

**Antarctic Automatic Weather Stations**  
**Abbreviated Field Report for 2009-2010**

**Matthew A. Lazzara**  
**George A. Weidner**  
**Jonathan E. Thom**  
**Lee J. Welhouse**  
**Nicole M. Schroeder**

**Space Science and Engineering Center**  
**University of Wisconsin - Madison**  
**Madison, Wisconsin 53706**

The National Science Foundation's Office of Polar Programs funds the placement of automatic weather station (AWS) units in remote areas in Antarctica in support of meteorological research, applications and operations. The basic AWS units measure air temperature, wind speed and direction at a nominal height of 3 meters above the surface. Air pressure is measured at the height of the AWS electronic enclosure. Some units measure relative humidity at 3 meters above the surface and the air temperature difference between .5 and 3 meters above the surface at the time of installation. A small, but increasing number of AWS sites measure snow accumulation. The data are collected by the ARGOS Data Collection System (DCS) on board the National Oceanic and Atmospheric Administration (NOAA) and MetOp (EUMETSAT) series of polar-orbiting satellites. The AWS units are located in arrays for specific research activities and also used for operational purposes. Any one AWS may support several experiments and all support operational meteorological services - especially support for weather forecasts for aircraft flights.

**Research areas supported in the past include:**

- Barrier wind flow along the Antarctic Peninsula and the Transantarctic Mountains
- Katabatic wind flow down the Byrd and Beardmore Glaciers, the Siple and Adelie Coast
- Mesoscale circulation and sensible and latent heat fluxes on the Ross Ice Shelf
- The Ross Ice Shelf Air Stream.
- Climatology of long operating AWS sites in particular, Byrd and Dome C sites.
- Meteorological support for the West Antarctic Ice Sheet Initiative
- Long Term Ecological Research (LTER) along the Antarctic Peninsula
- Meteorological support for United States Antarctic Program flight operations

**A sampling of historically supported principal investigators funded by NSF-OPP:**

- Dr. Douglas R. MacAyeal: Iceberg Drift in the Near-Shelf Environment, Ross Ice Shelf, Antarctica
- Drs. Tom Parish and John Cassano: The Ross Ice Shelf Air Stream
- Dr. Ray Smith, Long Term Ecological Research: Racer Rock, Bonaparte Point, and Santa Claus Island.
- West Antarctic Ice Sheet Initiative: Siple Dome and West Antarctic Divide drilling sites
- Aircraft Operation: All AWS sites in Antarctic.
- The Antarctic AWS units support many investigators outside of NSF-OPP.

**AMRC collaboration:**

- Climatological analysis from the AWS, and other stations (complimenting the activities in the SCAR READER project).
- Continued data collection, archival and distribution of AWS data.
- Continued educational outreach activities (as outlined in the above section and in the following outreach section).
- Utilities developed to generate climatological analyses from AWS observations.

**Current research efforts include:**

- Composite analysis of the surface effects of El Nino/Southern Oscillation and La Nina teleconnections on Antarctica
- Ross Ice Shelf wind flow studies (with collaborator, Dr. John Cassano)
- Snow accumulation studies
- State of the Antarctic climate

**Fieldwork completed for 2009-2010**

The 2009-2010 field team included Matthew Lazzara (O-283), Lee Welhouse (O-283), and Nicole Schroeder (O-283). Ms. Nicole Schroeder arrived in McMurdo 31 December 2009 and redeployed on 26 January 2010. Mr. Lee Welhouse and Dr. Matthew Lazzara deployed to McMurdo Station on 9 January 2010, and redeployed on 8 February 2010. Fieldwork was also done through cooperative programs with personnel from the Japanese Antarctic program (JARE), the French Antarctic program Institut Polaire Français - Paul Emile Victor (IPEV), the Mawson's Hut Foundation, and the British Antarctic Survey (BAS). A total of 15 AWS were visited this field season.

Several AWS sites were not able to be serviced due to the reduced field deployment and the weather. Sites that had been expected to visit included Siple Dome and Minna Bluff AWS. New sites that did not get installed included the Tall Tower AWS site and three new AWS in the Pine Island Glacier area of West Antarctica: Thurston Island, Bear Peninsula and Pig Helo Camp Site C/Meyers Nunatak – to be installed by Dr. David Holland. These will be attempted again in the 2010-2011 field season.

**Summary fieldwork follows:**

A. McMurdo based operations (USAP/Wisconsin)

<u>Site</u>	<u>ARGOS ID</u>	<u>Service performed at site</u>
Ferrell	8929	Retrieve ADG data, Replaced memory module, raised lower sensors
Willie Field	21364	Raised lower temperature probe Fixed wind sensor mounting
Windless Bight	8982	AWS raised; replaced ADG arm
Lettau	8928	Replaced Batteries
Pegasus North	8937	Fixed wind sensor mounting
Elaine	21375	Replaced AWS: new ADG and solar radiation sensors
Eric	8697	Raised AWS; recovered/replaced batteries

B. West Antarctic based operation (USAP/Wisconsin)

<u>Site</u>	<u>ARGOS ID</u>	<u>Service performed at site</u>
Kominko-Slade (WAIS)	8936	AWS raised; electronics added to snow temperature string; Added battery
Byrd	8903	AWS raised – new tower and sensor boom -by Dr David Holland, Joe Petit, Susha Dore

C. South Pole (USAP/Wisconsin)

<u>Site</u>	<u>ARGOS ID</u>	<u>Service performed at site</u>
South Pole	n/a	Test radiation shield AWS installed.

D. Palmer Station/Peninsula (USAP/Wisconsin)

No AWS serviced in the Palmer Station/Peninsula region

E. Field work in Adelie Land (France –IPEV)

<u>Site</u>	<u>ARGOS ID</u>	<u>Service performed at site</u>
D-47	8916	Replaced AWS 8947 with AWS 8916
E-66	8947	Removed AWS 8912 with AWS 8947

See appendix for excerpts from report from IPEV

F. Field work in Adelie Land (Mawson’s Hut Foundation)

No AWS servicing due to cargo problems

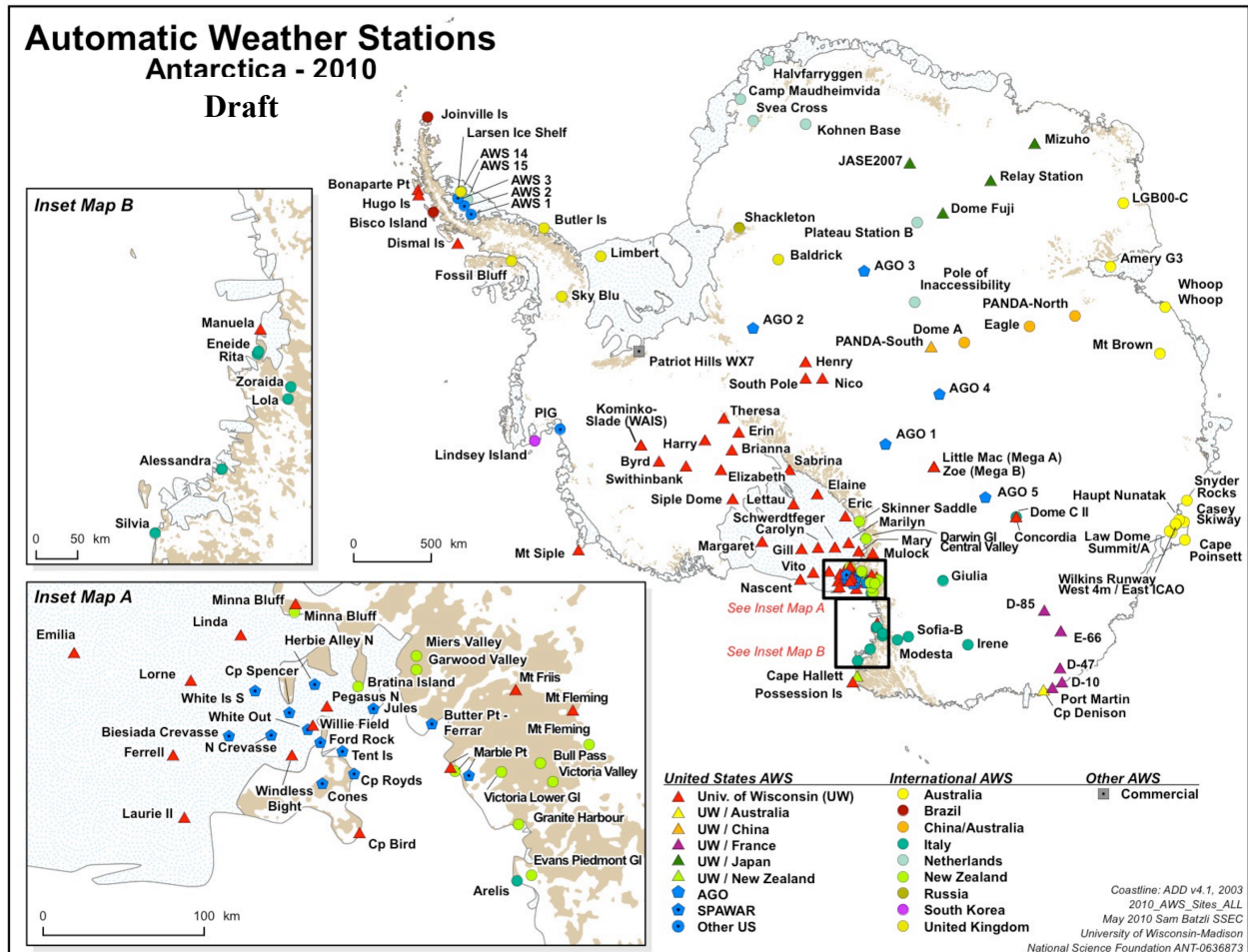
G. Field work in Enderby Land (Japan – JARE)

<u>Site</u>	<u>ARGOS ID</u>	<u>Service performed at site</u>
Dome Fuji	8904	Replaced AWS with a new AWS
Relay Station	8918	Replaced AWS with a new AWS

H. Field work in Peninsula (United Kingdom – BAS) & AWS maintained cooperatively with the British Antarctic Survey

<u>Site</u>	<u>ARGOS ID</u>	<u>Service performed at site</u>
Dismal Island	8932	Replaced AWS with a new AWS

See appendix for photos from BAS



**Figure 1. A draft map of Antarctica showing the locations of the University of Wisconsin's automatic weather stations (and other nations) for 2010. Identification of the sites is by the site name**

**Servicing of Dismal Island AWS by British Antarctic Survey**  
(Photos Courtesy of Tasmin Gray, BAS)



Nov 2009 / Jan 2010

# Adelie Land AWS report



Alain PIERRE

IPEV

Nov 2009 / Jan 2010

## 2) Cape Denison : ID8988

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**Type** : independent anemometer and wind direction sensor (Same as Port Martin)

**Electronic** : AWS2D

**Current Status**: HWS is not working

**Location** : 67°0'S / 142°39'E

This AWS is maintained by Mawson's Hut expeditionners.

**NB** : For Cape Denison AWS, boxes has to be received at Hobart before end of Nov.

## 3) Port Martin : ID8909

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**Type** : High wind system anemometer and wind direction sensor (Taylor Scientific)

**Electronic** : AWS2D with Telonics ST-5

**Current status**: Not working, Has to be replaced as soon as possible. (scheduled for Nov 2010)

**Location** : 66°49'S / 141°23'E

Actually Port Martin AWS can only be repaired during Nov, while Astrolabe vessel with 2 helicopters on board are not very far from Port Martin.

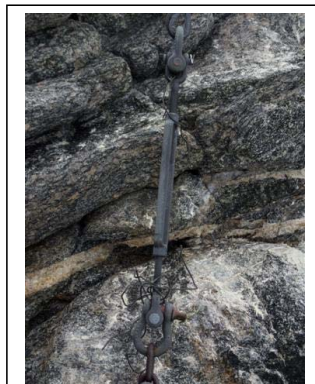
This year (Nov 2009) we went at Port Martin but unfortunately it was too windy to do any maintenance on it (80/km/h and higher wind with gusts).

The only parts which are in good conditions are :

- The mast
- Anchor points with steel chain and steel cable.



**All others parts have to be replaced.**



NB : Last summer season, AWS Port Martin box was not complete. One junction box was missing and terminations wire was not adapted at usual junction box plugs. However, replacement could still be done with some electrical adaptations and also because one spare junction box was available at Cap Prudhomme.

For others scientific reasons we have to go to Port Martin in Nov 2010 and we will try to install a new AWS station if AWS boxes are received at Hobart.

**NB : Port Martin AWS boxes has to be received at Hobart before 10<sup>th</sup> of October.**

#### 4) D10: ID 30374

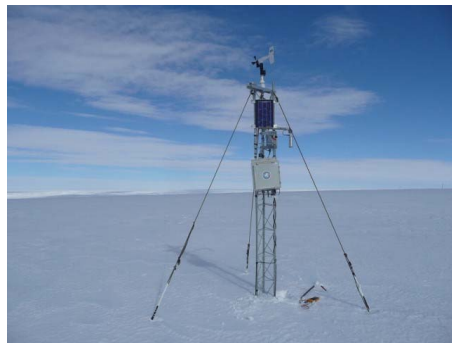
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**Type** : RM Young mounted on Bendix base on sensor boom.

**Electronic** : Campbell CR10X

**Current status**: Working ok

**Location** : 66°42'S / 139°50'E



D10 AWS (Feb 2010)



D10 AWS : Electronic box

Maintenance schedule :

- Due to annual snow, we will probably add a section mast during 2010-2011 summer season.

#### 5) D47 : ID8916

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(installed in Feb 2010)

**Type** : RM Young mounted on Pipe all sensors independent mounts to tower

**Electronic** : AWSCR1000 with Telonics ST-20 PTT ID 8916

**Current Status**: Transmitting need to check data but would assume is OK

**Location** : 67°23'S 138°43,4'E

**NB : Actual section mast used is smaller (IPEV mast) than AMRC section mast size. Keep in mind for next time when maintenance will be done.**



D47. (Janv 2010)

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## 6) E66 : ID8947

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installed in Jan 2005 at D47 and removed in Jan 2010 for E66

**Type** : Bendix on sensor boom

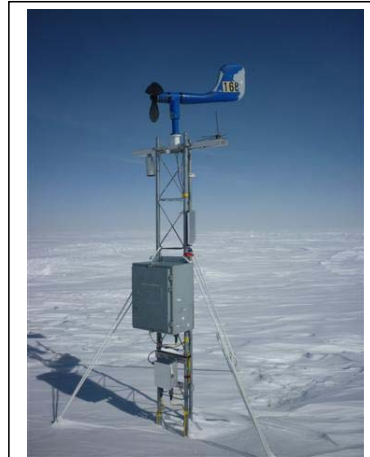
**Electronic** : AWS2B with Telonics ST-5 PTT

**Current status**: Working OK

**Location** :xxxxx / xxxxxx ?

Maintenance schedule :

- Due to annual snow, we will probably add a section mast during 2010-2011 summer season.



E66 AWS (Feb 2010)

## 7) D85 : ID8986

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**Type** : RM Young on Bendix base on sensor boom

**Electronic** : AWS2B Telonics ST-5 PTT

**Current Status**: Working OK

**Location** : 70°25,6'S 134°08,8'E

Photos ?