

# Testing CTDs: An Update

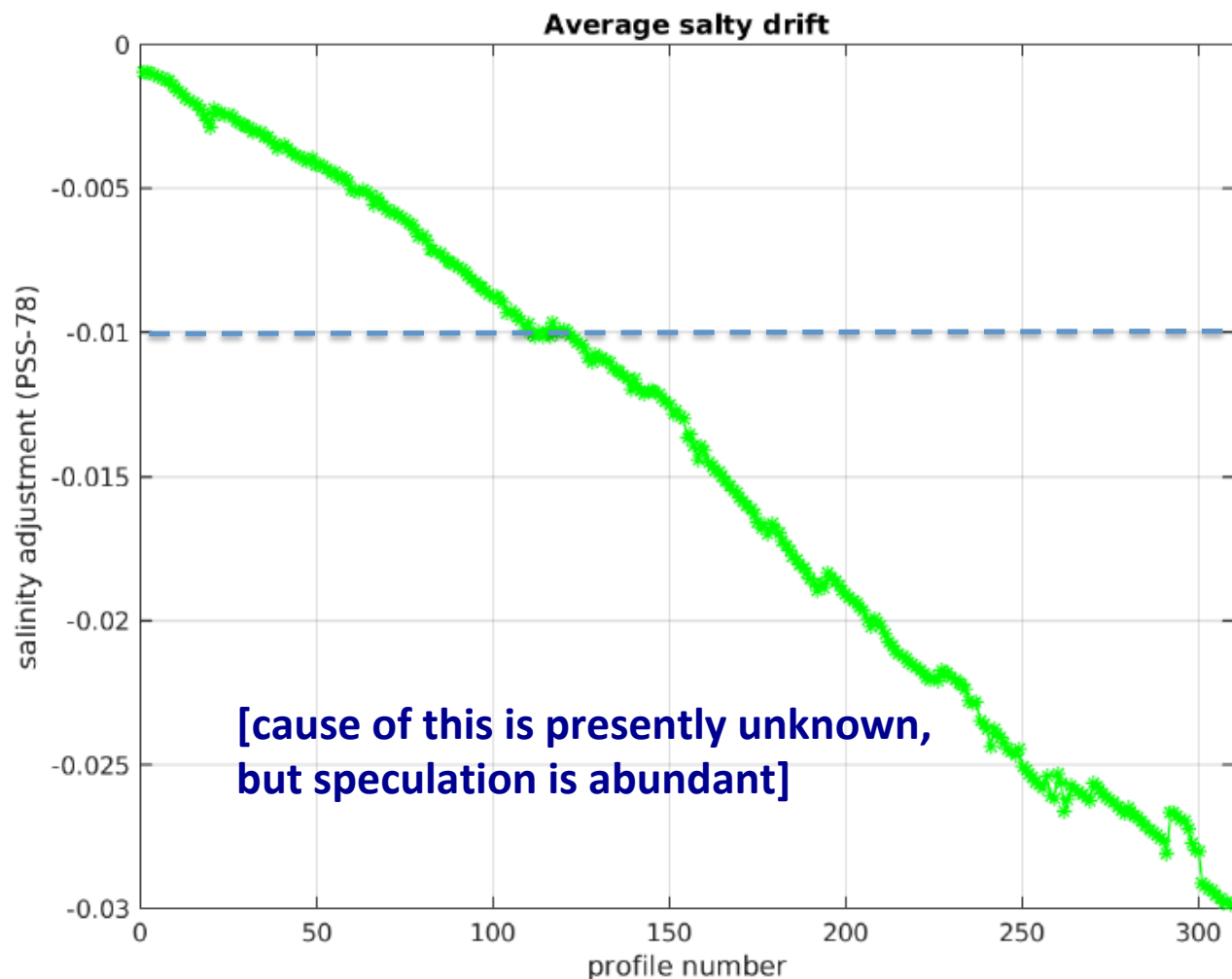
Argo Steering Team Meeting  
Sidney, B.C Canada  
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## (1) CTD salinity drift (from A. Wong)

From UW experience, about 10% of floats experience salinity drift.



**< 0.01 too small  
for adjustment**

**> 0.05 too big  
for adjustment**

## (2) New type of CTDs



RBR CTD on  
an APEX float

### RBR Argo CTD

- Inductive
- Low power (30% of SBE)
- Measures to the sea surface
- Still some stability problems, but getting better

Desirable tests: deploy RBR and SBE CTDs on paired floats, or put both side-by-side on the same float.

*Update: several APEX floats with prototype RBR CTD units were deployed at various sites late in 2017 and early in 2018. Unfortunately all failed after 1 or 2 profiles. The cause has been found and fixed and more prototypes will be deployed soon.*

### (3) Analysis: Examine laboratory pressure calibration data of Druck pressure sensors

Method: Deadweight tester

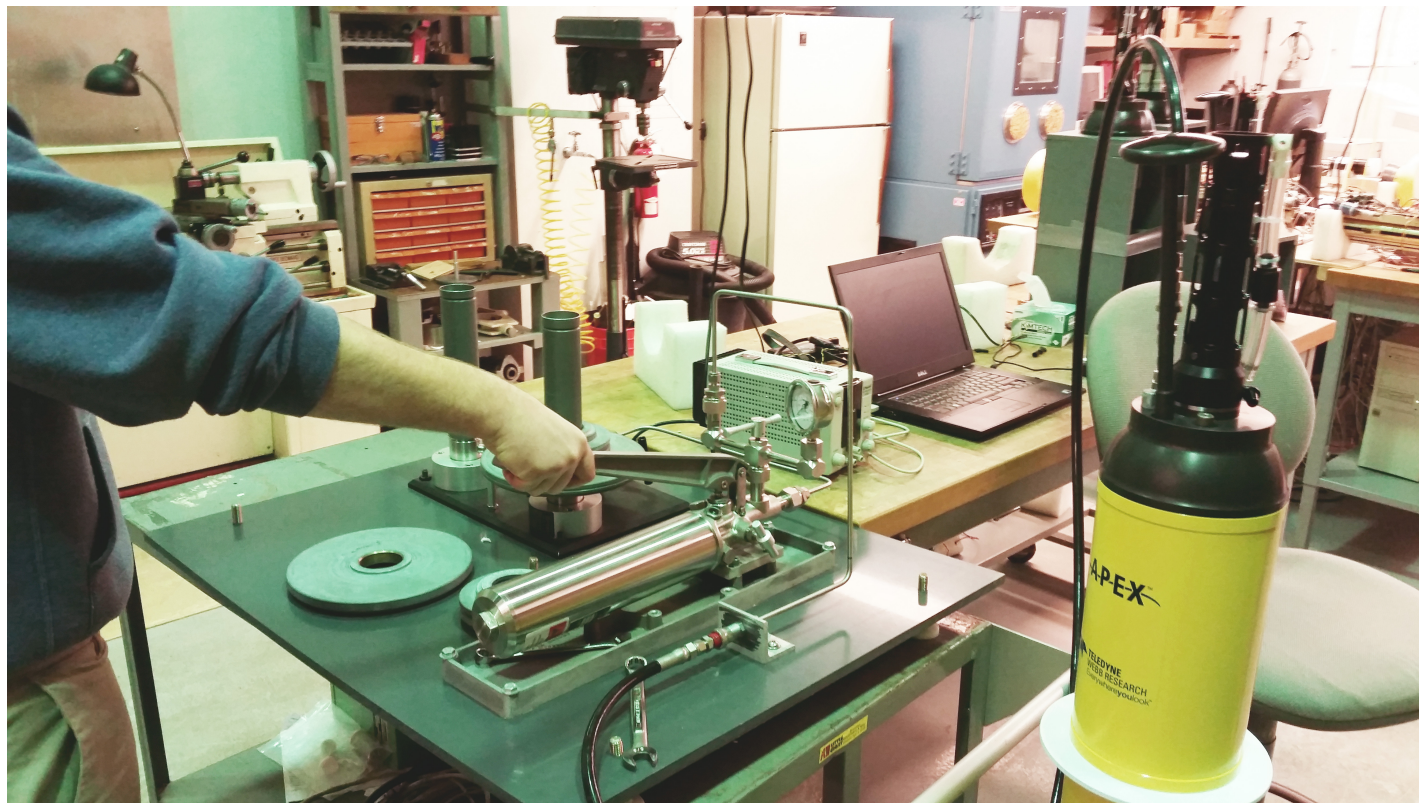
Data from 3 sources:

JAMSTEC (81 sensors, 2010-2011; warm)

SIO (58 sensors, 2012-2013; warm and cold)

UW (843 sensors, 2011-2018; warm and cold)

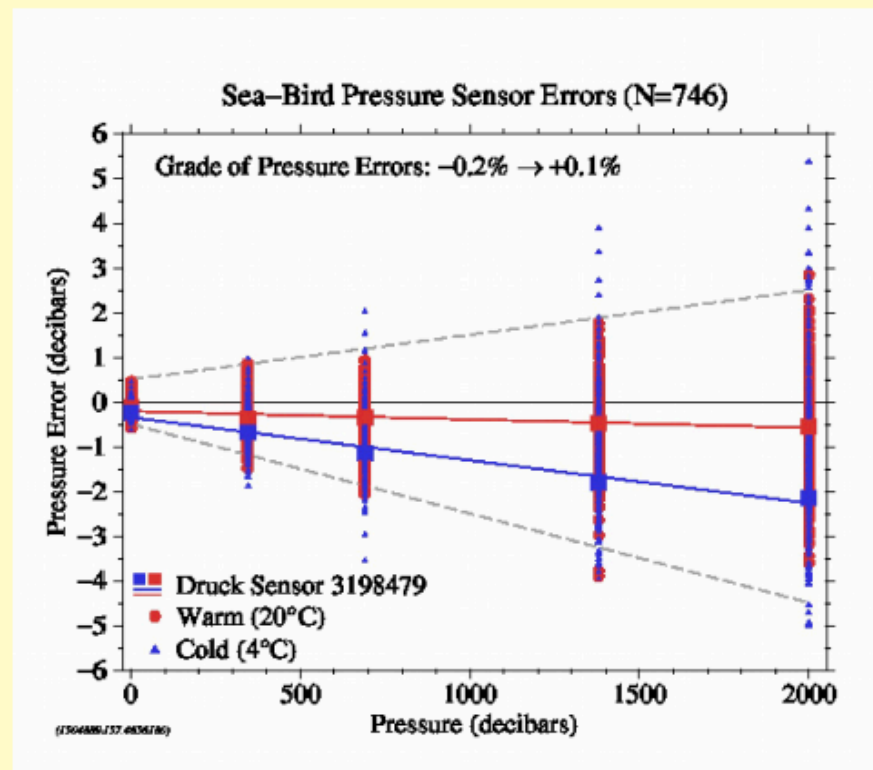
*warm:*  $\geq 18^{\circ}\text{C}$   
*cold:*  $\leq 3.5^{\circ}\text{C}$



# Predeployment verification of pressure sensor calibration.

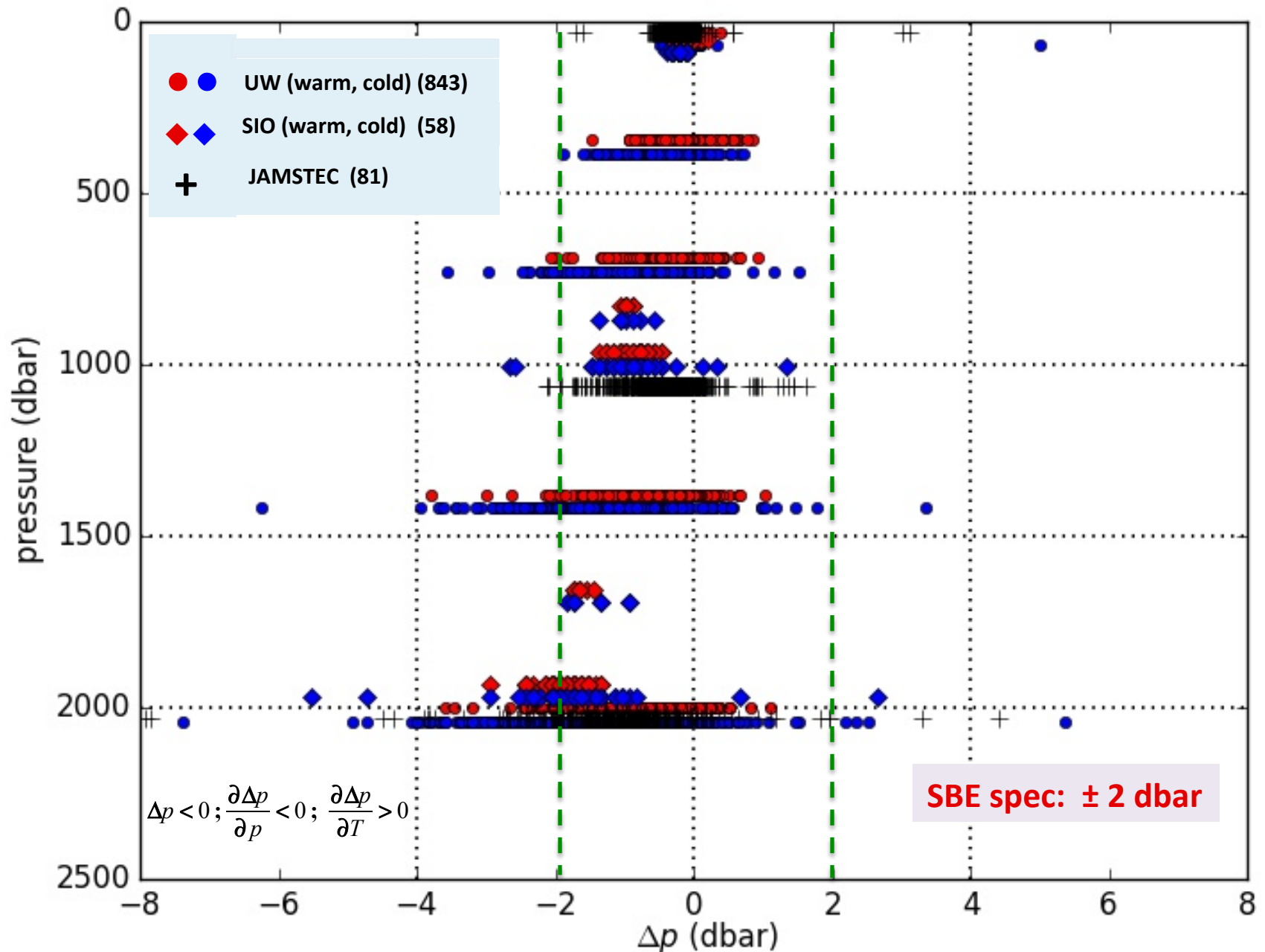
[D. Swift]

- UW implemented routine verification of pressure sensor calibration in 2011 for all floats.
- Verification is conducted twice; at room temperature and in a cold room at 4°C. Ametek dead-weight reference always remains at room temperature.
- Analysis of 746 sensors shows that errors vary linearly with pressure. For the whole ensemble, offsets are (-0.5,0.2) dbars and slope errors are (-0.2%,0.1%).





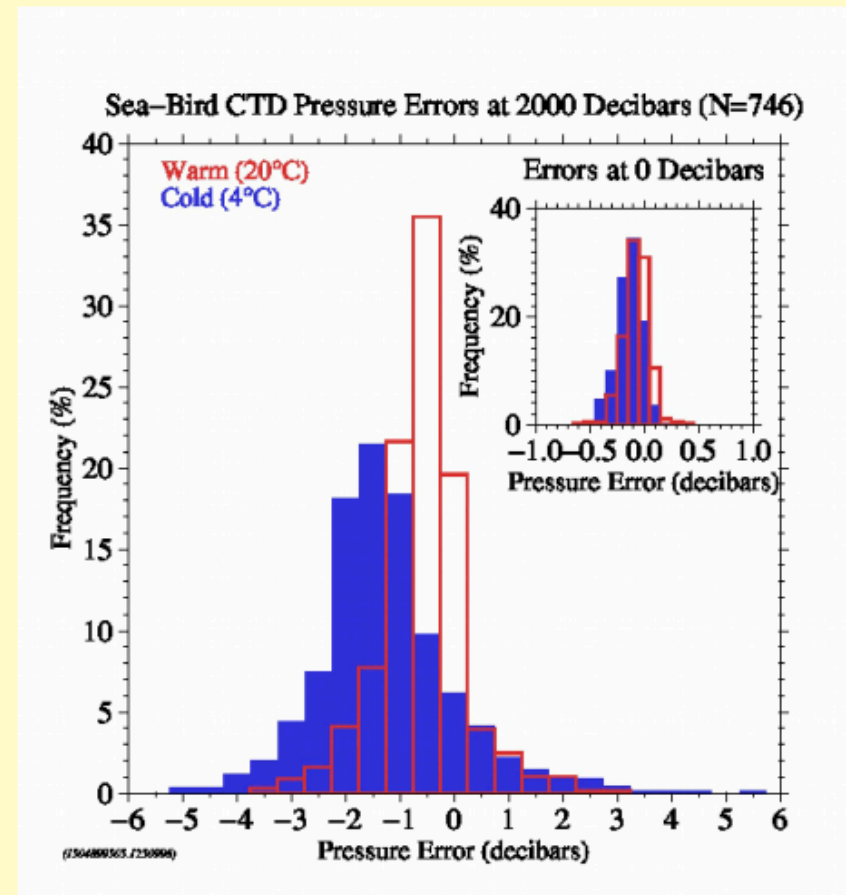
# All data: JAMSTEC, SIO, UW; warm and cold



# Distributions of pressure sensor errors with respect to temperature and pressure.

[D. Swift]

- At room temperature, Sea-Bird mostly satisfies their stated 2dbar specification over the full range of pressure.
- At 4°C, the distributions are shifted negative and the range is increased to (-4,2) dbar.
- Sea-Bird does not quite satisfy their stated specification in deep cold water.
- There exists a systematic cold bias in deep pressure that would have the effect of measuring a temperature that is low-of-correct for the indicated pressure.



[update: SBE has changed its calibration equation and claims to have eliminated this problem]

**(4) APF11 update:** Design and testing of a version of the APF11 controller for APEX floats continues at UW. Floats purchased from T/W contain a factory version of the APF11 that still has shown problems in some cases. There are some groups who might prefer a simpler version that uses the same hardware but firmware similar in spirit to the APF9. Field tests will begin this spring.

**(5) Recoveries?** At the Float/Sensor Workshop there was some interest in forming a group to try to recover a number of floats for recal and testing. This would be one way to examine the causes of the +S CTD drift.