McIDAS at the AMRC

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In memory of:

Dr. Neil Adams
1961-2012
Regional Manager Antarctic Meteorological Section
Tasmania/Antarctica Region
Bureau of Meteorology
Australia
Outline

- About the AMRC
  - Who we are, what we do, the US Antarctic Program

- AMRC and McIDAS
  - How we observe Antarctic Weather:
    - Automatic Weather Stations...Records, applications...
    - Satellite Composite Imagery...History, examples...

- Samples of McIDAS Use...

- Servers and Services...

- The other tools we use: McIDAS-V, RAMADDA, etc...

(Sprinkle of photos from the “ice”)

Antarctic Meteorological Research Center
Grantee of the Office of Polar Programs
National Science Foundation
United States Antarctic Program
Weather Stations

Satellites

Outreach

Teaching

Research

Service

What we do....
Antarctic Meteorology
How do we observe the weather?

- Staffed Surface Observations
- Radiosonde/Weather Balloons
- Ships & Buoys
- Aircraft
- **Automatic Weather Stations**
- Weather Satellite Studies
  - Polar Orbiting
  - Via Satellite Composites
Wisconsin Automatic Weather Station (AWS)

- Able to send data via satellite
- Small memory storage needs: Original AWS uses 256 bytes (Today ~16 kilobytes)
- Built for extreme cold
- 1300 Watt-Hours power used all year long (power used to run a 60 watt light bulb for ~22 days!)

Port Martin AWS 1994
Windiest Place in Antarctica: Cape Denison

- 40 to 60 miles per hour average monthly winds
- Greater than 122 miles per hour actual wind speeds
Wisconsin AWS Record Antarctic Maximum Wind Speed:
137 miles per hour (61.3 meters per second) at Minna Bluff on July 10, 2001
Wisconsin AWS
Antarctic Record
Low Temperature:
-120.3 °F (-84.6 °C)
Dome C
August 26, 1982
Wisconsin AWS Record High Temperature

Bonaparte Point AWS
51 F (10.6 C)
Dec 6, 1992  18:50 UTC

*1991-2001 quality control years

otherwise
Marble Point AWS
44.8 F (7.1 C)
Dec 29, 2001  21:10 UTC
Past:
- Barrier and Katabatic wind studies
- Mesoscale circulations
- Sensible and latent heat flux studies
- Southern Ocean GLOBEC
- Long Term Ecological Research
- Weather forecasting
- Research on Ocean-Atmosphere Variability and Ecosystem Response in the Ross Sea
- West Antarctic Ice Sheet Initiative and International Trans-Antarctic Scientific Expedition
- Iceberg studies
- And more....

Current:
- Long term climatology
- Antarctic ENSO studies
- Precipitation/snow accumulation studies
- Ross Ice Shelf Air Stream (RAS) near surface wind field
- Boundary Layer Studies
- Weather forecasting
- And more....
• Dr. Charles R. Stearns visits Colorado in 1987/88 sees this Composite!
• Inspiration for real-time a composite for:
  – Forecasting
  – Research
  – Education
• Larger context of USAP meteorology program

Produced from USAF DMSP film transparencies archived for NOAA/NESDIS at the University of Colorado, CIRES/National Snow and Ice Data Center

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Visible Composites...
...thanks to Rick Kohrs!
Atmospheric Motion Vectors
With LEO/GEOAMV - Global Coverage!

IMGPARAM contributed to this effort!!!
AWS Meteorogram....
...Thanks to Russ Dengel

AWSMG Command...
...with DELTA= “filtering”
Tracking Icebergs...via LEO command:
Additional Examples of AMRC Special McIDAS-X usage....

- AWSLOC AWS text listings from AWS decode calibration file (works with *new* AWSMG)

- MAKE_AWIP (with server) to generate Arctic Composite for AWIPS I

- TXT2MDA - SDI decoded AWS observations into McIDAS MD file format

- ...and others for support in composite work...
ADDE Servers:
DATALOC ADD AWS AWS.SSEC.WISC.EDU (Primary - realtime)
DATALOC ADD AMRC AMRC.SSEC.WISC.EDU (Backup - realtime)
DATALOC ADD ARCHIVE AWS.SSEC.WISC.EDU

Web: http://amrc.ssec.wisc.edu
RSYNC Service: amrc.ssec.wisc.edu, aws.ssec.wisc.edu
LDM: Antarctic-IDD: aws.ssec.wisc.edu, amrc.ssec.wisc.edu, & fog.ssec.wisc.edu
RAMADDA: https://amrc.ssec.wisc.edu/repository
Time-ordering Reanalysis with Antarctic Composites: McIDAS-V ... thanks to Jay Heinzelman + others
AMRC’s RAMADDA (Thank you Unidata)
South Pole Climatology Project: MatLab

Average Temperatures Jan - Dec

"Coreless" Winter!

Temperatures: 1956-2010

No significant change...

Lazzara et al. 2012

NSF

Wind Speed: 1956-2010

Significant decrease!
AWS Quality Control: IDL

Seefeldt and Keller, 2006
Thank you! Questions?

Marble Point AWS Ozone Site - photo courtesy of Lars Kalnajs, CU
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