Response to observed salinity drift in Argo float fleet

Sea-Bird is responding to Susan Wijffels' February 2018 analysis of positive salinity drift occurring early in the life of a number of floats. The corresponding CTDs appear to be manufactured in the second half of 2014. While it is early in the investigation, mid 2014 corresponds to a period where we were having problems with batches of urethane used to hermetically seal the electrical leads of conductivity cells.

During this era the observed failure at Sea-Bird was seawater intrusion between the glass conductivity cell and the urethane encapsulant, causing a parallel resistance path between signal and ground leads, resulting in a calibration drift toward higher salinity. Sea-Bird identified the problem in the summer of 2014 and, as an added precaution to the solution, put an extensive screening test in place to keep such hermetic failures out of the Argo fleet. The screening process consisted of cycling newly constructed cells under low pressure (~40 dbar) in seawater repeatedly for up to 30 days. Any electrical continuity between signal and ground leads of a dry cell identified a failure. Cells were then integrated into CTDs and placed into calibration for extended evaluation. Because the screening process and extended calibration produced CTDs that demonstrated months of stability we felt confident that vulnerable cells had been identified and kept out of the Argo fleet.

Although the urethane problem was resolved by fall of 2014, and enhanced salinity drift has not been observed in other Sea-Bird products as they return from the field for calibration, we have to look at the possibility that the urethane encapsulant issue plays a role in the salinity drift identified by Susan Wijffels. Sea-Bird is currently working to identify CTD serial numbers and relate those to our internal conductivity cell build and test documentation.

We recognize that there may be warranty ramifications, but we are very early in the investigation to speculate on specific warranty relief.

This is a preliminary note, but the Argo Program and investigators can expect a thorough written report as we identify the root cause of early positive salinity drift in "Susan's" floats. We will be grateful for a certain amount of help from the Argo community in the effort ahead.

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