

DAT installed in Daphne (tests at MBARI)

Jan/Feb 2013

M. J. Stanway, B. Kieft, B. Hobson



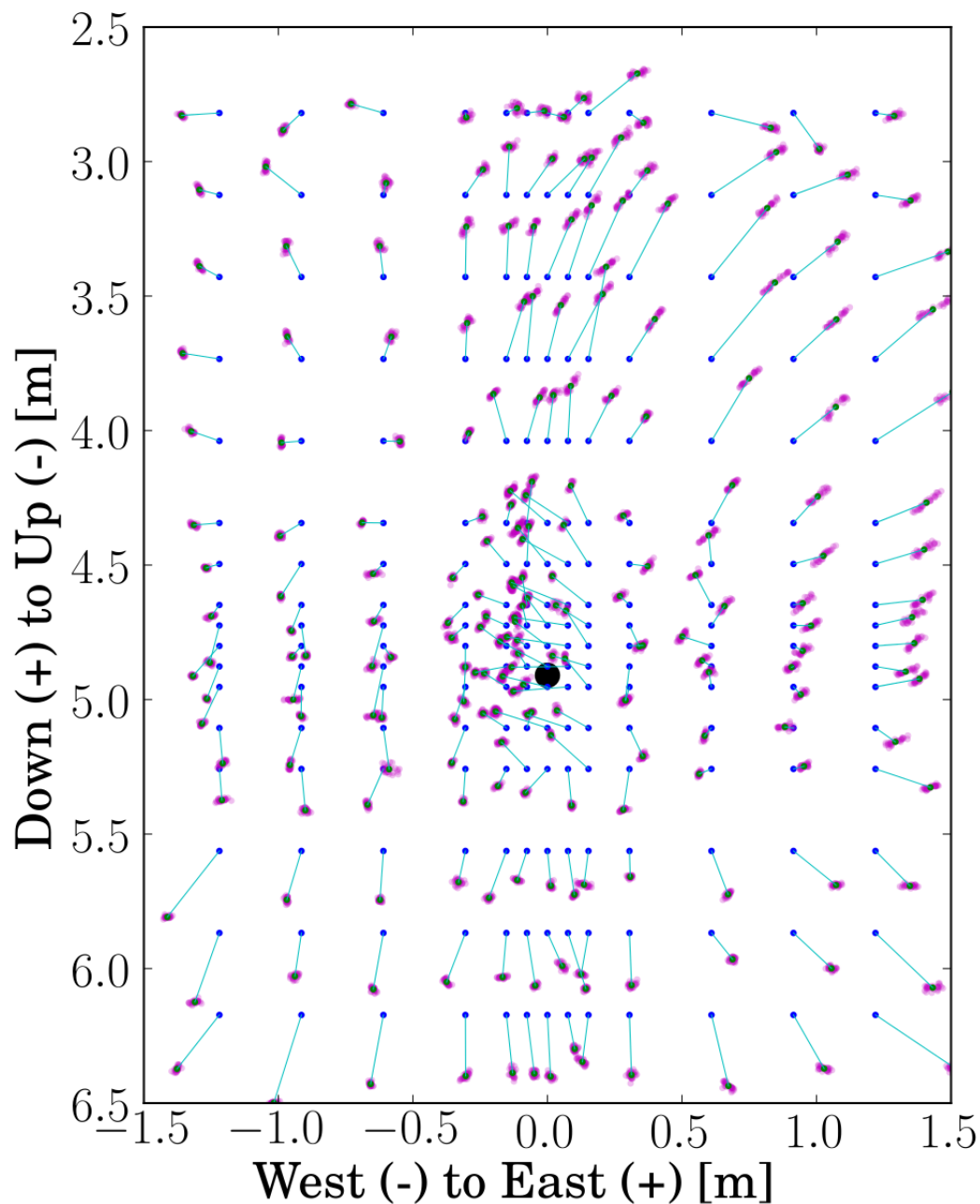
S06 = 05 (-09 dB)

single SADM-1 plate

4.59 m (~ 15') standoff
between measurement
plane and *back* of DAT

"phase" with rotoreflection

dense sampling near
boresight,
~1 degree separation
between sample points



uncalibrated intersections

- blue: actual position

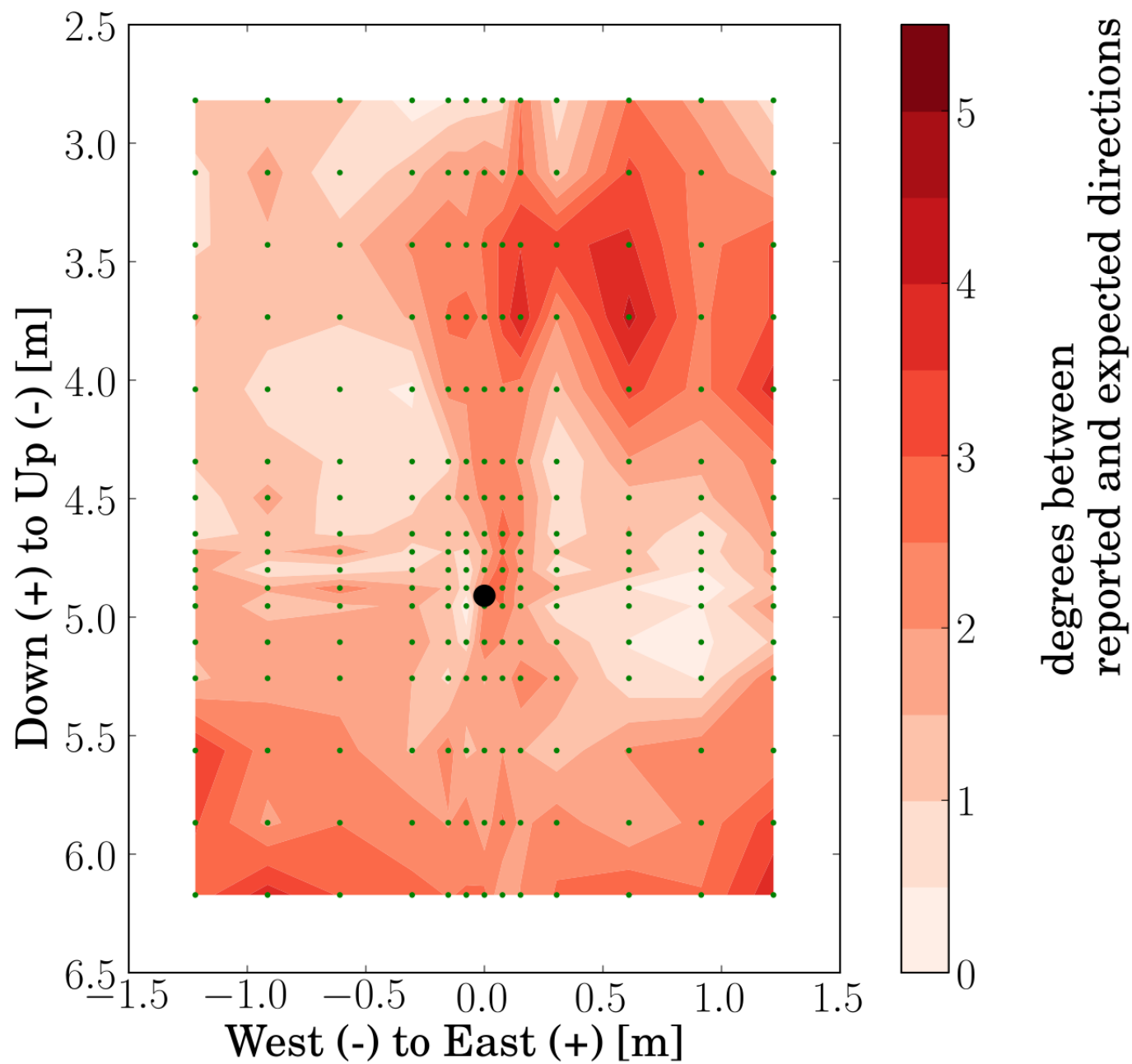
- magenta: individual
samples

- green: average

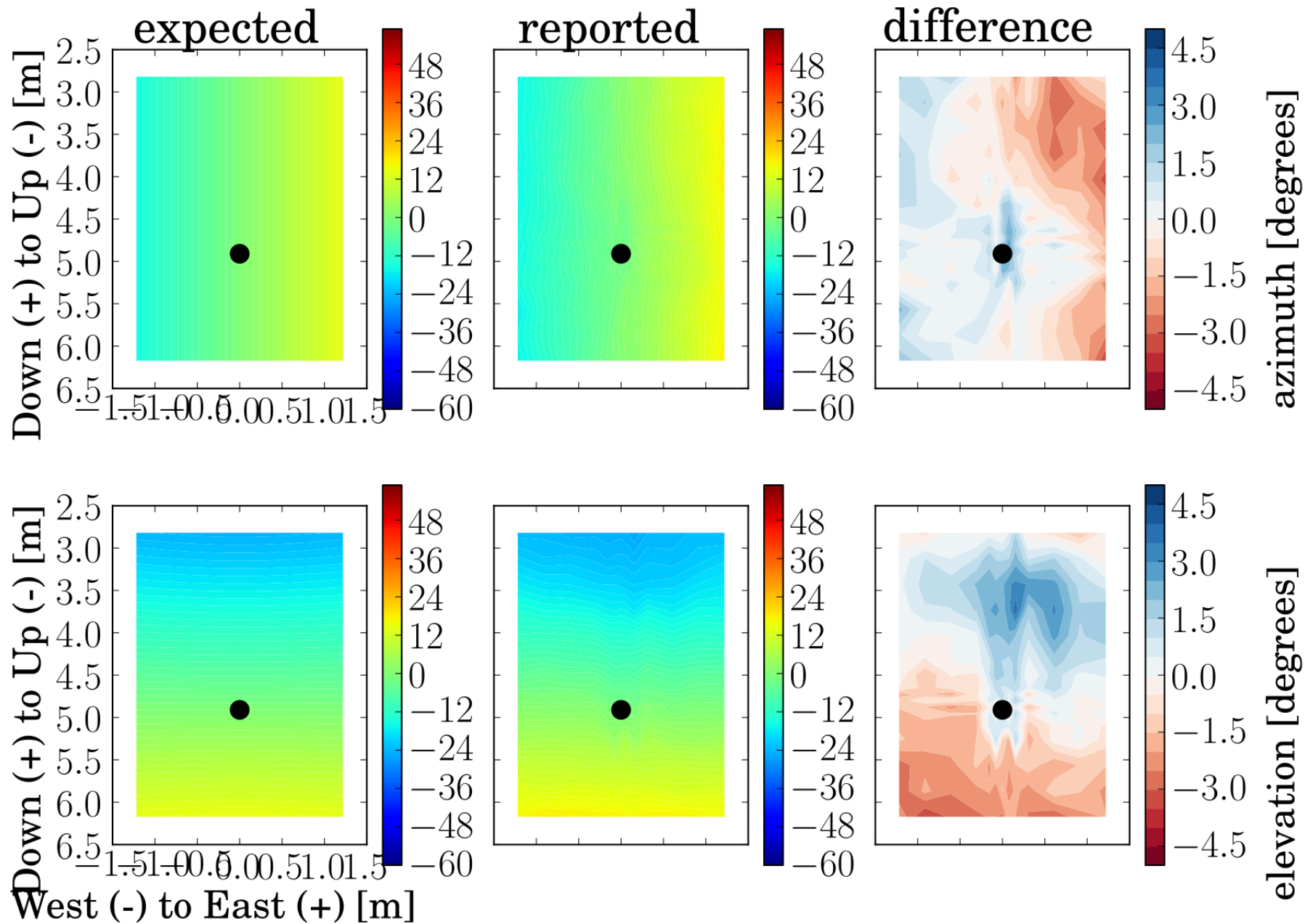
- cyan: line connecting
actual to average

manually set
AGC = 32

"phase" with rotoreflection



"phase" with rotoreflection



Conclusions:

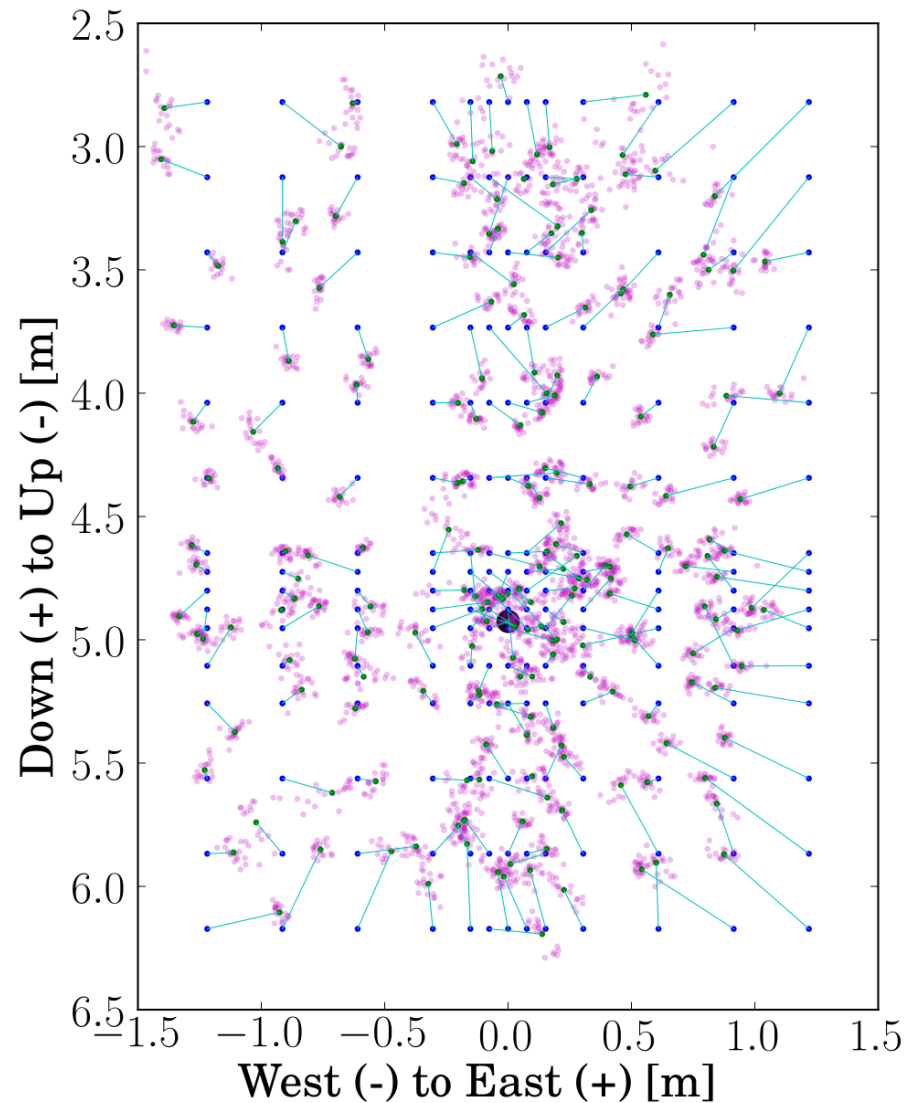
- **[OK]** There are many areas where the *uncalibrated* direction calculated from the phase measurement is off by *several* degrees.
 - **[BAD]** These can't be corrected by a simple linear transform.
 - **[GOOD]** It looks like these might be correctable using a lookup table or another general approach. (Benthos usually uses a lookup table.)
- **[UGLY]** There is an intermittent problem with saturated hydrophones, which significantly degrades performance, and we're not sure what the root cause of that was.
 - **[GOOD]** We can partially mitigate this problem by setting the AGC manually.
 - **[GOOD]** We can identify symptoms of saturated hydrophones, by eye or automated, using the LVL debug output values.
 - **[GOOD]** This isn't a fundamental problem with the Benthos DAT system, but more likely an intermittent cable failure or something else we can eventually isolate and solve.

Next steps

- Confirm our positive results hold true in the field -- conduct simple estimation and homing tests.
- Identify root cause of hydrophone saturation (watch for known symptoms, in the meantime).

Details: signal saturation on multiple hydrophones -- possible intermittent issue with cabling?

"phase" with rotoreflection

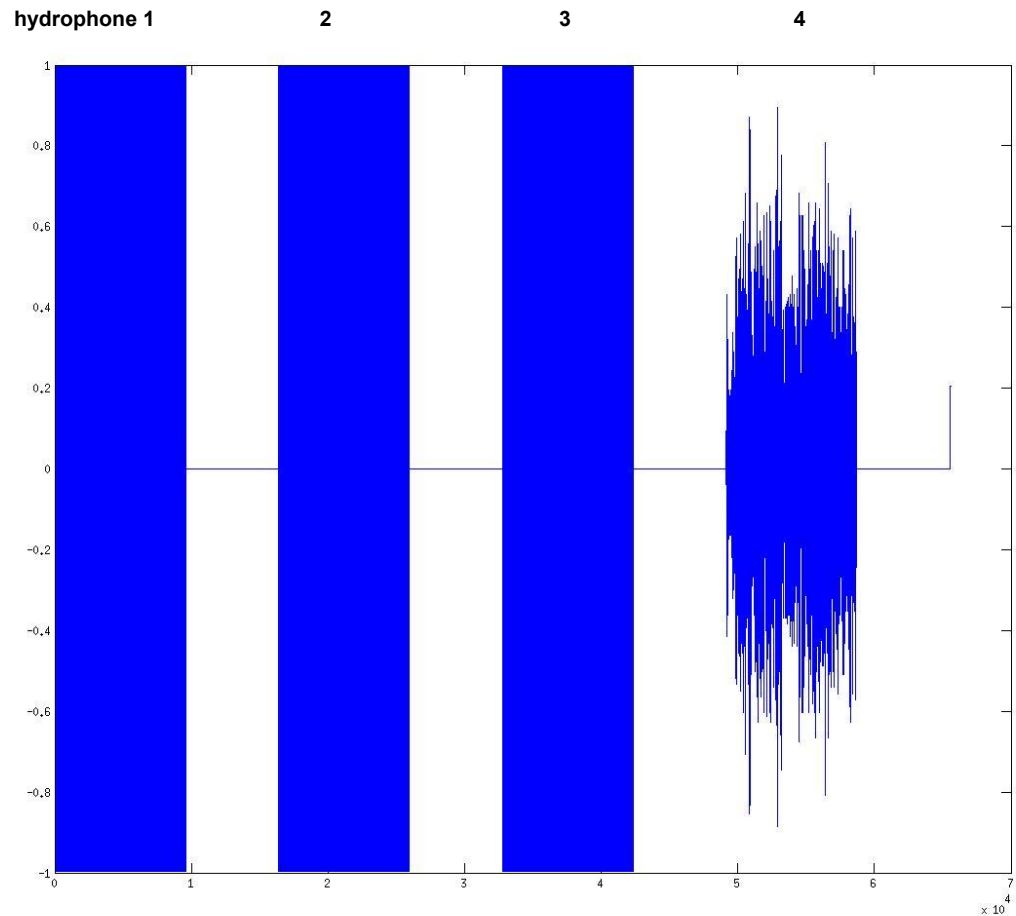


Peak wave levels examined for clipping and problem with 3 of 4 hydrophones is discovered

Levels on the first 3 hydrophones are railed while the 4th is at the expected value:

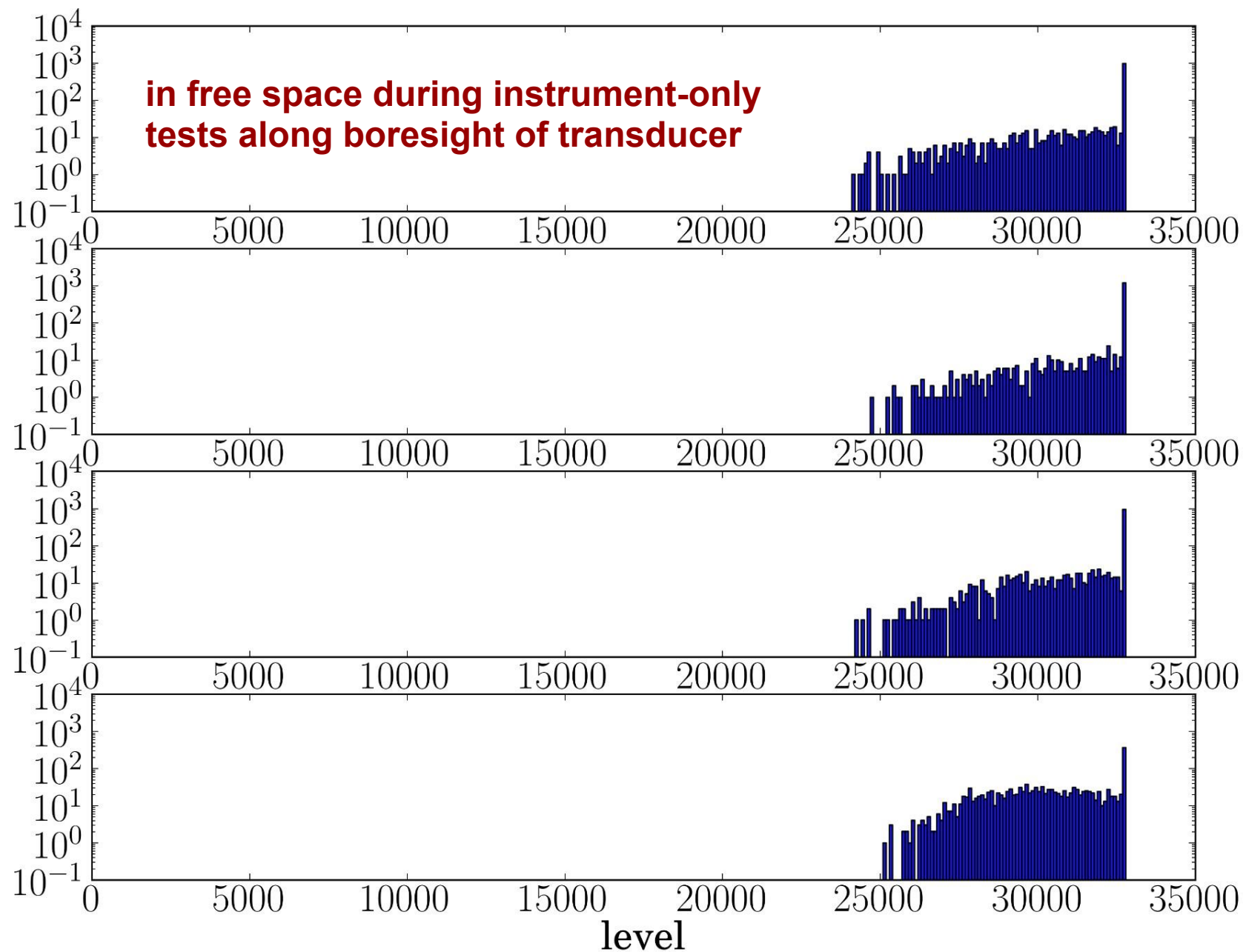
00:26:58.8557 , LVL= 32752, 32753, 32754, 883, AGC= 48
00:26:59.8557 , LVL= 32752, 32753, 32754, 851, AGC= 48
00:27:00.8557 , LVL= 32752, 32753, 32754, 915, AGC= 48
00:27:01.8557 , LVL= 32752, 32753, 32754, 899, AGC= 48
00:27:02.8557 , LVL= 32752, 32753, 32754, 851, AGC= 48

Waveform sample was taken and visualized

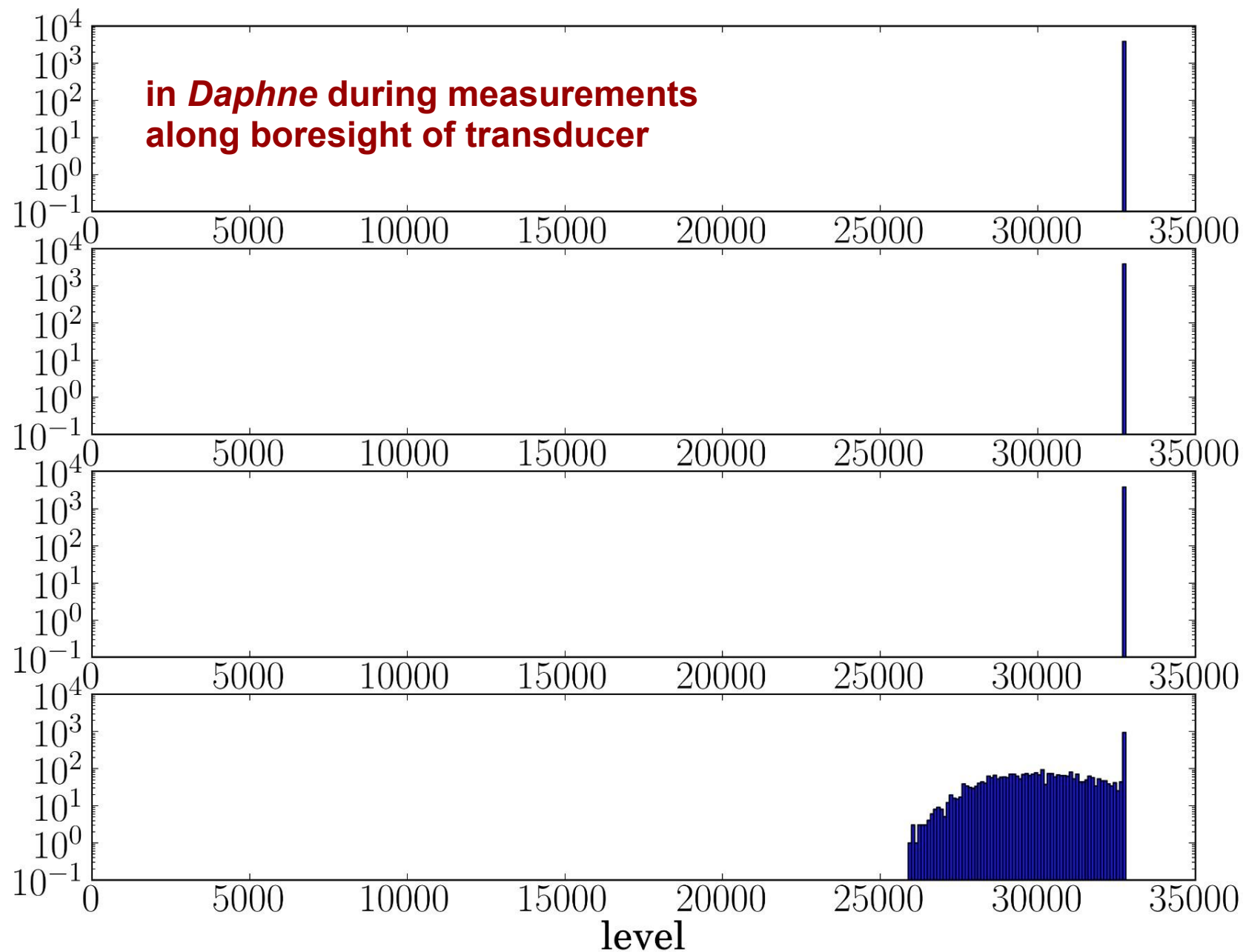


this has a characteristic signature in the debug output of the DAT, using the LVL variable

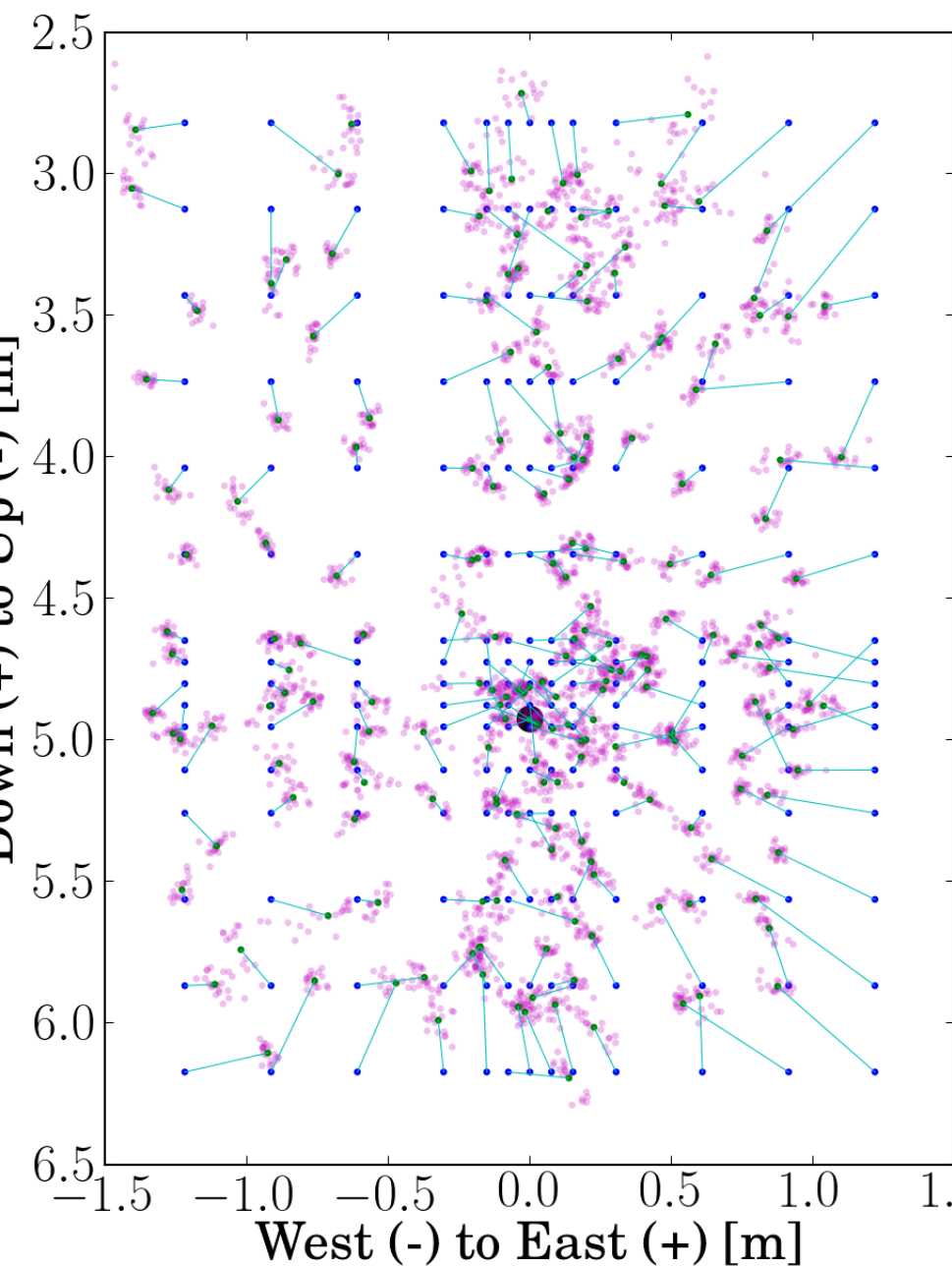
2012-12-20 DAT tank tests baffled



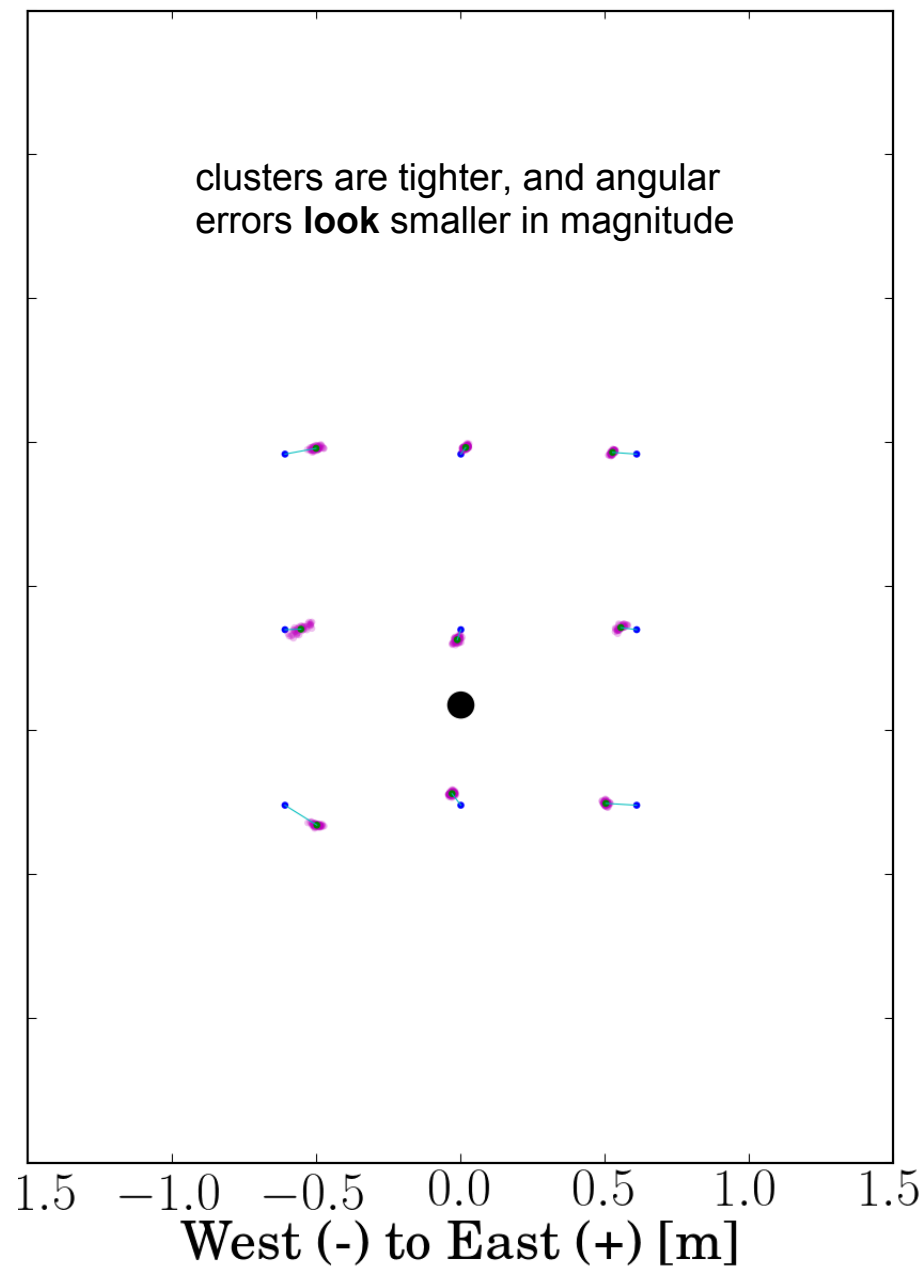
2013-01-29 Daphne test tank

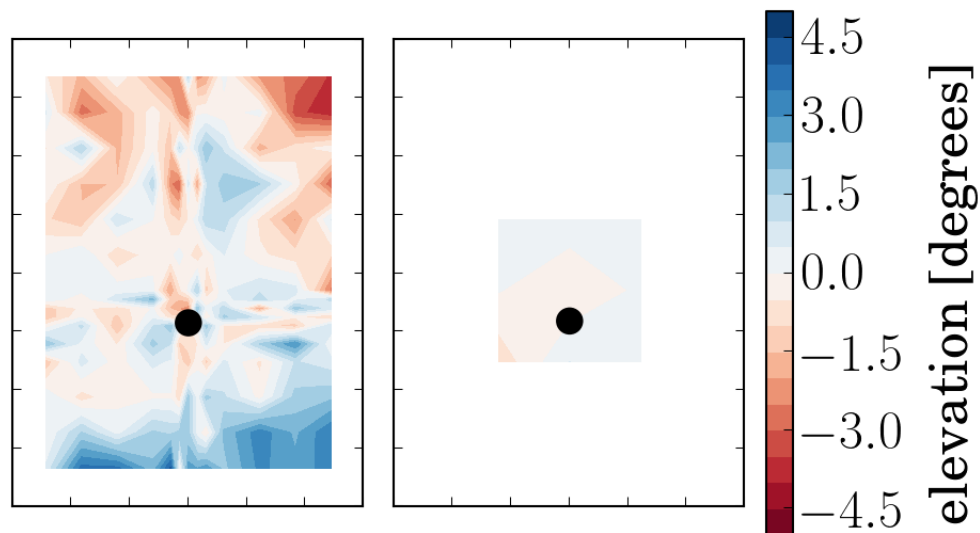
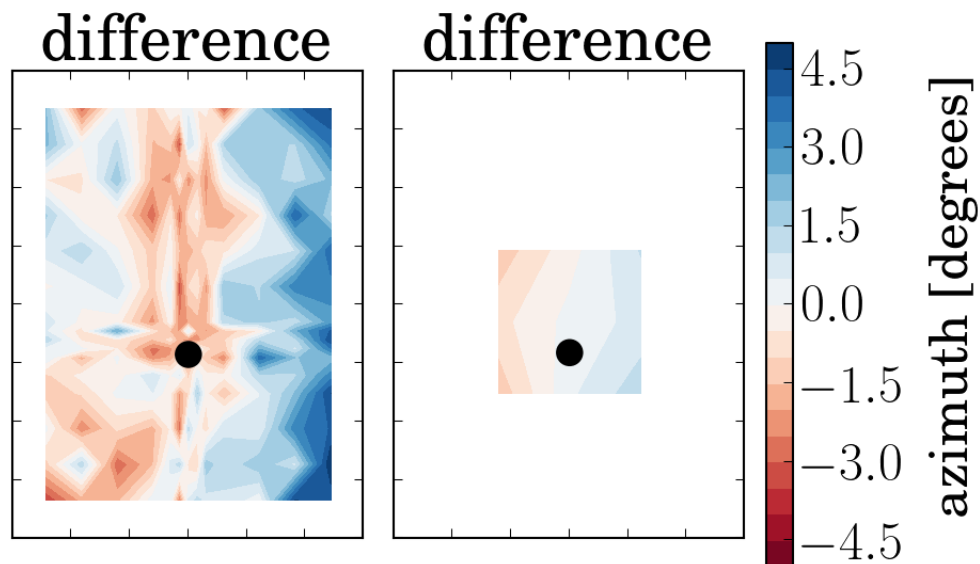


"phase" with rotoreflection



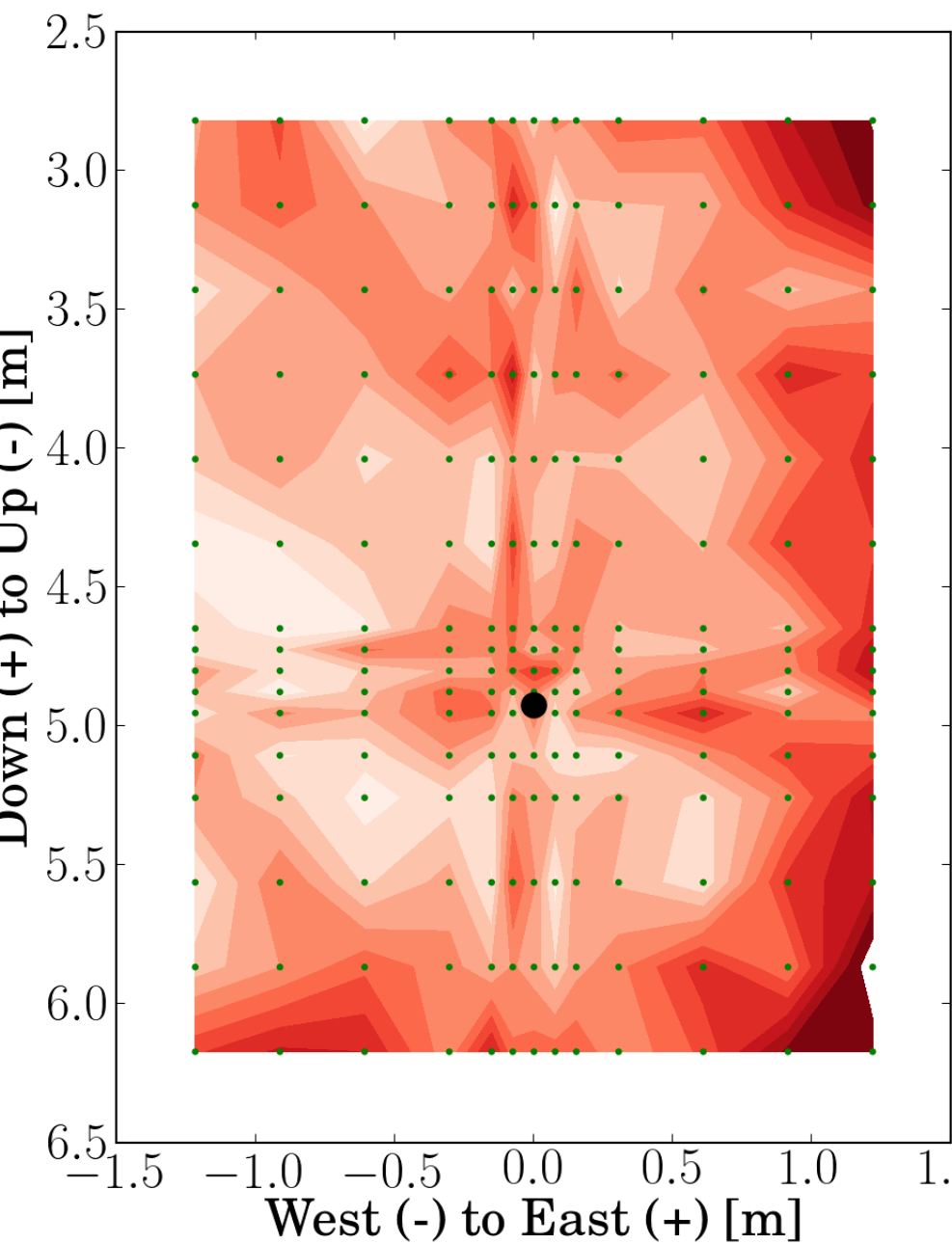
"phase" with rotoreflection



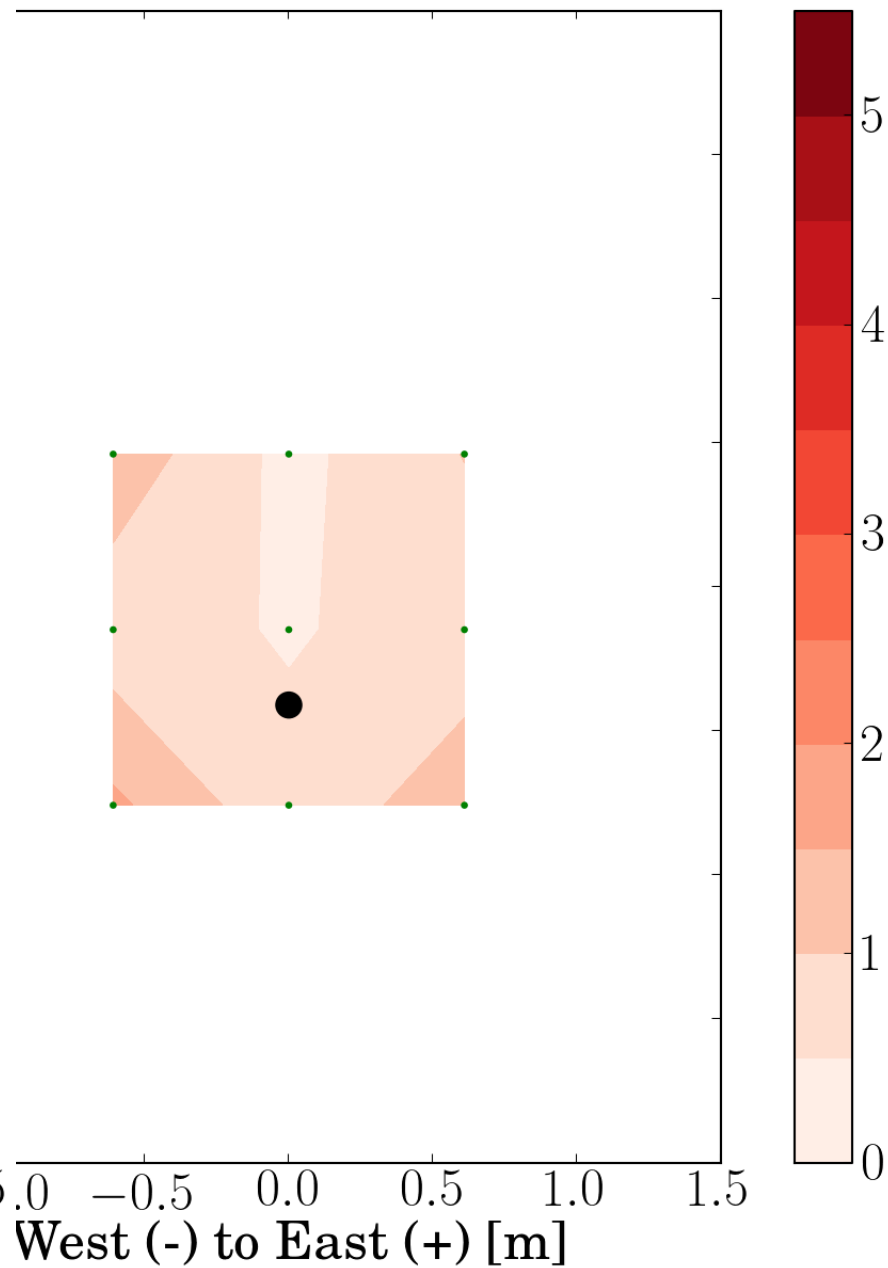


even without sampling densely enough to resolve the same levels of variation, the magnitude of errors is lower using the bench power and boardset with the assumed wiring change

"phase" with rotoreflection



ase" with rotoreflection



Conclusions:

- Daphne transducer appears to be working correctly (so does the other transducer)
- Daphne DAT boardset or wiring is suspect and may be causing the hydrophone failures
- Acoustic results using bench power and second board set appear calibratable based on a very small data set -- *more data will be needed to confirm this*