Byrd Surface Camp on 21 January 1994. The trip from Byrd Surface Camp to Byrd site was made by snowmobile. The existing 1.8 m boom was replaced with a new 0.9 m boom. The existing antenna was unusable, and another antenna was shipped to Byrd Surface Camp and installed by camp personnel on 30 January 1994.

The wind speed sensor was questionable at Marble Point site. On 22 January, a USCG helicopter flight was made to the site. A replacement aerovane was installed and the wind speed sensor output appeared to be fine.

Mount Howe, Kelly, and Lindsay sites were visited by Twin Otter on 22 January 1994. The station at Mount Howe had sustained severe damage from wind and the ice around the anchors and tower base had ablated so that the tower was no longer anchored sufficiently. Mount Howe site was removed, as were Kelly and Lindsay, which had been installed in support of S-203.

Clean Air site was moved from its previous location to one approximately 30 meters from the South Pole Meteorological tower on 24 January 1994. AWS 8918 was replaced with AWS 8987. A snow temperature profile was also added. The depth of the profile extends to 4 meters. The PICO drill from the Berg Field Center, McMurdo was found to be incomplete upon arrival at the South Pole and the hole for the snow temperature profile installation could not be drilled to a depth of 10 to 16 m but only to 4 m. The temperature profile was supposed to measure the snow temperatures at -10 (16), -7 (-8), -4, -2, -1, -0.5, -0.25, -0.0, 0.25, 0.50, 0.75, and 1.0 m relative to the snow surface at the time of installation.

An attempt was made to visit Gill site by Twin Otter on 27 January 1994. We were unable to land due to low clouds and fog. The clouds and fog remained in the area during the following day and the flight was scrubbed.

In early March, crew members of the USCG ice breaker Polar Sea flew by helicopter to Whitlock site and replaced AWS 8925 with AWS 8921.

Near the Adelie Coast, members of Expeditions Polaires Francaises visited D-80 Site on 1 February 1994. Two 1.9 meter tower sections were added, as were two boxes of three 40 amp hr batteries. A new sensor boom and aerovane were installed as well. They replaced the existing electronics with a new unit. The ARGOS ID of 8919 was unchanged, however new pressure calibration data will be provided. Also, AWS 8916 at D-47 was removed for returning to Madison for repair.

On the Antarctic Peninsula, members of the British Antarctic Survey serviced several AWS units during the austral summer. AWS 8917 was installed at Sky-Hi site in mid February. AWS 8932 was installed at Recovery Glacier. Butler Island (AWS 8902) was serviced and two 1.9 meter tower sections were added to Uranus Glacier site. Larsen Ice Shelf site will be serviced at a later date if possible.

On 9 March 1994 the seawater temperature probe on AWS 8912 at Bonaparte Point was replaced. The removed probe was still working but the protective conduit was broken. The wire and probe appeared to be in good condition.

Members of the Japanese Antarctic Research Expedition were responsible for the installation of an AWS unit at their intermediate camp. At this time, no report of their progress has been received.

Acknowledgements:

The automatic weather station program is supported by National Science Foundation OPP 93-03569. The British Antarctic Survey installs and services the automatic weather stations in the Antarctic Peninsula area. Expeditions Polaires Francaises installs and services the units along the Adelie Coast. The Japanese Antarctic Research Expedition installs and services those units near the Prince Olav Coast.

We were assisted at McMurdo by NSFA-Meteorology, Byrd Surface Camp personnel, and the crews of the Twin Otters, USCG helicopters, and the LC-130s.

Table 1. The 1994 Antarctic automatic weather station site name, ARGOS identification number, latitude, longitude, altitude above sea level, site start date and WMO number for the Global Telecommunications System.

Site	ARGOS ID	Lat. (deg)	Long. (deg)	Alt. (m)	Date Start	WMO#
Adelie Coast						
D-10	8914	66.70°S	139.80°E	240	Feb 80	89832
D-80	8919	70.02°S	134.72°E	2500	Nov 84	89836
Dome C	8904	74.50°S	123.00°E	3280	Feb 80	89828
Port Martin	8930	66.82°S	141.39°E	39	Jan 90	
Cape Denison	8933	67.02°S	142.68°E	31	Jan 90	
Penguin Point	8929	67.62°S	146.00°E	30	Dec 93	89847
West Antarctica						
Byrd Station	8903	80.00°S	120.00°W	1530	Feb 80	89324
Mount Siple	8981	73.20°S	127.05°W	30	Feb 92	89327
Ross Island Region						
Marble Point	8906	77.43°S	163.75°E	120	Feb 80	89866
Ferrell	8934	78.02°S	170.80°E	45	Dec 80	89872
Pegasus North	8927	77.95°S	166.51°E	10	Jan 90	89667
Pegasus South	8937	78.03°S	166.60°E	10	Jan 91	
Minna Bluff	8988#	78.56°S	166.69°E	920	Jan 91	89768
Linda	8915#	78.50°S	168.35°E	50	Jan 91	89769
Willie Field	8901	77.85°S	167.08°E	40	Jan 92	
Ocean Islands						
Whitlock	8921	76.24°S	168.70°E	275	Jan 82	89865
Scott Island	8983	67.37°S	179.97°W	30	Dec 87	89371
Young Island	8980	66.28°S	162.33°E	30	Dec 90	89660
Possession Island	8984	71.90°S	171.13°E	30	Dec 92	89879
Ross Ice Shelf						
Marilyn	8931	79.98°S	165.03°E	75	Jan 84	89869
Schwerdtfeger	8913	79.94°S	169.83°E	60	Jan 85	89868
Gill	8911	80.03°S	178.63°W	55	Jan 85	89863
Elaine	8900	83.15°S	174.46°E	60	Jan 86	89873
Lettau	8908	82.52°S	174.43°W	55	Jan 86	89377
Reeves Glacier						
Manuela	8905	74.92°S	163.60°E	80	Feb 84	89864
Sandra	8923	74.48°S	160.48°E	1525	Jan 88	89861
Lynn	8935	74.21°S	160.39°E	1772	Jan 88	89860
Antarctic Peninsula						
Larsen Ice	8926	66.97°S	60.55°W	17	Oct 85	89262
Butler Island	8902	72.20°S	60.34°W	91	Mar 86	89266
Uranus	8920	71.43°S	68.93°W	780	Mar 86	89264
Cape Adams	8917	75.01°S	62.53°W	25	Jan 89	89268
Racer Rock	8947	64.16°S	61.54°W	17	Nov 89	89261
Bonaparte Point	8912	64.78°S	63.06°W	8	Nov 91	89269
Recovery Glacier*	8932	80.82°S	22.26°E	1220	Jan 94	WMO#
Ski-Hi*	8917	74.??°S	70.??°W	????	Feb 94	WMO#
High Polar Plateau						
Clean Air	8987#	90.00°S		2835	Jan 86	89208
Henry	8985	89.00°S	0.30°W	2755	Jan 93	89108
Nico	8924	89.00°S	90.13°E	2935	Jan 93	89799

* New locations for 1994

New ARGOS ID for 1994 at the site

● New latitude and/or longitude based on aircraft GPS

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Table 2. Antarctic automatic weather station locations for 1993 including the ARGOS ID and WMO#. The AWS units are in the order of the ARGOS ID.

Site	ARGO ID	Lat. (deg)	Long. (deg)	Alt. (m)	Date Start	WMO#
Elaine	8900	83.15°S	174.46°E	60	Jan 86	89873
Willie Field	8901	77.85°S	167.08°E	40	Jan 92	
Butler Island	8902	72.20°S	60.34°W	91	Mar 86	89266
Byrd Station	8903	80.00°S	120.00°W	1530	Feb 80	89324
Dome C	8904	74.50°S	123.00°E	3280	Feb 80	89828
Manuela	8905	74.92°S	163.60°E	80	Feb 84	89864
Marble Point	8906	77.43°S	163.75°E	120	Feb 80	89866
	8907	Not active				
Lettau	8908	82.59°S	174.27°W	55	Jan 86	89377
Linda	8909	78.50°S	168.35°E	50	Jan 91	89769
	8910	Not Active				
Gill	8911	80.03°S	178.63°W	55	Jan 85	89863
Bonaparte Point	8912	64.78°S	63.06°W	8	Nov 91	89269
Schwerdtfeger	8913	79.94°S	169.83°E	60	Jan 85	89868
D-10	8914	66.70°S	139.80°E	240	Feb 80	89832
Linda	8915	78.50°S	168.35°E	50	Jan 91	89769
D-47	8916	67.38°S	138.72°E	1560	Jan 83	89834
Ski-Hi*	8917	74.??°S	70.??°W	????	Feb 94	WMO#
	8918	Not active				
D-80	8919	70.02°S	134.72°E	2500	Nov 84	89836
Uranus	8920	71.43°S	68.93°W	780	Mar 86	89264
Whitlock	8921	76.24°S	168.70°E	275	Jan 82	89865
Kenton	8922	Greenland				
Sandra	8923	74.48°S	160.48°E	1525	Jan 88	89861
Nico	8924	89.00°S	90.13°E	2935	Jan 93	89799
	8925	Not active				
Larsen Ice	8926	66.97°S	60.55°W	17	Oct 85	89262
Pegasus North	8927	77.95°S	166.51°E	10	Jan 90	89667
Julie	8928	Greenland				
Penguin Point	8929	67.62°S	146.00°E	30	Dec 93	89847
Port Martin	8930	66.82°S	141.39°E	39	Jan 90	
Marilyn	8931	79.98°S	165.03°E	75	Jan 84	89869
Recovery Glacier*	8932	80.82°S	22.26°E	1220	Jan 94	
Cape Denison	8933	67.02°S	142.68°E	31	Jan 90	
Ferrell	8934	78.02°S	170.80°E	45	Dec 80	89872
Lynn	8935	74.21°S	160.39°E	1772	Jan 88	89860
GISP2	8936	Greenland				
Pegasus South	8937	78.03°S	166.60°E	10	Jan 91	
Klinck	8938	Greenland				
Barber	8939	Greenland				
Racer Rock	8947	64.16°S	61.54°W	17	Nov 89	89261
Young Is.	8980	66.28°S	162.33°E	30	Dec 90	89660
Mount Siple	8981	73.20°S	127.05°W	30	Feb 92	89327
	8982	Planned for installation by Japanese Expedition				
Scott Island	8983	67.37°S	179.97°W	30	Dec 87	89371
Possession Is.	8984	71.90°S	171.13°E	30	Dec 92	89879
Henry	8985	89.00°S	0.30°W	2755	Jan 93	89108
	8986	Not active				
Clean Air	8987	90.00°S		2835	Jan 86	89208
Minna Bluff	8988	78.56°S	166.69°E	920	Jan 91	89768
Matt	8989	Greenland				

* New locations for 1994

Sites to be continued but AWS unit not installed this year						
D-47		67.38°S	138.72°E	1560	Jan 83	89834
Cape Adams		75.01°S	62.53°W	25	Jan 89	89268
					CRS, 28 Mar 94	

Table 3 AWS units planned for removal, repairs, or installation during the 1994-1995 or later field season in Antarctica.

Ross Island Region				
Cape Crozier		77.55°S	174.46°E	Install AWS unit
Beaufort Island		77.??°S	167.??°E	Install AWS unit
West Antarctica				
By Twin Otter aircraft based at Byrd Station, 80.00°S, 120.00°W.				
500		85.00°S	136.50°W	Install AWS unit
500		83.90°S	134.20°W	Install AWS unit
500		82.60°S	137.00°W	Install AWS unit
1000		84.90°S	128.70°W	Install AWS unit
1000		83.00°S	121.40°W	Install AWS unit
1000		81.20°S	126.10°W	Install AWS unit
1500		84.60°S	115.60°W	Install AWS unit
1500		82.20°S	113.40°W	Install AWS unit
Ross Ice Shelf				
Byrd Neve		80.5?°S	152.??°E	Install AWS unit
Ross Ice Edge		78.??°S	177.50°E	Install AWS unit
Martha II		78.38°S	173.42°W	Reinstall
		79.0?°S	158.0?°W	Install AWS unit
Siple Dome		82.0?°S	158.0?°W	Install AWS unit
		85.0?°S	158.0?°W	Install AWS unit
		82.0?°S	150.0?°W	Install AWS unit
Antarctic Peninsula				
British Antarctic Survey				
Cape Adams		75.01°S	62.53°W	Replace AWS unit
Long Term Ecological Research Program				
Joubin Island		64.9?°S	64.0?°	Install AWS for LTER
Hugo Island		64.9°S	66.0?°W	Install AWS unit for LTER
Biscoe Island		66.0?°S	63.0?°W	Install AWS unit for LTER
West Antarctic Coast				
Peter I Island		69.8?°S	91.??°W	Install dog house AWS
Cape Colbeck		77.2?°S	159.0?°W	Install dog house AWS
Mount Vance		76.2?°S	140.0?°W	Install dog house AWS
East Antarctic Plateau				
Mizuho Station		70.70°S	44.33°E	2230 m Install AWS unit
Dome F		77.37°S	39.61°E	4000 m Install AWS unit

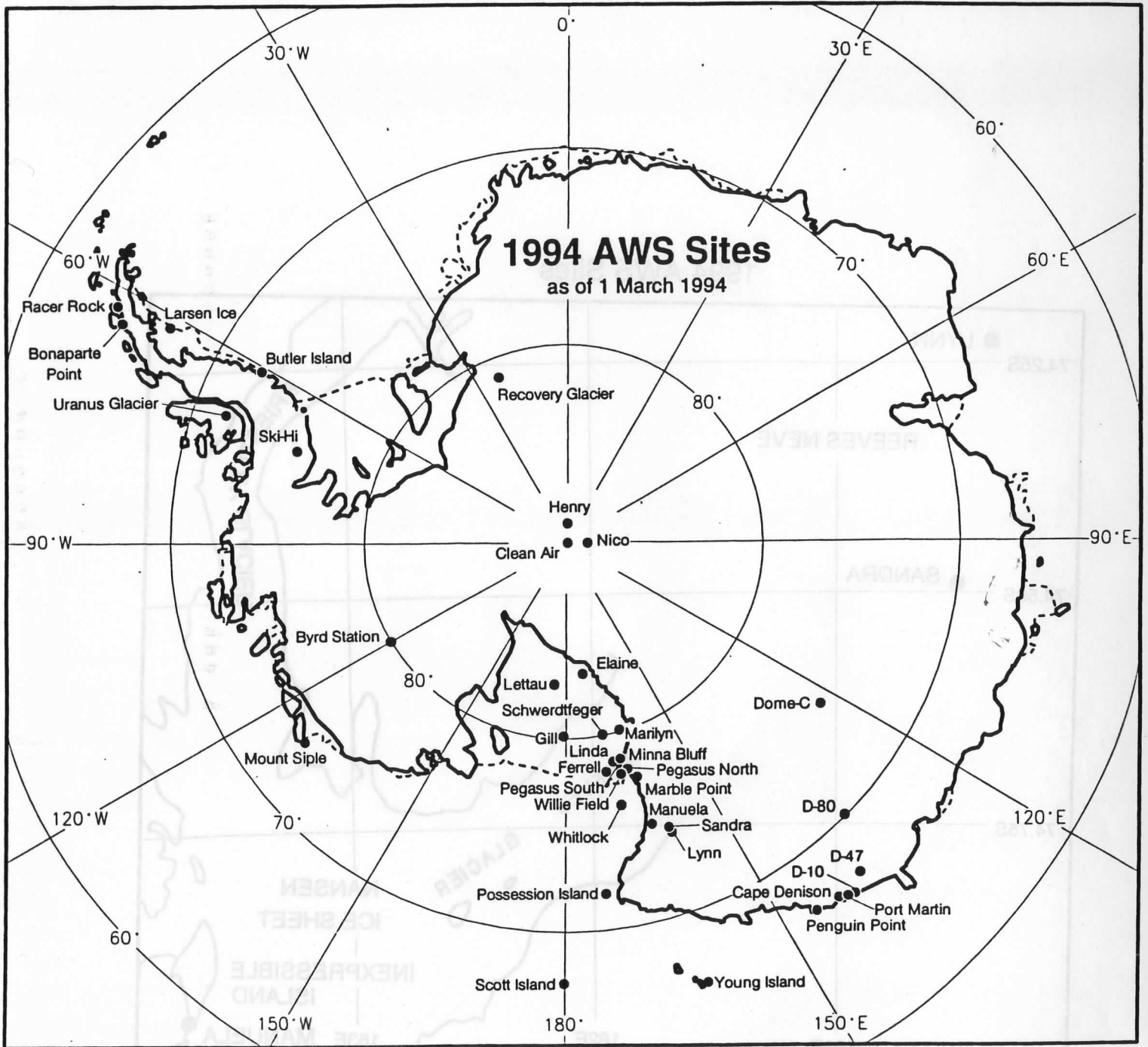


Figure 1. Map of Antarctica showing the locations of widely spaced automatic weather station units for 1994. The Cape Adams AWS site is not shown because the unit could not be found. The Siple Station unit was removed and installed at SKi-Hi. Siple AWS site is decommissioned because of maintenance difficulty.

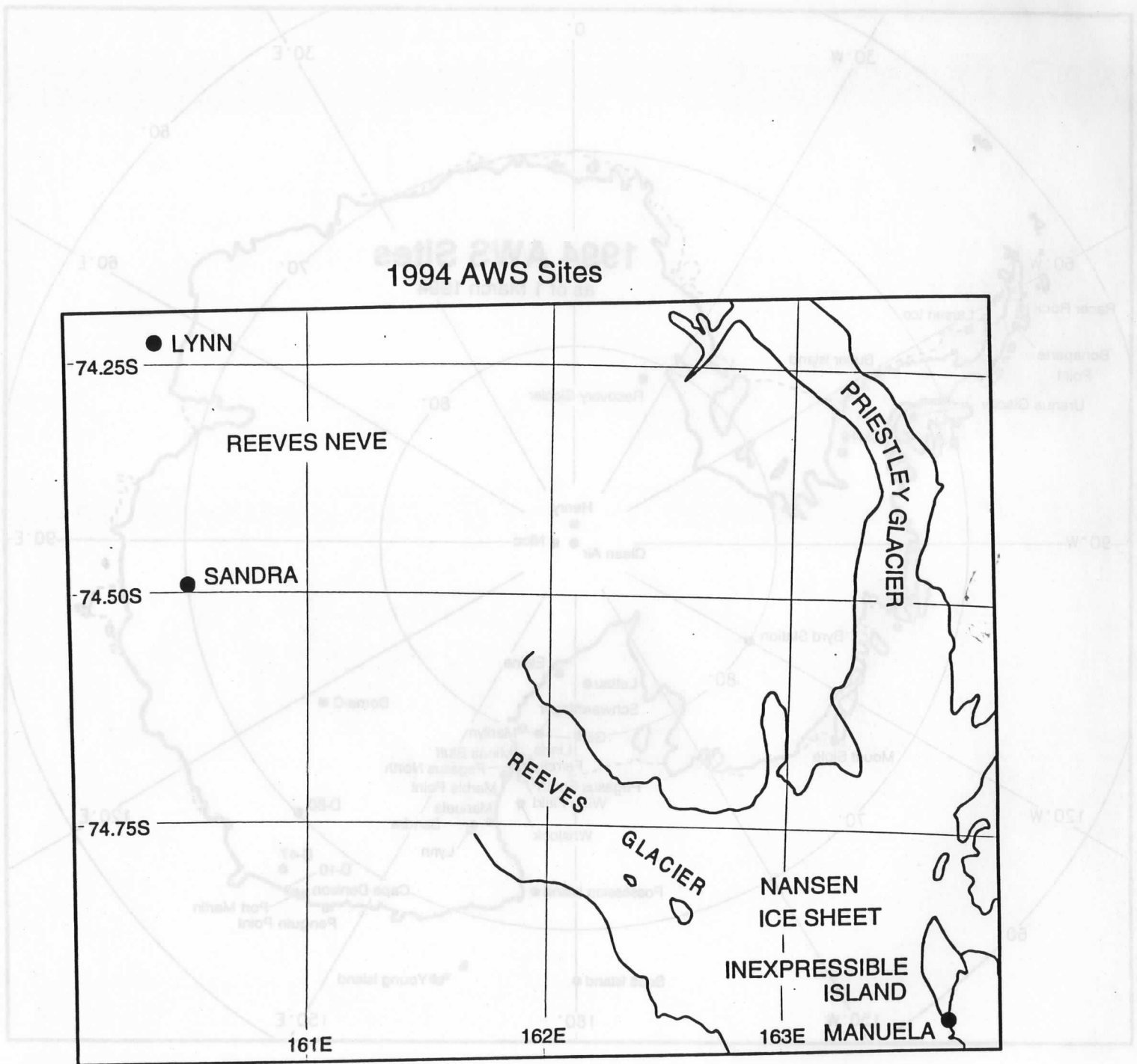


Figure 2. Map of the Reeves Glacier west of Terra Nova Bay showing the 1994 locations for Manuela, Sandra, and Lynn AWS units.

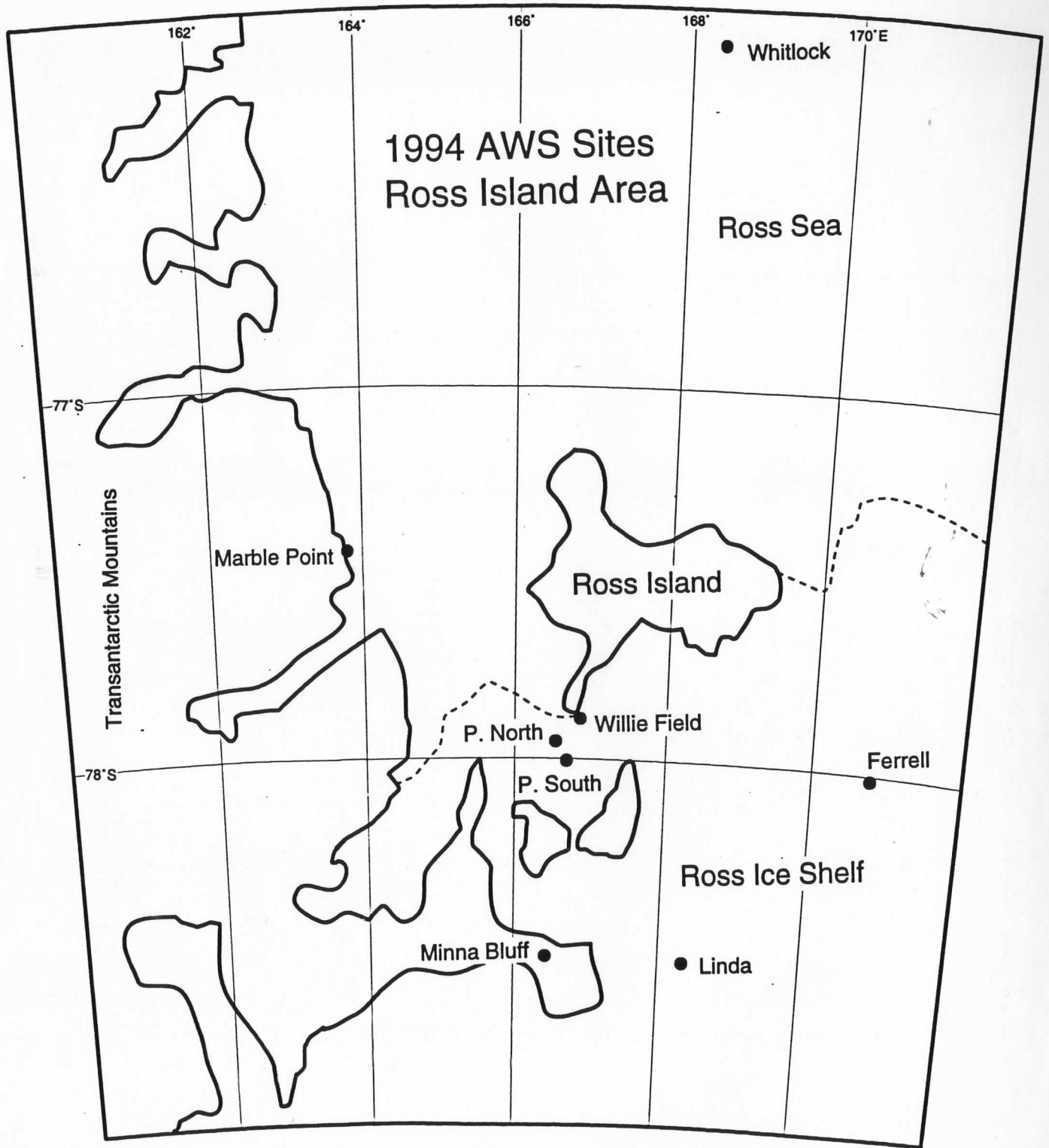


Figure 3. Map of the 1994 locations of the automatic weather stations in the vicinity of Ross Island, Antarctica.

