

Antarctic Automatic Weather Station Field Report:
1996-1997 Season

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The National Science Foundation's Office of Polar Programs places automatic weather station (AWS) units in remote areas in Antarctica in support of meteorological research, applications, and operations. (See Figures 1-7). The basic AWS units measure air temperature, wind speed, and wind direction at a nominal height of 3 meters above the surface. Air pressure is measured at the height of the electronics enclosure. Some units measure relative humidity at 3 meters above the surface and the air temperature difference between 3 meters and 0.5 meters above the surface at the time of installation. The data are collected by the ARGOS Data Collection System on board the National Oceanic and Atmospheric Administration series of polar-orbiting satellites.

Tables 1 and 2 give 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 in 1997. In Table 1 the AWS units are grouped together based on the area and are usually related to a single meteorological experiment, and in Table 2 the AWS units are listed in the order of the ARGOS identification number.

The AWS units are located in arrays for meteorological experiments and at other sites for operational purposes. Any one AWS may contribute to several experiments and all contribute to operational purposes, especially for preparing weather forecasts for aircraft flights to and from New Zealand and within Antarctica.

Some of the areas supported are:

- a. Barrier wind flow along the Antarctic Peninsula and the Transantarctic Mountains;
- b. Katabatic wind flow down Reeves Glacier, Byrd Glacier, Beardmore Glacier, Siple Coast, and the slope to the Adelie Coast;
- c. Mesoscale circulation and the sensible and latent heat fluxes on the Ross Ice Shelf;
- d. Climatology of Byrd and Dome C stations;
- e. Meteorological support around the South Pole;
- f. Meteorological support for West Antarctic Ice Sheet Initiative and The International Trans-Antarctic Scientific Expedition;
- g. Long Term Ecological Research (LTER) along the Antarctic Peninsula;
- h. Meteorological support for flight operations at McMurdo, Antarctica;

The automatic weather station data are available at 3-hour intervals on floppy disks starting

in 1980. The yearly data books prior to 1994 contain 3-hourly data and monthly summaries. The AWS data are also available via anonymous ftp on the Internet by contacting “ftp uwaaws.ssec.wisc.edu”. At “user” type “anonymous”, at “password” type “your email address”. Then “cd pub”. This puts you in the public directory where there are several readme files that will guide you to what you want. The first file to read is “readme.faq”. If you have problems then email chucks@ssec.wisc.edu or front242@uwamrc.ssec.wisc.edu requesting help. Additional meteorological data are on “uwamrc.ssec.wisc.edu” and <http://uwamrc.ssec.wisc.edu/amrhome.html> and <http://www.ssec.wisc.edu/~rbrbrn/awsproj.html>.

Antarctic Peninsula

The 1996-1997 Antarctic field season began with Tony Amos taking the place of C.R. Stearns on the Polar Duke to repair the AWS units on Bonaparte Point and Santa Claus Island. At Bonaparte Island Tony Amos replaced the AWS electronics, batteries, and boom. The electronic box connectors to the boom and junction box were replaced with connectors that are supposed to be capable of withstanding corrosion by salt water. The connections between the junction box and the batteries and solar panel were wired directly and the openings were plugged up with modeling clay. The water temperature sensor was installed in the sea water at Bonaparte Point. The water temperature probe that was removed was severely damaged by the salt water and the action of the sea ice. At Santa Claus Island the pipes protecting the water temperature probe were destroyed. In addition the AWS tower was bent at the base but left in place. The replacements were similar to those at Bonaparte Point. There was an initial problem with the wind system but the non-problem was corrected at another visit to the island. The water temperature probe was left on the surface and not put into the water. A stop was made at Racer Rock. The AWS unit is operating intermittently but the equipment was not available to make the necessary repairs.

The parts removed from the two sites were returned to the University of Wisconsin in March 1997. The condition of the boom and other parts such as the antenna indicates that several changes need to be made to make sure the AWS units withstand the corrosion of sea water.

The field season activities based out of McMurdo Station, Antarctica began 21 December, 1996 when R. E. Holmes left Madison, Wisconsin for McMurdo Station, arriving on 26 December, 1997.

On 2 January, 1997, a Twin Otter flight was made to Elaine AWS site. The site was raised by one 0.9 m tower section and the lower delta-T sensor was raised to a height of 1.0 m. AWS 8900 was replaced with AWS 8915.

For the next twelve days, efforts to fly via Twin Otter to Lettau AWS site were hampered by fog at Lettau. On 13 January, a Twin Otter flight was made to Lettau AWS site but the aircraft was unable to land due to fog.

On 17 January, R. E. Holmes left McMurdo Station for Siple Dome field camp via LC-130. On 18 January, Byrd AWS site was visited by Twin Otter. The unit began operating after disconnecting and reconnecting power. The unit was raised by one 1.5 m tower section. The solar panels and power junction box were also replaced. Also on 18 January, a new AWS unit was installed in West Antarctica via Twin Otter at a site named “Swithinbank” after Charles

Swithinbank of the British Antarctic Survey because he was very helpful to me at the beginning of the weather station program. AWS 21356 was installed.

On 20 January, a Twin Otter flight was made to JC AWS site. The aircraft was unable to land due to fog at JC site and continued on to Doug AWS site. AWS 21359 was removed and replaced with AWS 8922.

On 21 January, a new AWS site near the Siple Dome field camp was installed. AWS 8900 was installed approximately 3 km to the true east of the field camp. Also on this day, the crew of the Twin Otter visited JC AWS site on their way to South Pole and replaced the R. M. Young wind sensor and installed two boxes of three gel-cell batteries.

On 25 January, a USCG helicopter flight was made to Cape Bird to search for a suitable location to install an AWS unit. On 29 January, a USCG helicopter flight to install a new AWS unit at a location east of Cape Crozier was cancelled due to weather.

On 30 January, a USCG helicopter flight was made to a location east of Cape Crozier, but the aircraft was unable to land due to fog. AWS 8983 was installed in the doghouse on the USCG icebreaker Polar Sea for deployment on Scott Island.

On 31 January, the USCG helicopter flight to install the new AWS unit east of Cape Crozier was again cancelled due to weather. On 2 February, 1997, an aerovane was brought aboard the USCG Polar Sea to be installed at Manuela AWS site.

The Coast Guard icebreaker crew under the direction of Lt. John Talbert replaced the wind system at Manuela site despite the -60°F wind chill. The crews installed a dog house AWS unit, ID 8983, on Scott Island and were able to remove the electronics, thermometer, and antenna from the old unit. This is the first time we have recovered components from a dog house AWS unit that has stopped operating. We now have the triangle of Young Island, Possession Island, and Scott Island operational again.

The French removed the AWS units at D-10, D-47, D-57, and D-80 for repair and have been returned to Madison, WI. The units are expected to be installed in December 1997 on a traverse to Dome C. AWS 8914 was shipped to Dumont D'Urville for installation at D-10. AWS 8914 will be installed when the sea ice between Dumont D'Urville and the Adelie Coast is strong enough to permit travel between the two points. New batteries were installed at Port Martin.

The British Antarctic Survey (BAS) visited the Larsen Ice Shelf site. The tower was raised 3 feet, two deadman and guys were installed, the wind vane and prop were replaced. The site is 18 miles from the ice edge. Next season the battery cables will need to be extended and the tower will need to be raised again. At Butler Island site the tower was raised 3 feet and the wind vane was replaced. Next season the tower will need raising again, another deadman and rope will be needed along with battery extension cables for two battery boxes. At Uranus Glacier one 3 foot tower section was added and new deadman and guys.

World Meteorological Organization (WMO) numbers have been assigned to Siple Dome AWS and Limbert AWS sites and the data are entering the Global Telecommunications System (GTS).

Table 1. The 1997 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. Sites with three digits after the decimal point in the latitude and longitude were located using the ARGOS positions for a three day period, aircraft GPS, or hand held GPS.

Site	ARGOS ID	Lat. (deg)	Long. (deg)	Alt. (m)	Date Start	WMO#
Adelie Coast						
D-10	8919	66.71°S	139.83°E	243	Jan 80	89832
D-47	8986	67.397°S	138.726°E	1560	Nov 82	89834
D-57	21360	68.199°S	137.538°E	2105	Jan 96	
D-80	8916	70.040°S	134.878°E	2500	Jan 83	89836
Dome C II	8989	75.121°S	123.374°E	3250	Dec 95	89828
Port Martin	8930	66.82°S	141.40°E	39	Jan 90	
Cape Denison	8907	67.009°S	142.664°E	31	Jan 90	
Penguin Point	8929	67.617°S	146.180°E	30	Dec 93	89847
Sutton	8939	67.08°S	141.37°E	871	Dec 94	
Cape Webb	8933	67.934°S	146.824°E	37	Dec 94	
West Antarctica						
Byrd Station	8903	80.007°S	119.404°W	1530	Feb 80	89324
Brianna	21362	83.887°S	134.145°W	549	Nov 94	
Elizabeth	21361	82.606°S	137.082°W	549	Nov 94	89332
J.C.	21357	85.070°S	135.516°W	549	Nov 94	
Erin	21363	84.901°S	128.810°W	1006	Nov 94	
Harry	21355	83.003°S	121.393°W	945	Nov 94	
Theresa	21358	84.599°S	115.811°W	1463	Nov 94	89314
Doug	8922	82.315°S	113.240°W	1433	Nov 94	
Mount Siple	8981	73.198°S	127.052°W	230	Feb 92	89327
Siple Dome*	8900	81.656°S	148.773°W	620	Jan 97	89345
Switbank*	21356	81.200°S	126.174°W	945	Jan 97	
Ross Island Region						
Marble Point	8906	77.439°S	163.759°E	120	Feb 80	89866
Ferrell	8934	77.928°S	170.820°E	45	Dec 80	89872
Pegasus North	8927	77.952°S	166.505°E	10	Jan 90	89667
Pegasus South	8937	77.990°S	166.576°E	10	Jan 91	
Minna Bluff	8988	78.554°S	166.656°E	920	Jan 91	89768
Linda	8909	78.480°S	168.375°E	50	Jan 91	89769
Willie Field	8901	77.865°S	167.017°E	40	Jan 92	
Ocean Islands						
Whitlock	8921	76.144°S	168.392°E	274	Jan 82	89865
Scott Island	8983	67.37°S	179.97°W	30	Dec 87	89371
Young Island	8980	66.229°S	162.275°E	30	Jan 91	89660
Possession Is.	8984	71.891°S	171.210°E	30	Dec 92	89879
Ross Ice Shelf						
Marilyn	8931	79.954°S	165.130°E	75	Jan 84	89869

Schwerdtfeger	8913	79.904°S	169.973°E	60	Jan 85	89868
Gill	8911	79.985°S	178.611°W	55	Jan 85	89376
Elaine	#8915	83.134°S	174.169°E	60	Jan 86	89873
Lettau	8908	82.518°S	174.452°W	55	Jan 86	89377
Reeves Glacier						
Manuela	8905	74.946°S	163.687°E	80	Feb 84	89864
Lynn	8935	74.207°S	160.409°E	1772	Jan 88	89860
Antarctic Peninsula						
Larsen Ice	8926	66.949°S	60.914°W	17	Oct 85	89262
Butler Island	8902	72.207°S	60.171°W	91	Mar 86	89266
Uranus	8920	71.43°S	68.93°W	780	Mar 86	89264
Limbert	8925	75.422°S	59.948°W	40	Dec 95	
Racer Rock	8947	64.067°S	61.613°W	17	Nov 89	89261
Bonaparte Point	#8923	64.778°S	64.067°W	8	Jan 92	89269
AGO-A84	8932	84.36°S	23.86°W	2103	Jan 96	
Ski-Hi	8917	74.975°S	70.766°W	1395	Feb 94	89272
Santa Claus I	#21364	64.964°S	65.670°W	25	Dec 94	
High Polar Plateau						
Clean Air	8987	90.00°S		2835	Jan 86	89208
Henry	8985	89.011°S	1.025°W	2755	Jan 93	89108
Nico	8924	89.000°S	89.669°E	2935	Jan 93	89799
Relay Station	8918	74.017°S	43.062°E	3353	Feb 95	89744
Dome Fuji	8904-#8982	77.31°S	39.70°E	3810	Feb 95	89734

* New locations for 1997

CRS, 25 March 1997

New ARGOS ID for 1997 at the site

Table 2. The 1997 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. Sites with three digits after the decimal point in the latitude and longitude were located using the ARGOS positions for a three day period, aircraft GPS, or hand held GPS.

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Siple Dome*	8900	81.656°S	148.773°W	620	Jan 97	89345
Willie Field	8901	77.865°S	167.017°E	40	Jan 92	
Butler Island	8902	72.207°S	60.171°W	91	Mar 86	89266
Byrd Station	8903	80.007°S	119.404°W	1530	Feb 80	89324
Dome Fuji	8904	77.31°S	39.70°E	3810	Feb 95	89734
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* New site for 1997

CRS, 25 March 1997

New ARGOS ID for 1997 at the site

Table 3. AWS units planned for installation during the 1997-1998 field season.

Site	Lat.	Lon.
Cape Crozier	77.55°S	170.82°E
Ross Ice Shelf	77.80°S	180.00°E
Cape Bird	77.20°S	166.70°E
Byrd Névé	80.50°S	152.00°E
Roosevelt Island	?	?
West Antarctic Dome	77.33°S	116.33°W

Table 4. The 1997 AGO sites; ARGOS identification number, latitude, longitude and altitude above sea level.

Site	ARGOS ID	Lat.	Lon.	Alt.
AGO-1	20655	83.86°S	129.61°E	2865 m
AGO-2	08073	85.67°S	313.62°E	1860 m
AGO-3	20654	82.76°S	28.58°E	2912 m
AGO-4	08864	82.01°S	96.76°E	3565 m
AGO-5	26620	77.23°S	123.50°E	3084 m
AGO-6	26621	69.51°S	130.01°E	2560 m

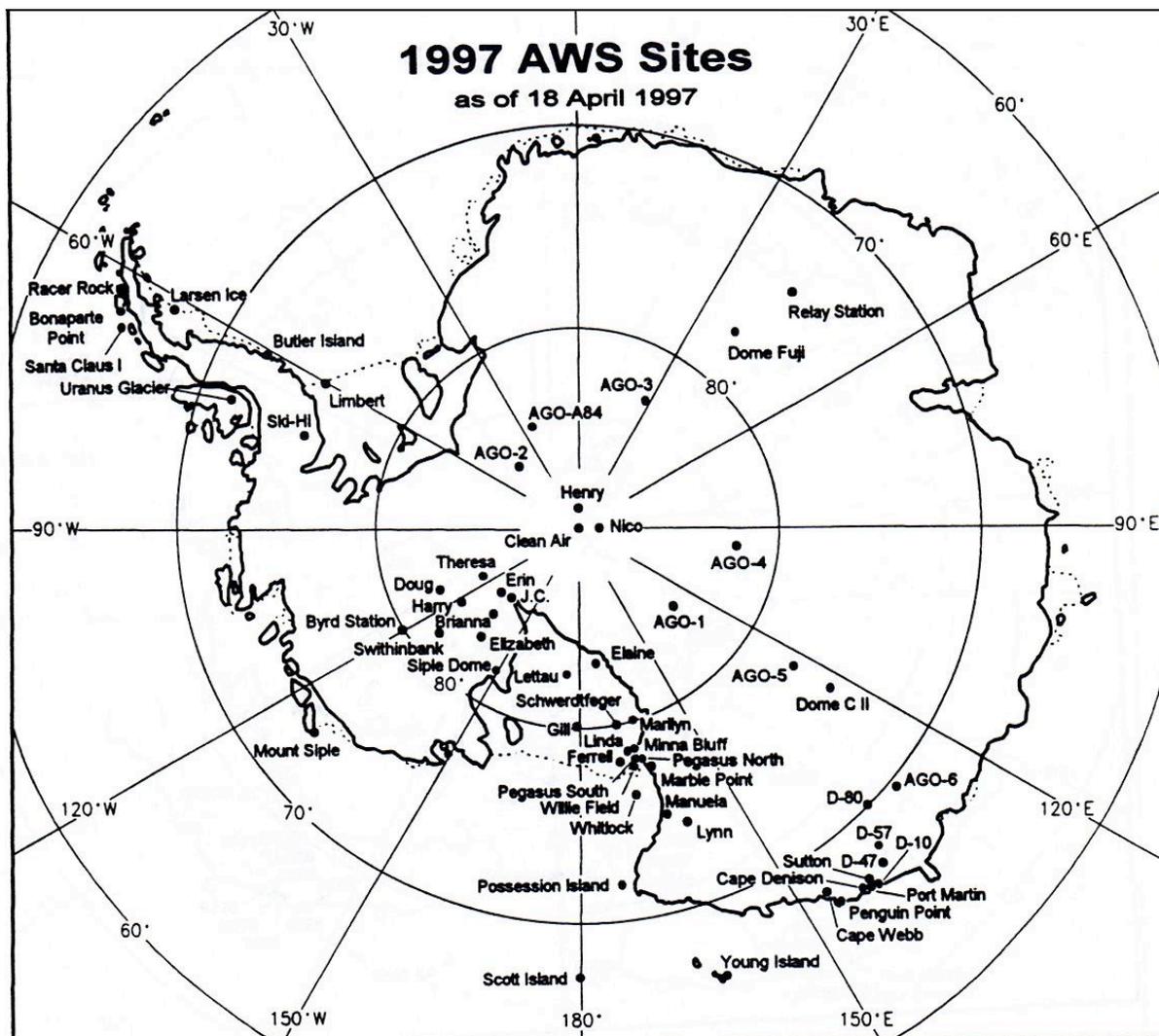


Figure 1. Map of Antarctica showing the locations of widely spaced automatic weather stations for 1997. Identification of the sites is by the site name. The locations of the AGO sites are included but are not a part of the AAWS program.

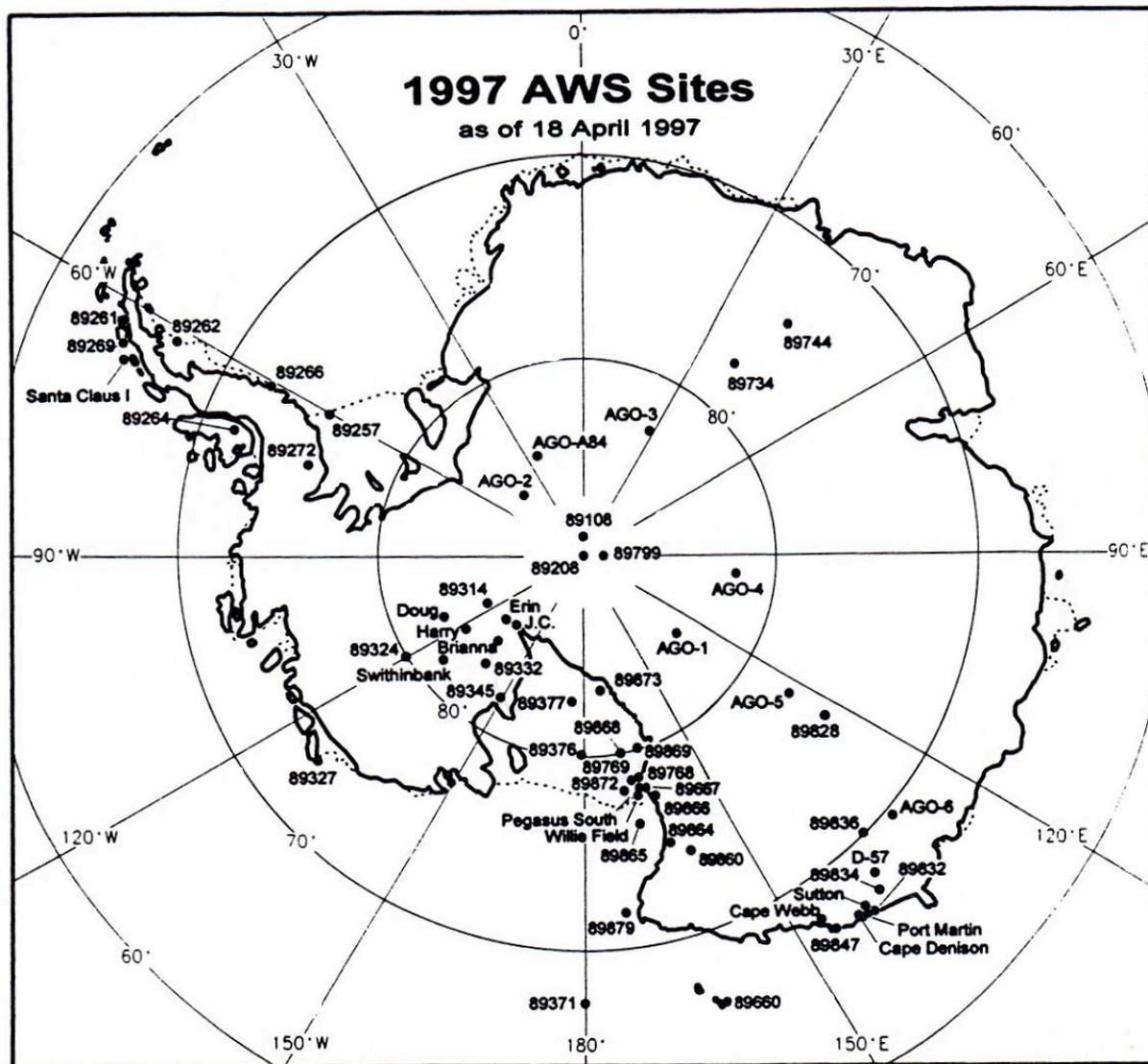


Figure 3. Map of Antarctica showing the locations of widely spaced automatic weather stations for 1997. Identification of the sites is by the automatic weather stations for 1997 identified by the WMO number if the site has a WMO number assigned to it.

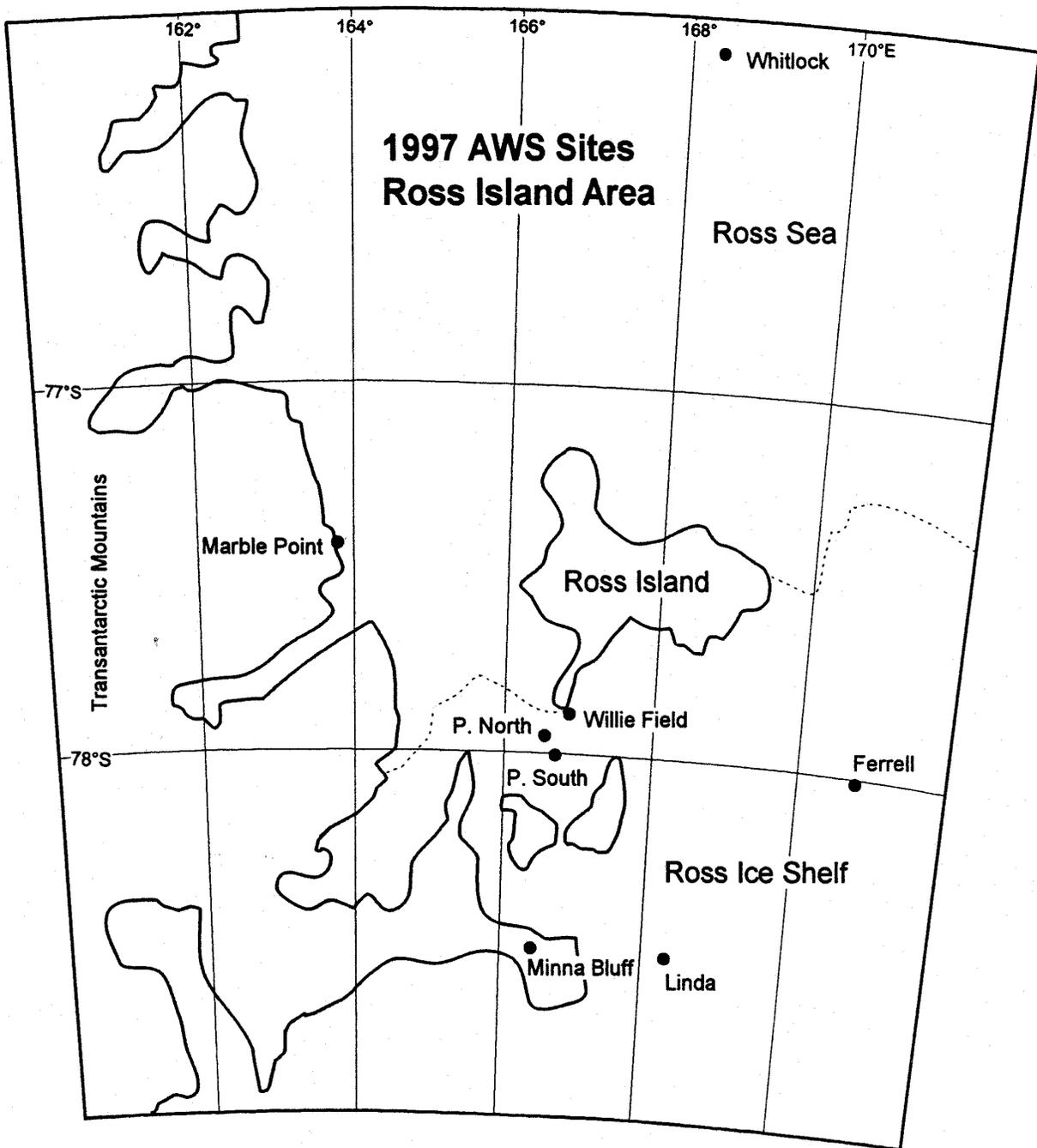


Figure 4. Location map of the automatic weather stations in the Ross Island vicinity for 1997.

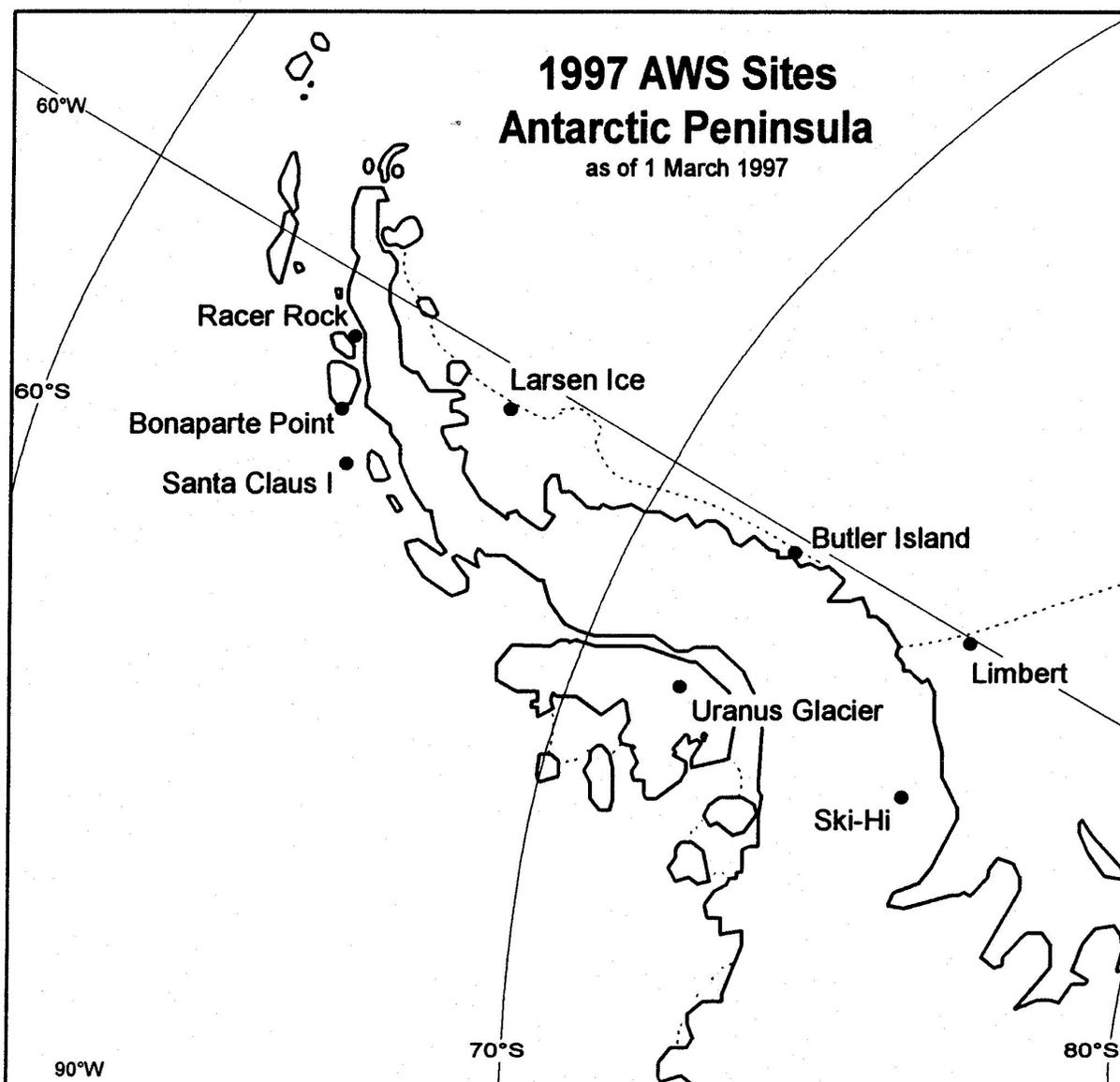


Figure 5. Location map of the automatic weather stations in the Antarctic Peninsula region for 1997.

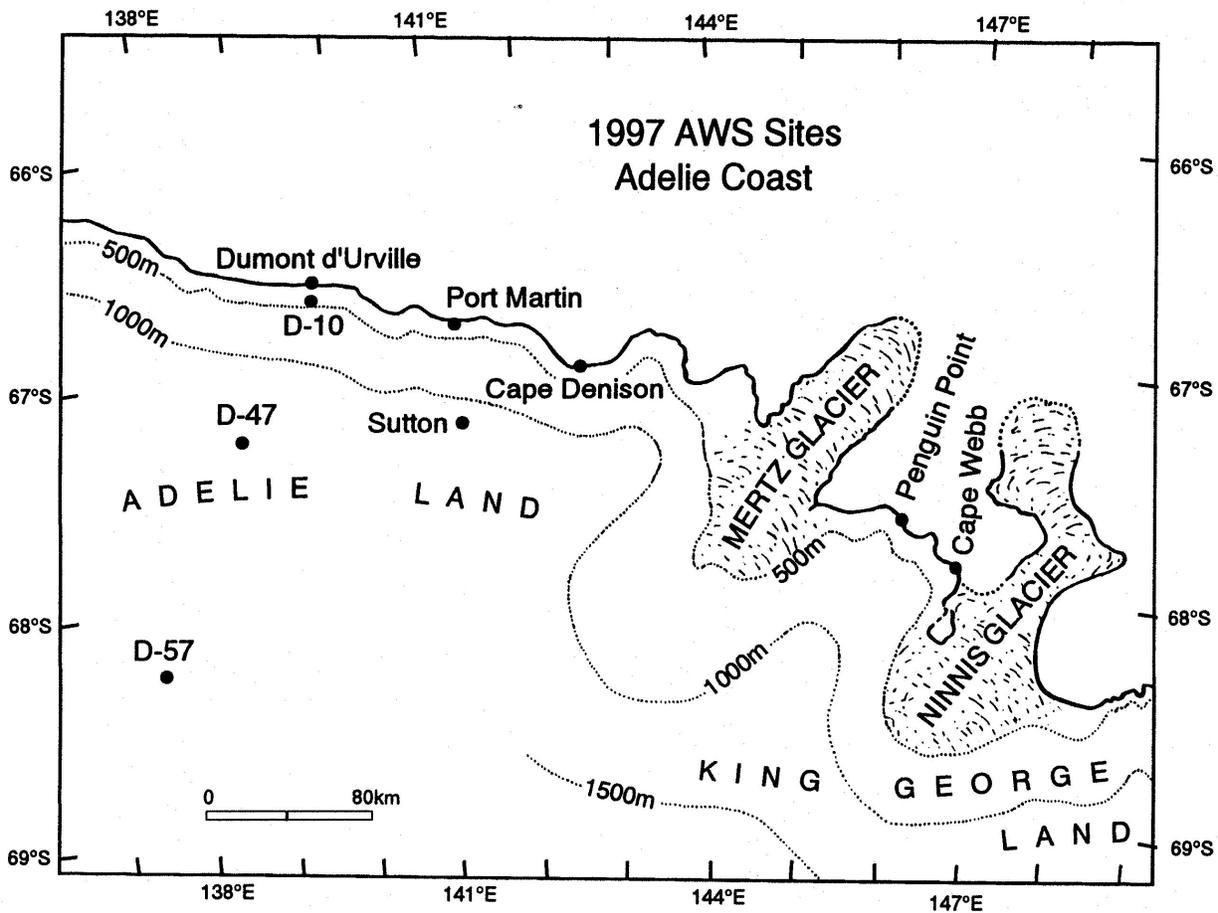


Figure 6. Location map of the automatic weather stations along the Adelie Coast for 1997.

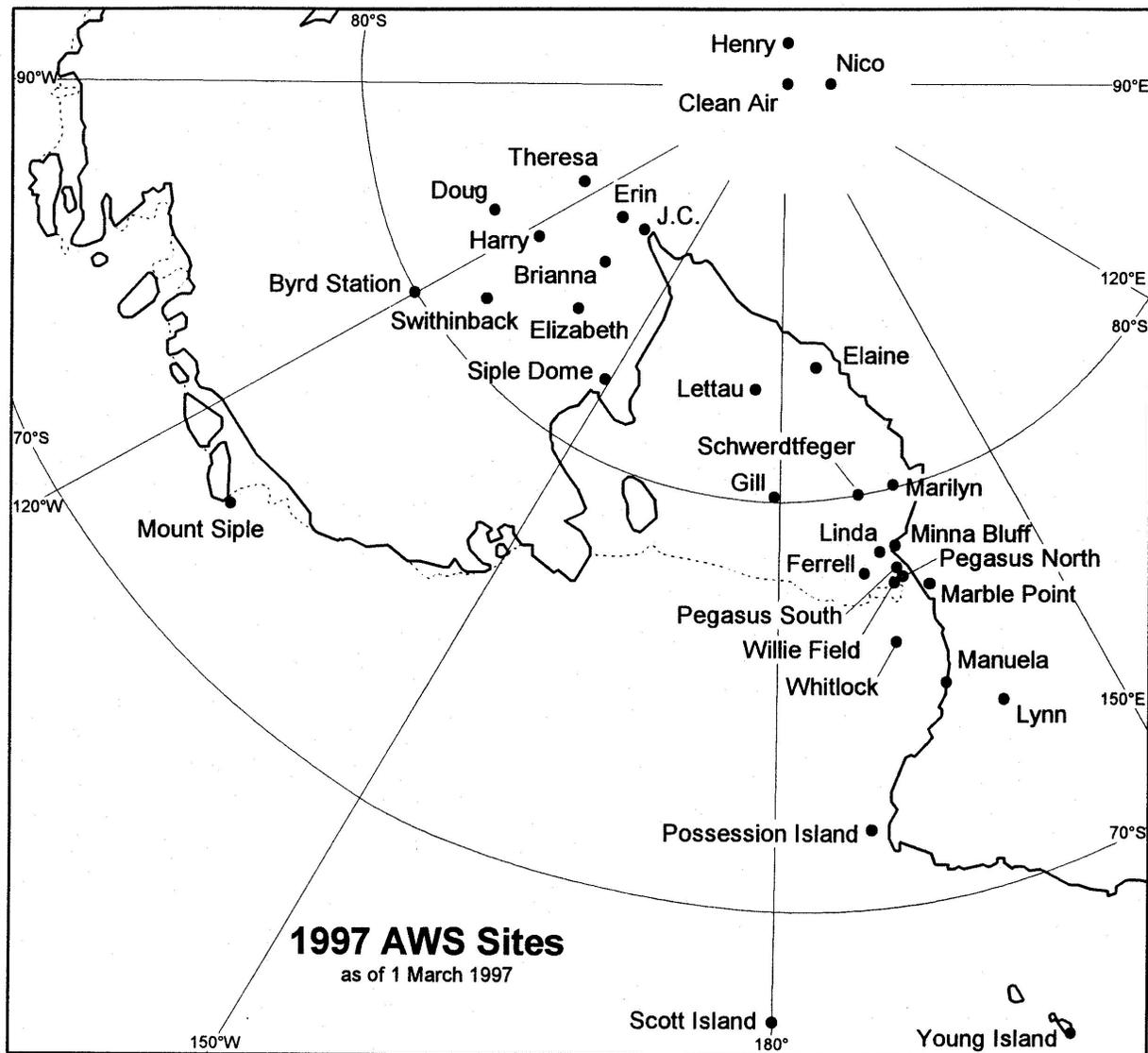


Figure 7. Location map of the automatic weather stations in West Antarctica on the Ross Ice Shelf, near Ross Island, and on the ocean islands for 1997.