ANALYSIS OF PRESSURE FROM "INTERIM" DRUCK PRESSURE SENSORS ON OOI CTDS

Kim Martini May 8, 2017

Moored SBE 19plus CTDs use a strain gauge sensor specifically manufactured for Sea-Bird from Druck. In 2014 the factory that makes the sensors burned down. Sea-Bird integrated a substitute pressure sensor from Druck into the CTDs, herein described as the "interim" Druck sensor. To meet the immediate needs of the OOI program, SBE 16s with the "interim" Druck pressure sensors were provided.

After the deployment of these CTDs by OOI, some of the "interim" Druck sensors measured greater pressure (I.e. deeper) values when compared to the actual known deployment depths. The affected CTDs were returned to Sea-Bird for servicing. The pressure sensors on the affected units were replaced before additional calibrations could be performed to correct the problem. Subsequent data analysis verified that the pressure error was simply an offset error and could be easily fixed from the data.

1 Identifying "Interim" Druck sensors

"Interim" Druck sensors were installed on some CTDs built between 11/2014 and 11/2016. Identification of the interim Druck sensors can be made by examining the data or by Sea-Bird if given the CTD serial number.

2 Pressure analysis

Dana Manalang observed an error in the "interim" Druck pressure sensor from a SBE 19plus deployed at ~2645 m but measured a depth of ~2756 m. By comparing data from CTDs deployed at the same site before and after the "interim" Druck sensor, it was determined the error was simply an offset. The offset is easily calculated by finding the difference in the mean pressure between the "good" and "bad" deployments. Offsets are easy to identify in the data, as there will be a large change in pressure between deployments.

For a deep CTD (CTDPFB301) deployed at 2645 m, the offset was 111.6 m. There was a similar, yet smaller offset for shallow "interim" Drucks. For a shallow CTD (CTDPFA103) deployed at 195 m, the offset was 4.5 m.

It was verified that the magnitude of the pressure variability was the same for both sets of sensors using tidal analysis. Once the offsets for "interim" Drucks and atmospheric pressure were applied, the result would be absolute pressure. For all affected sensors, salinity must be recalculated using the corrected pressure.

3 OOI CTD Inventory

"Interim" Drucks were used in CTDs built after 11/6/2014 and before 10/2015 for instruments rates to 350 m and before 11/2016 for instruments rated to 3500 m (highlighted in red below). If there are concerns about another instrument, please send the serial number to Sea-Bird and we can look into it.

Mooring	Serial Number	Product	Ship Date
CTDPFA103	6914 50118	SBE 19plus V2	10/20/2011 5/20/2015
CTDPFA102	7205 50115	SBE 19plus V2	10/31/2012 5/20/2015
CTDPFA303	7233 50123	SBE 19plus V2	12/5/2012 5/20/2015
CTDPFA302	7232 50122	SBE 19plus V2	12/5/2012 5/20/2015
CTDPFB101	7234 50119	SBE 19plus V2	12/5/2012 5/20/2015
CTDPFB301	50031 50128	SBE 19plus V2	 5/20/2015
	0144 0145 0146	SBE 52-MP	11/5/2014 11/5/2014 11/5/2014