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Polar Services

UNITED STATES ANTARCTIC PROGRAM

**The South Pole Meteorological Comparison
and CLIMAT Message Projects**

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OUTLINE

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- **COMPARISON PROJECT**

- Old Met Station at Pole
- New Met Station(s) at Pole
- Objectives
- Sample Initial Results

- **CLIMAT PROJECT**

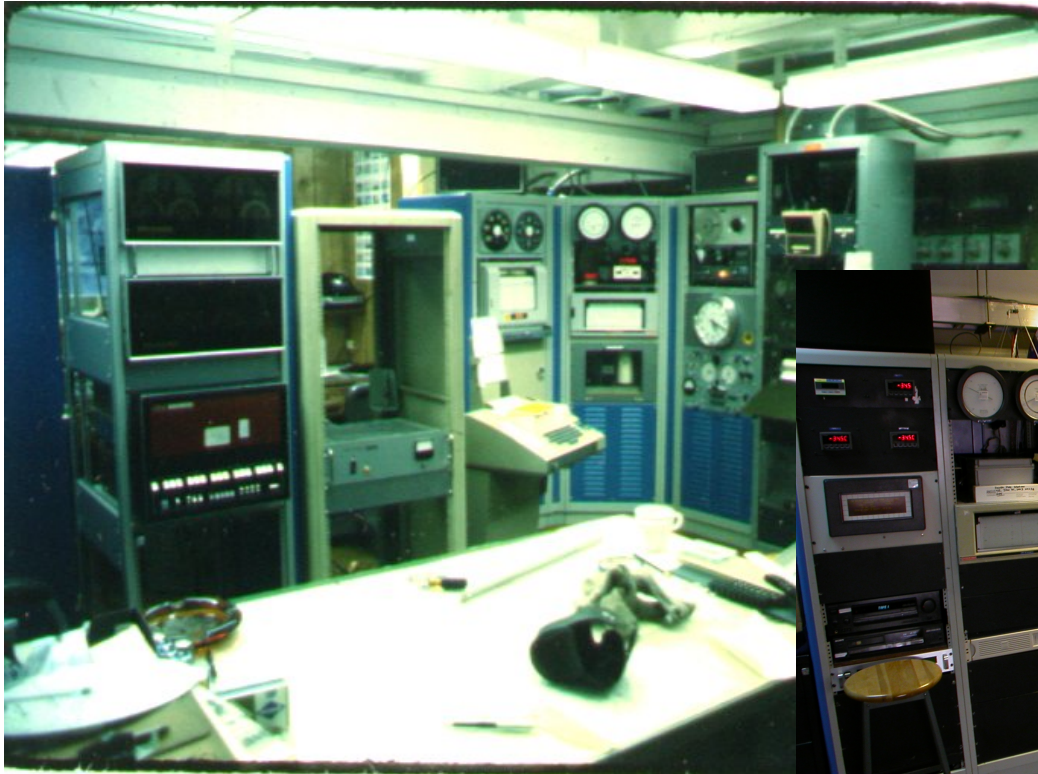
- Joint support
- Objectives
- Implications





Old South Pole Met Station

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Old South Pole Met Station Sensors

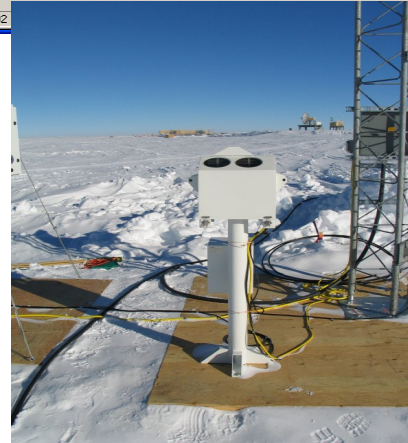
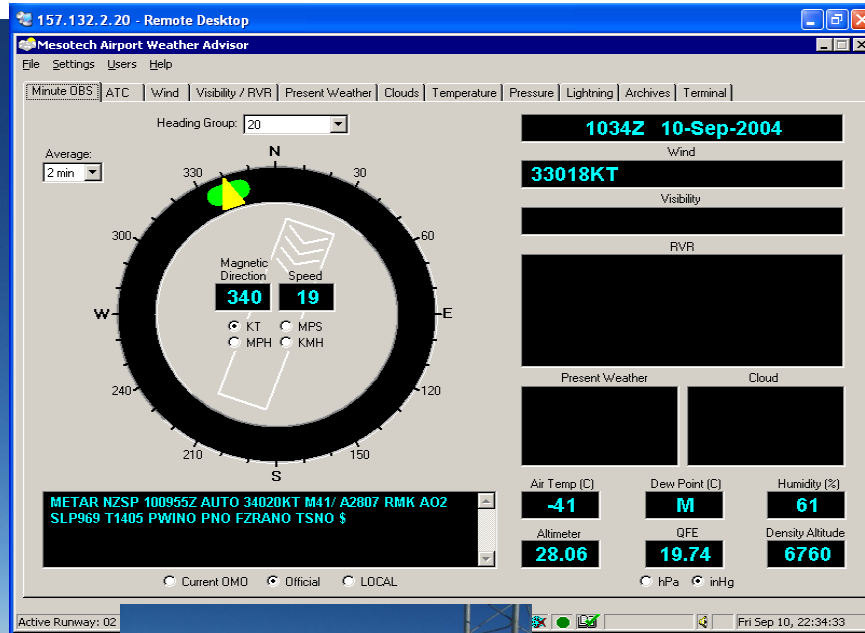
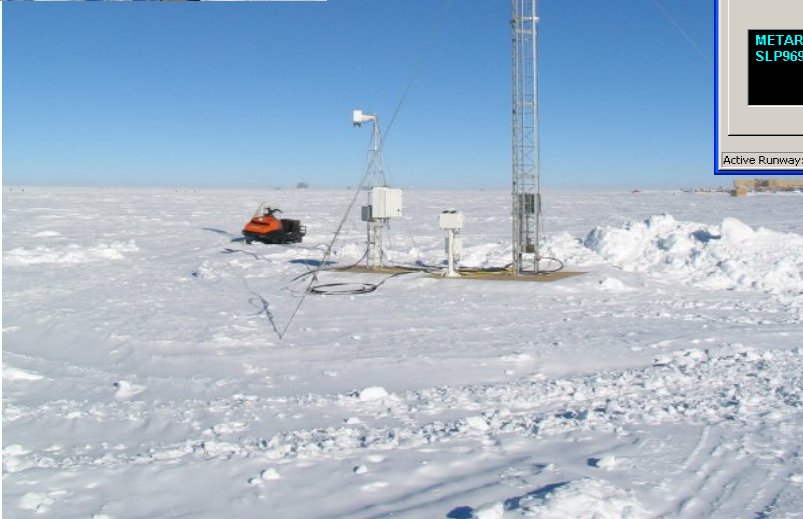
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- **Researching sensor specs to acquire operational and accuracy ranges etc**
 - **Temperature:**
 - Omega Platinum RTD Probe – Model PR-14-3-100-1/4-6-E
 - Omega DP41 High Performance Digital Temperature Indicators
 - Qualimetrics Motor Aspirated Radiation Shield
 - Backup system was Rosemount Platinum RTD displayed on Esterline Angus Thermograph.
 - **Pressure:**
 - Navy digital” barometer located in dome Met office.
 - Backups: Kollsman aneroid barometer and Belfort Microbarograph.
 - **Winds:**
 - RM Young Wind Monitor – Model 05103 on Met Tower 1
 - RM Young Wind Tracker digital display M-Tek Chart Recorder
 - Backup: Identical RM Young on Met Tower 3 and
 - Navy UMQ-5 windbird on Met Tower 1 (above RM Young)



New South Pole Met Station (s)

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New South Pole Met Station Sensors

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- **Temperature: Operating range: down to -80C , accuracy .2C**
 - **Temp/RH sensors: RM Young, 43440, temperature-humidity plug-in probe with aspirated radiation shield (precision resistance temperature detector (RTD) and capacitive humidity sensor).**
 - **Pressure: Operating range: down to -40C, 600 – 1100 hPa, accuracy .75hPa**
 - **Barometers: Druck, , 3 resonant silicon transducer barometers located inside the FDCU enclosure on the Clean Air tower (readings from the 3 barometers are averaged and at least 2 of 3 must be within .1 MB).**
 - **Winds: Operating range: -70C - +55C, 0-60m/s, accuracy .67 mph**
 - **RM Young, 05103**



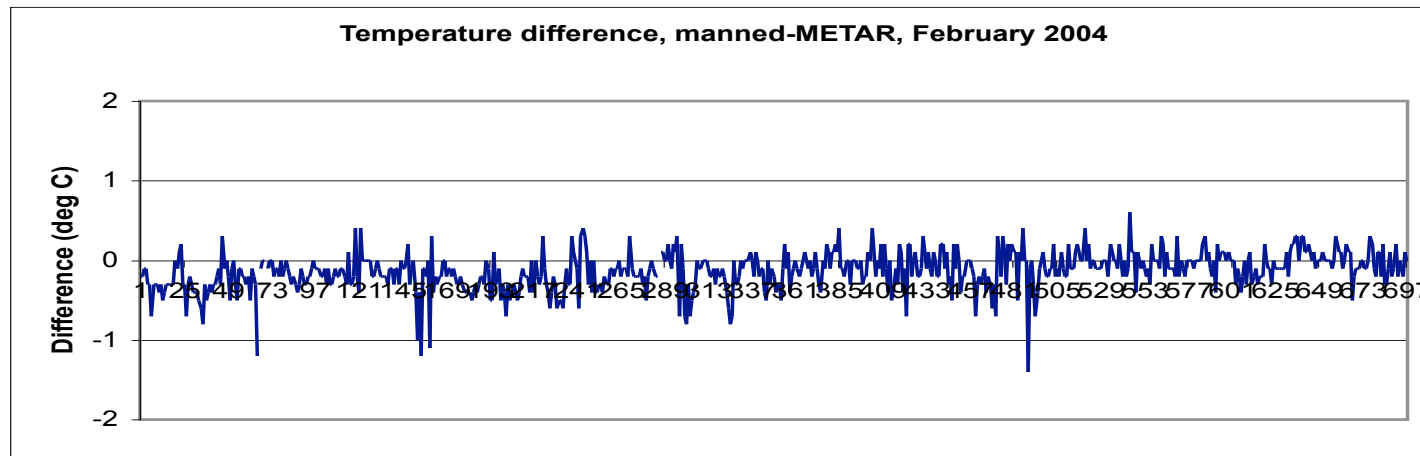
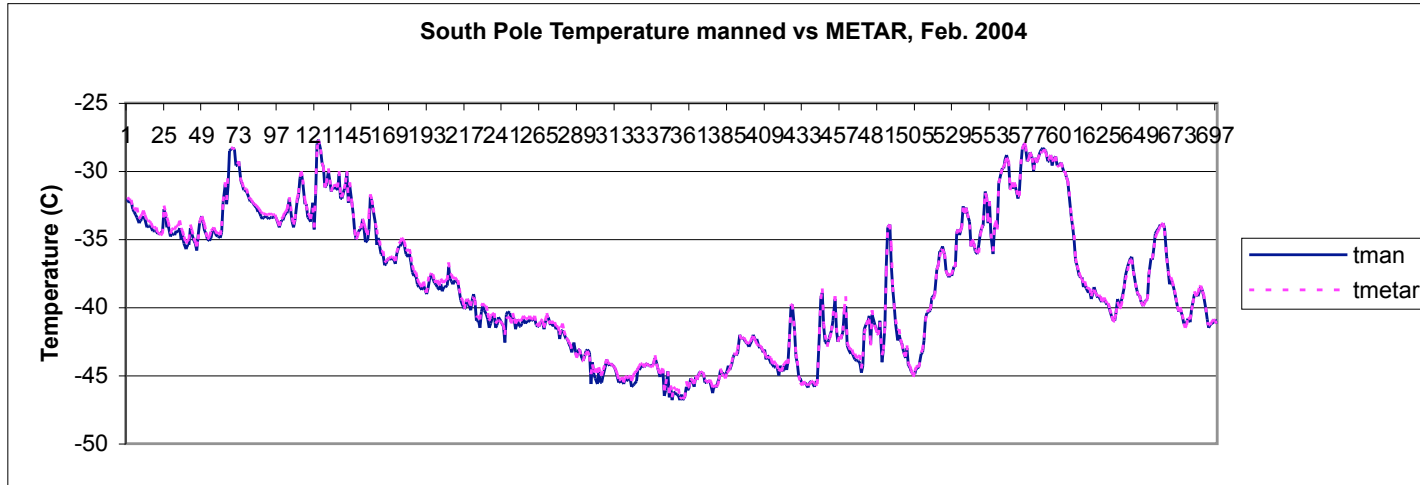
Comparison Objectives

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- **One year overlap of observational data**
 - **Compare the data between:**
 - **Old South Pole instruments/sensors**
 - **New Coastal Environmental OS-21**
 - Clean Air
 - Ski Way
 - **UW's Clean Air AWS**
 - **Outcomes:**
 - **Searching for any differences**
 - **Documented for science and climatological use**
 - **Plans to publish results**
 - Basics in a peer-reviewed journal
 - More complete report as a UW-SSEC publication



Example #1: February Temperatures

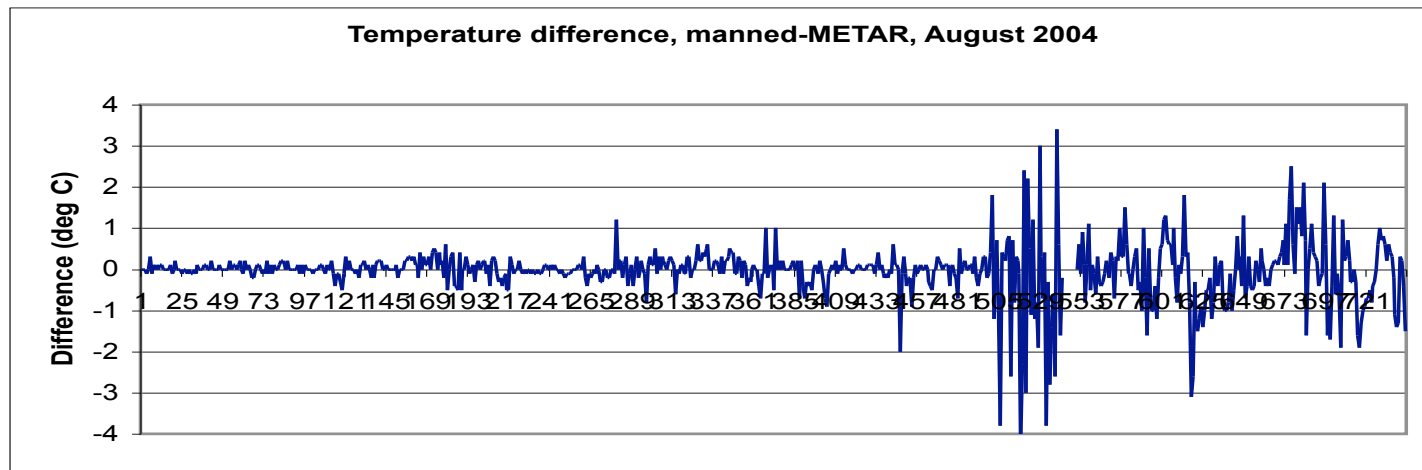
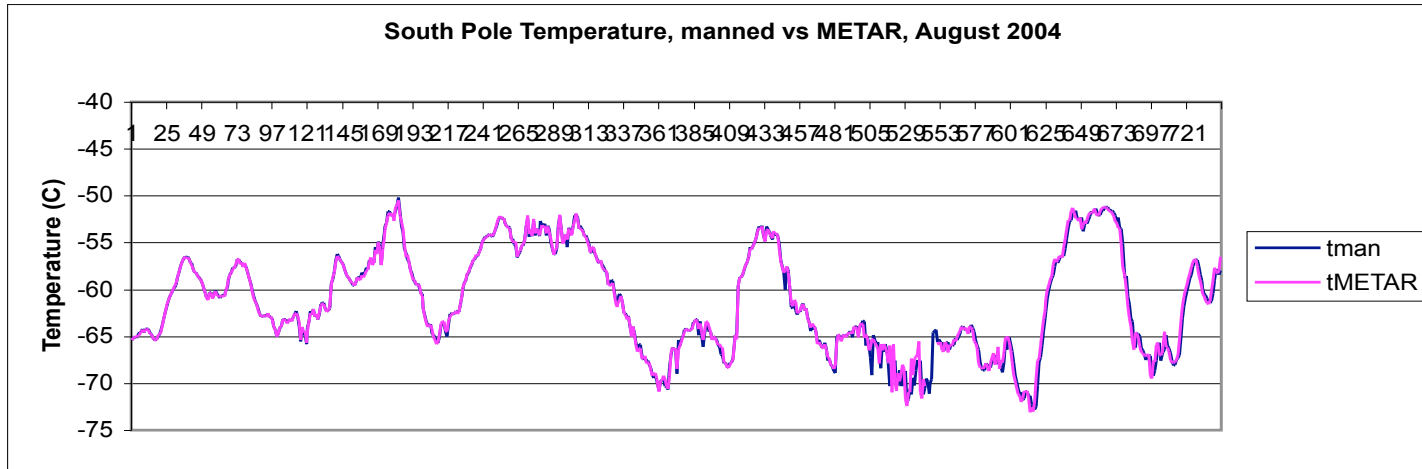


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Example #2: August Temperatures

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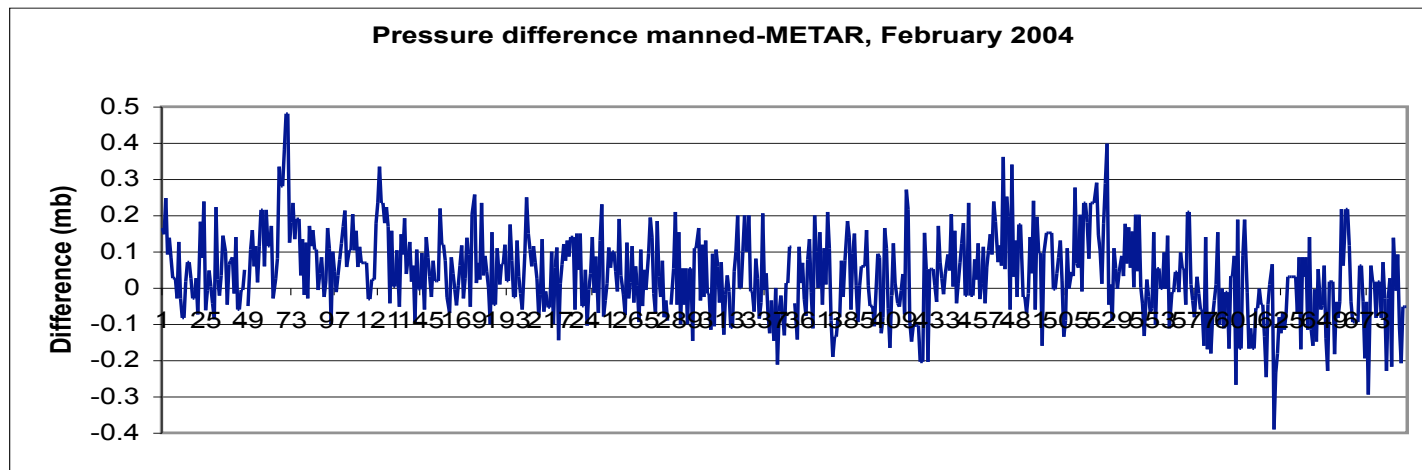
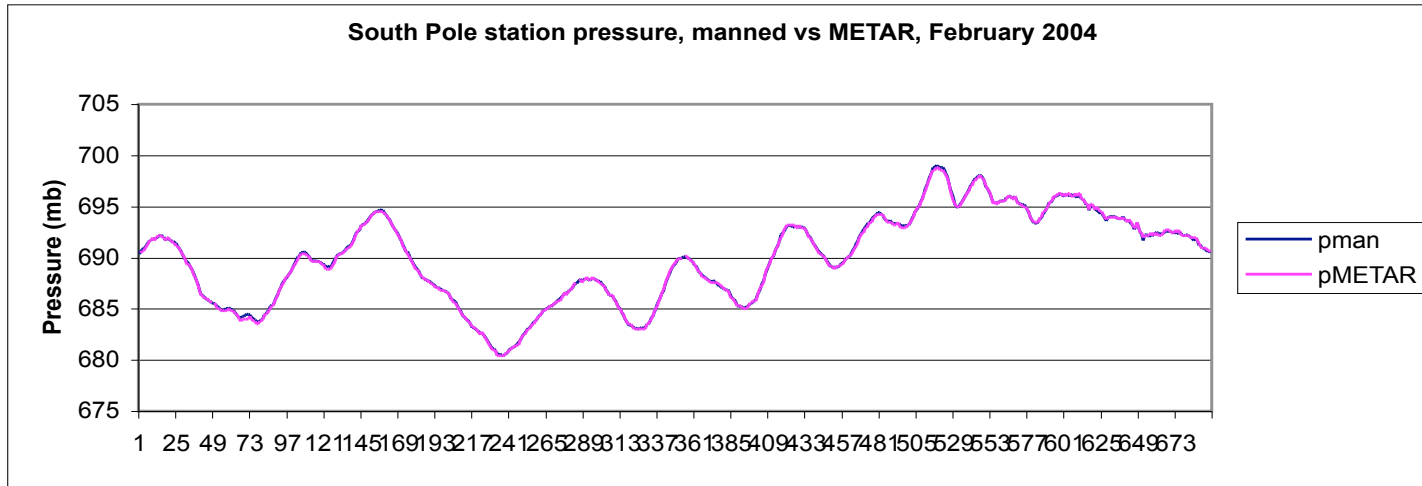


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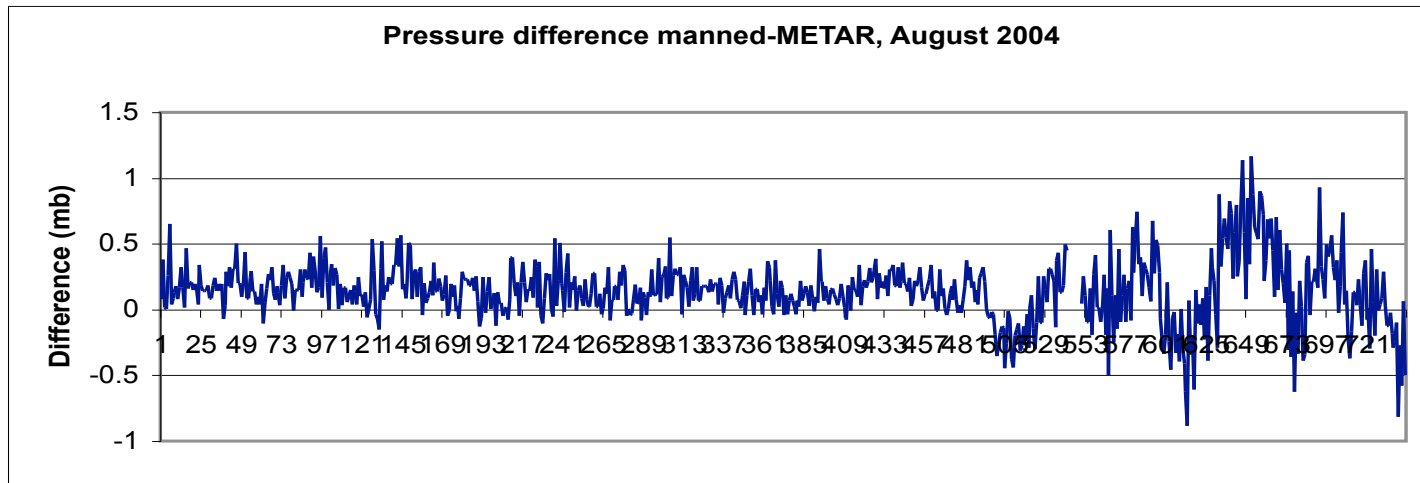
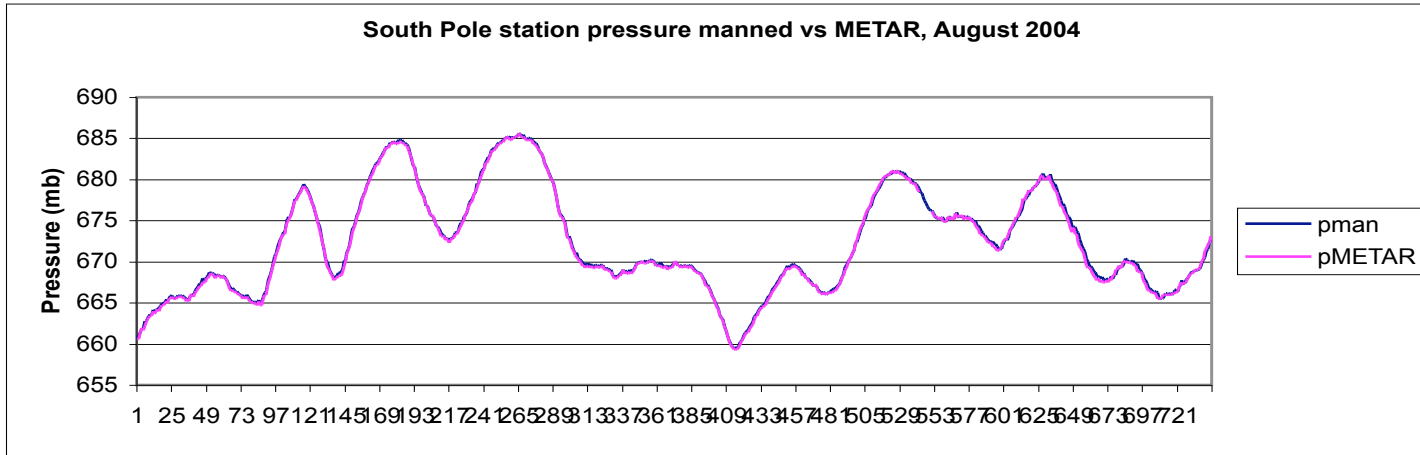
Example #3: February Pressures



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Example #4: August Pressures





Work in progress...

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- **The effort is in progress and not complete yet**
 - **Will be adding the UW Clean Air AWS to the comparison**
 - **Will complete temperature and pressure comparison**
 - **Will pursue other variables**
 - Wind Speed and Direction, etc.



South Pole CLIMAT Message Project

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- **AMRC and RPSC Contacted by WMO subcommittee (GCOS)**
 - Concerned about planned changes in computing average temperatures
 - **AMRC and RPSC submitted proposal to NOAA/NCDC:**
 - Create CLIMAT messages (historical and real-time)
 - NSF supporting RPSC portion of the effort
 - NOAA/NCDC slated to fund AMRC portion of effort
 - **Will utilize WMO CLIREP software for historic and eventual real-time generation**



Building the Climatology, discoveries in the data....

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- **NCDC observational data from 1957 – 1988, original electronic files still available for 1988 to the present**
 - **Previously calculated averages and extremes have differences – going by the observations unless temp and wind extremes from climate reports are ‘more’ extreme**
 - **Will produce new records in some cases**
 - **Some missing data incidents will now be resolved**
 - **New monthly climate reports will document changes**



Outcomes

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- **Complete historical CLIMAT messages 1956-present**
 - Delivered to NOAA/NCDC
 - Available from AMRC servers
 - **Initiation of real-time CLIMAT message generation monthly from South Pole to GTS**
 - Possible availability on Antarctic-IDD?
 - **Be a model for other pending efforts**
 - McMurdo Station
 - Palmer Station
 - Selected US AWS sites
 - Historical USAP stations? (e.g. Siple, Plateau, etc.)



Example Output

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ZCZC

CSUS01 NZSP 221847

CLIMAT 01000 27612

**111 19907 20107 31063062 410431082 5035 7024040 8010222
9010401**

**222 06190 10011 29011 31102030 410521152 5012 6004505
7060 8101010 9112233**

333 22818 63030 73000 8010000

444 0000910 1118726 2001709 3120326 5112030 6//01 711503 =

NNNN



Thank you!

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- **Thanks to NSF**
 - Al Sutherland
 - Sue LaFratta
 - Karl Erb
- **Thanks to NOAA/NCDC**
 - Howard Diamond
 - Thomas Petersen
- **WMO**
 - Dick Thigpen

