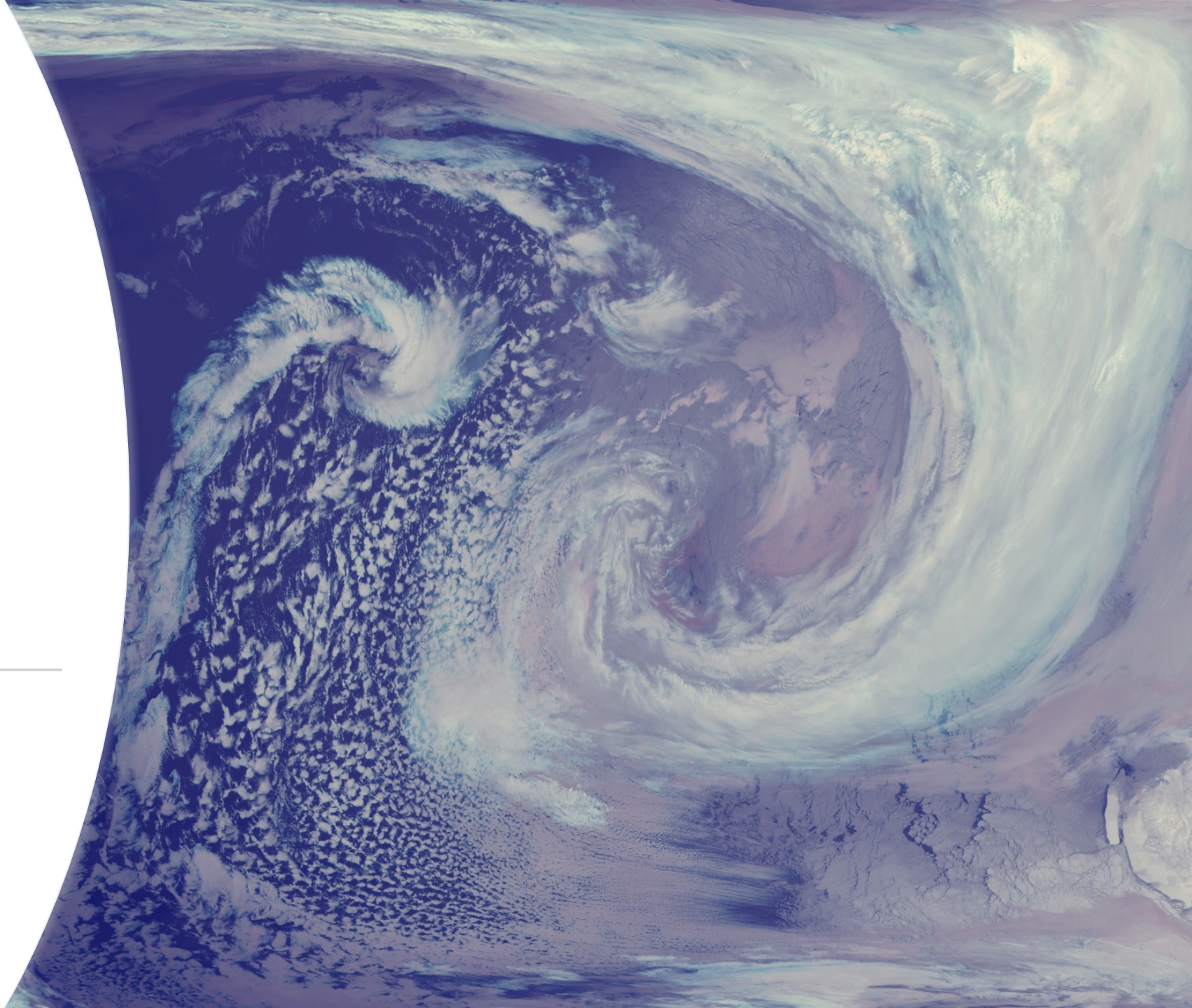
Two Cases of McIDAS: The AMRDC & MATC!

Matthew Lazzara, PhD

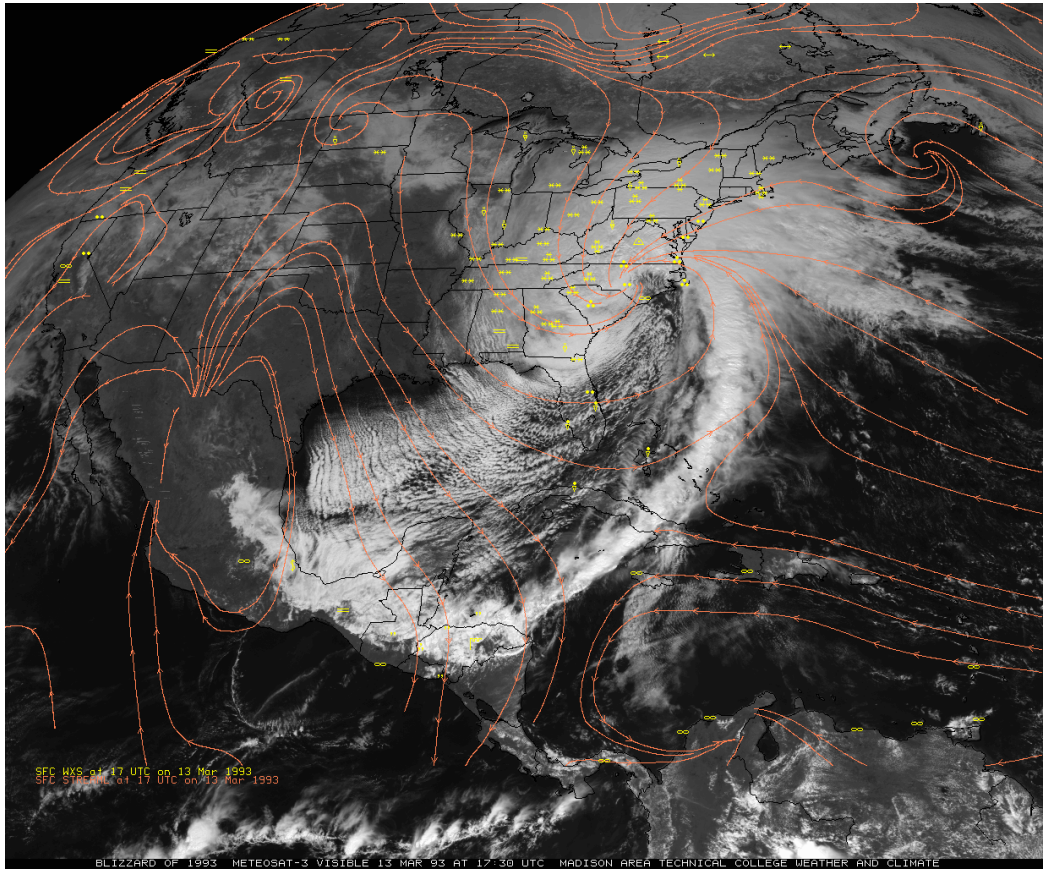
AMRDC, UW-Madison

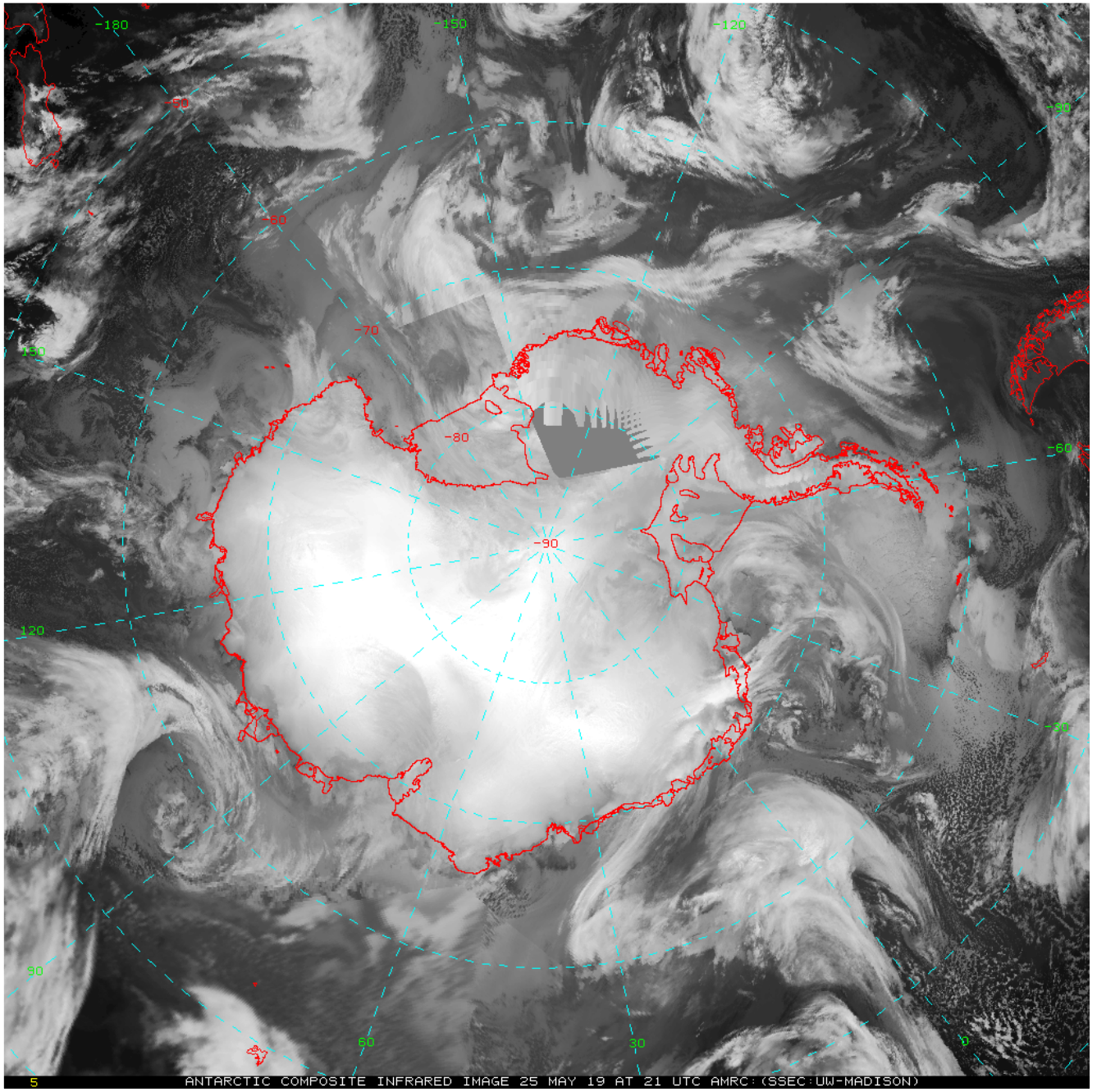
Physical Sciences, MATC



Outline

- The AMRC…
- Madison College





The Team!!

The Man computer Interactive Data Access System: 25 Years of Interactive Processing

Matthew A. Lazzara, John M. Benson, Robert J. Fox, Denise J. Laitsch, Joseph P. Rueden, David A. Santek, Delores M. Wade, Thomas M. Whittaker, and J. T. Young
Space Science and Engineering Center, University of Wisconsin–Madison, Madison, Wisconsin

ABSTRACT

On 12 October 1998, it was the 25th anniversary of the Man computer Interactive Data Access System (McIDAS). On that date in 1973, McIDAS was first used operationally by scientists as a tool for data analysis. Over the last 25 years, McIDAS has undergone numerous architectural changes in an effort to keep pace with changing technology. In its early years, significant technological breakthroughs were required to achieve the functionality needed by atmospheric scientists. Today McIDAS is challenged by new Internet-based approaches to data access and data display. The history and impact of McIDAS, along with some of the lessons learned, are presented here.

1. Introduction

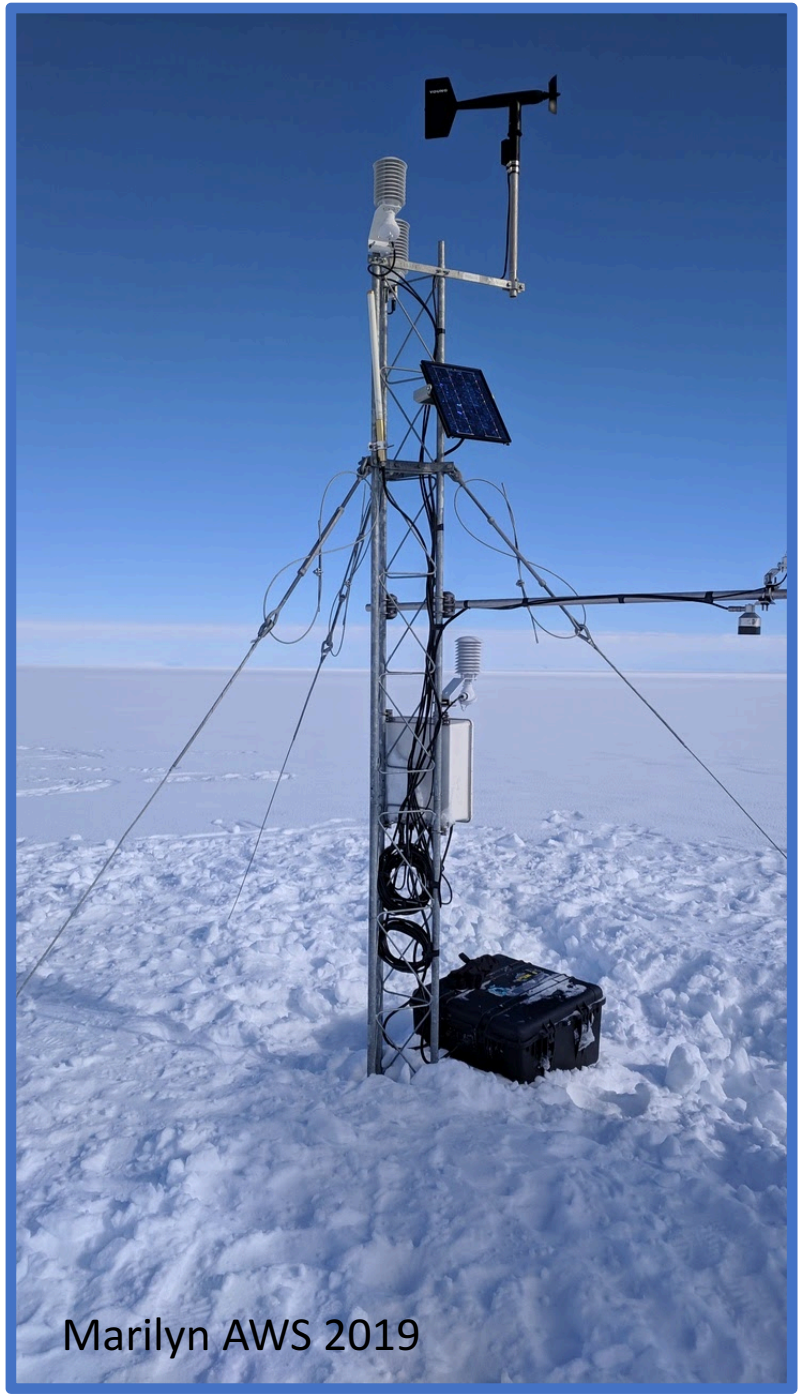
The Man computer Interactive Data Access System (McIDAS) has had a substantial influence on the computerization of the atmospheric sciences. McIDAS made its first major impact analyzing cloud drift winds derived from time sequences of geostationary satellite images. In its early years, McIDAS was used to produce television broadcasts and was the unparalleled forerunner of the television weather graphics industry of today. In 1977, McIDAS provided a major impetus to the computerization of the college classroom following the National Science Foundation (NSF)-sponsored Interactive Video Displays for Atmospheric

The McIDAS systems installed at the National Meteorological Center [NMC, now the National Centers for Environmental Prediction (NCEP)], National Severe Storms Forecast Center [NSSFC, now the Storm Prediction Center (SPC)], and the National Hurricane Center [NHC, now the Tropical Prediction Center (TPC)] were used to help define the technical requirements for the Advanced Weather Information Processing System (AWIPS). AWIPS is one leg of the NWS Modernization Program, which, in addition to AWIPS, includes the new Doppler Weather Surveillance Radar, the Automated Surface Observing System, a new generation of Geostationary Operational Environmental Satellites, and the National Center for

AMRDC

The AMRC…er…AMRDC

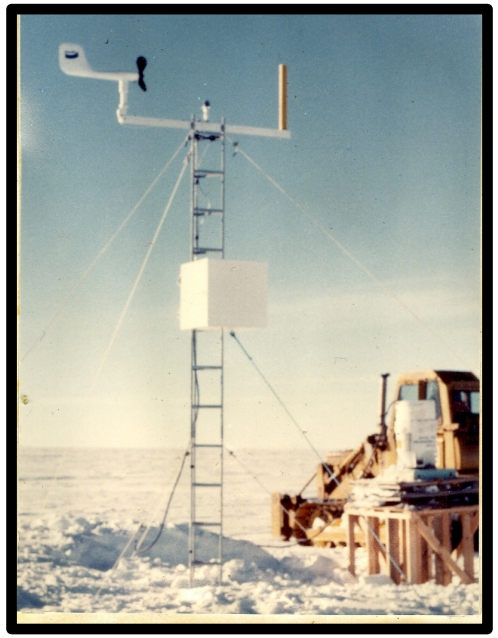
- The Antarctic Meteorological Research Center
  - ”Marriage” between the McIDAS Project and Automatic Weather Station project
  - Established in 1992 – at a MUG meeting!!
  - Centered around satellite composite work, real-time weather displays, and data archival for Antarctica
    - Satellite data ingest was also sort of included…
- Today we are called the Antarctic Meteorological Research and Data Center or AMRDC
  - Check out our commands/servers in XRD and servers in McIDAS-X! ☺
  - AWSMG, NOAA Level 1b ADDE server, etc.


Marilyn AWS 2019

43 Years of Antarctic Meteorological Sentinel Service

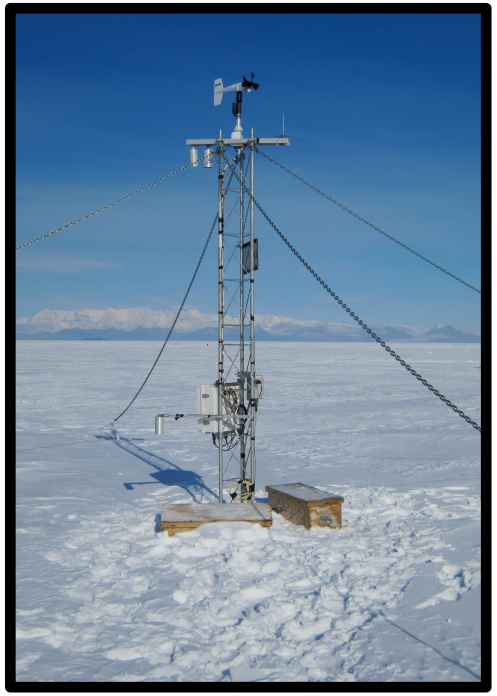
Antarctic Automatic Weather Stations (AWS)

Late-1970s/1980s



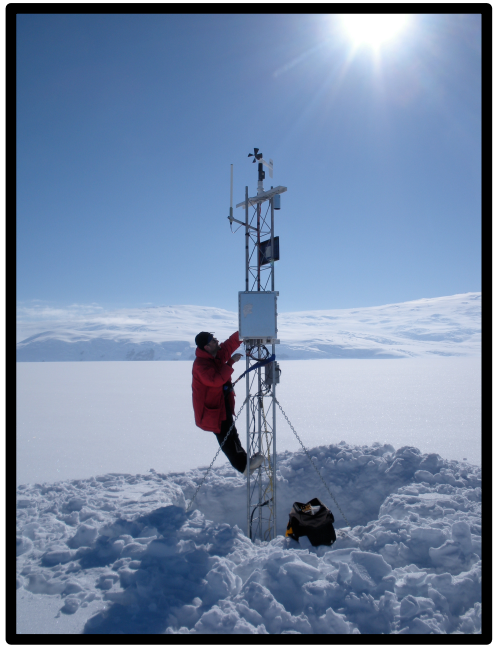
Stanford/Wisconsin 1A

1980s



Wisconsin 2B

1990s



Wisconsin CR10X

2000s

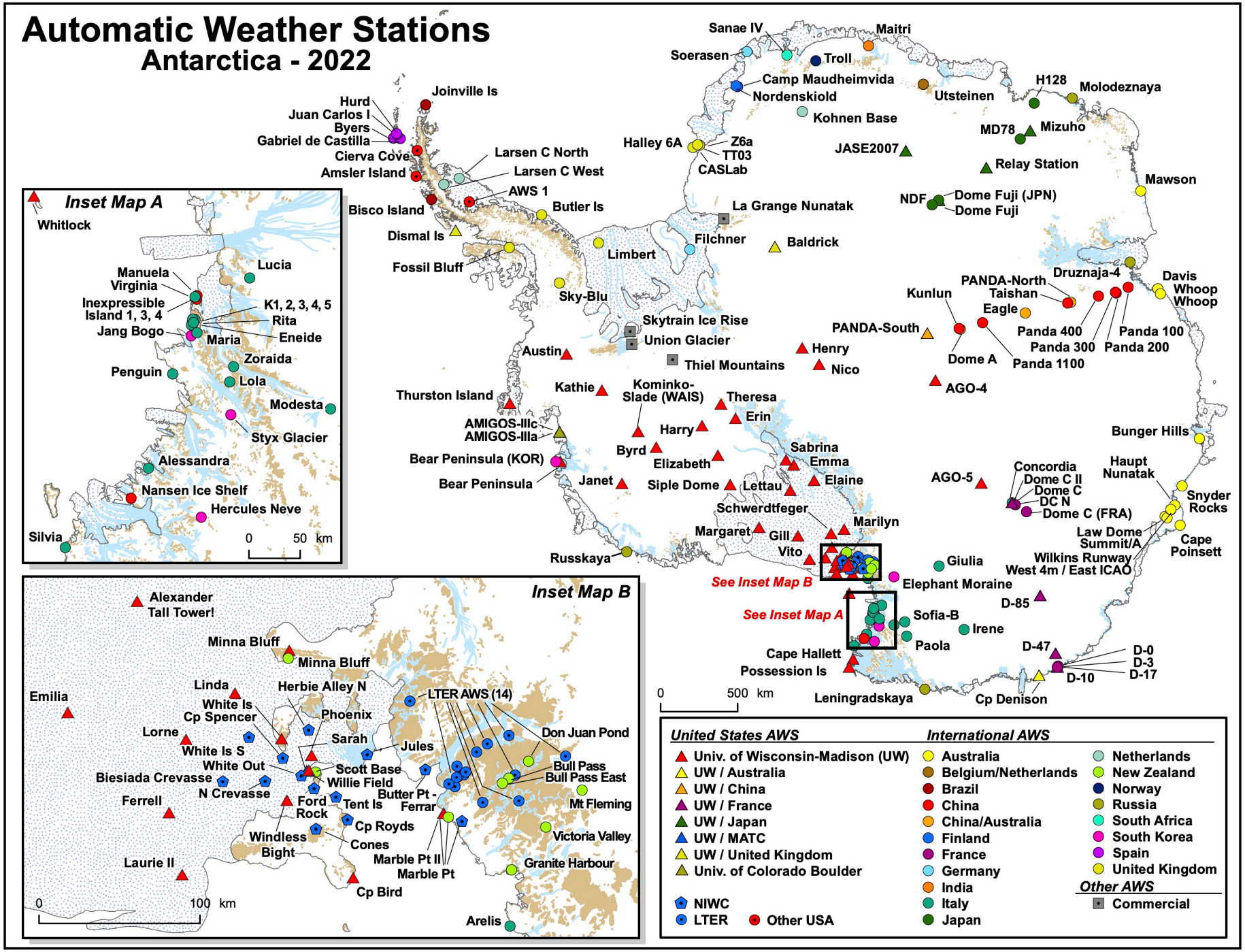
Wisconsin CR1000

2010/2020

Madison PCWS

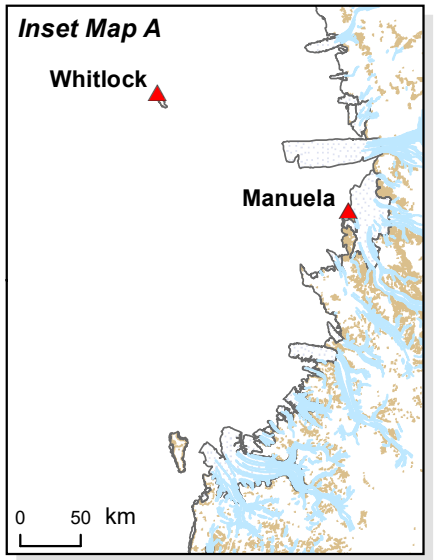
All photos from the UW AWS Program

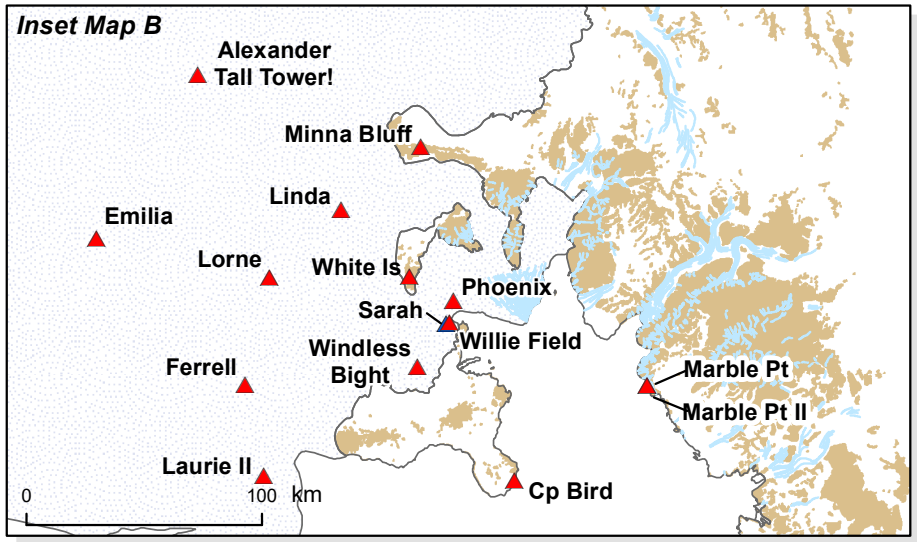
Automatic Weather Stations
Antarctica - 2022

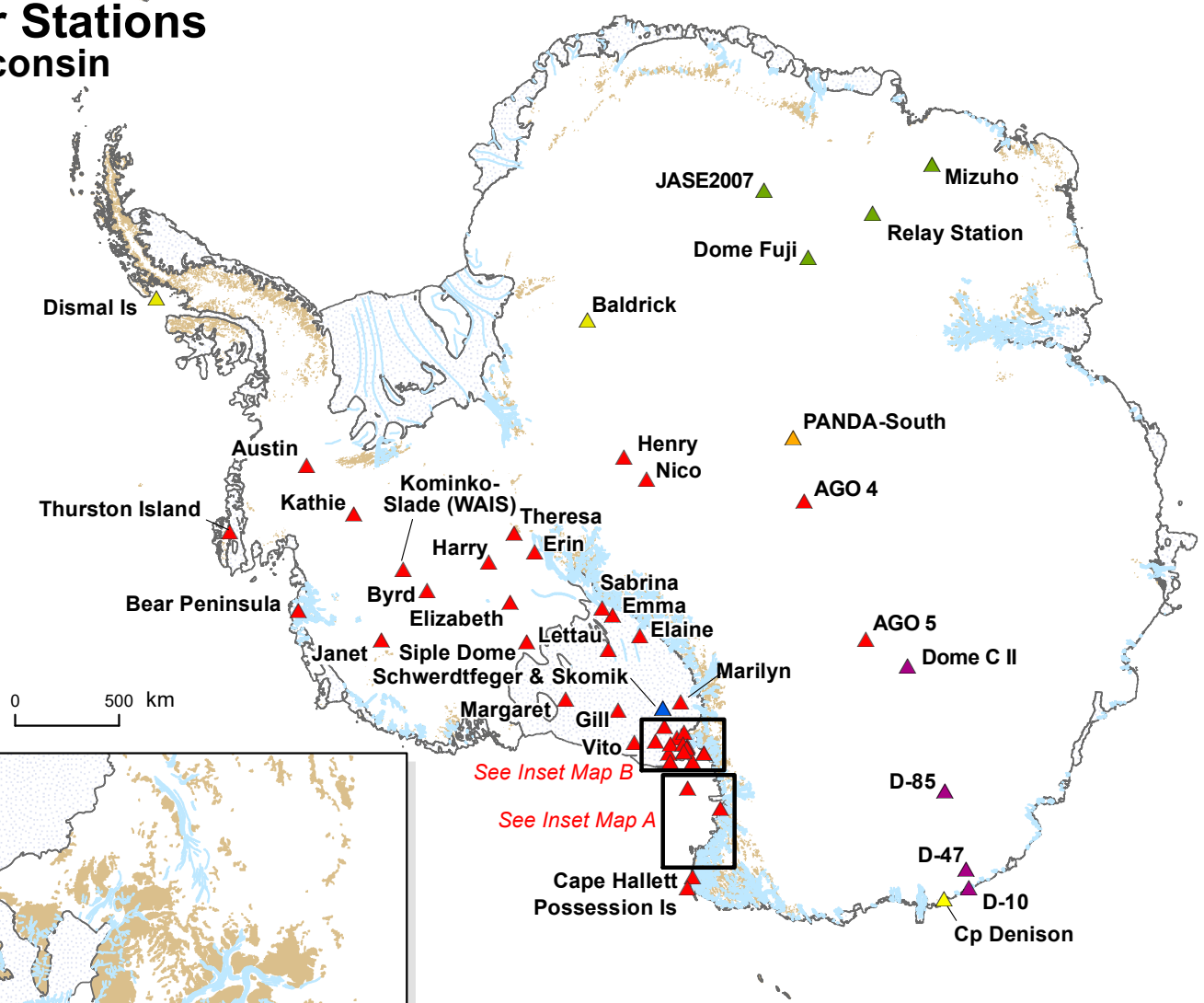


Coastline: ADD v4.1, 2003; Cartography: August 2022 Sam Batzli, SSEC, University of Wisconsin-Madison; Funding: National Science Foundation Grant Number 1924730

Automatic Weather Stations
University of Wisconsin
2022



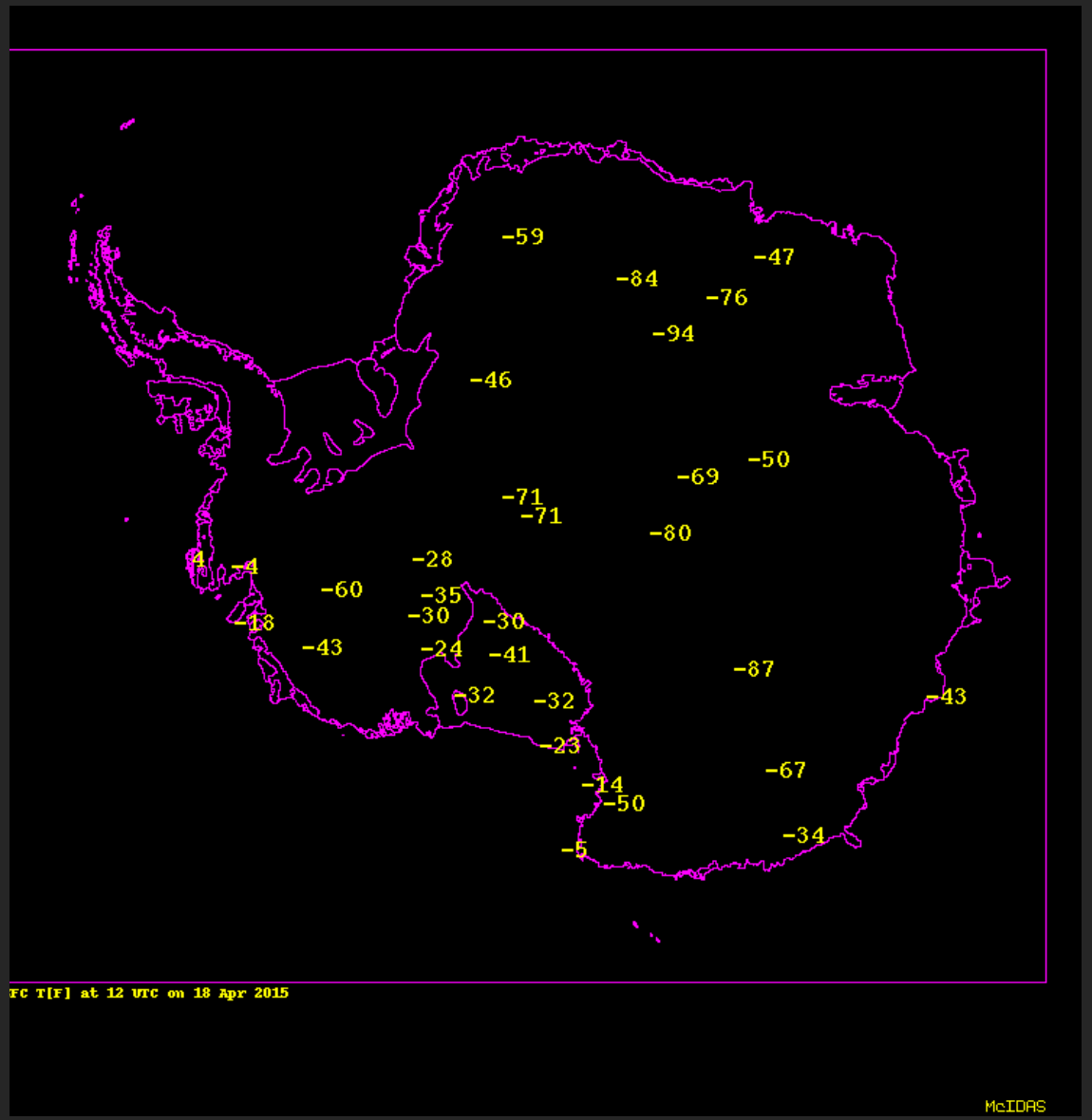




University of Wisconsin AWS

- Univ. of Wisconsin (UW)
- UW / Australia
- UW / China
- UW / France
- UW / Japan
- UW / MATC
- UW / United Kingdom

September 2022 by Sam Batzli for AMRDC, SSEC University of Wisconsin-Madison, National Science Foundation Grant #1924730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-30
-18
-43
-24
-41
-87
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-23
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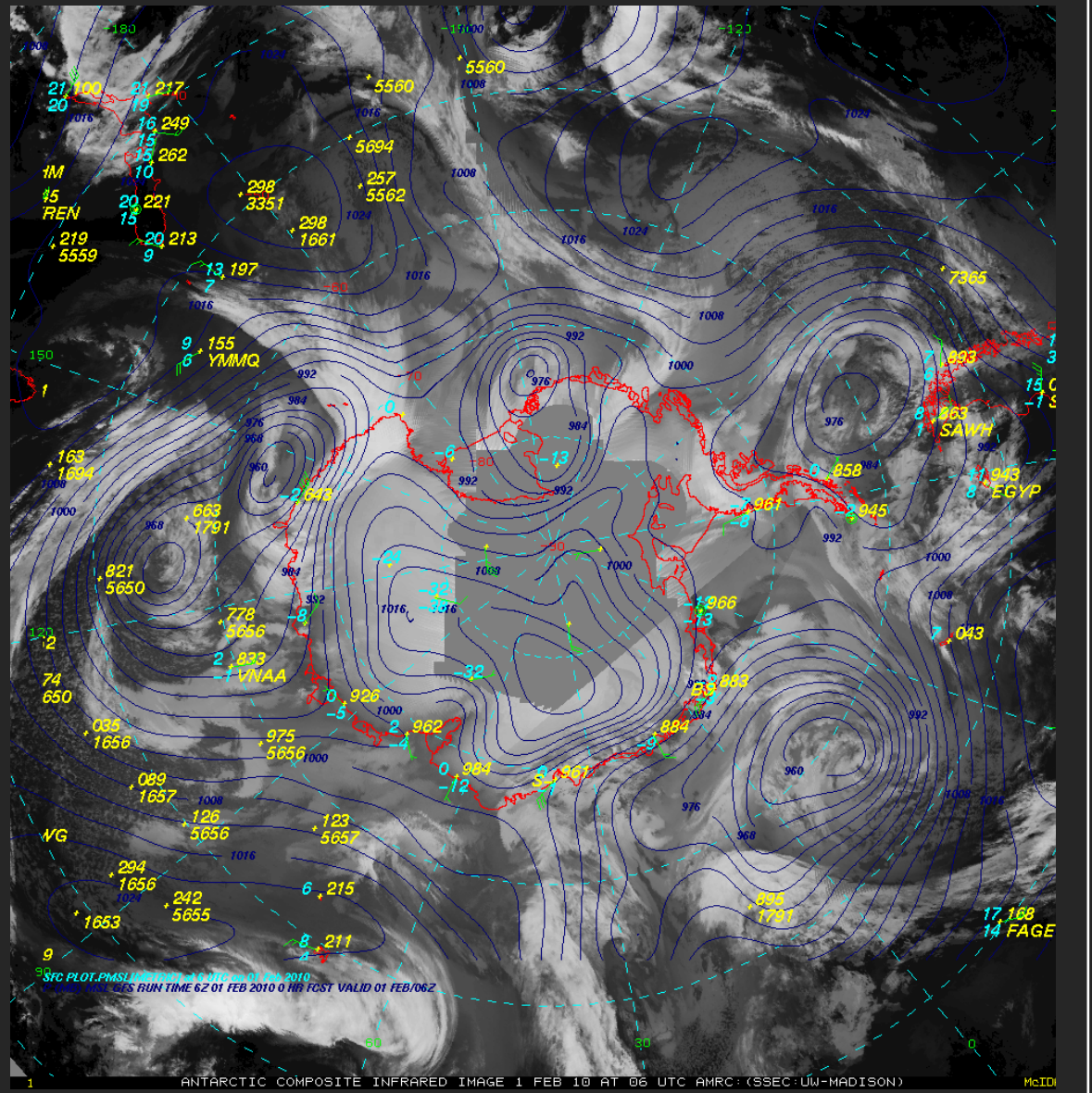
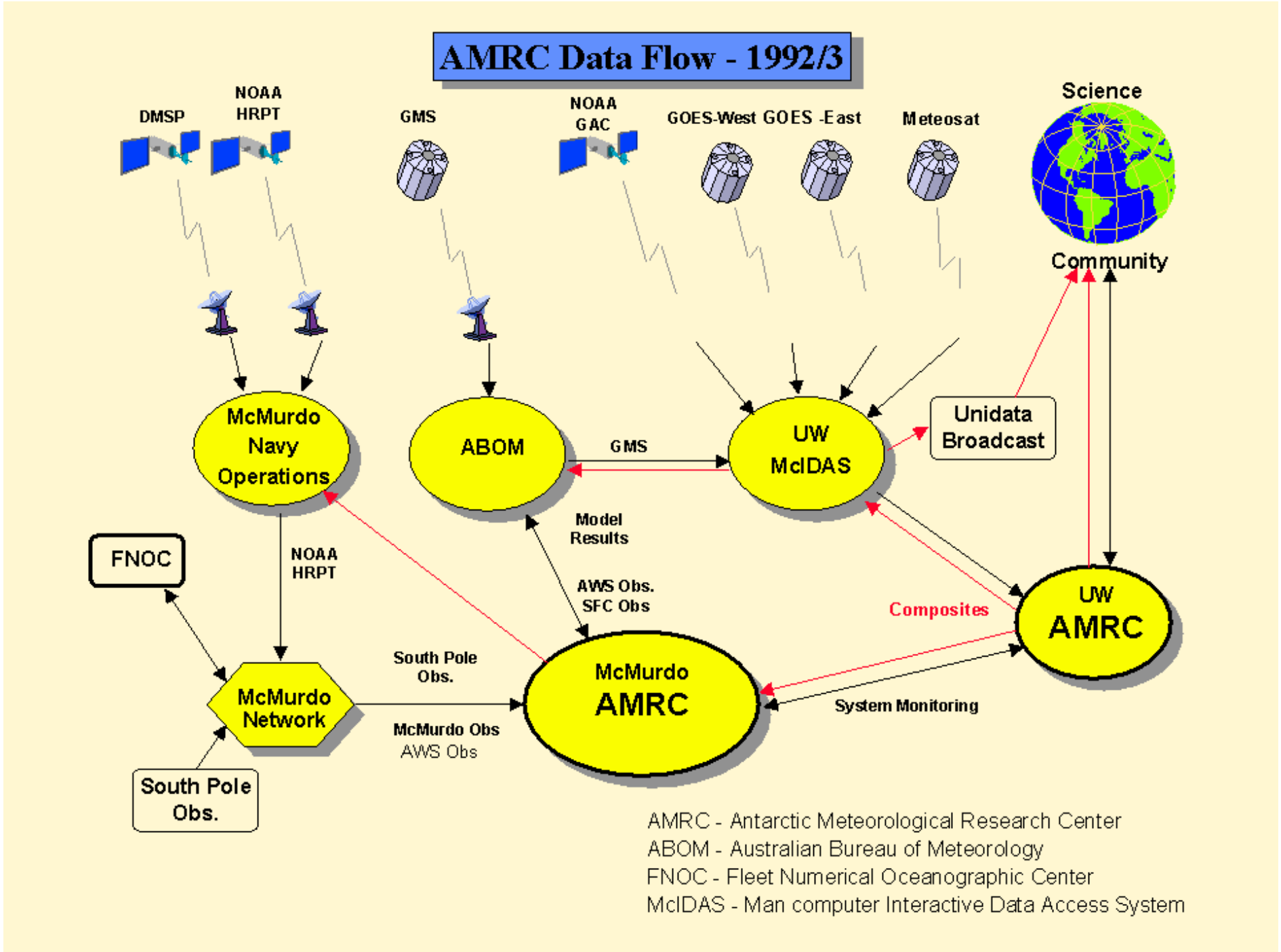
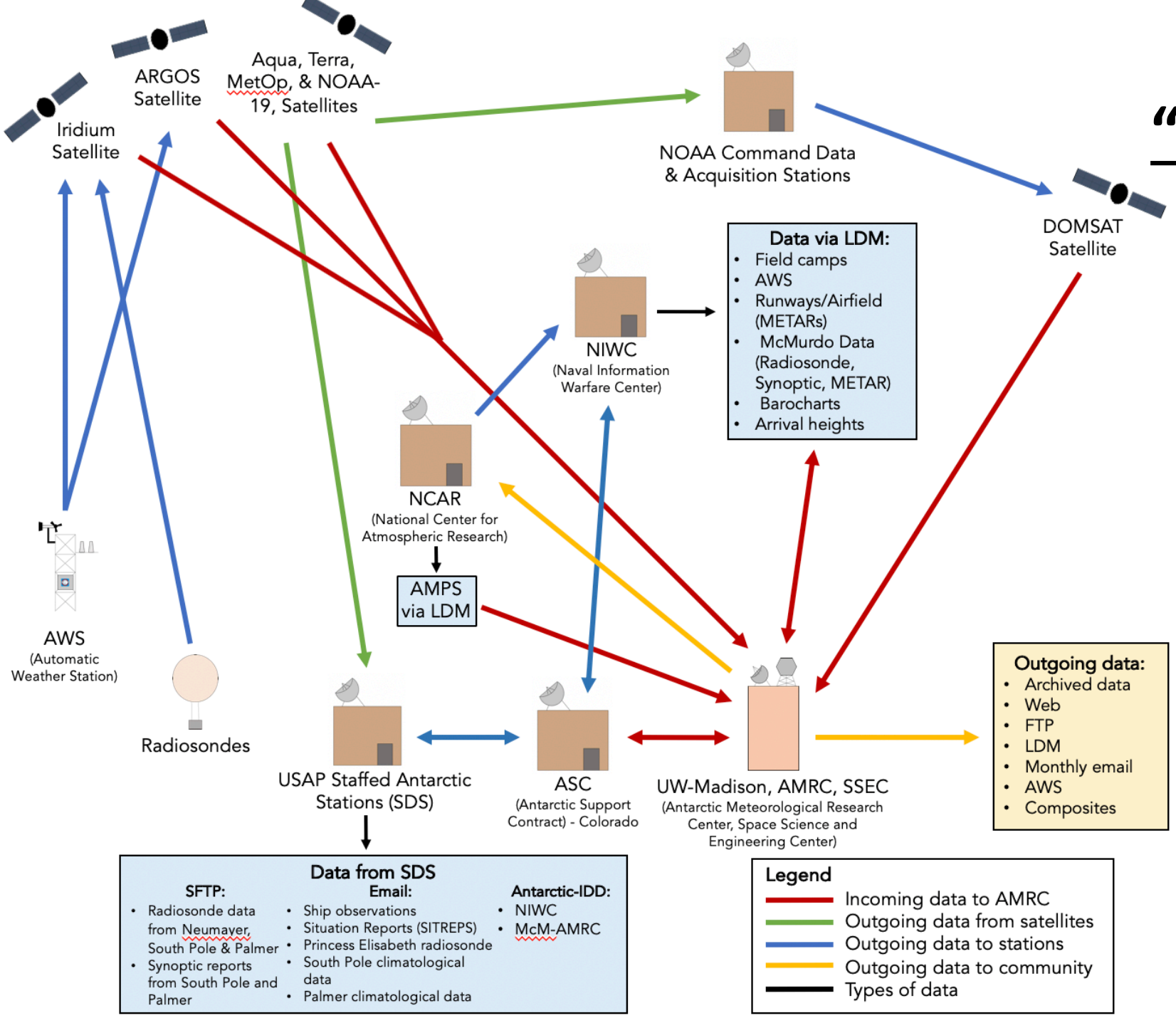
-14
-50
-34
-5
FC T[F] at 12 UTC on 18 Apr 2015
McIDAS

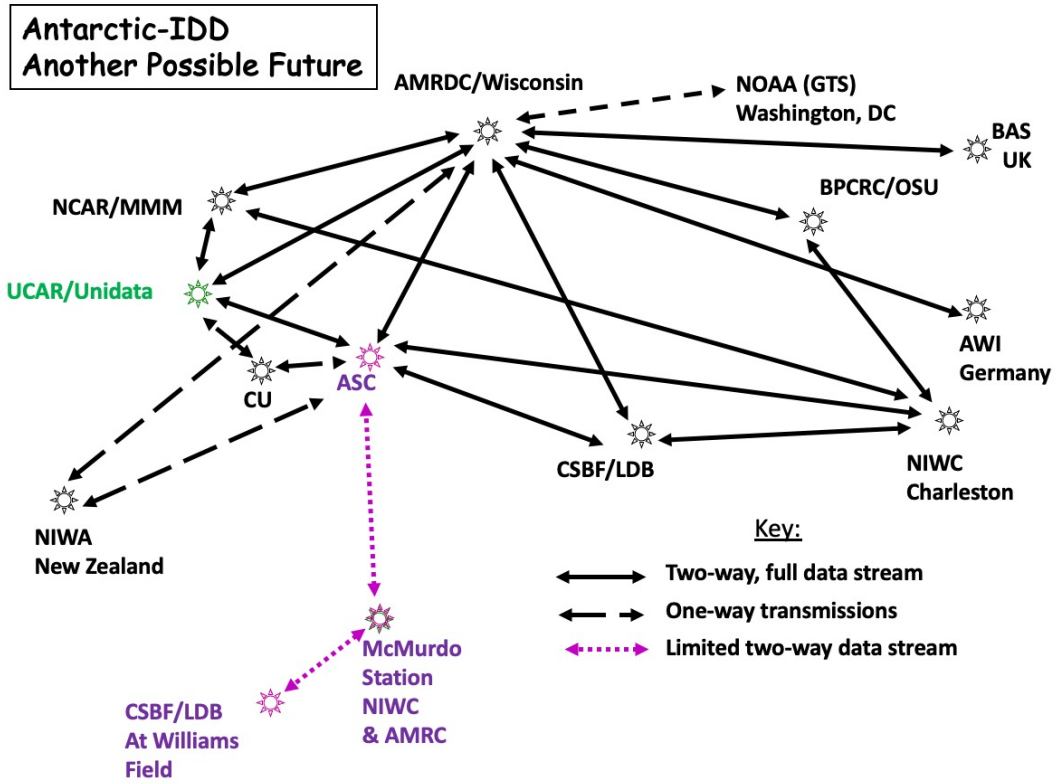

YMMQ
SAWH
EGYP
VNAA
FAGE
SFC PLOT.PMSL
GFS RUN TIME 6Z 01 FEB 2010 0 HR FCST VALID 01 FEB/06Z
ANTARCTIC COMPOSITE INFRARED IMAGE 1 FEB 10 AT 06 UTC AMRC:(SSEC:UW-MADISON)


AMRC Data Flow - 1992/3
DMSP
NOAA HRPT
GMS
NOAA GAC
GOES-West
GOES -East
Meteosat
Science Community
McMurdo Navy Operations
ABOM
GMS
UW McIDAS
Unidata Broadcast
FNOC
NOAA HRPT
Model Results
AWS Obs.
SFC Obs
Composites
UW AMRC
South Pole Obs.
McMurdo Network
McMurdo AMRC
System Monitoring
McMurdo Obs
AWS Obs
South Pole Obs.
AMRC - Antarctic Meteorological Research Center
ABOM - Australian Bureau of Meteorology
FNOC - Fleet Numerical Oceanographic Center
McIDAS - Man computer Interactive Data Access System

AMRC
"Data Center"



Meteorological Data Servers and Services



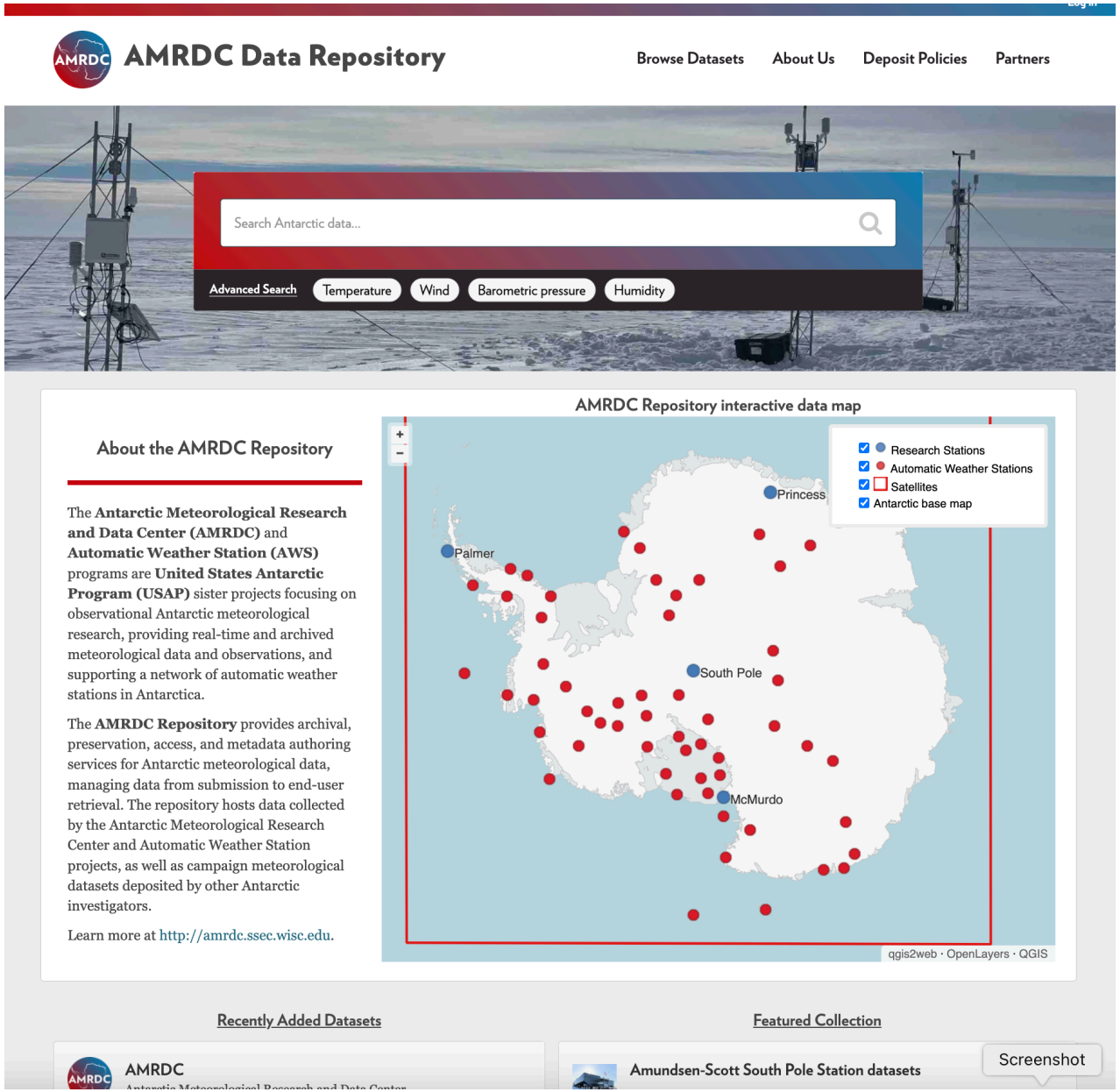
- McIDAS ADDE
  - AMRDC mcw.ssec.wisc.edu
  - AMRC amrc.ssec.wisc.edu
  - ARCHIVE amrc.ssec.wisc.edu
  - ROSS ross.ssec.wisc.edu
- LDM – Antarctic-IDD
- THREDDS – TBA
  - https://amrdcdata.ssec.wisc.edu/thredds/catalog/catalog.html
- Data Repository
  - https://amrdcdata.ssec.wisc.edu/

AMRDC Repository

- Based on CKAN
  - Open Source

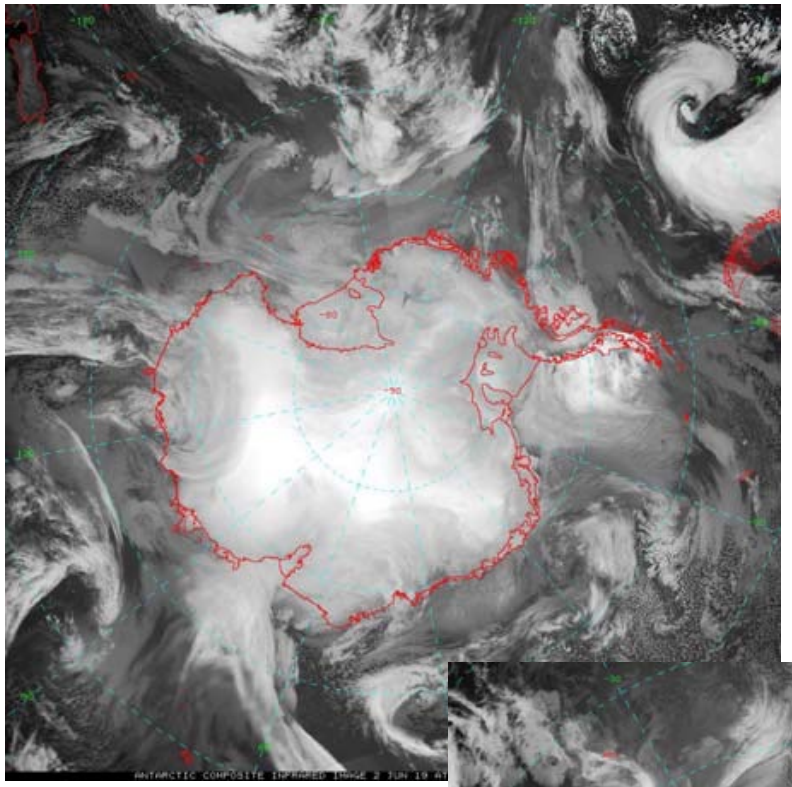
  (Comprehensive Knowledge Archive Network)
- Easy access
- Search/Advanced Search
- Clickable Map
- Keywords
- Digital Object Identifiers (DOI)
- Follows ‘FAIR’ conventions
  - Findable, Accessible, Interoperable, and Reusable
- Now available!
  - **Please make use of it!!**
  - Feedback welcome!
  - *Data being added all the time*

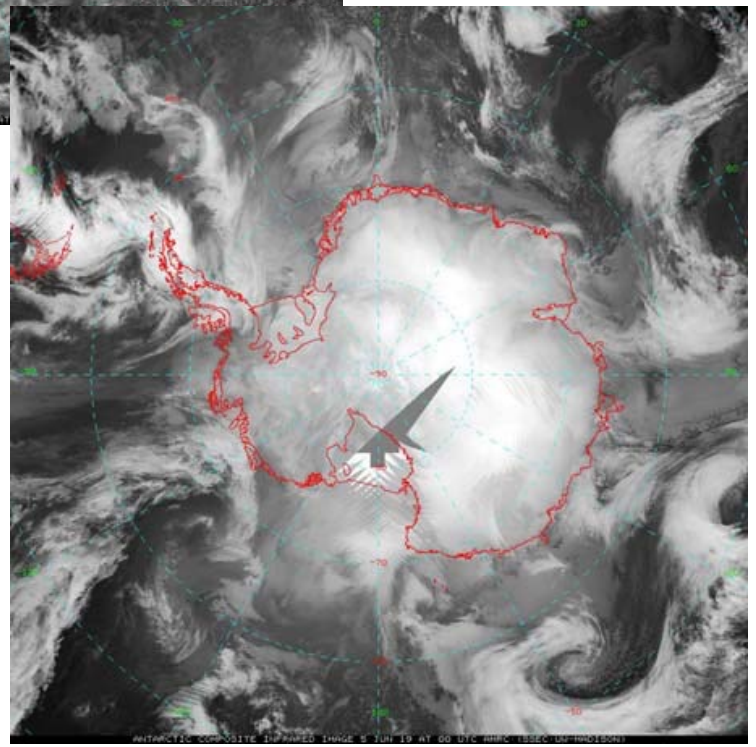
https://amrdcdata.ssec.wisc.edu



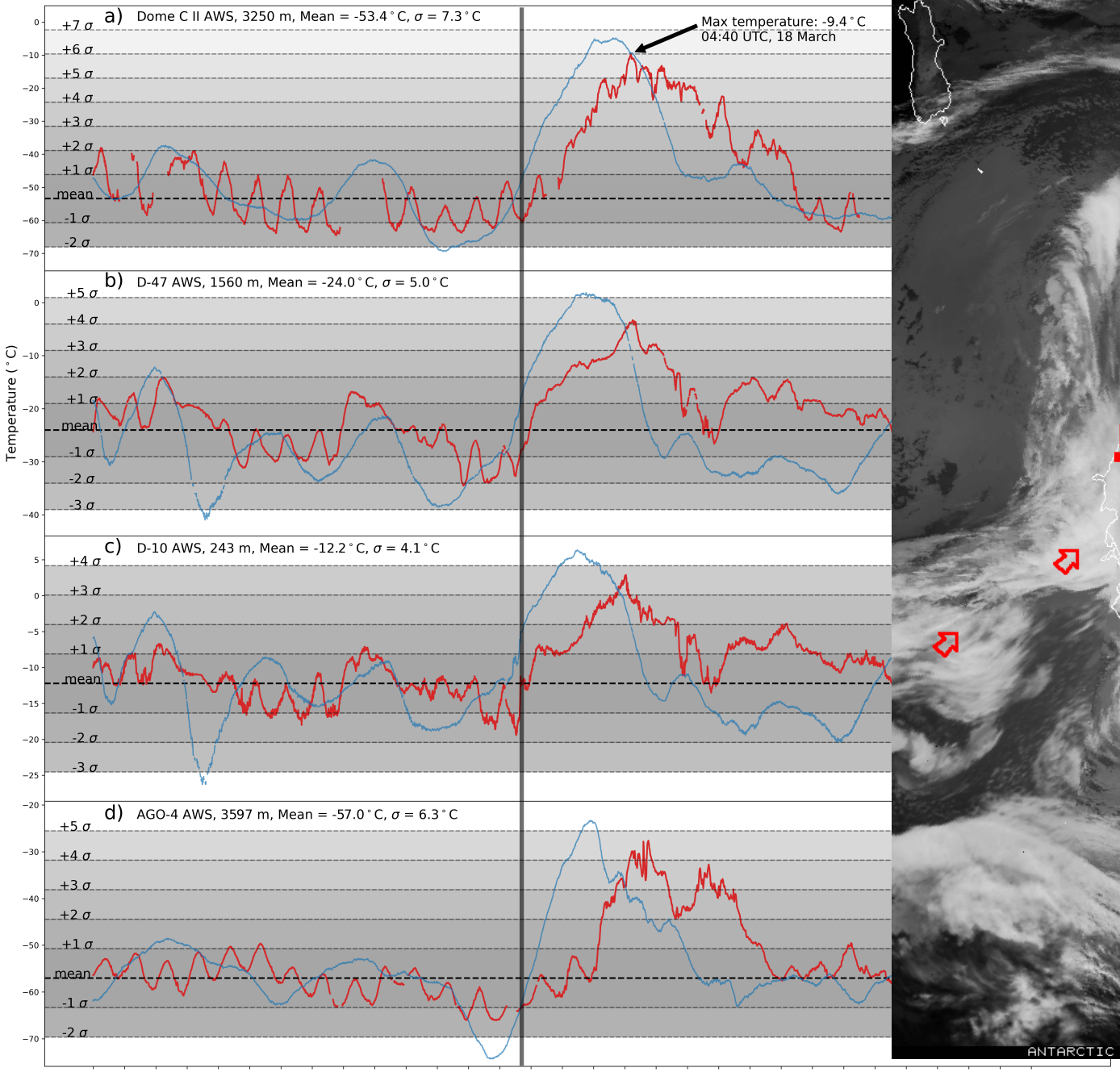
Antarctic Satellite Composite Imagery

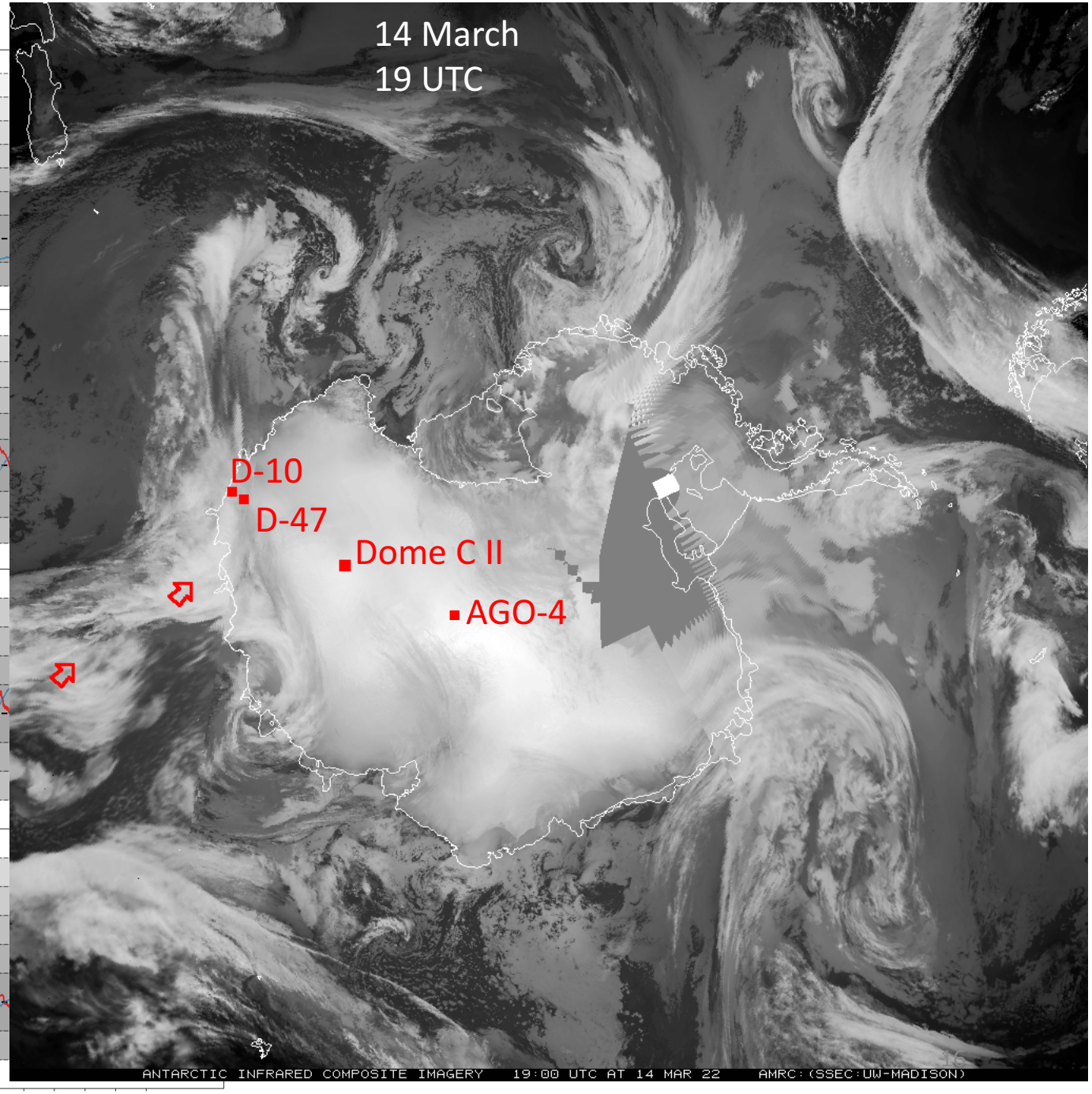
- This project *formal* operational support for these composites after 30+ years of generation!!
- Improve by including more satellites into the composite
- Providing a “standard grid-north-up” product
- Continue to make hourly composites available in 5 spectral channels.





Dome C II, D-47, D-10, AGO-4 UW-Madison AWS
10-minute quality-controlled observations, March 2022
Respective March temperature climatology





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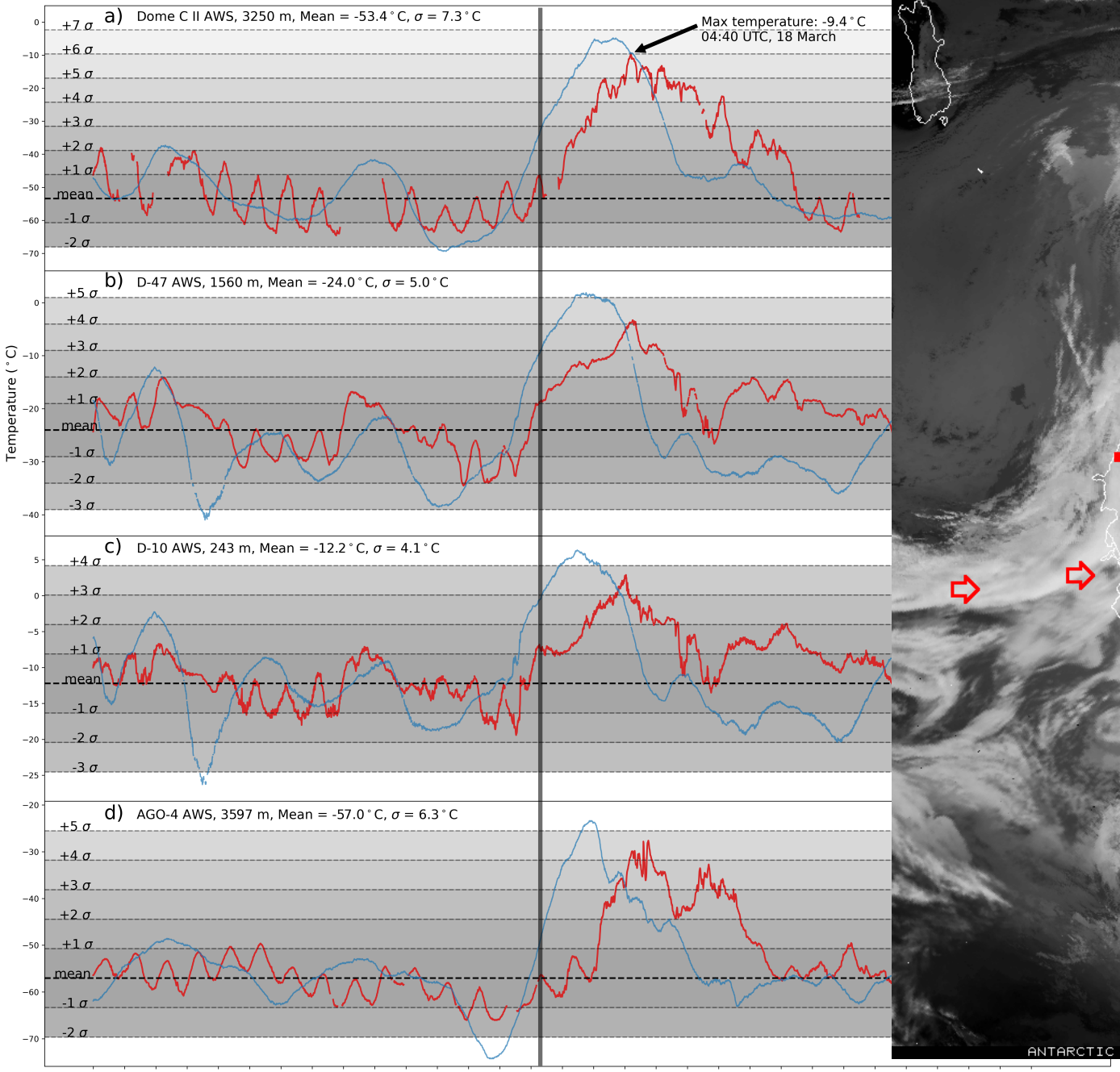

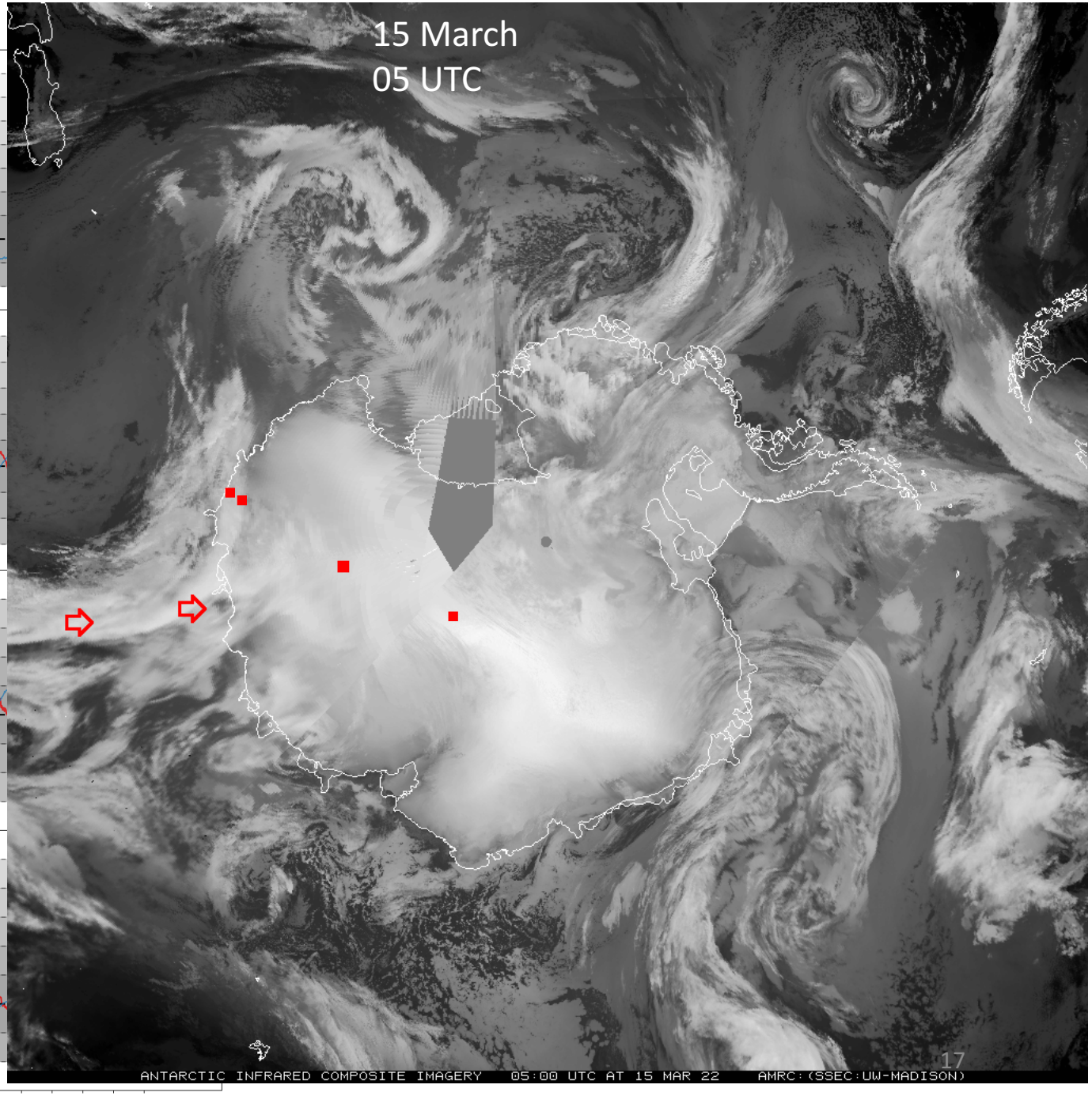

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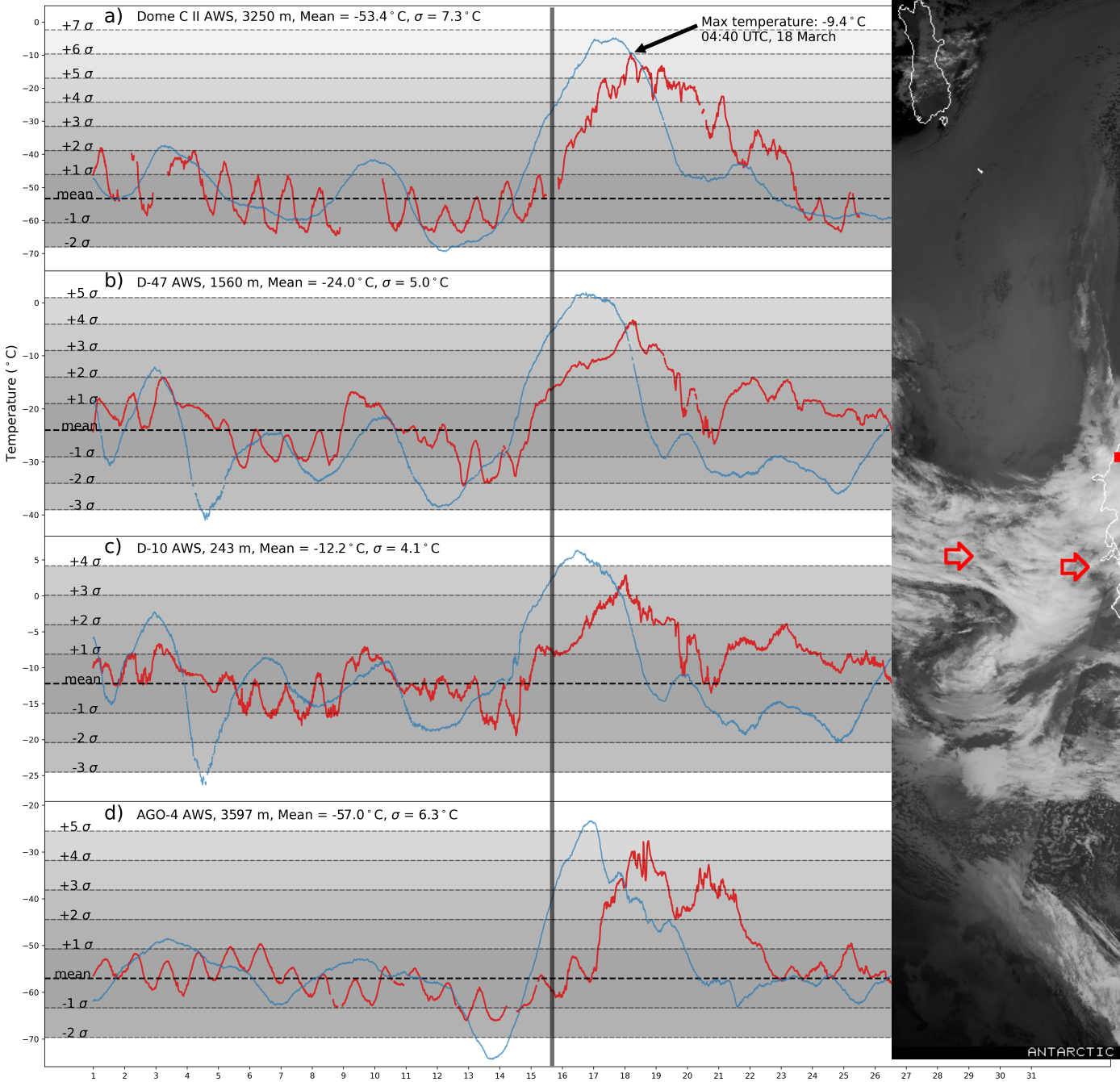

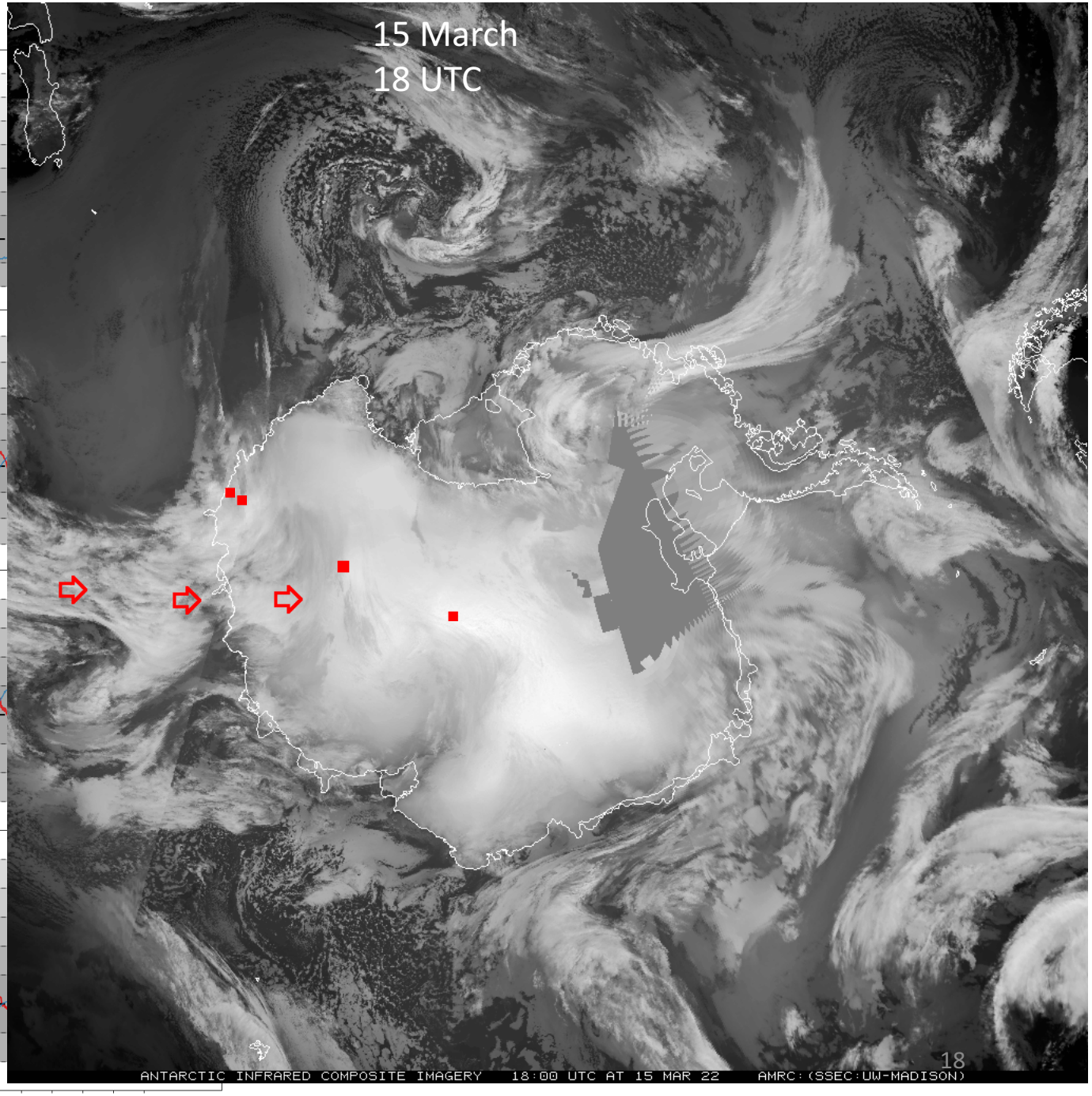

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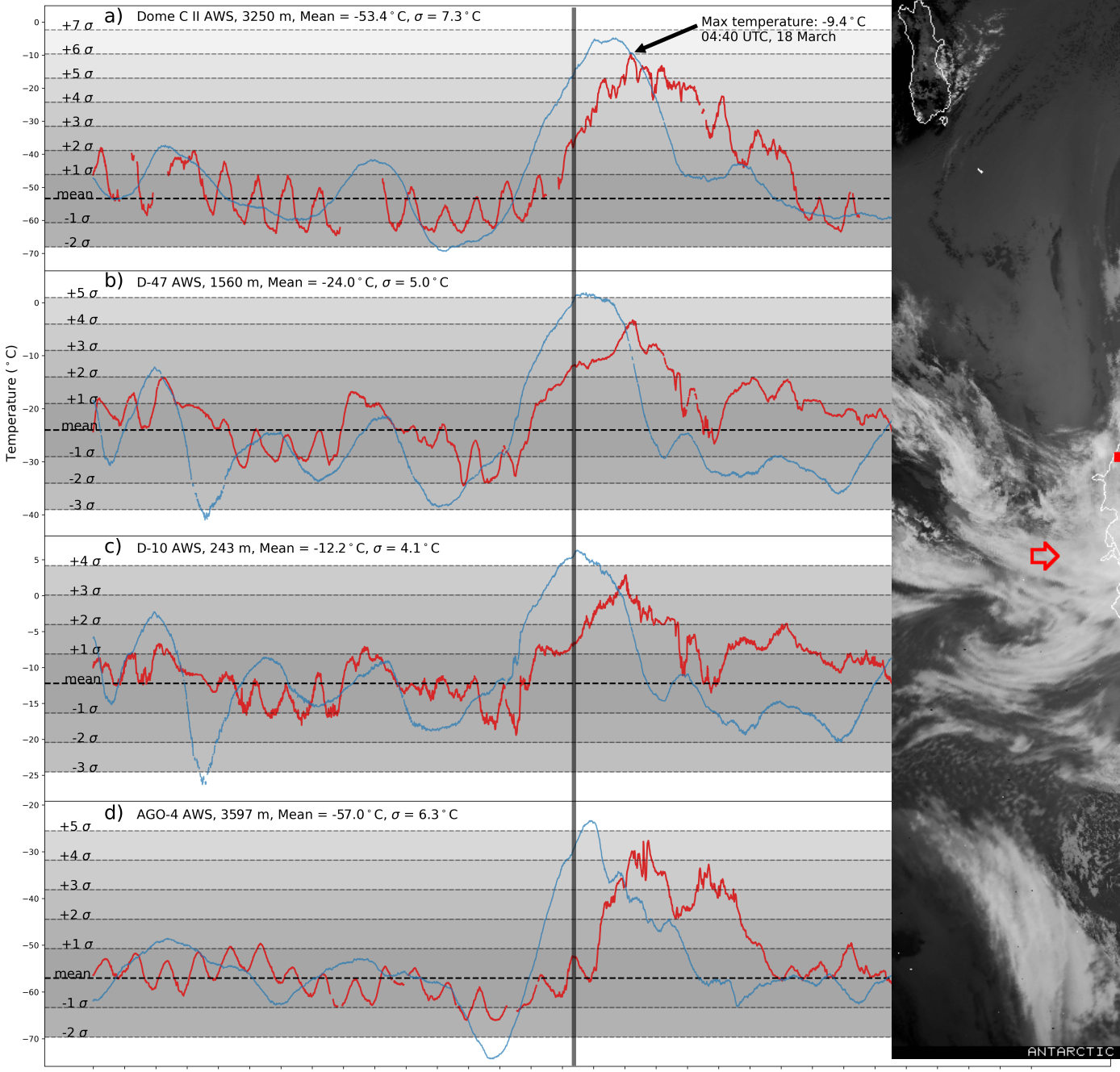

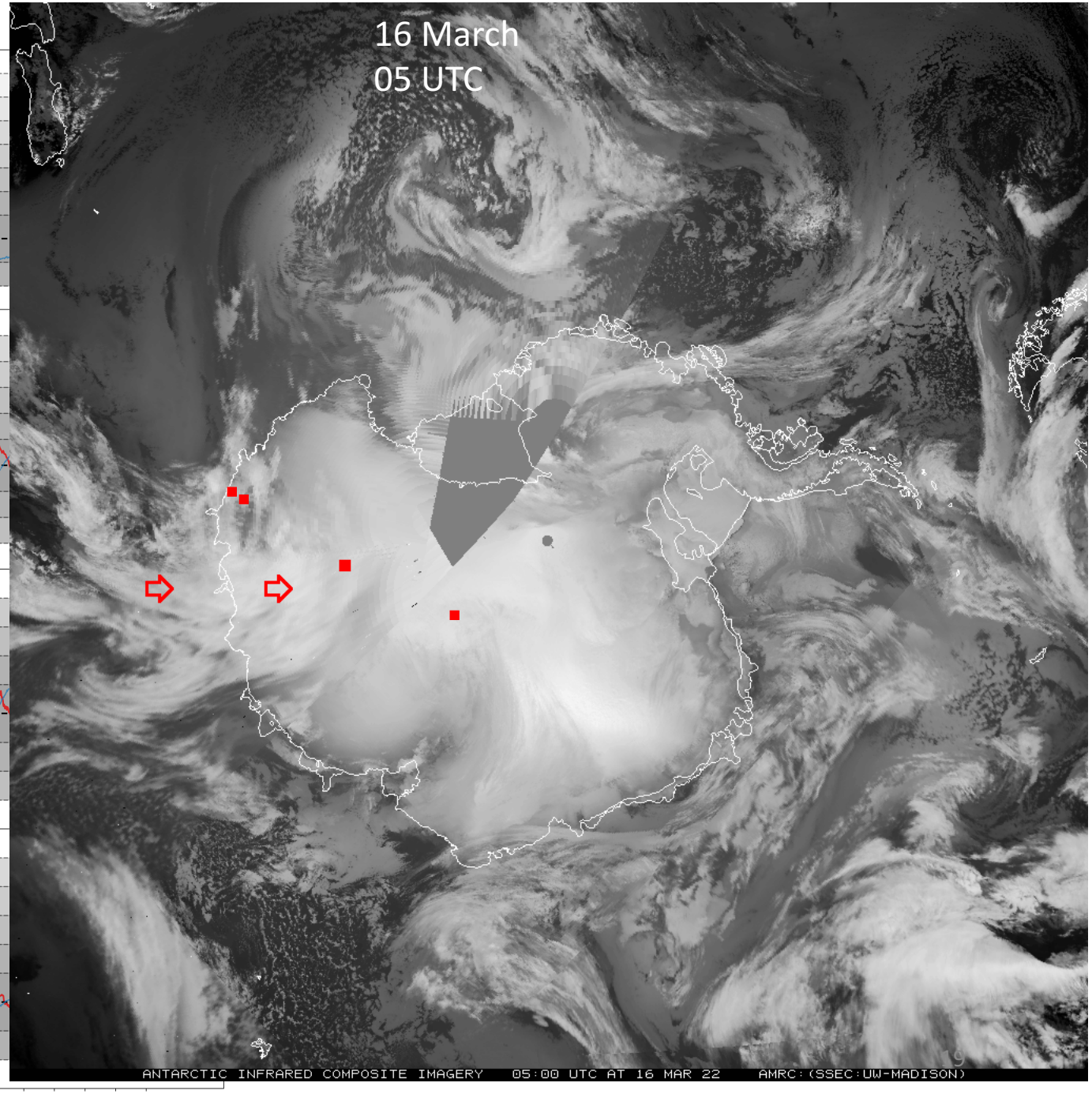

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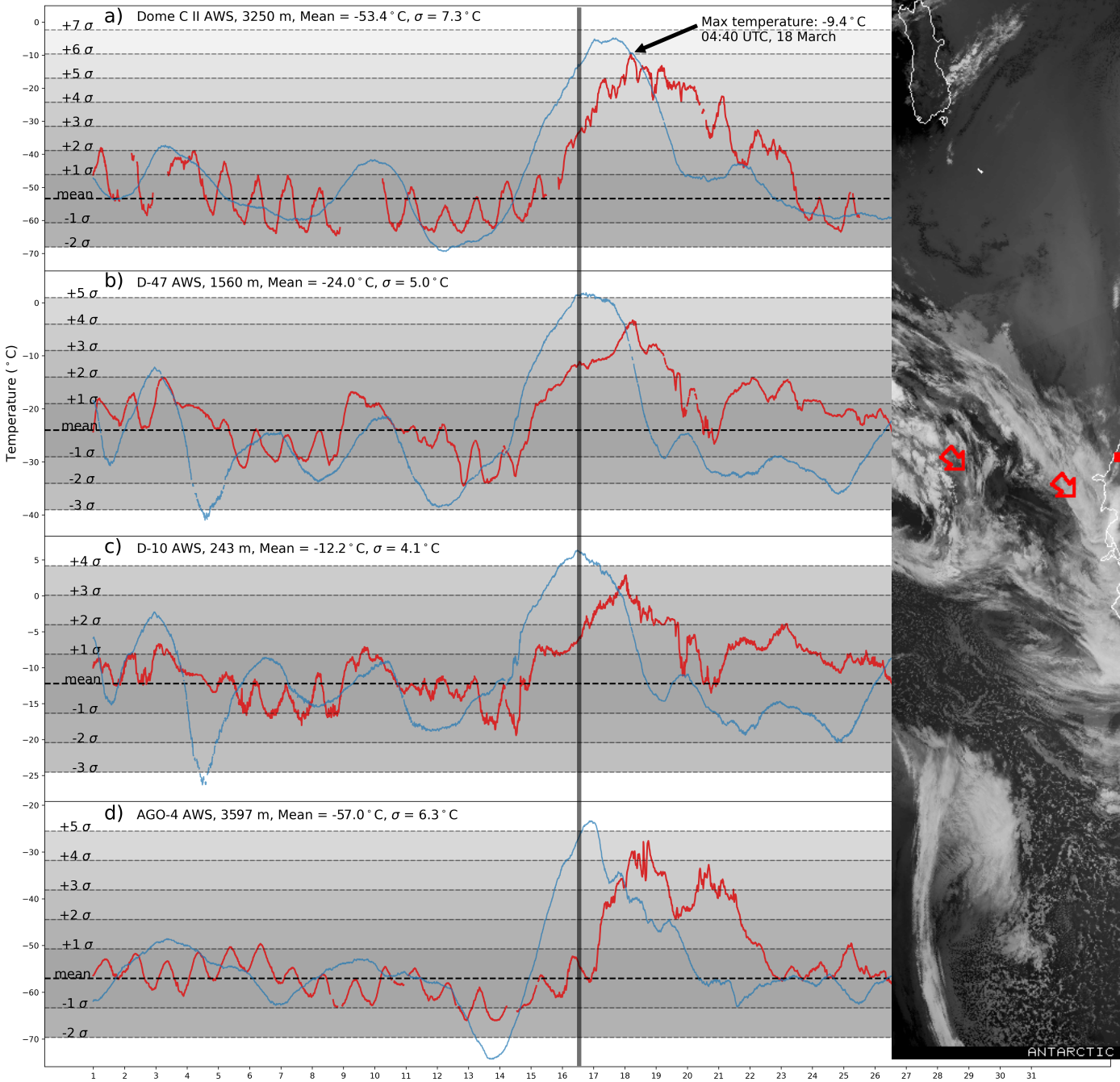
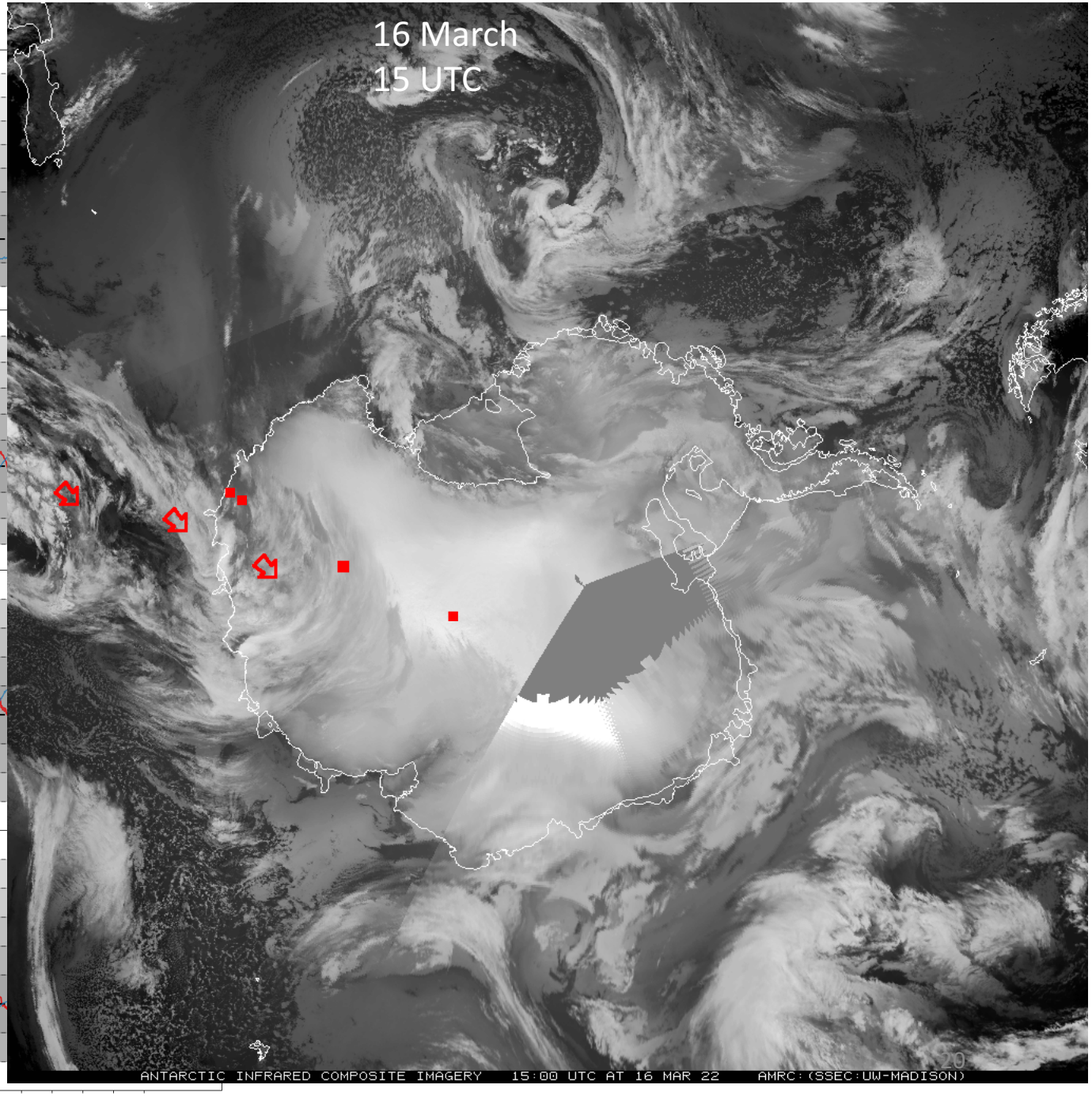
Respective March temperature climatology





Dome C II, D-47, D-10, AGO-4 UW-Madison AWS
10-minute quality-controlled observations, March 2022
Respective March temperature climatology

a) Dome C II AWS, 3250 m, Mean = -53.4 °C, σ = 7.3 °C

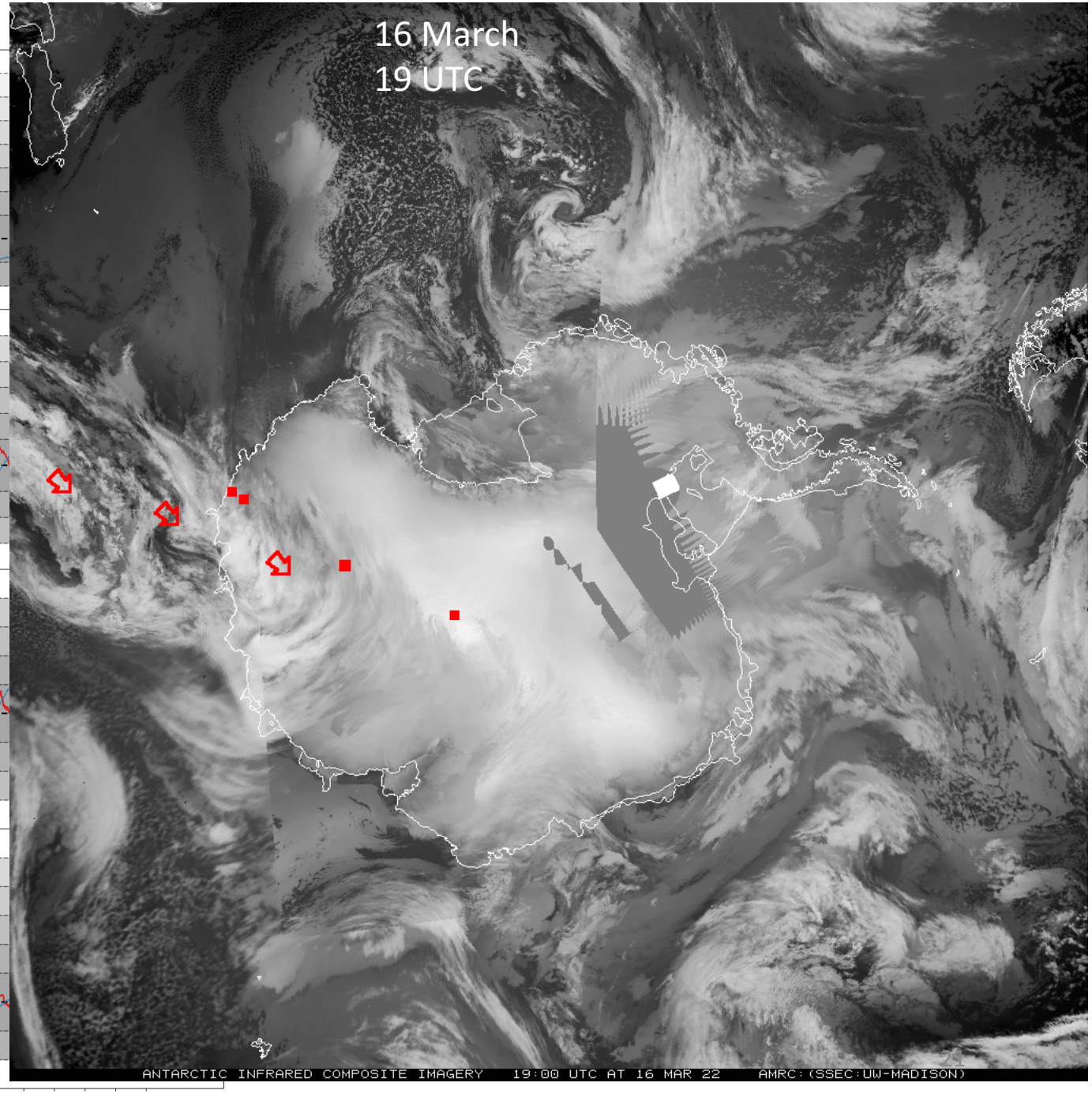
Max temperature: -9.4 °C
04:40 UTC, 18 March

b) D-47 AWS, 1560 m, Mean = -24.0 °C, σ = 5.0 °C

c) D-10 AWS, 243 m, Mean = -12.2 °C, σ = 4.1 °C

d) AGO-4 AWS, 3597 m, Mean = -57.0 °C, σ = 6.3 °C

Temperature (°C)



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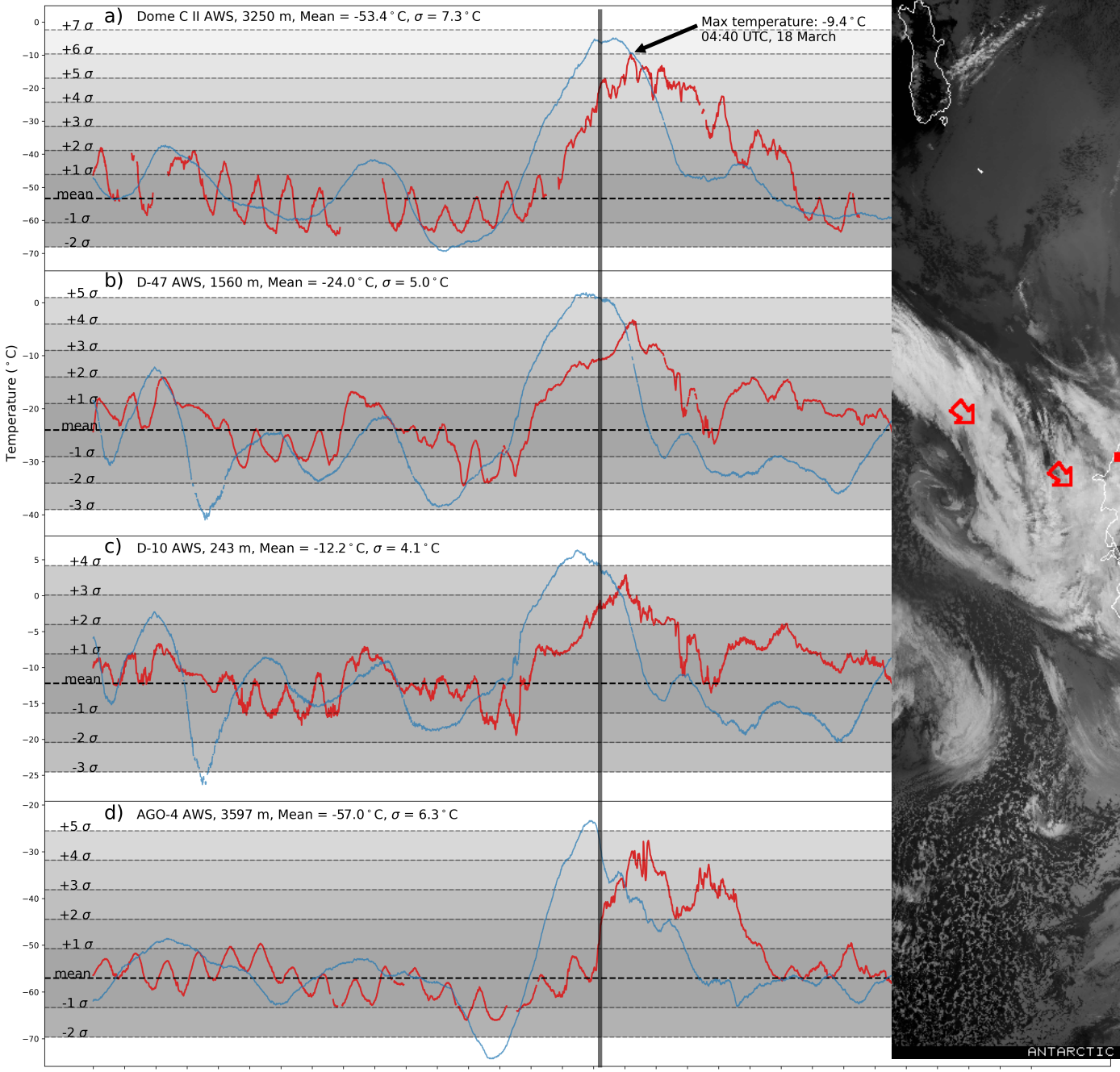

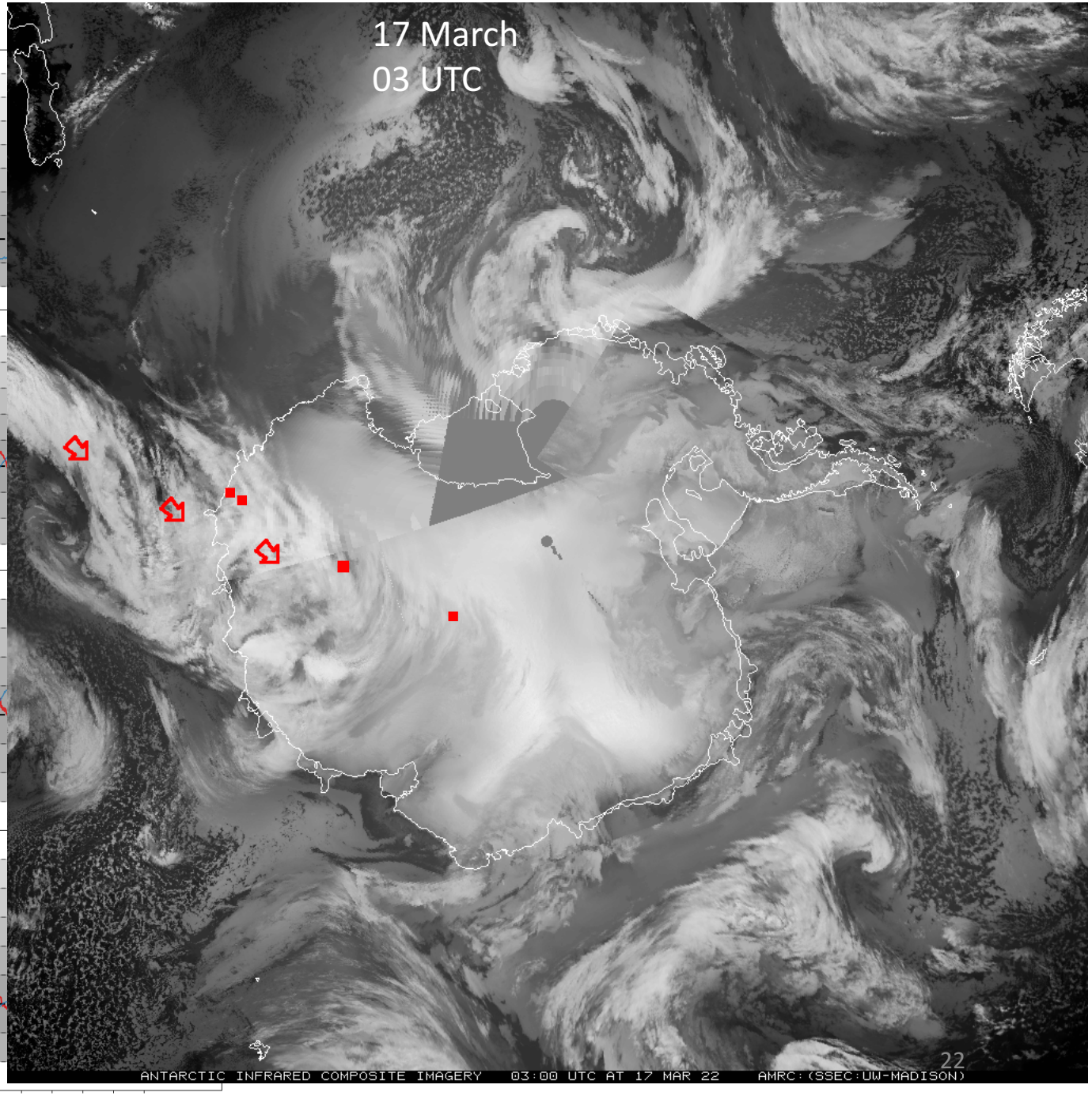

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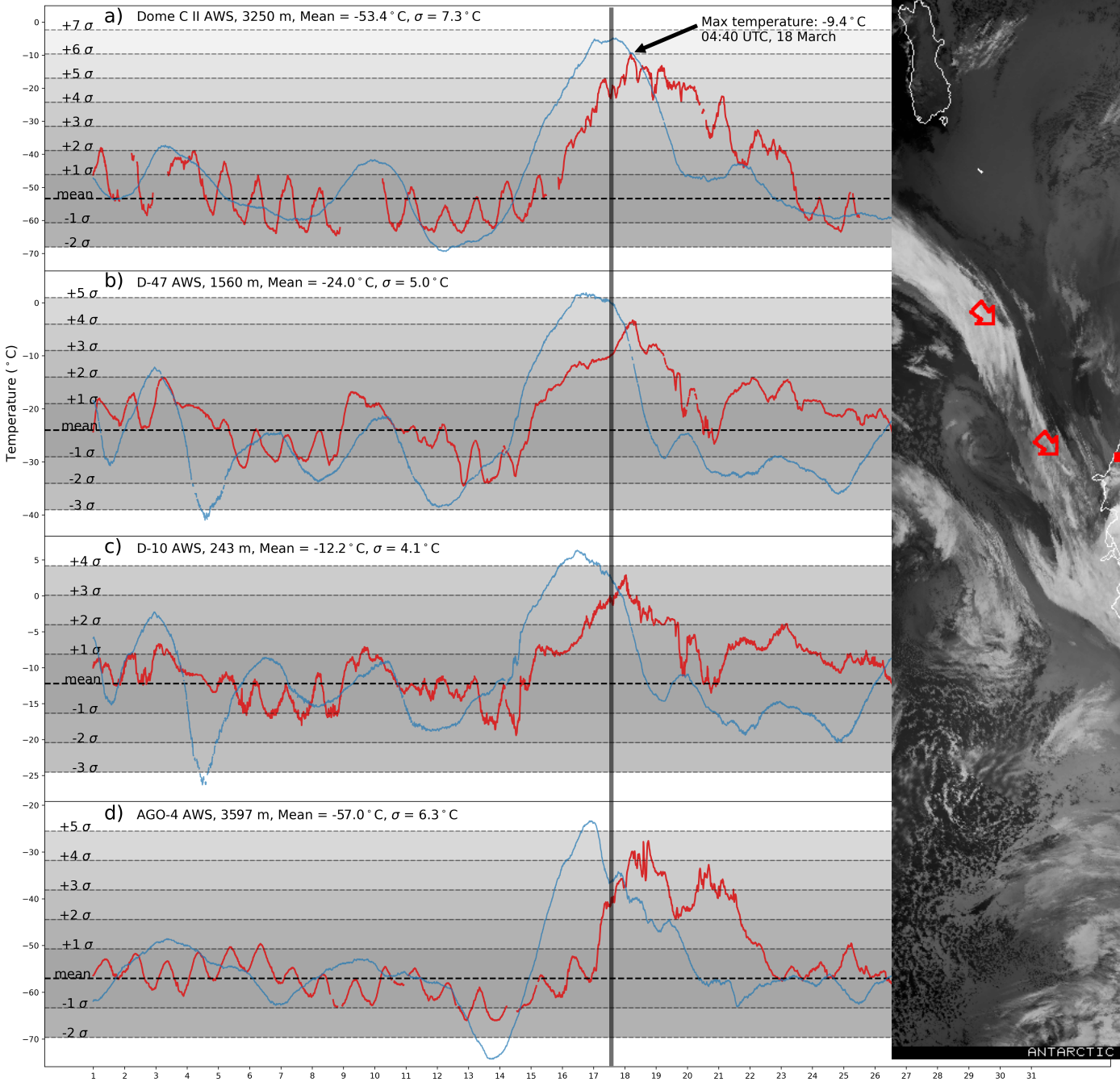

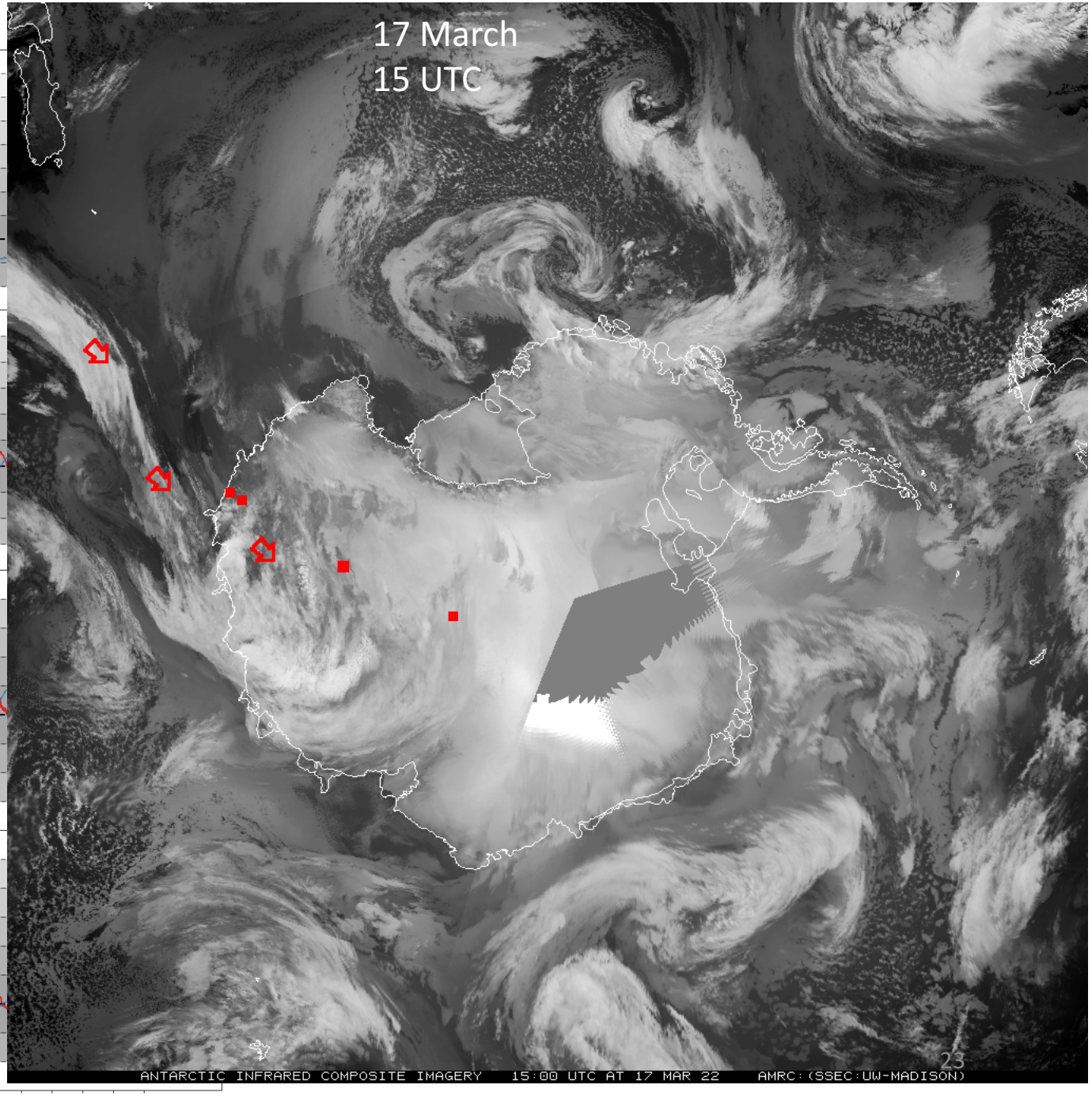

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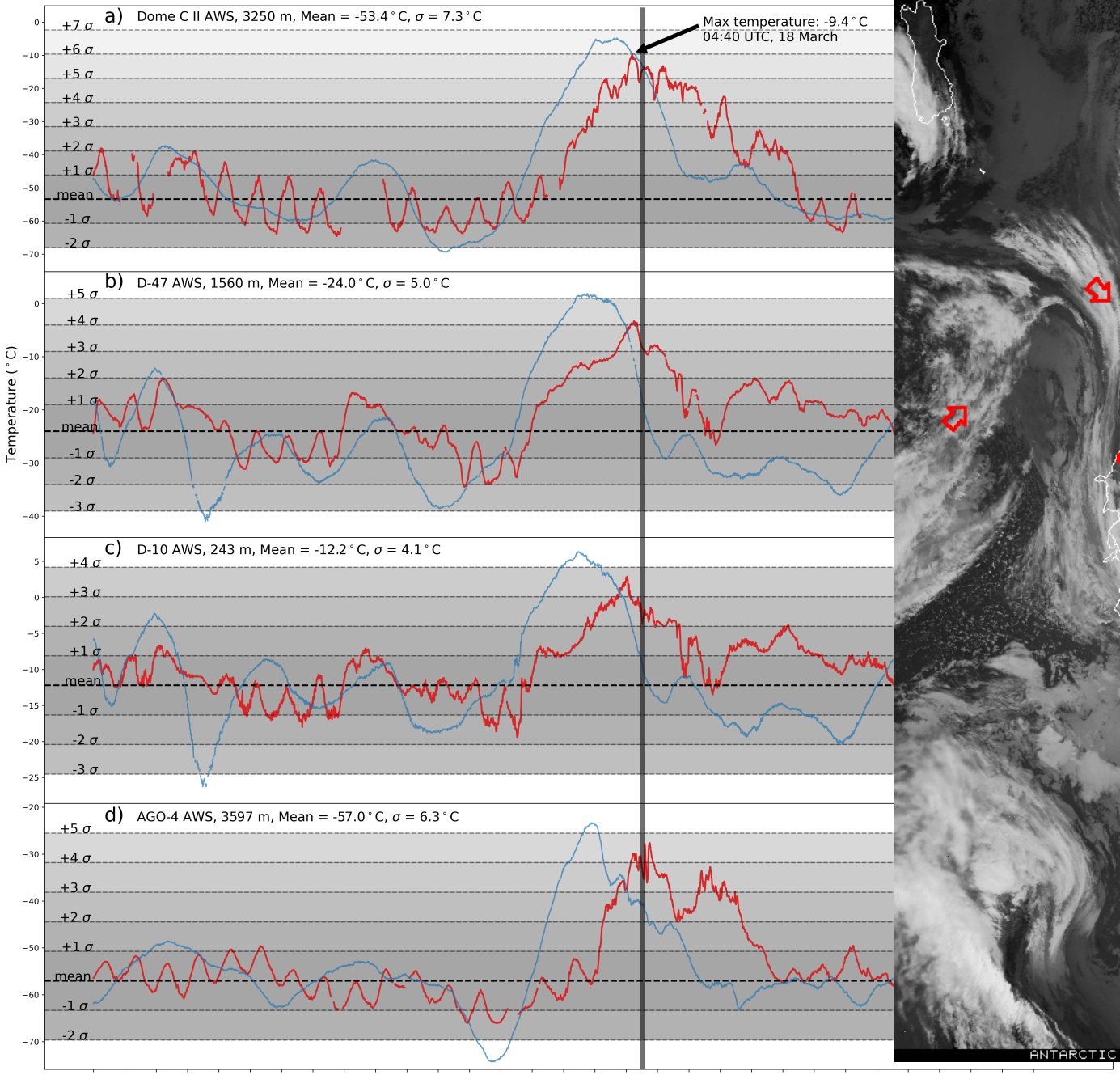

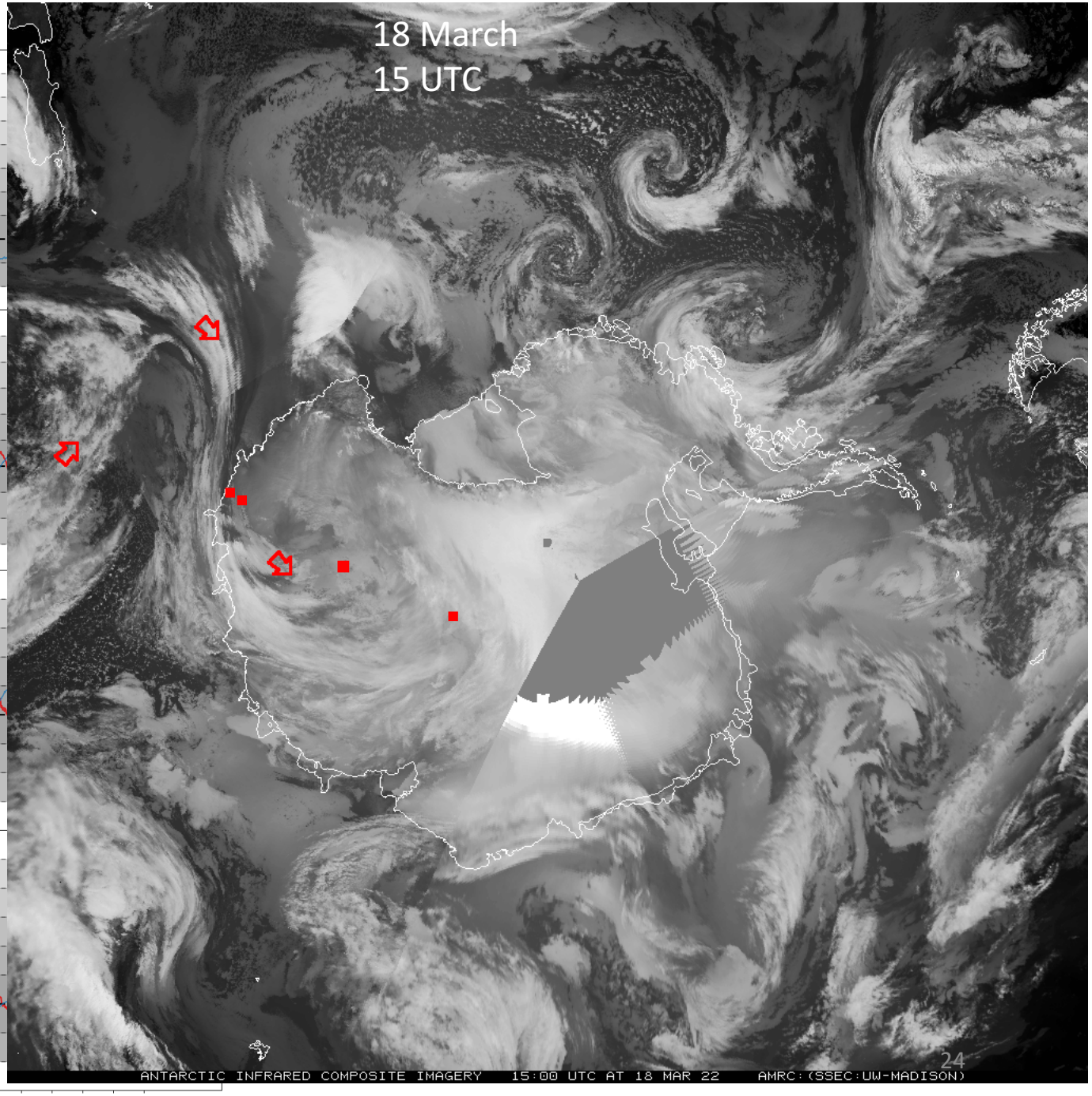

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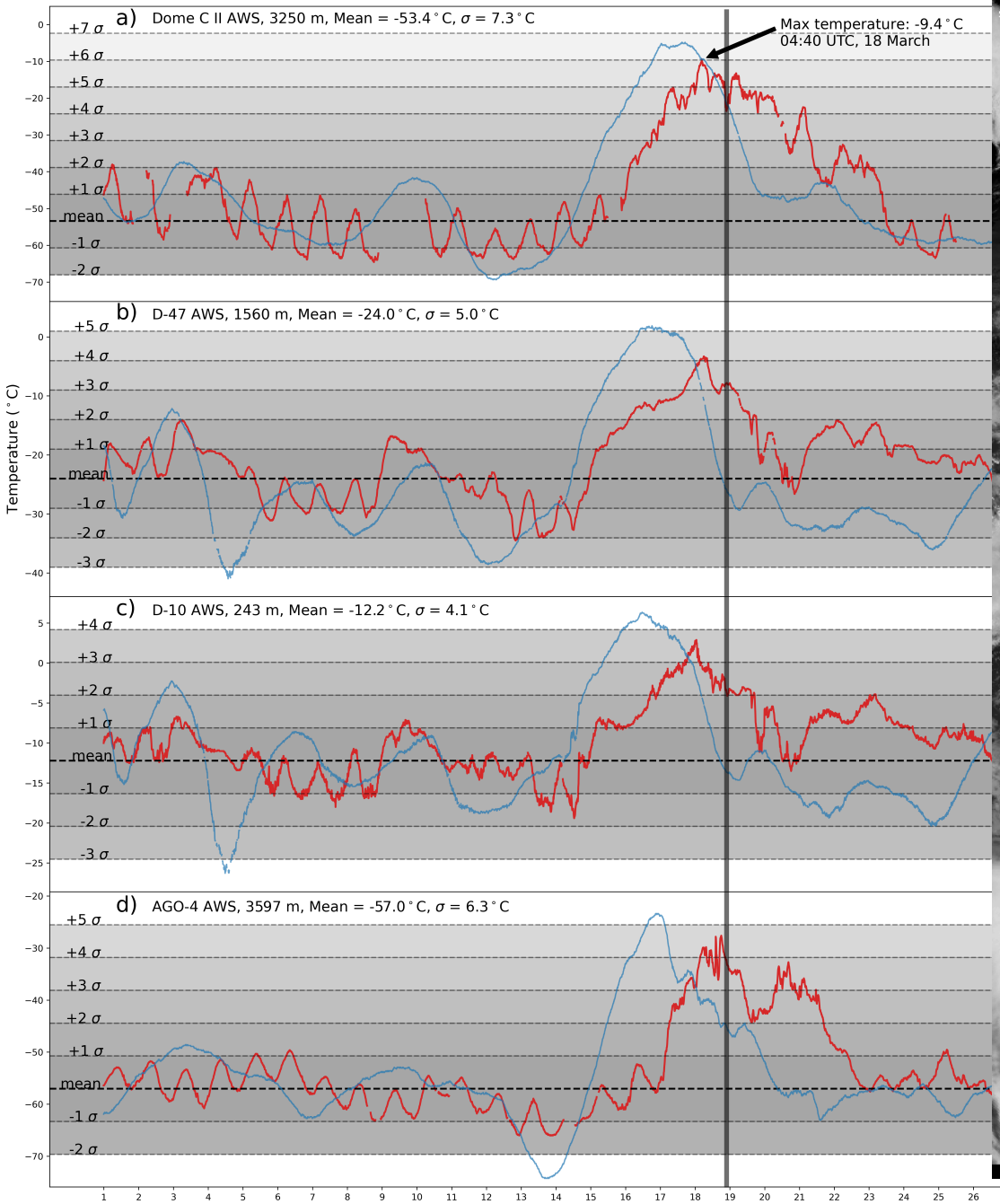
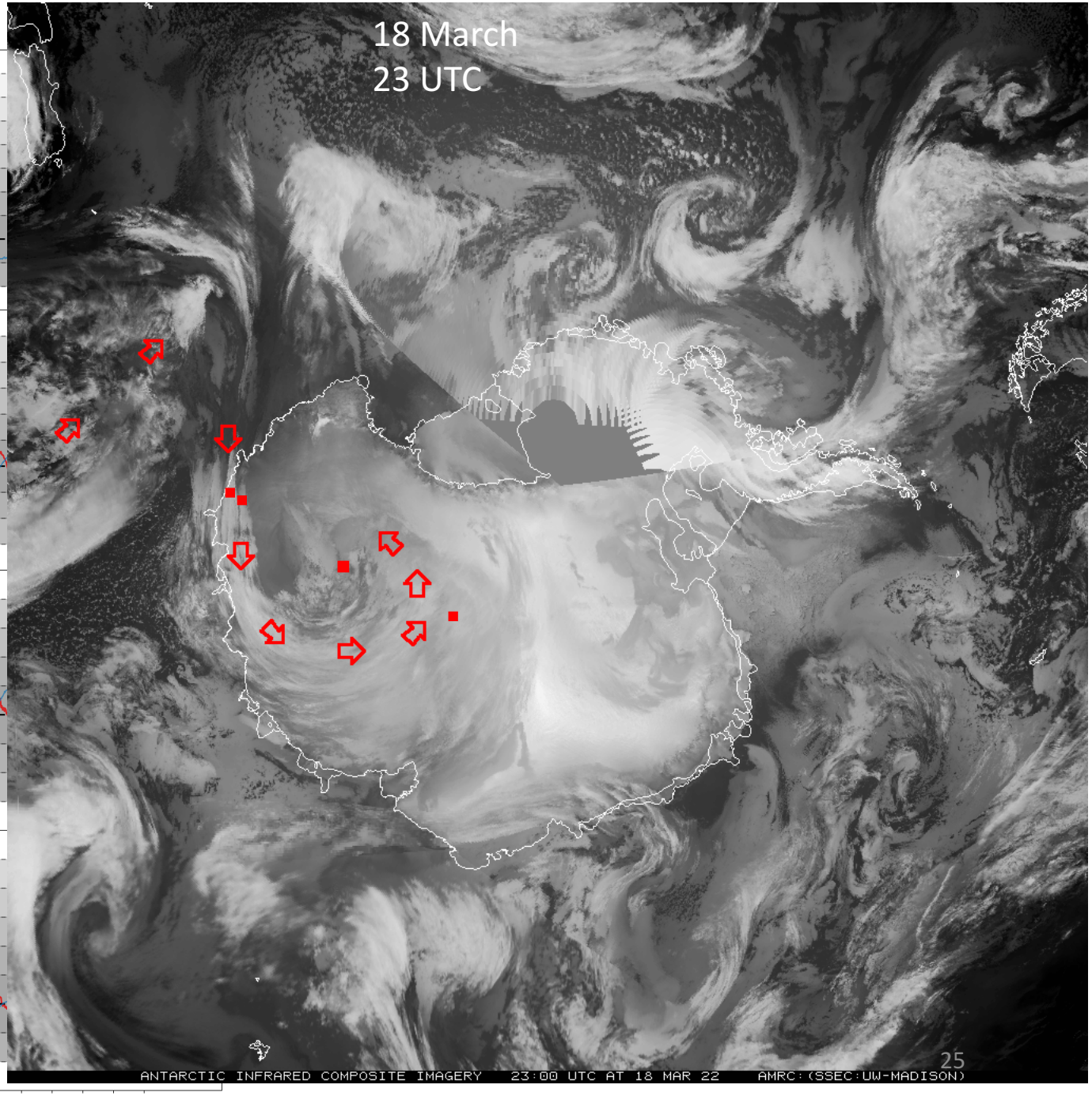
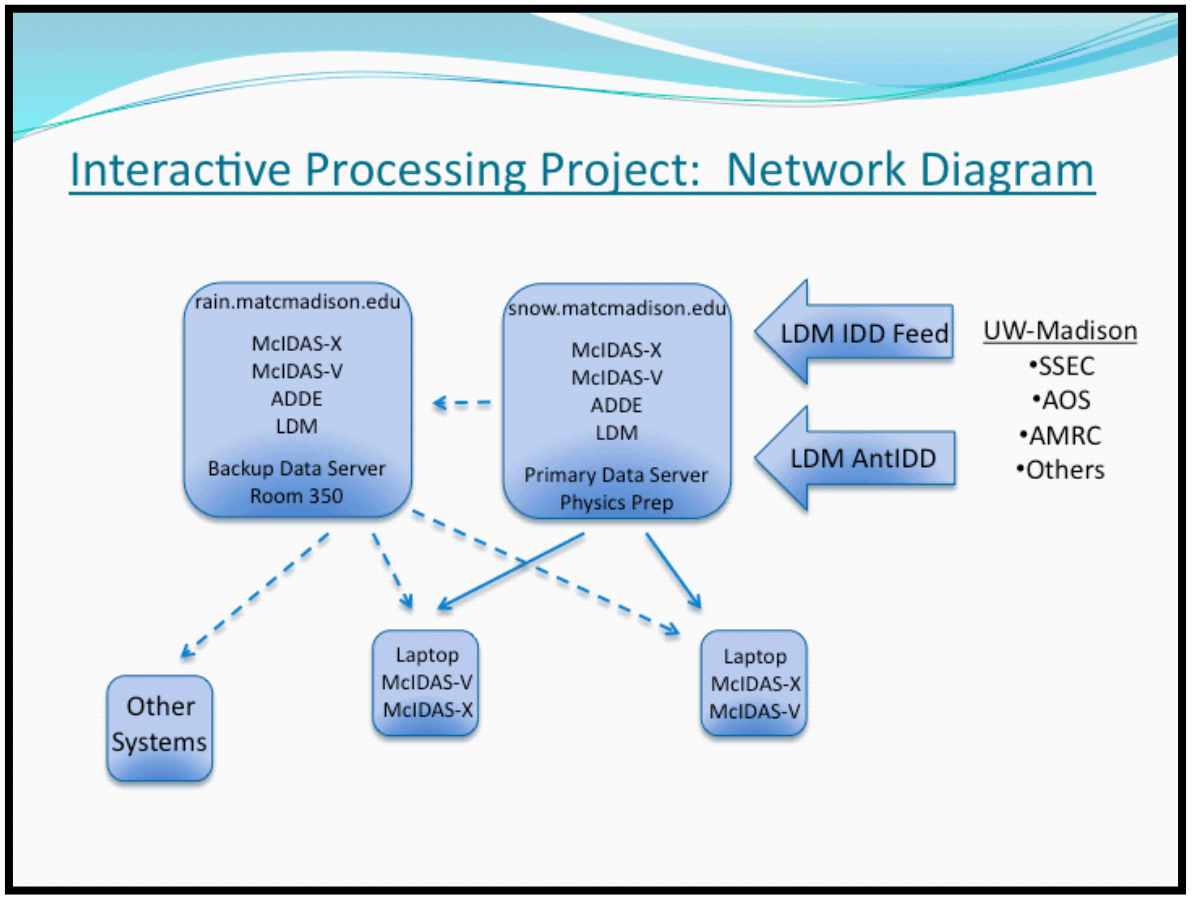




Madison College

- An unusual Unidata site
- Unidata Equipment Award 2010
- McIDAS-X: Classroom and Lab use - Macs



Madison Area Technical College Interactive Processing Project

Matthew A. Lazzara, PhD
Principal Investigator

Scott S. Lindstrom, PhD
Co-Investigator

Brian M. Goodman, PhD
Co-Investigator

Department of Physical Sciences
Arts and Sciences Center
Madison Area Technical College
Madison, WI

Draft January 2011

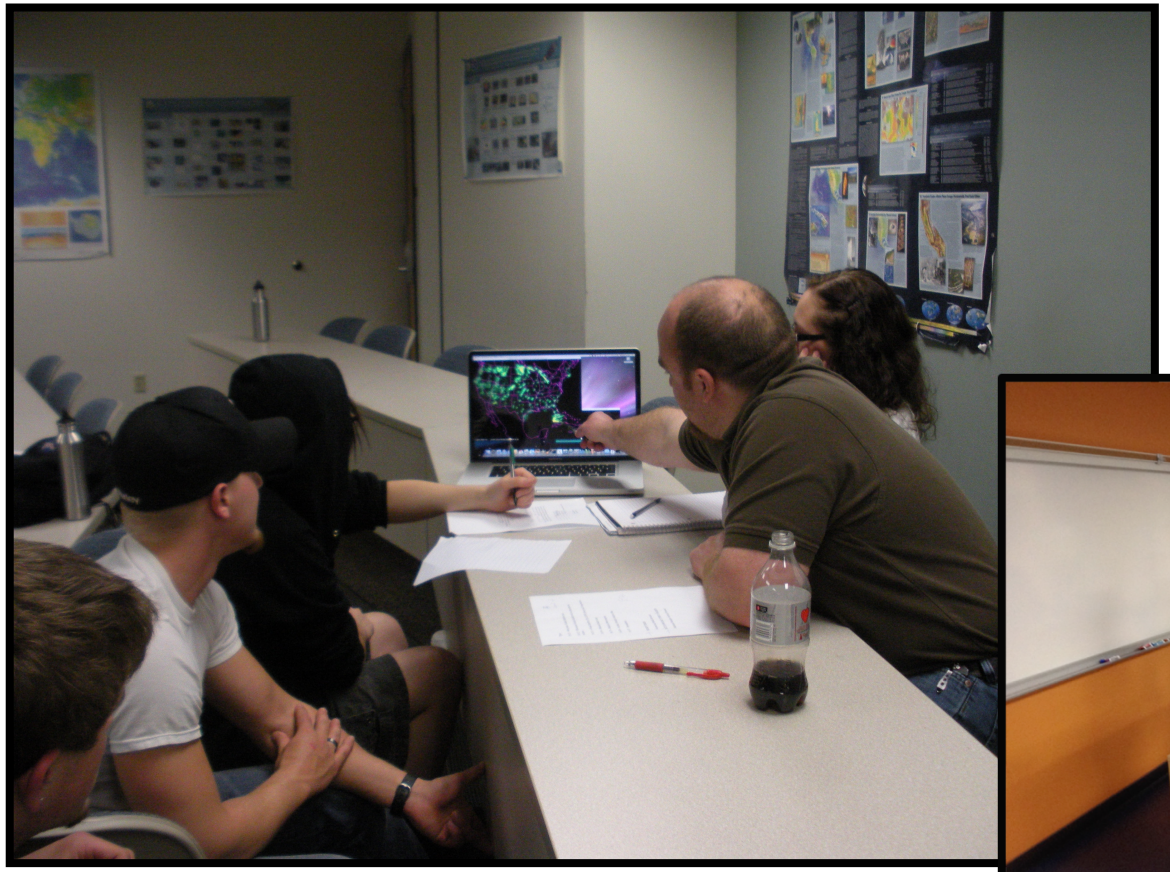
Funded by Unidata Program
University Corporation for Atmospheric Research (UCAR)

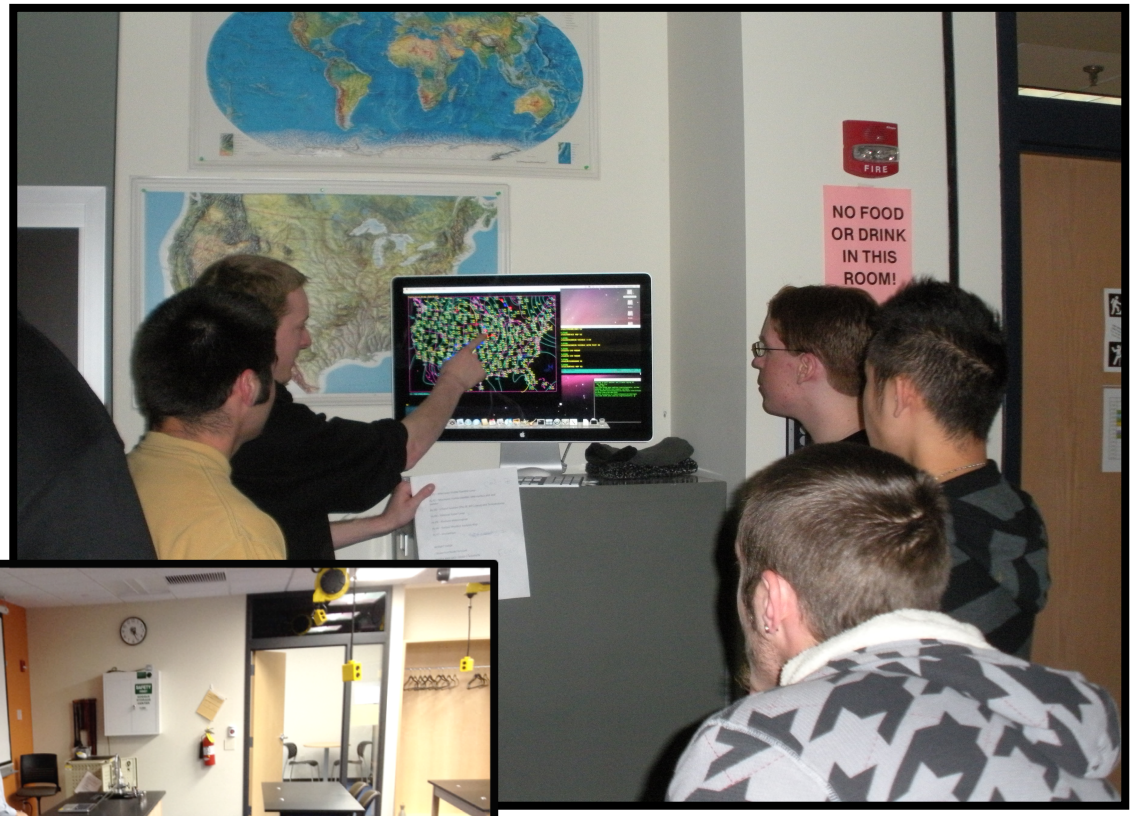
MATC McIDAS Usage

- Educational
  - Course support:
    - Weather and Climate
    - Weather and Climate Lab
    - Climate and Climate Change (less so)
    - Aviation Weather (coming spring 2024!)
    - Independent study
    - Honors meteorology
  - Other applications:
    - Astronomy observing support
    - Hall weather display/monitor
    - Research activities

Educational Experiences with Data!

- …its more than just pretty pictures!





Comments on McIDAS-X on MacOS at MATC…

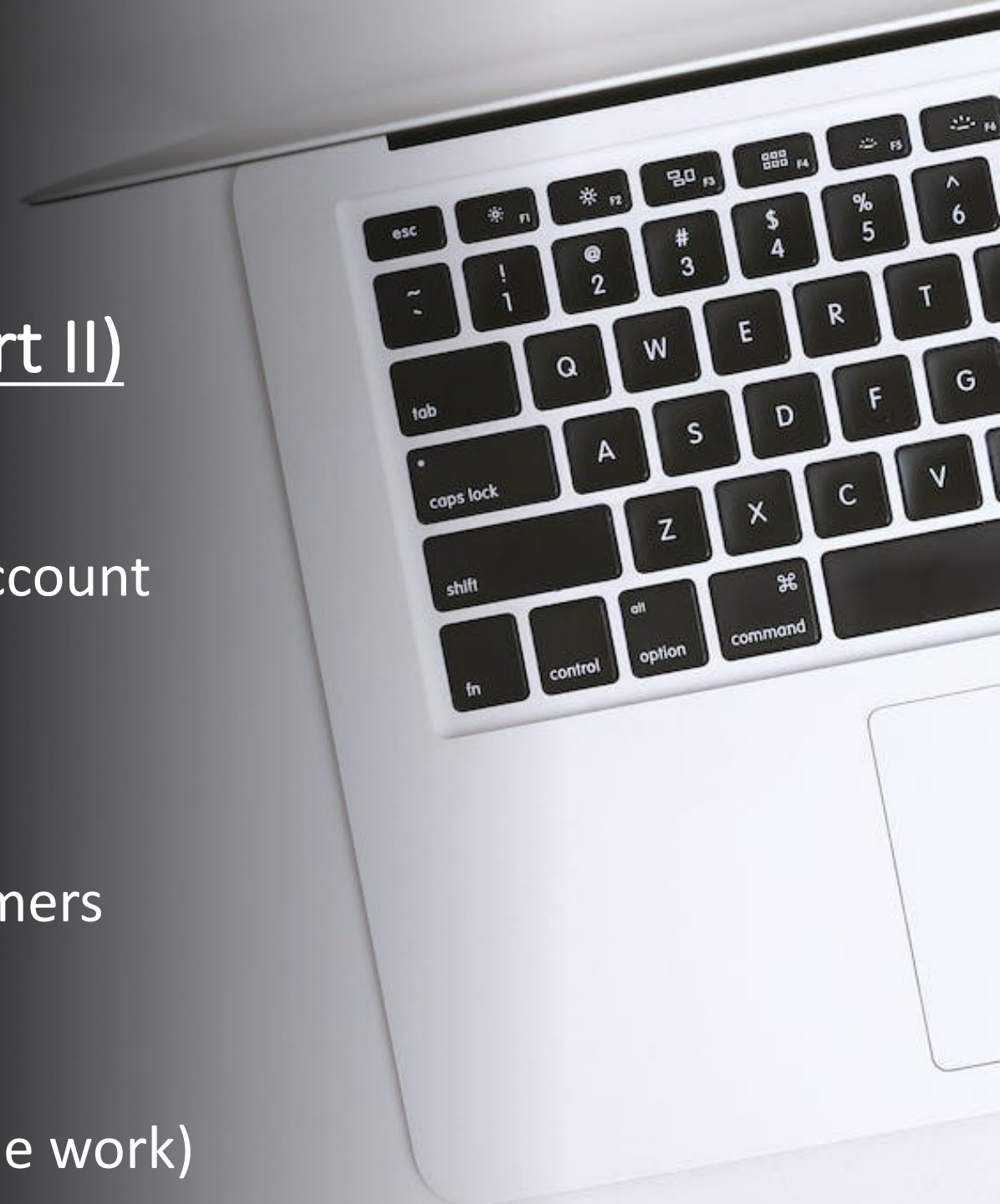
- We are a Mac shop (for our department)
- Always on the bleeding edge of new versions of MacOS
- Routine hardware “refresh” for systems
  - (on the order of 3 to 4 years or less)
- Currently on Mac’s with M2 chips system
- No utility ‘mcidas’ account due to MATC security rules
  - Installed in /User/Shared/mcidas
- JAMF management environment at MATC for Mac systems
  - “Push” or deploy software (or using a ”self-service” system)

How’d we do it that? (the Reader’s Digest version)

- JAMF - Install of CMAKE, Xquartz
- Script to trick softwareupdate to update and install Command Line Tools
- Homebrew—
  - Script found to install as root (and bypass issues with that)
  - Older version for i386 – works for Arm Architecture
  - Install in incorrect directories issues?
    - use the arch -x86_64 (Thanks Dave Paker!) command to force brew to install the dependencies as i386 and not care about the arm part
    - arch -x86_64 brew install gcc@11
- All of this has been placed into a PKG
  - Use of preinstall and postinstall script
- A few steps not mentioned here – including dealing with dependencies…
- Built mcidas in /User/Shared (make and install) and then build is zip’ed

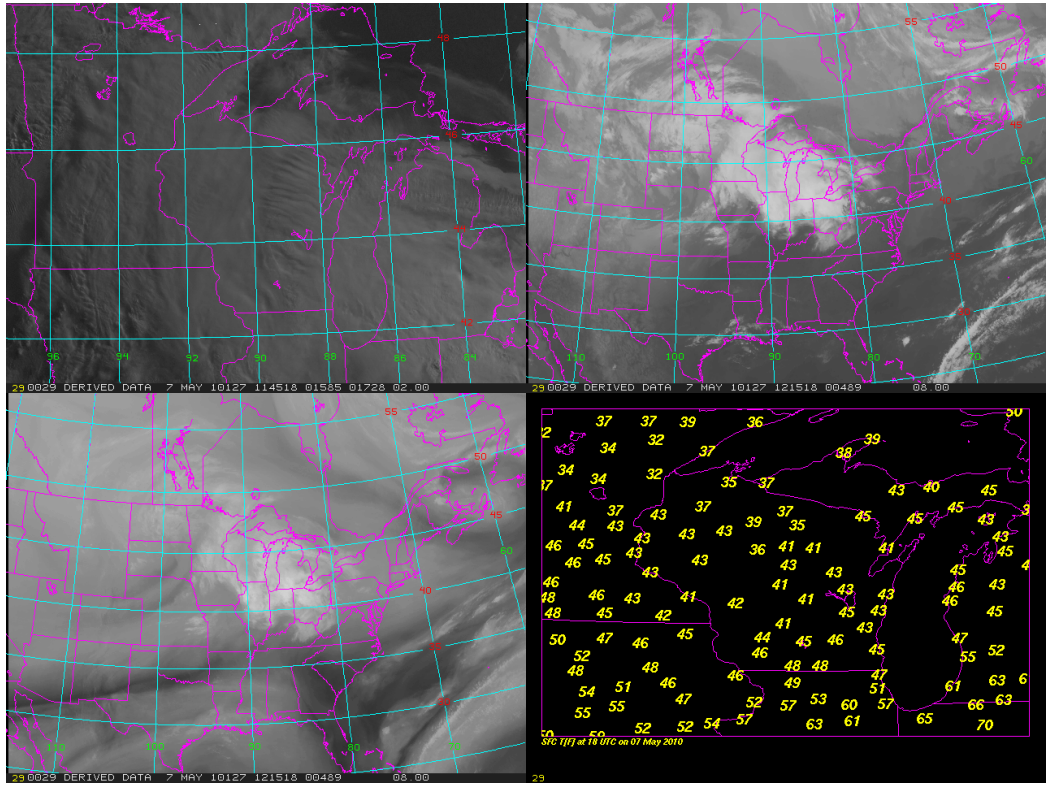
How’d we do it that?
(the Reader’s Digest version – Part II)

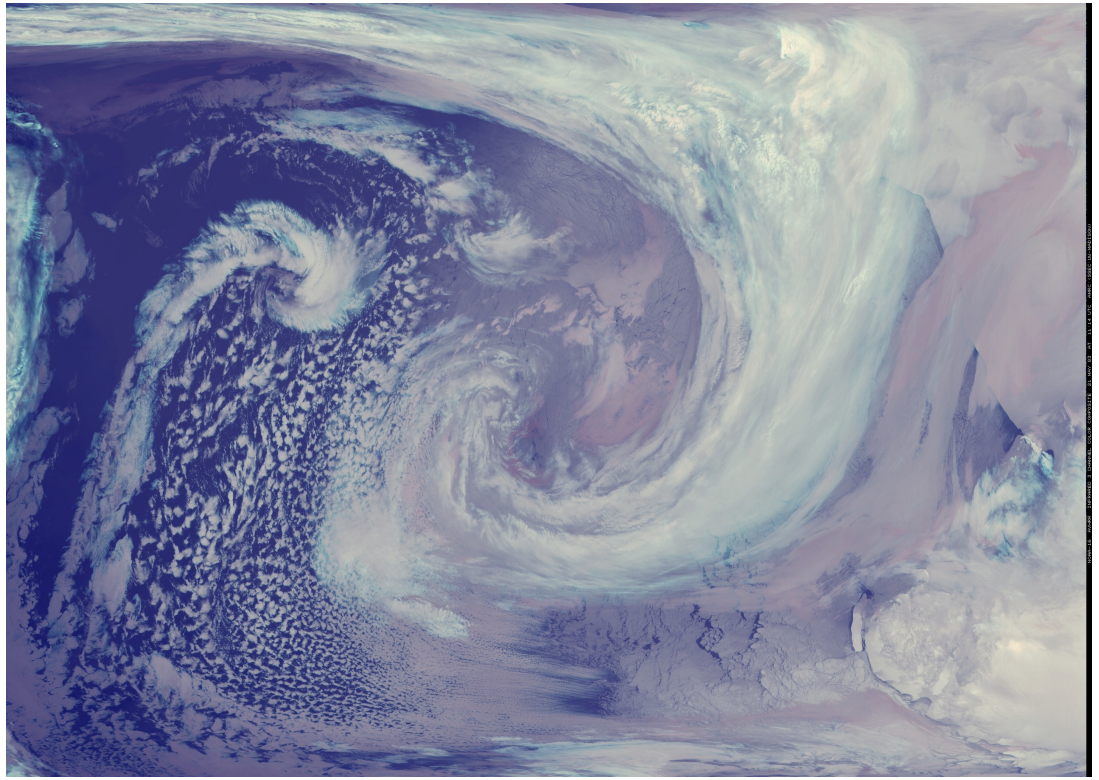
- Bottomline – it actually seems to work!
  - Just need the PKG, internet and an account named administrator
  - Only tested with Apple Silicon Macs
- Be careful trying this at home!
- (Apply all standard warnings and disclaimers here)
- …and let me know if you have questions
- (I can route them to the folks who did the work)



Two Cases of McIDAS

- **AMRDC**
- **MATC**





Thank you!! Questions?

- Thanks to MUG and fellow MUG members over the years!
- Thanks to Rick Kohrs and SSEC Satellite Data Services
- Thanks to the MUG Help Desk
- Thanks to Unidata
- Thanks to MATC (Physical Sciences) and SSEC (AMRDC)!
- Thank you to the MUG membership!
- Thanks to NSF: Grants 1924730, 1951720, 1951603, and 2301362

Lorne AWS Courtesy of Taylor Norton