
# Real-Time Water Quality Monitoring at Clam Bayou St. Petersburg, Florida

Mark E. Luther, Jeff Scudder, Dan Otis, Gerardo Toro-Farmer, and Frank Muller-Karger, University of South Florida College of Marine Science

Mike Lizotte, YSI/Xylem

Ryan P. Moyer, Christina E. Powell, Fish and Wildlife Research Institute, Florida Fish and Wildlife Conservation Commission

SECOORA Annual Meeting

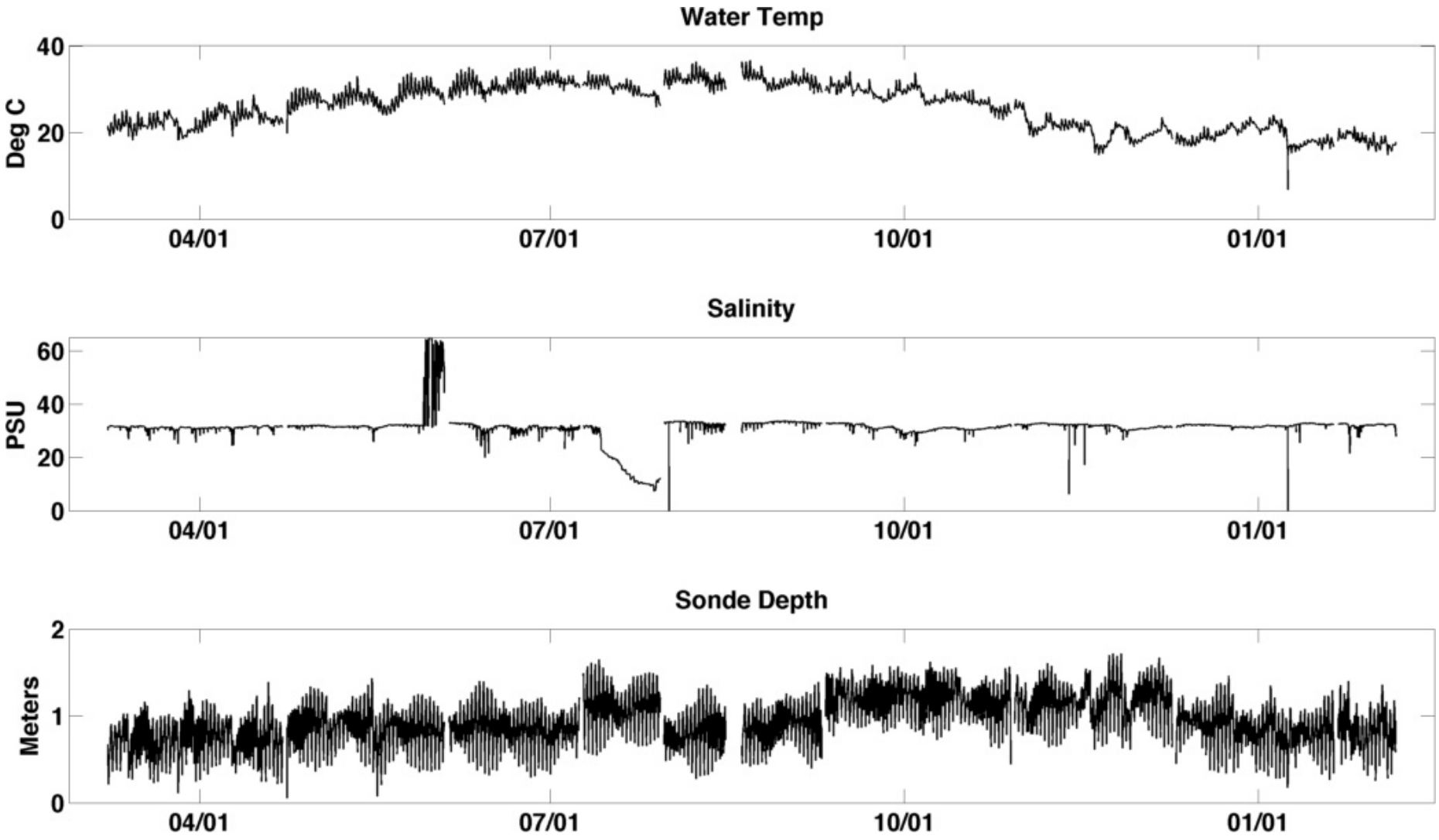
May 20, 2015


8/28/2013 2:56:32 pm
2 pm
5 pm
USF TSTSTA DOMSATANTE 001
Paradise Island
South Causeway Isles
South Pasadena
Gulfport
Clam Bayou
USF COMPS Clam Bayou QW Monitor
USF COMPS Clam Bayou Meteorological Measurements
Coquina Key
Boca Ciega Bay
St Pete Beach
Boca Ciega Isle
Gulfport Middle Ground
Long Key
Mud Key
Sol, Isla del
Bird Key
Indian Key
© 2014 Google
Image © 2014 TerraMetrics
Google earth
1994
Imagery Date: 1/17/2014 27°43'27.89" N 82°41'30.74" W elev 2 ft eye alt 32044 ft

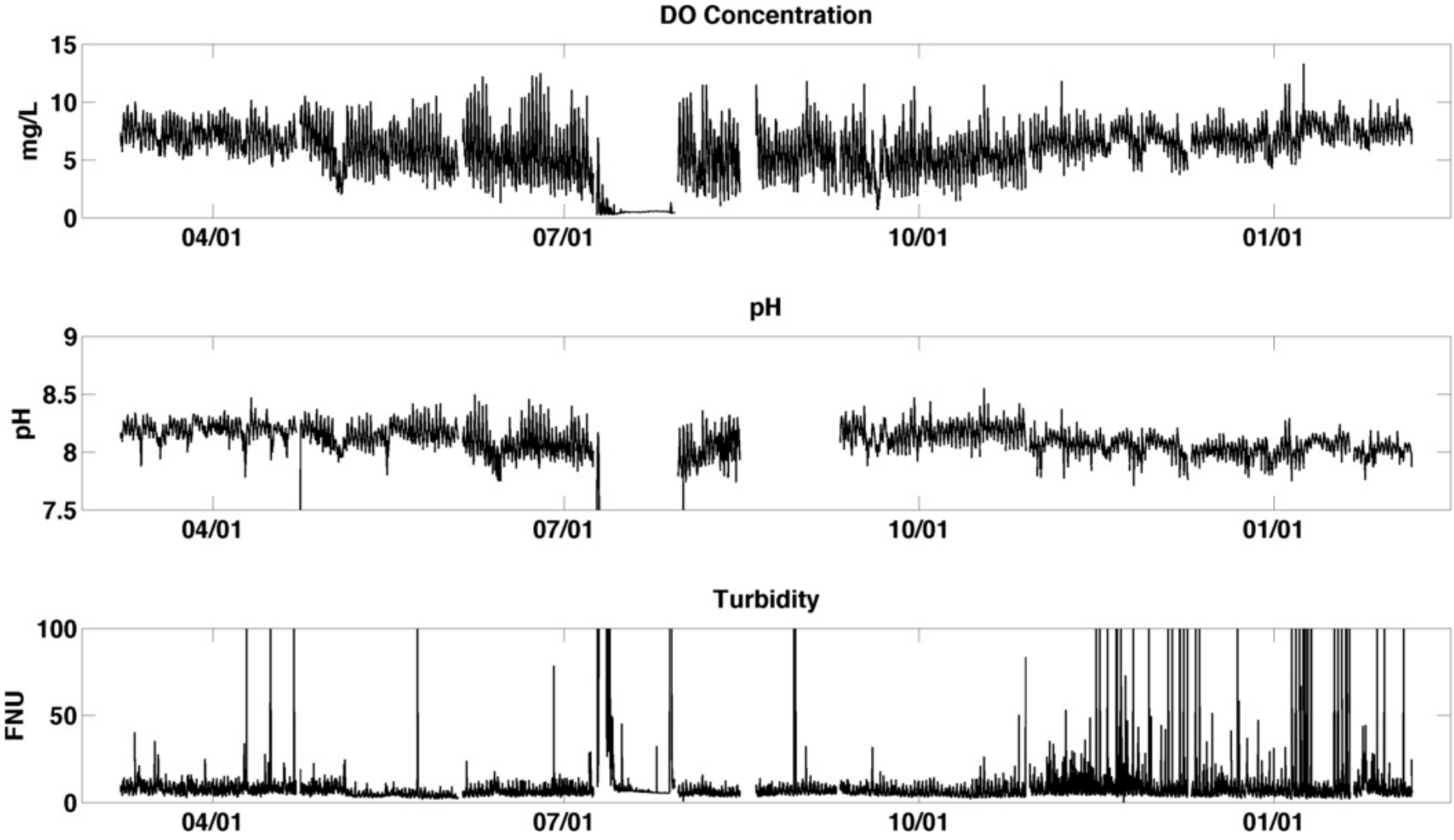
# Sensor suite

- Atmospheric parameters: wind speed and direction, air temperature, relative humidity, barometric pressure and rainfall
- Water quality parameters: water level (Radar, Bubbler, and Pressure), dissolved oxygen, salinity, water temperature, chlorophyll and CDOM fluorescence, pH, and turbidity (YSI EXO$^2$ Sonde)

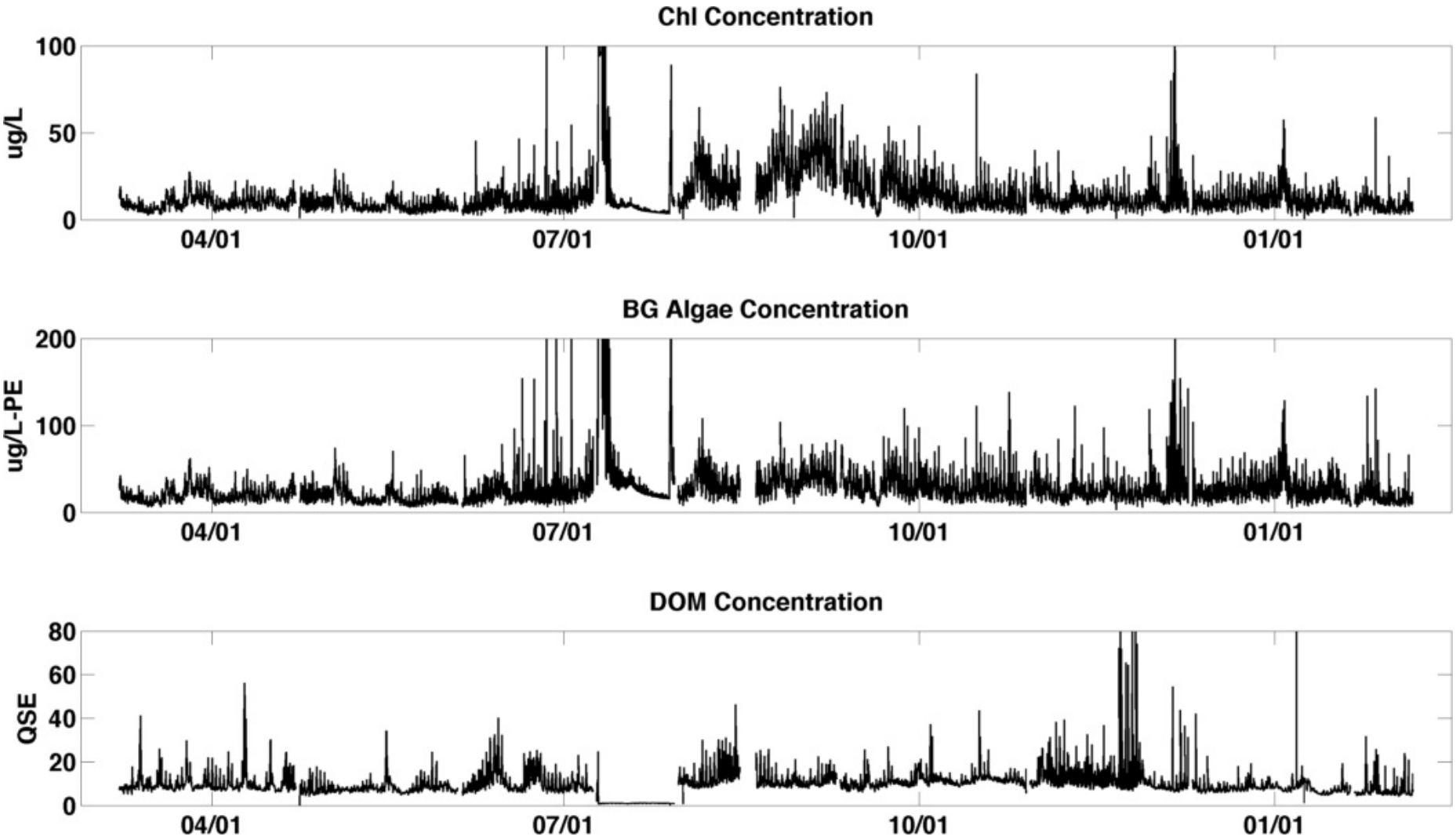
# Water Quality Data – YSI EXO² Sonde



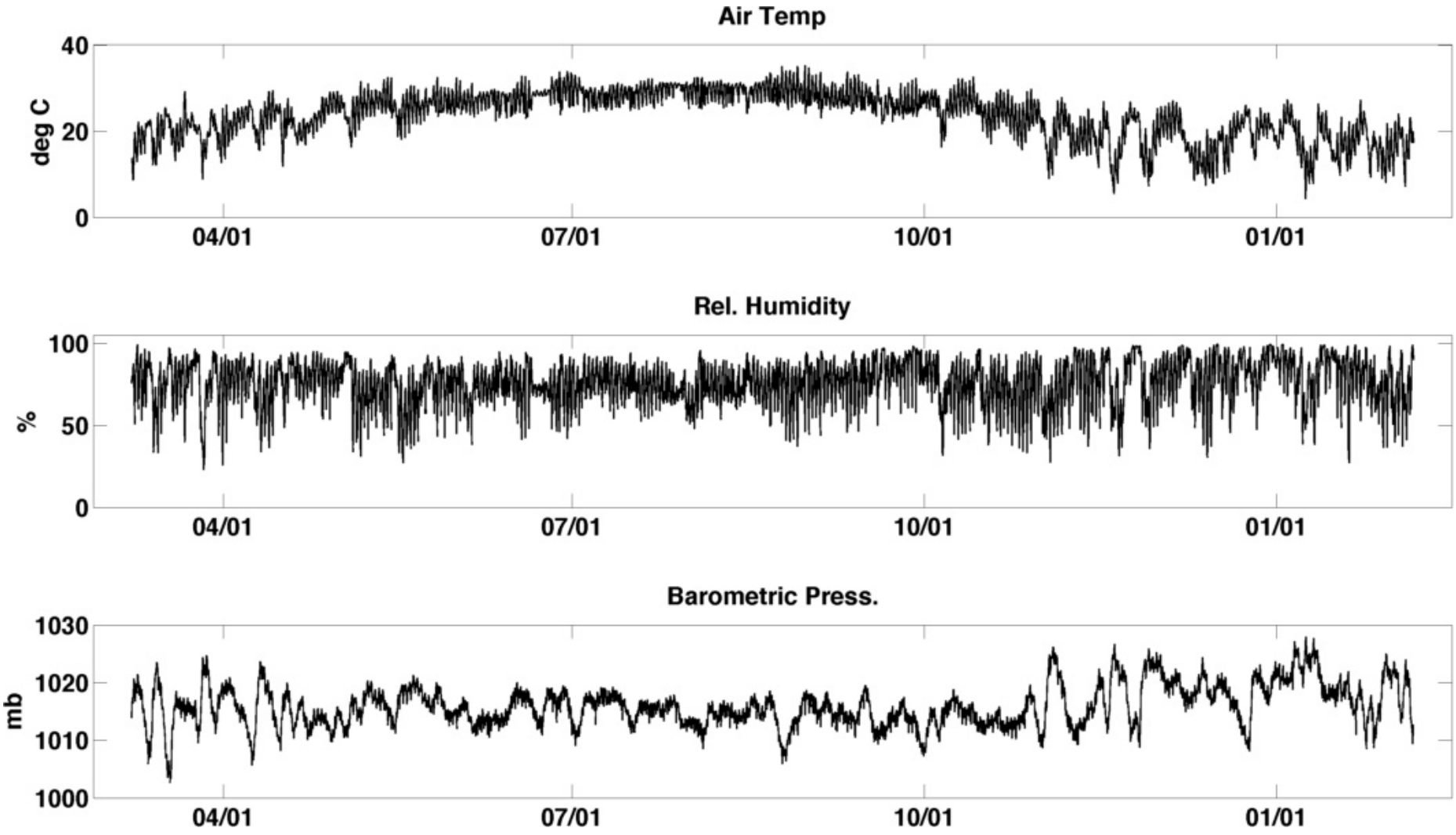
# Water Quality Data – YSI EXO² Sonde



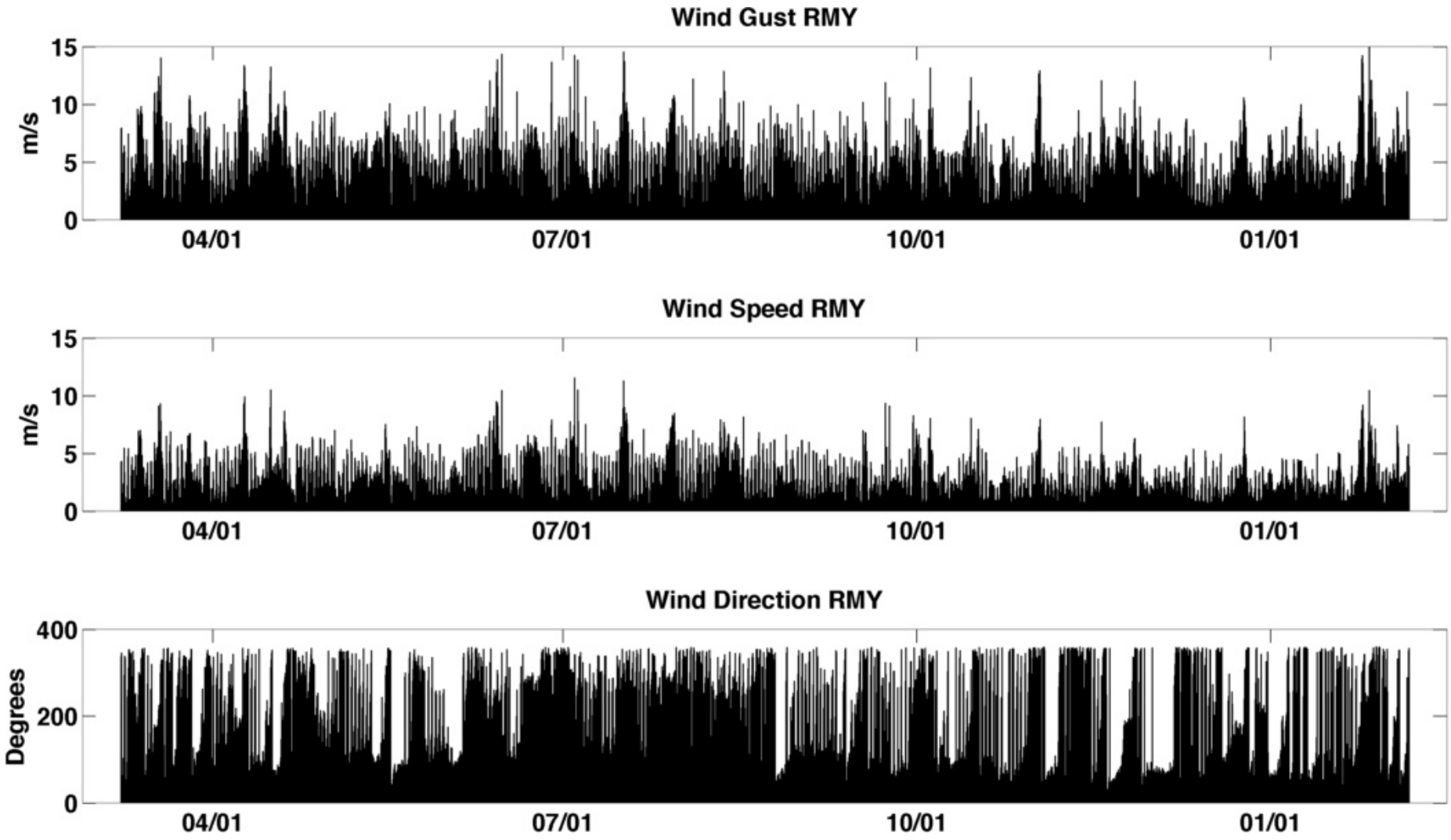
# Water Quality Data – YSI Sonde



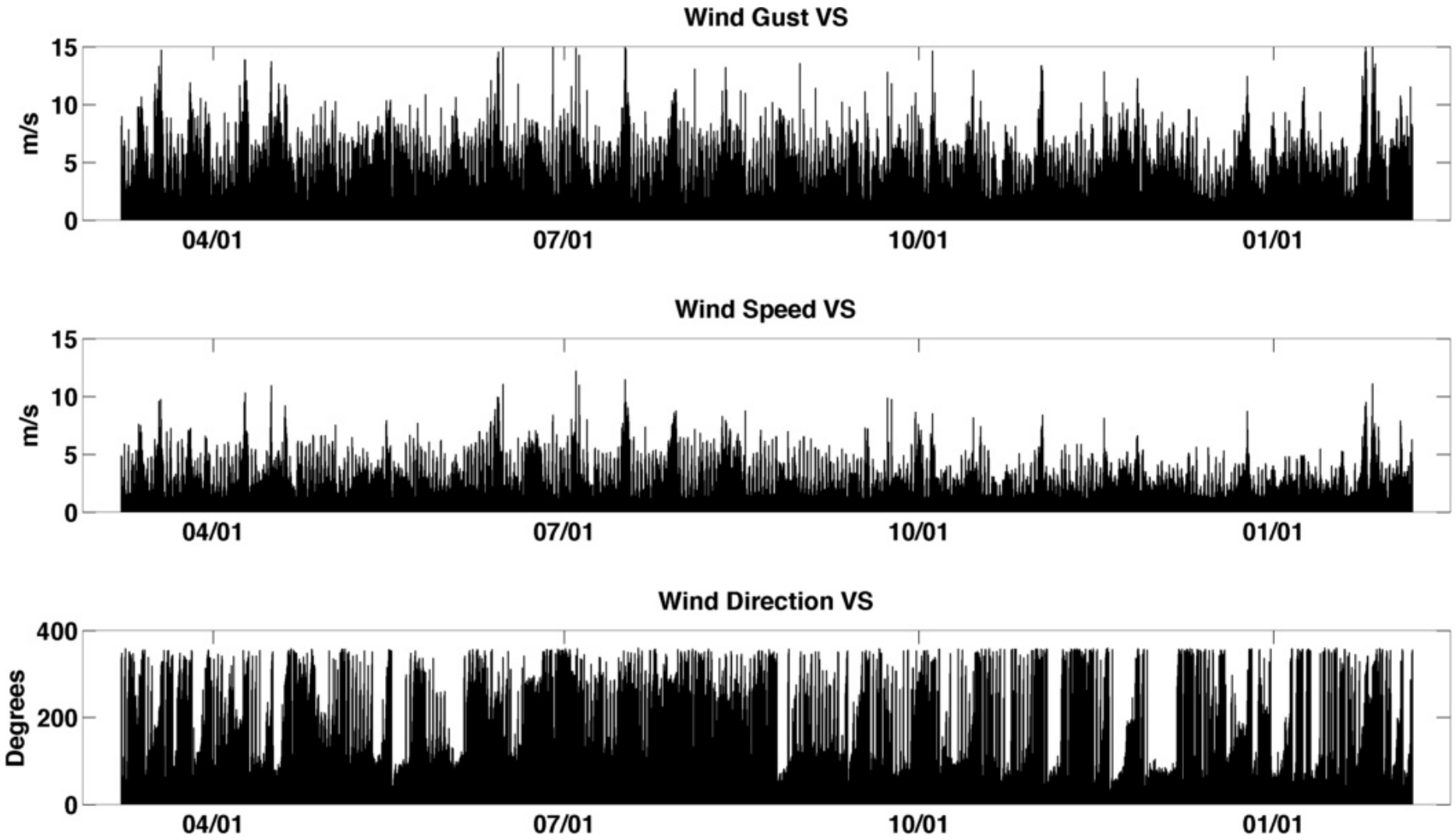
# Met Data

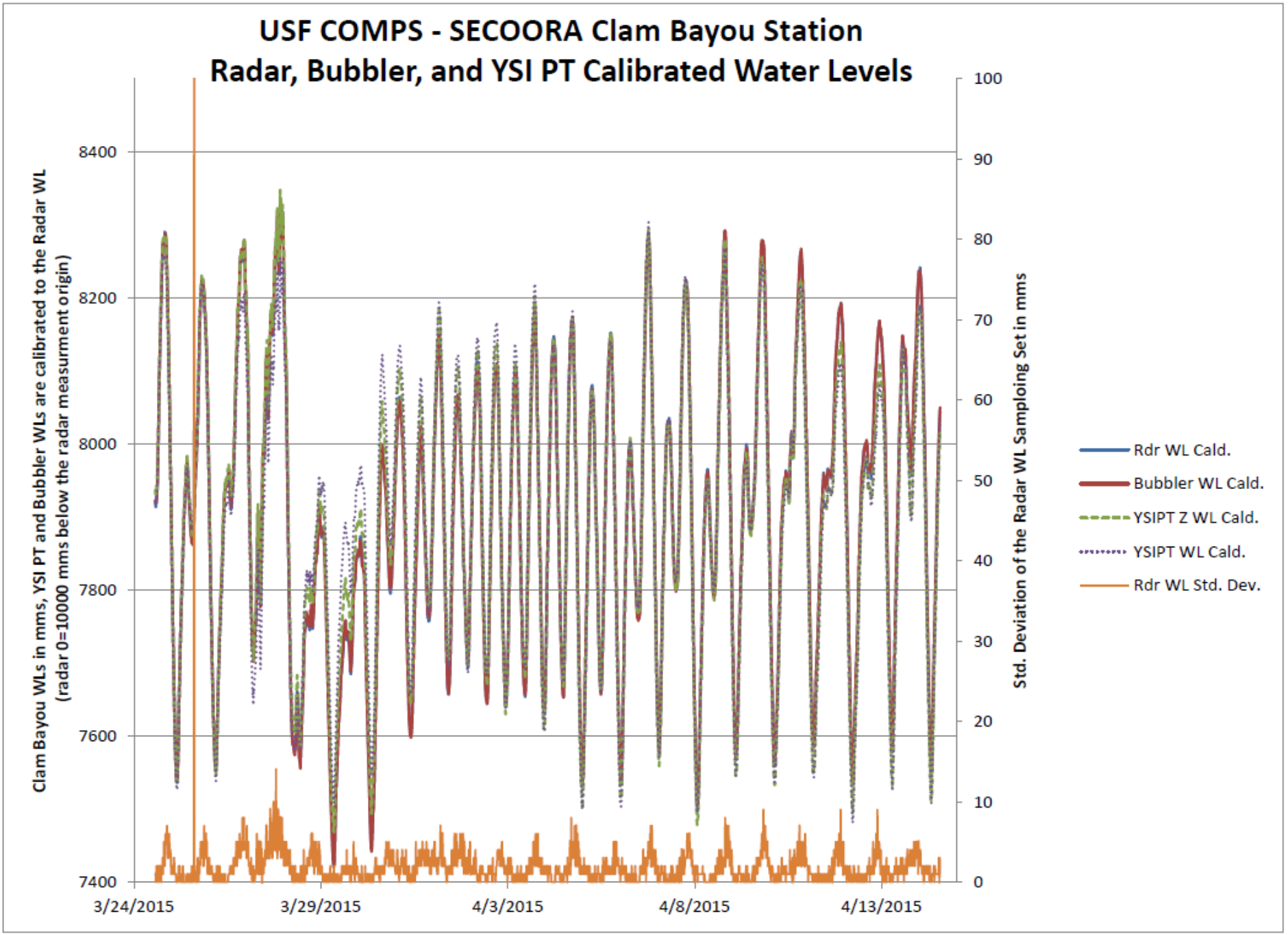

Air Temp
deg C
40
20
0
04/01
07/01
10/01
01/01
Rel. Humidity
%
100
50
0
04/01
07/01
10/01
01/01
Barometric Press.
mb
1030
1020
1010
1000
04/01
07/01
10/01
01/01

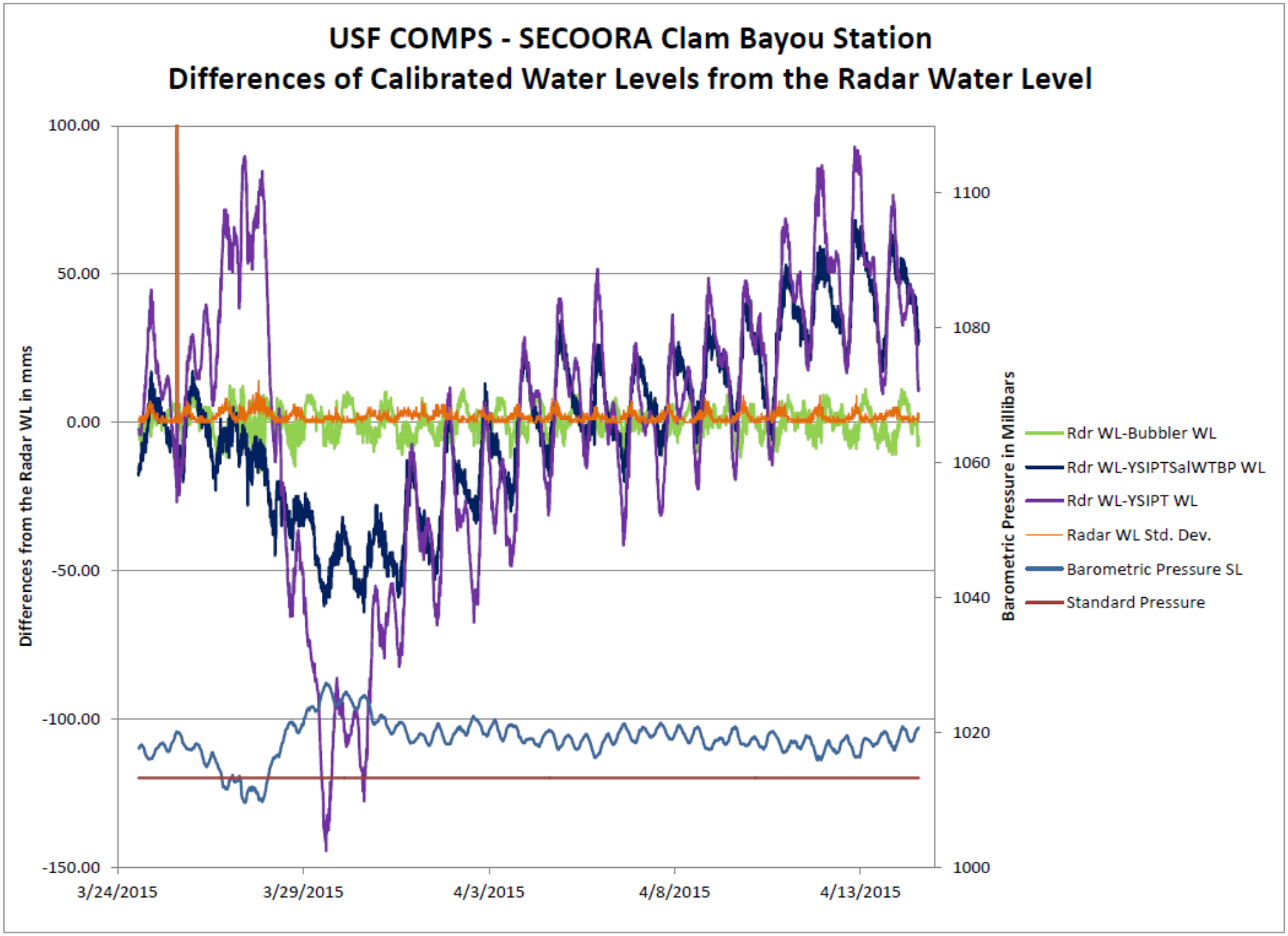
# Met Data – RMY sensor



# Met Data – VS sensor




USF COMPS - SECOORA Clam Bayou Station
Radar, Bubbler, and YSI PT Calibrated Water Levels
Clam Bayou WLs in mms, YSI PT and Bubbler WLs are calibrated to the Radar WL
(radar 0=10000 mms below the radar measurment origin)
Std. Deviation of the Radar WL Samploing Set in mms
8400
8200
8000
7800
7600
7400
100
90
80
70
60
50
40
30
20
10
0
3/24/2015
3/29/2015
4/3/2015
4/8/2015
4/13/2015
Rdr WL Cald.
Bubbler WL Cald.
YSIPT Z WL Cald.
YSIPT WL Cald.
Rdr WL Std. Dev.


USF COMPS - SECOORA Clam Bayou Station
Differences of Calibrated Water Levels from the Radar Water Level
Differences from the Radar WL in mms
100.00
50.00
0.00
-50.00
-100.00
-150.00
3/24/2015
3/29/2015
4/3/2015
4/8/2015
4/13/2015
Barometric Pressure in Millibars
1100
1080
1060
1040
1020
1000
Rdr WL-Bubbler WL
Rdr WL-YSIPTSalWTBP WL
Rdr WL-YSIPT WL
Radar WL Std. Dev.
Barometric Pressure SL
Standard Pressure

# QARTOD

- QA for Real-Time Oceanographic Data

| | | |
|---|---|---|
| 1) | Time/Gap Test | Data Stream Tests |
| 2) | Syntax Test | |
| 3) | Location Test | |
| 4) | Gross Range Test | Statistical Tests |
| 5) | Climatological Test | |
| 6) | Spike Test | |
| 7) | Rate of Change Test | |
| 8) | Flat Line Test | |
| 9) | Multi-Variate Test | |
| 10) | Attenuated Signal Test | |
| 11) | Neighbor Test | |
| 12) | TS Curve/Space Test | Tests specific to T/S |
| 13) | Density Inversion Test | |

# QARTOD tests:

Need to establish:

- Gross ranges for each parameter

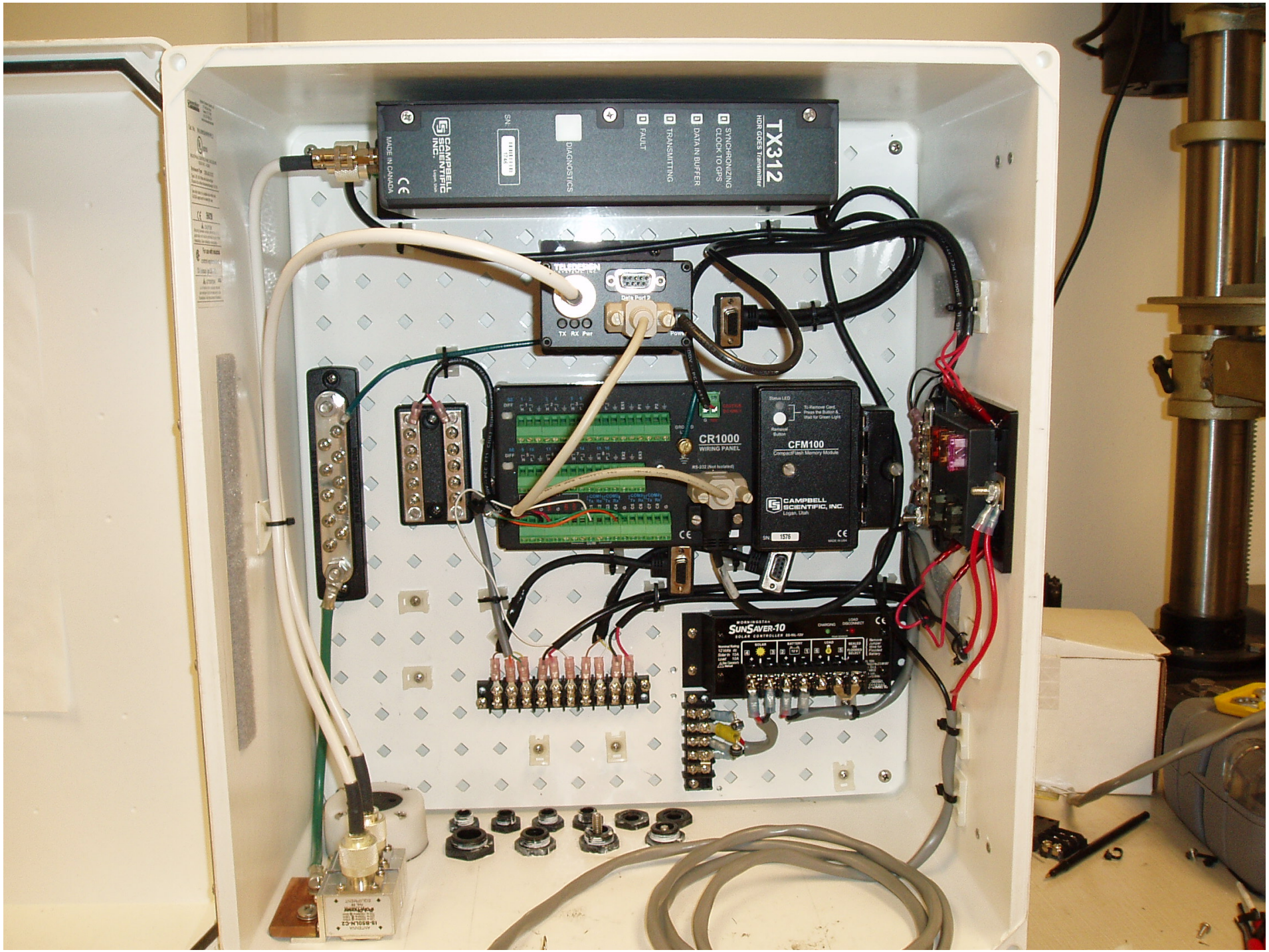
- Climatology for each parameter
  - Use 1 year of data to best account for seasonality

- Rate of change and spike test for each parameter


CAMPBELL SCIENTIFIC
ENVIRONMENTAL SAMPLER
PORTABLE SAMPLER


FWC


CAMPBELL SCIENTIFIC


TX312
HDR GOES Transmitter
SYNCHRONIZING CLOCK TO GPS
DATA IN BUFFER
TRANSMITTING
FAULT
DIAGNOSTICS
SN:
CAMPBELL SCIENTIFIC INC.
MADE IN CANADA
CR1000
WIRING PANEL
CFM100
CompactFlash Memory Module
CAMPBELL SCIENTIFIC, INC.
Logan, Utah
SN: 1576
SunSaver-10
SOLAR CONTROLLER