

USACE Walla Walla District QA/QC Evaluation of 2010 FMS TDG Monitoring Data

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Presentation Outline

- Station locations
- Instrumentation
- Data completeness
- QA/QC
 - Pre and post calibration comparisons to primary standards
 - Sensor comparisons to secondary standards
- Summary

FMS's

- 15 sites: 6 year-round sites, 9 seasonal sites
- 5 Forebay sites, 6 Tailwater sites, 4 Riverine sites
- All 15 sites visited every three weeks during spill season and 6 tailwater sites every four weeks outside spill season

Field equipment

- 35 sondes
- Mostly Hydrolab Mini 4, 4a, and Mini 5 sondes. MS5 where not used this year.
- Sutron digital barometers
- 14 Sutron Satlink 2 HDR DCP's plus one Sutron 8210 HDR DCP.
- NovaLynx hand-held digital field barometer, Surveyor 4 internal barometer

Field equipment for 2010

- All Sutron digital barometers at FMS's
- Replaced DWQI LDR with Sutron 8210 HDR DCP.
- Purchased 25 new TDG Membranes from Hach Environmental.
- 15 MS5 Purchased over the last two years by USGS and USACE that are being sent back to be retrofitted with new TDG sensor

Lab equipment

- Heise calibrated digital pressure gage
- Ashcroft calibrated digital pressure gage
- Two Barnant digital thermometers
- ParoScientific digital barometric pressure Digiquartz Laboratory Standard.
Model 745.

Data Completeness

During the Spill Season April 1 to Sept. 30.

99.2% of the BP, 98.9% TDG data and 99.1% of the WT data were received in real-time

and passed provisional QA/QC review.

Of that percentage these three sites PAQW, IDSW and DWRI account for 96.7% of BP, 72.5% of TDG and 85.7% of WT missing data.

For the whole reporting period 99.7% of the BP, 99.2% TDG and 99.6% of the WT data





Missing/ Anomalous BP and TDG Data

935 Hours or 1.1% of Total for 2010

Hours	Percent	Reason
302	32.3	DCP failure
240	25.7	Missing / Vandalism
188	20.1	Bad Sonde
166	17.8	Bad Membrane
25	2.6	Inspection
14	1.5	Spike
0	0	Bad Communication Cord
0	0	Missed transmission
0	0	Other

Unusable BP/TDG data

- Worst Sites: IDSW 271 hours, PAQW 240 hours and DWQI 484 hours where unusable
 - Mostly due to DCP failure, Bad Membrane, Bad Sonde and Vandalism.
- Best sites: LGSA and LGNW : 0 hours unusable
- Some examples of what caused unusable data.



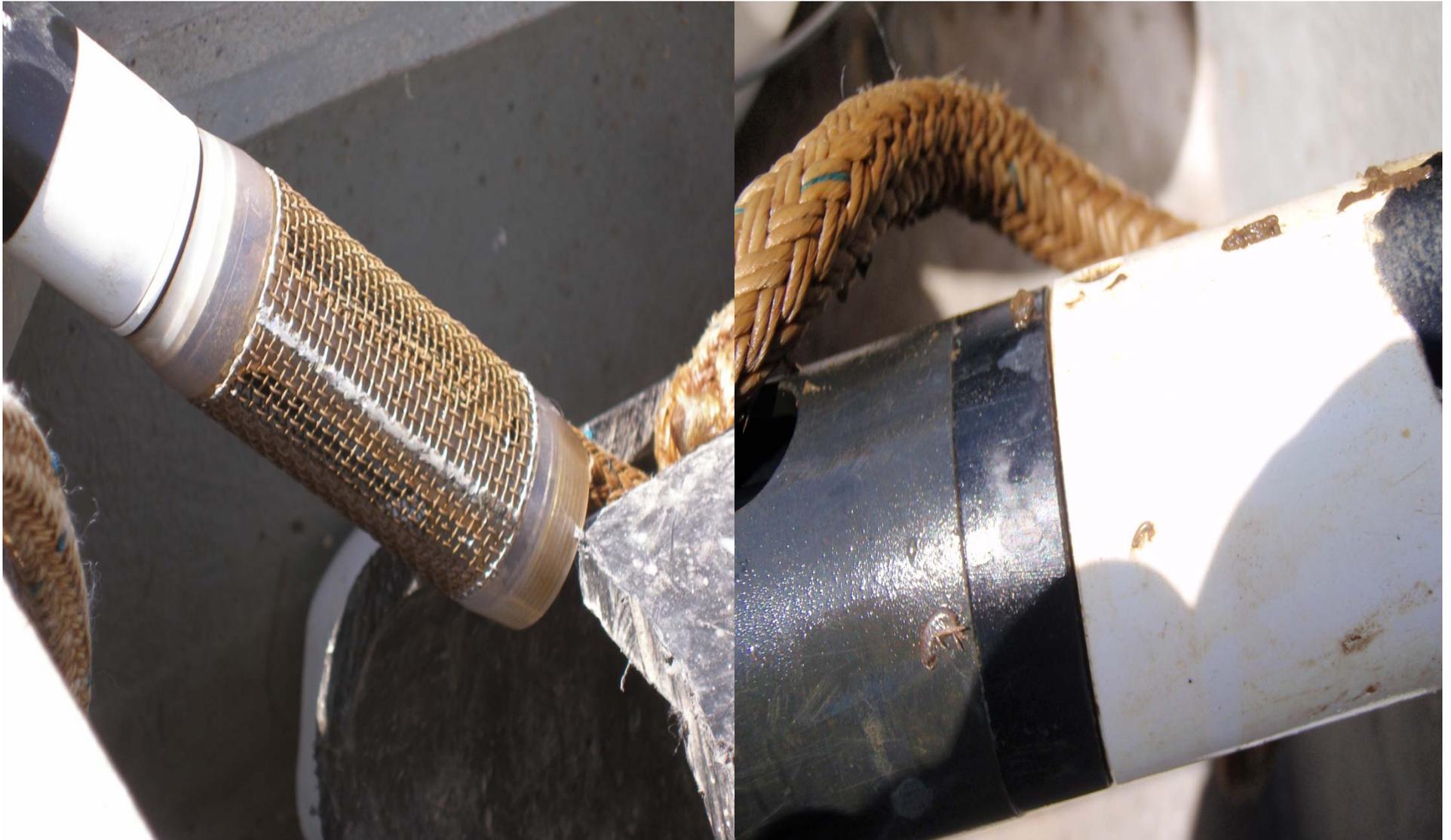
Damage by Barge





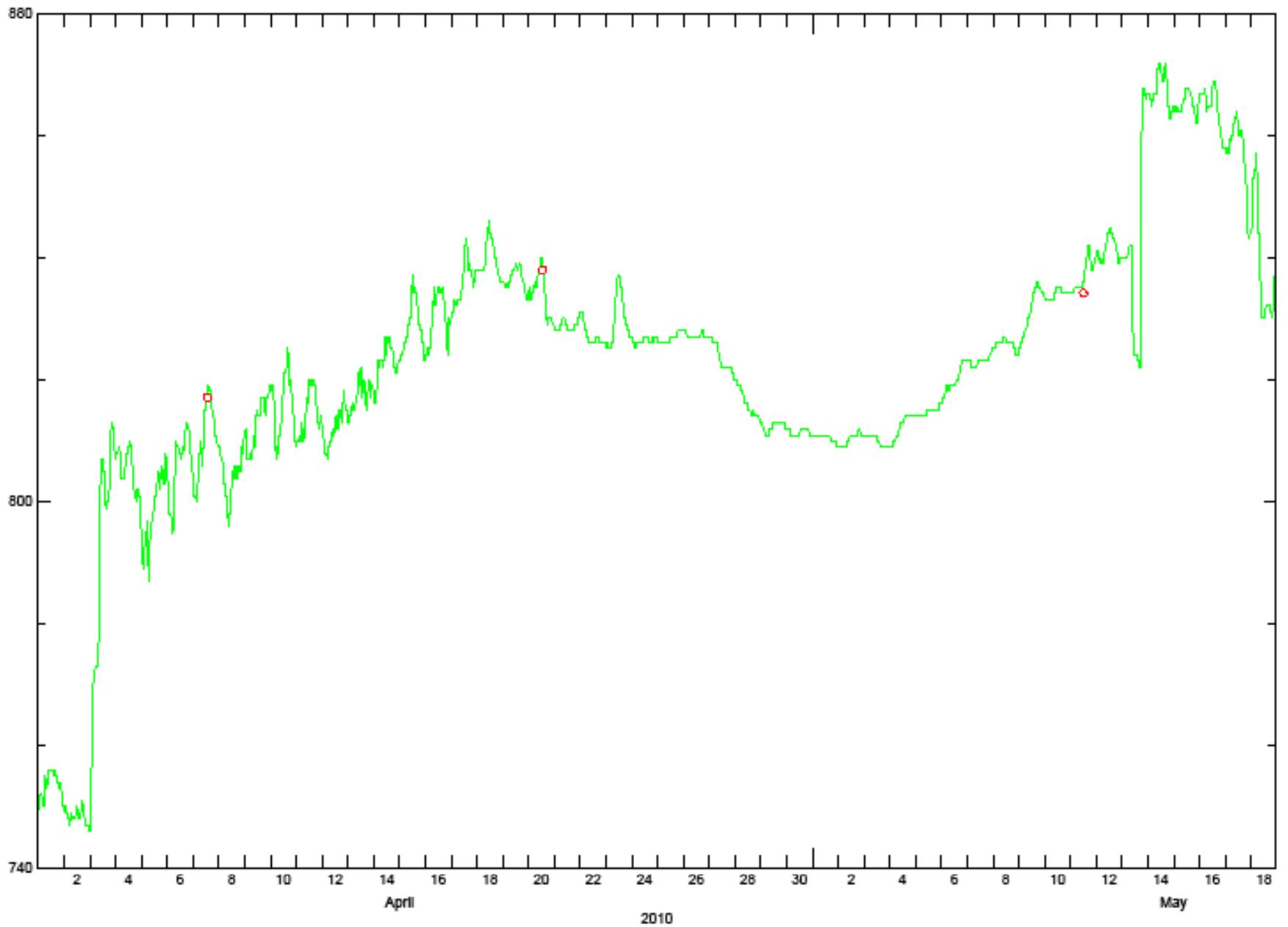
Cleaning the delivery tube at Pasco. Also done at Anatone and Peck.





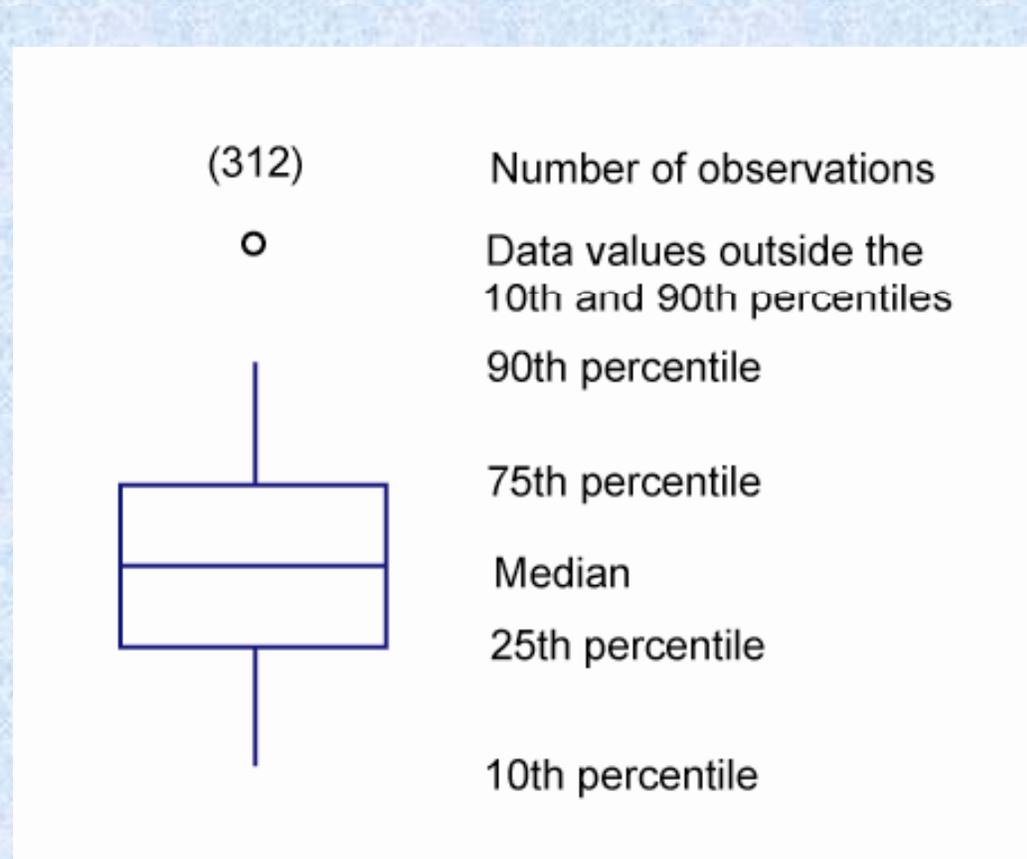
Mesh guard to help stop the little critters from getting in.



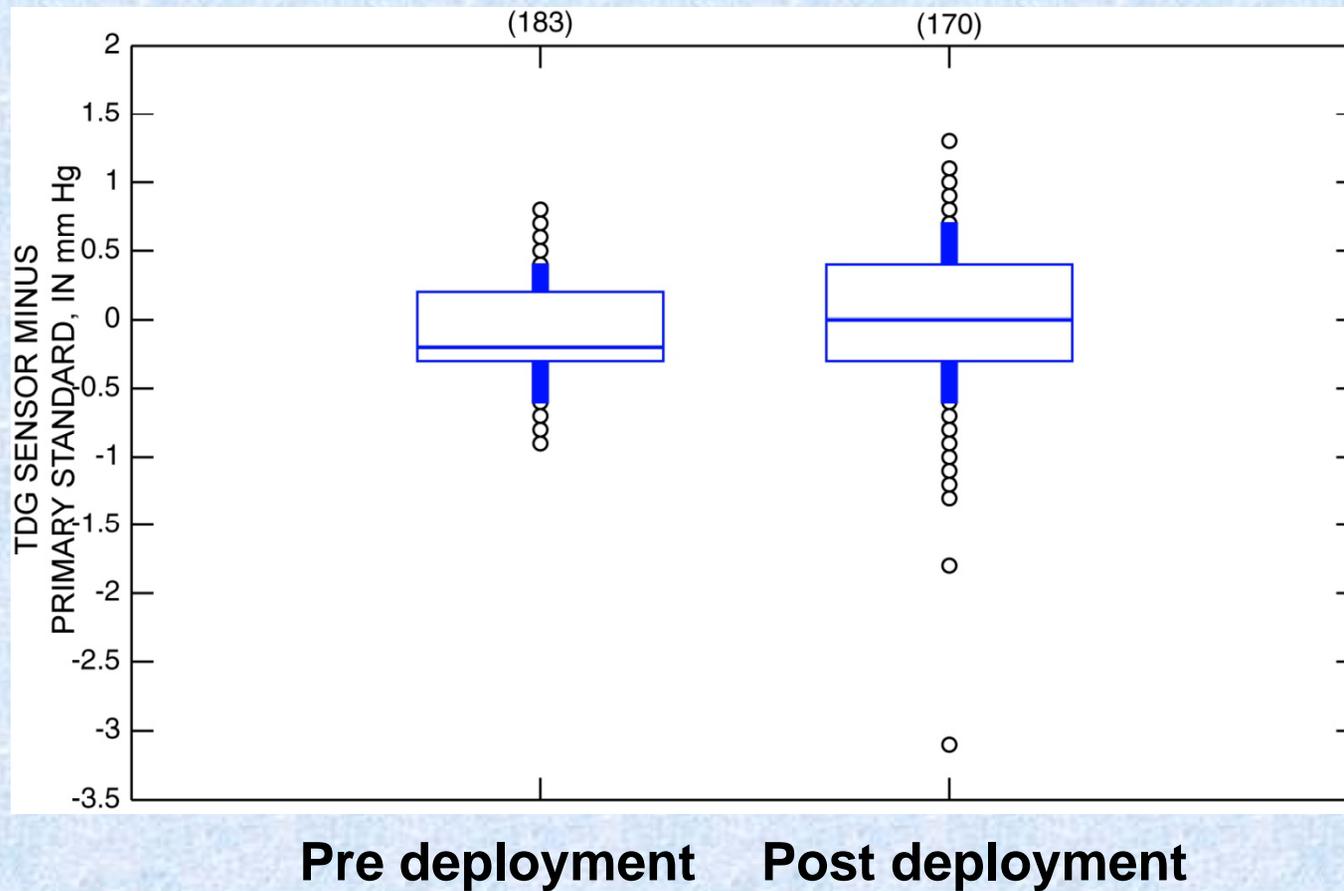


— 13343860 SNAKE RIVER BELOW LITTLE GOOSE DAM, WA (Pressure, diss gases FROM DCP (mm/Hg), COMPUTED) + 1
○ 13343860 SNAKE RIVER BELOW LITTLE GOOSE DAM, WA (All sensor readings, Pressure, diss gases)

Explanation of a Boxplot

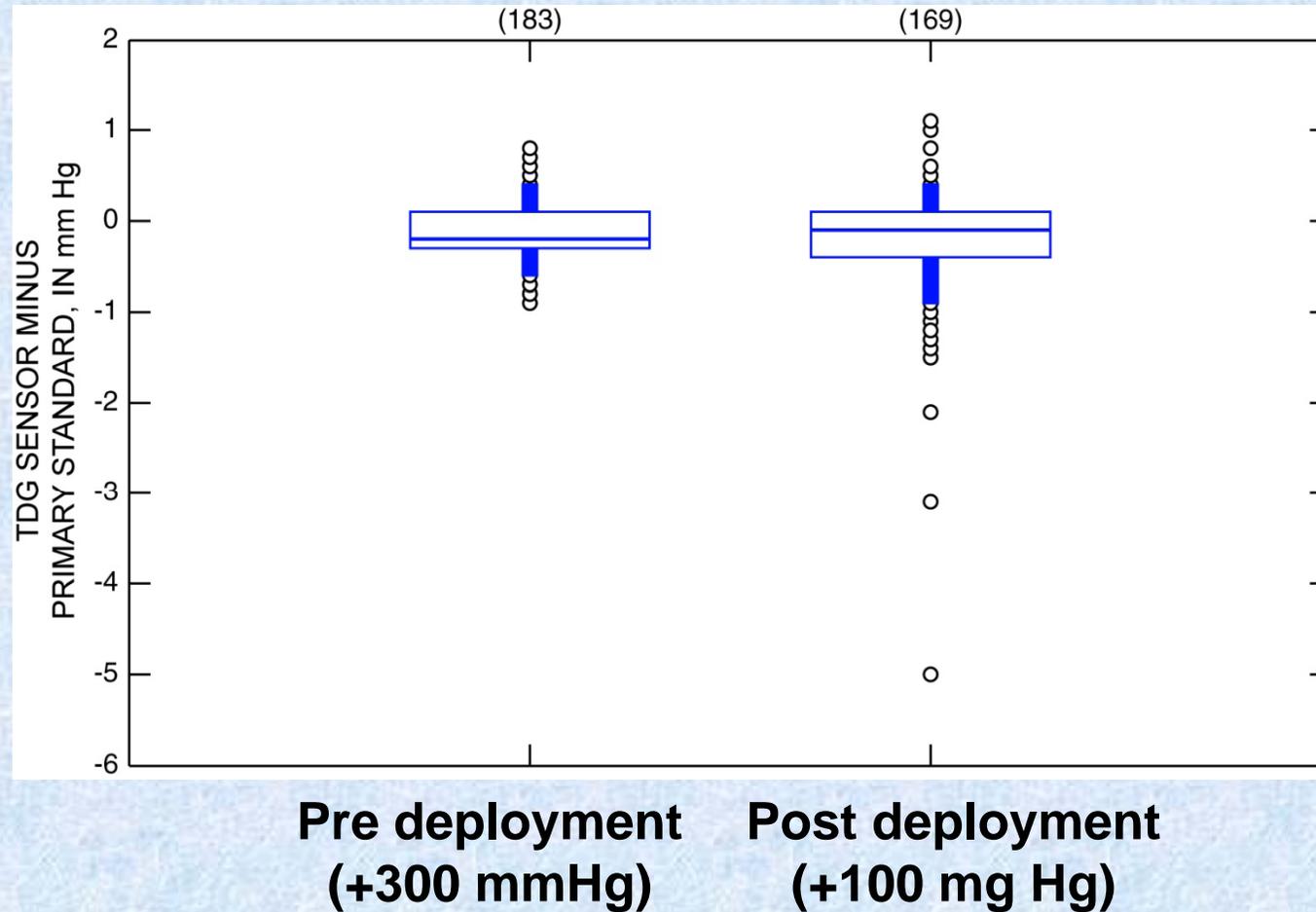


TDG Sensor vs Primary Standard Barometric Pressure



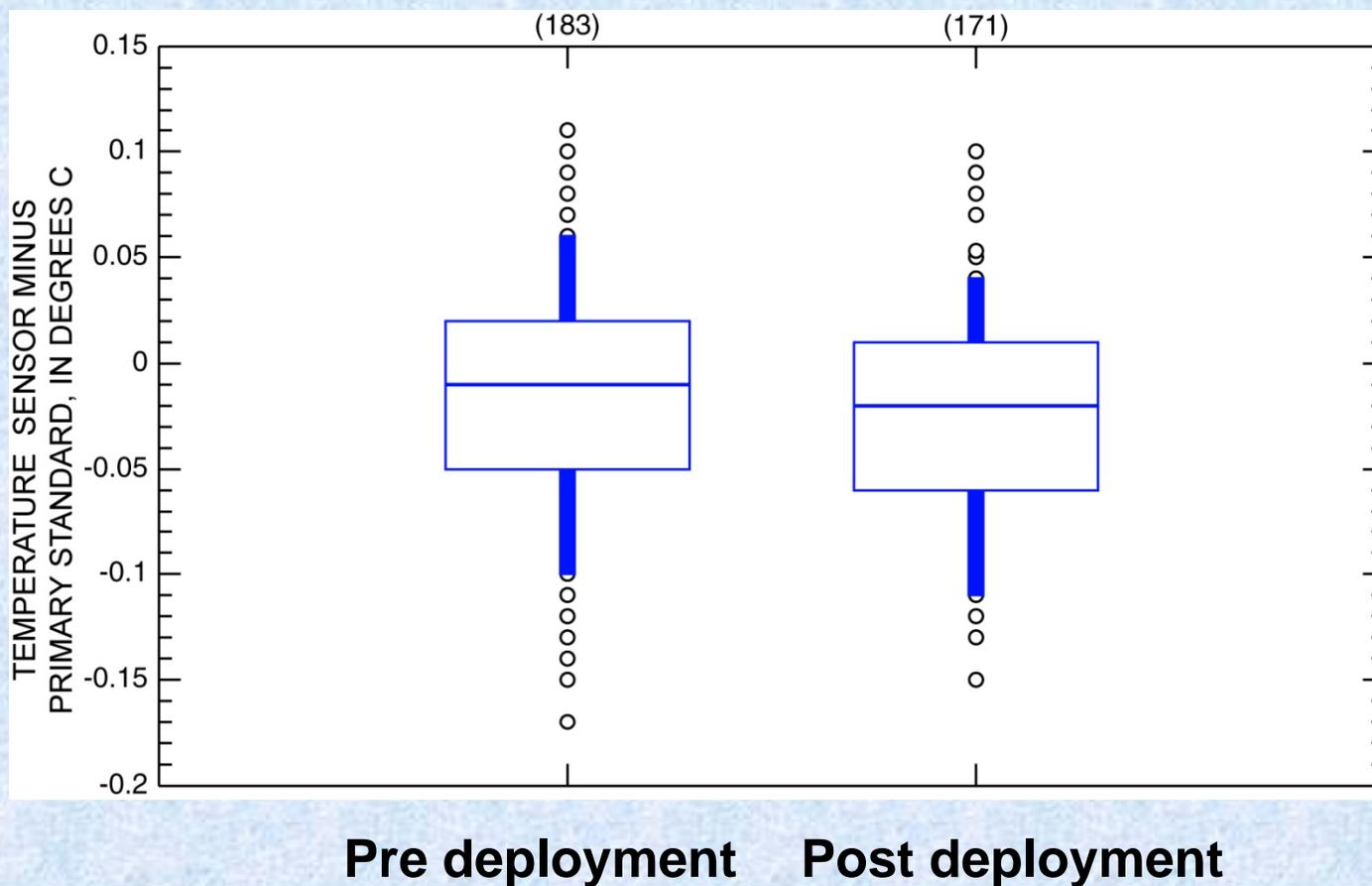
TDG Sensor vs Primary Standard

Barometric Pressure + 300 or 100 mm Hg

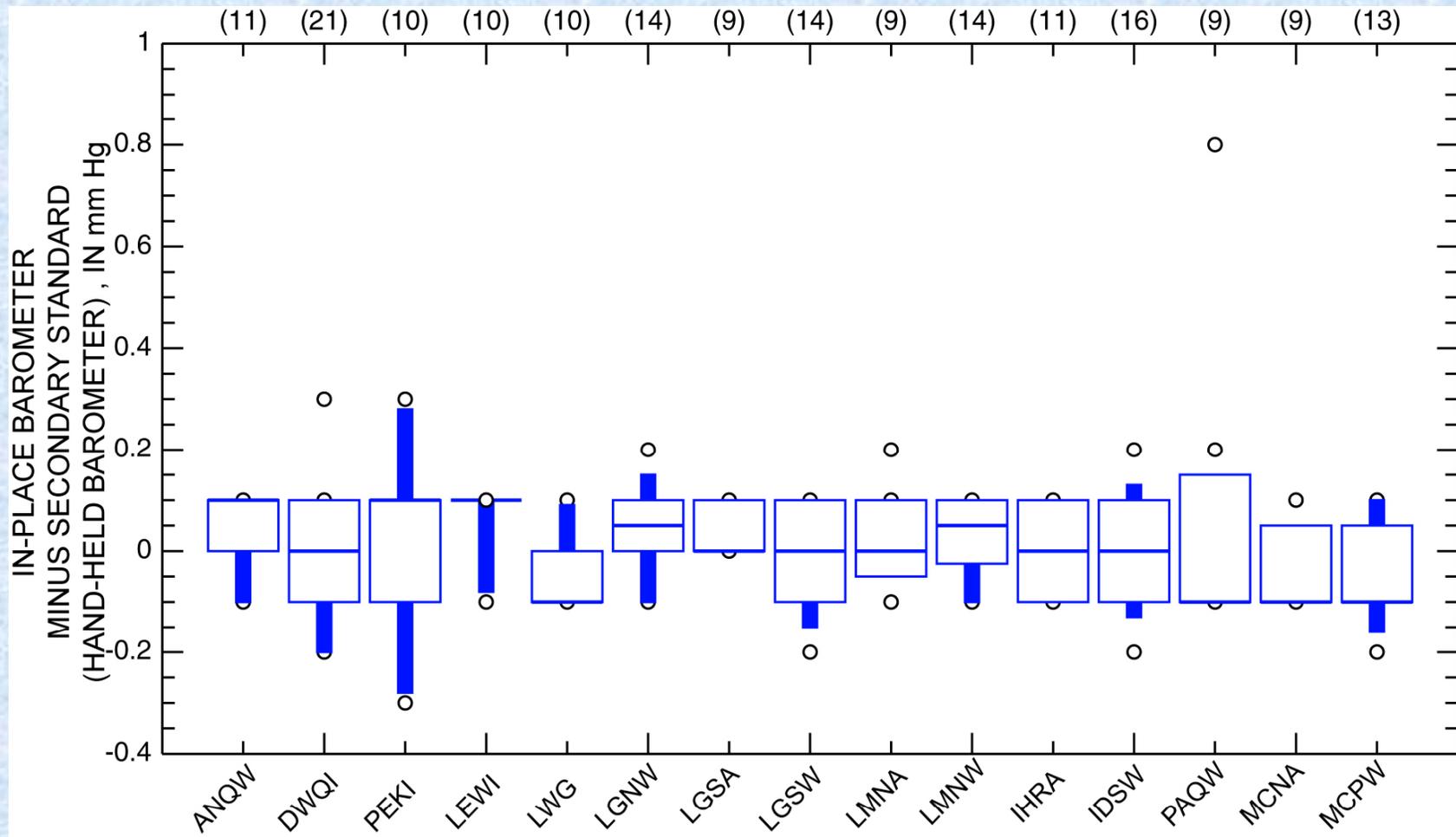


Temperature Sensor vs Primary Standard

Water temperature

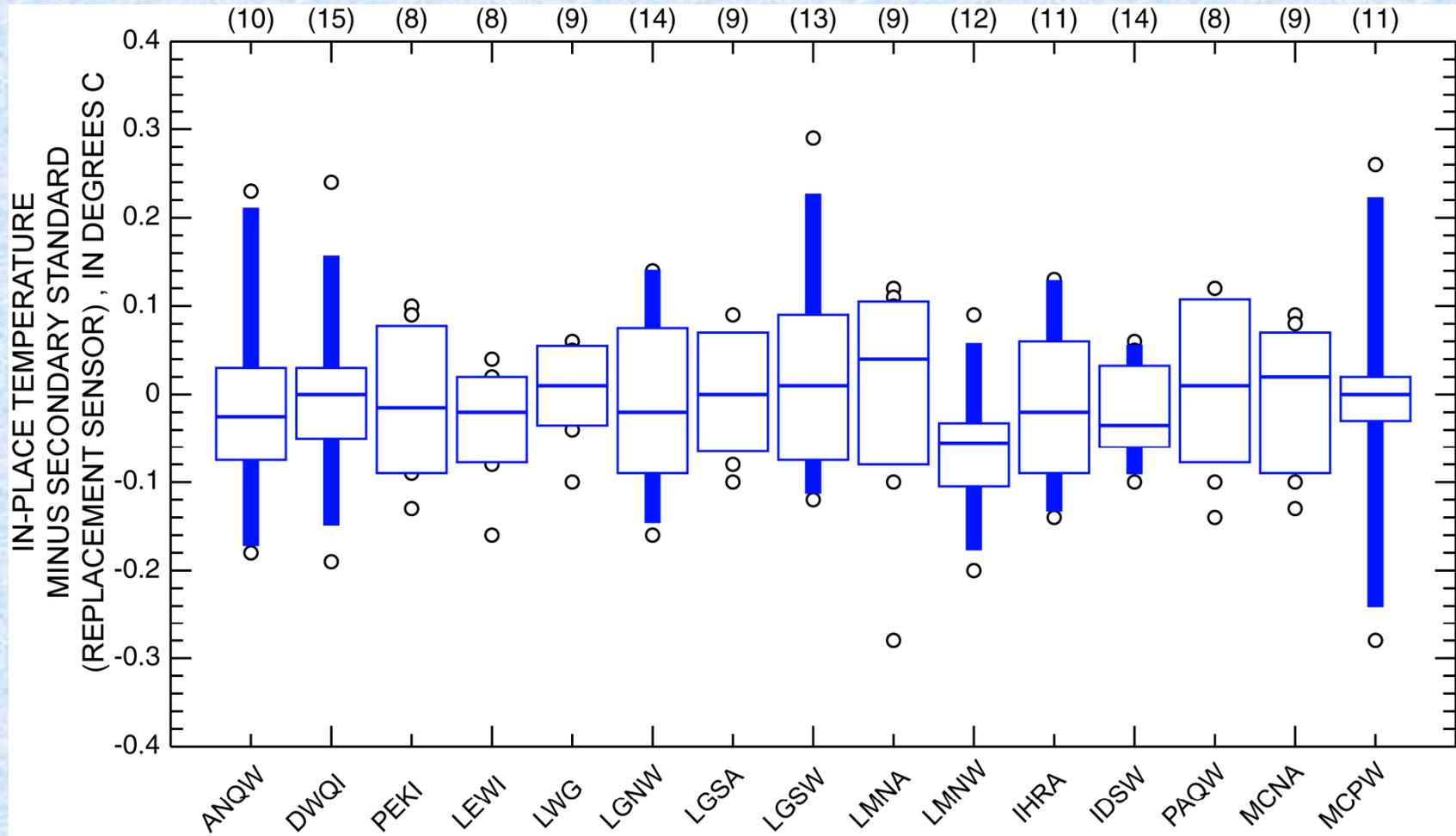


In-Place Barometer vs Secondary Standard Barometric Pressure



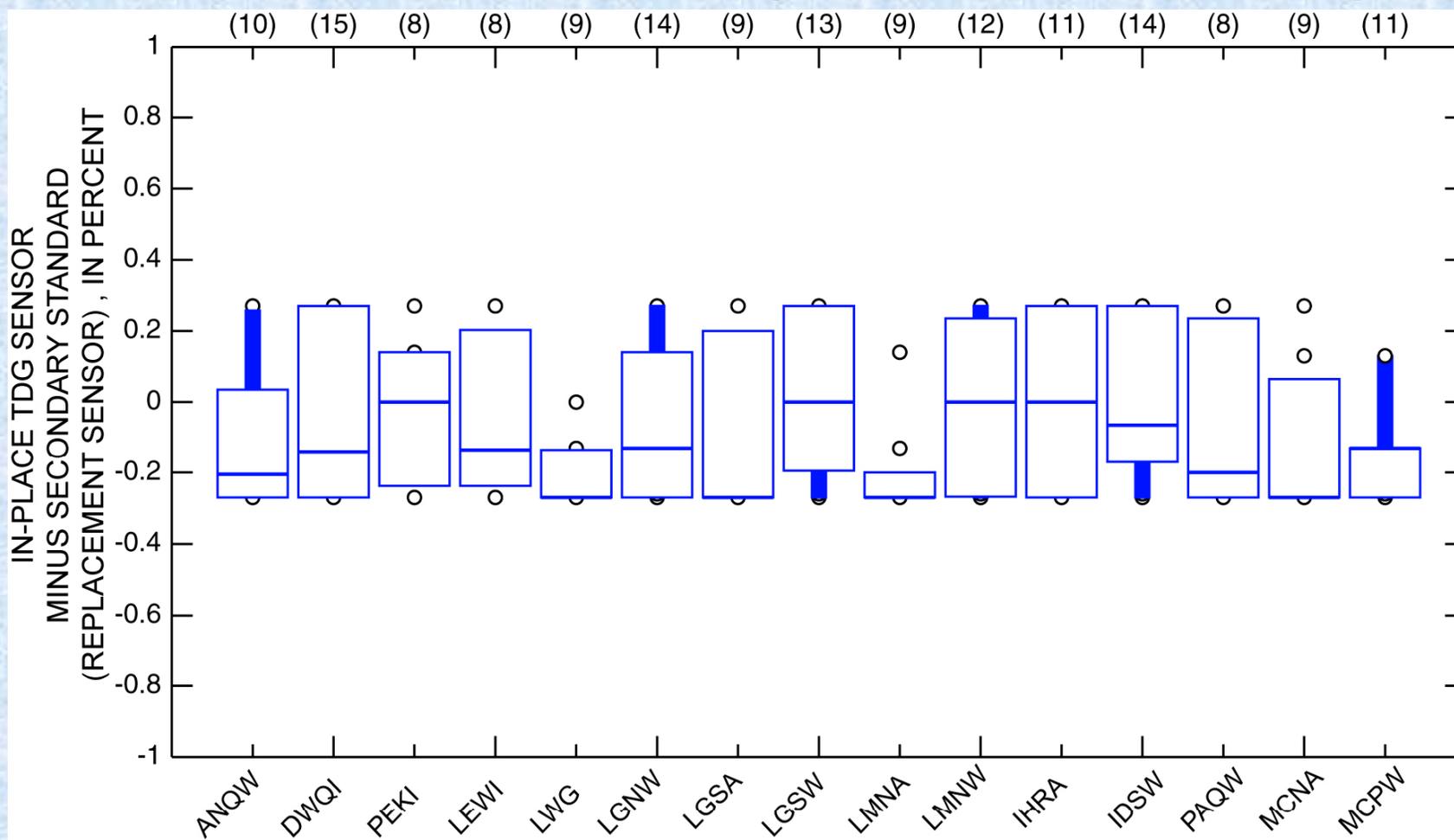
Temperature Sensor vs Secondary Standard

Water Temperature



TDG Sensor vs Secondary Standard

Difference in TDG (Percent Saturation)



Summary

- 15 sites: 6 year-round and 9 seasonal stations
- 1.1% missing/ anomalous data

Summary

Median differences between TDG Sensors vs. Primary Standards (performed in lab)

- **Barometric pressure**
 - Pre deployment: -0.2 mm Hg
 - Post deployment: 0.0 mm Hg
- **Water temperature**
 - Pre deployment: -0.01 °C
 - Post deployment: -0.02 °C

Summary

**Median differences between TDG Sensors vs.
Secondary Standards (performed in field)**

Barometric pressure: 0.0 mm Hg

Water temperature: -0.01 °C

TDG, in percent saturation: -0.13%

