

## AT39-01 CORK Pressure Data Summary

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R/V Atlantis/Jason cruise AT39-01 to the North Pond area west of the mid-Atlantic Ridge was funded by the National Science Foundation Division of Ocean Sciences. A primary objective was recovery of long-term formation and seafloor pressure data from three “CORK” subseafloor hydrogeological observatories in North Pond, specifically supported under NSF grant OCE-1536601 (K. Becker PI). These include two CORK-II hydrogeological observatories installed in fall 2011 in Holes U1382A and U1383C during IODP Expedition 336 (see Edwards et al., 2012 for details) and a “CORK-Lite” observatory installed in spring 2012 in Hole U1383B during MSM-20/5 (Wheat et al., 2012). Maria S. Merian cruise MSM-37 had visited these CORKs in 2014, and pressure datasets from these three CORKs through 2014 can be accessed under the MSM-37 entries.

The pressure-monitoring instrumentation in the three CORK’s was procured under a prior NSF grant (OCE-0946795, K. Becker PI). Each CORK pressure monitoring instrument system included 2-4 Paroscientific 8B7000-2 Digiquartz absolute pressure gauges, a data logger produced by E. Davis and colleagues at the Geological Survey of Canada with expected battery lifetime of 10-20 years depending on sampling rate, and a separate temperature sensor on the inside wall of the data logger pressure case. The Paroscientific gauges include internal temperature sensors allowing for temperature compensation of the basic frequency response in converting to pressure. All the gauges are mounted on the wellhead instrument assembly. Each North Pond installation included a seafloor reference gauge plus 1-3 formation gauges connected by ¼” tubing to sampling screens at independent formation depths isolated by downhole packers (tabulated below). The line format for each data file consists of: date and time (UTC), data logger temperature (°C), and pressure gauge temperatures (°C) and pressures (kPa) in sequence from the deepest formation zone gauge up to the seafloor gauge.

During normal data recovery operations, logger clock drift is assessed, and at operator discretion the clock may be reset to UTC. In addition, the relative offsets among the gauges may be checked with wellhead valves that allow each gauge to be switched to a seafloor input for a specified time. Finally, at operator discretion, the logger memory may be cleared at the end of the communications. During MSM-20/5 in 2012, the initial ~6-month data records from the two CORKs installed in fall of 2011 were recovered and hydrostatic checks were conducted, but the clock drift checks were invalid because of a problem with the laptop used for the transfer so the clocks were not reset. The data were left in memory, so the data files recovered during MSM-37 in 2014 included all the data since original CORK installations. During MSM-37, hydrostatic calibrations were conducted again, the clock drift was successfully assessed, and the clocks were reset.

The table below summarizes the relevant parameters for the accompanying data files. PLEASE NOTE that NO hydrostatic corrections or clock drift corrections have been applied to these data files, as different users may choose to use different methods in applying such corrections. The files are given a data quality designation of 1 because temperature compensation was applied in converting raw gauge frequency data to pressures.

Edwards, K.J., Wheat, C.G., Orcutt, B.N., Hulme, S., Becker, K., Jannasch, H., Haddad, A., Pettigrew, T., Rhinehart, W., Grigar, K., Bach, W., Kirkwood, W., and Klaus, A., Design and deployment of borehole observatories and experiments during IODP Expedition 336, Mid-Atlantic Ridge flank at North Pond, Proc. IODP, 336: College Station, TX (IODP-MI), doi: 10.2204/iodp.proc.336.109.2012.

Wheat, C.G., Edwards, K.J., Pettigrew, T., Jannasch, H.W., Becker, K., Davis, E., Villinger, H., and Bach, W., CORK-Lite: bringing legacy boreholes back to life, Scientific Drilling, 14, 39-43, doi: 10.2204/iodp.sd.14.05.2012.

Summary of AT39-01 North Pond CORK pressure data parameters. All times UTC.

CORK	U1382A	U1383C	U1383B
Lat., Long.	22°45.3531'N 46°04.8911'W	22°48.1241'N 46°03.1662'E	22°48.1328'N 46°03.1556'W
Seafloor depth	4483 m	4425 m	4414 m
Installation date	11 Oct 2011	6 Nov 2011	29 April 2012
# of formation gauges	1	3	1
Formation pressure zones (screen depths in parentheses)	102-210 mbsf (158)	58-142 mbsf (100), 142-196 mbsf (163), 196-332 mbsf (203)	54-90 mbsf (no screen)
Sampling interval	2 min through Oct 2017, reprogrammed for 20 min since then		
Hydrostatic calibration	11 Oct 2017, 23:14-23:42	10 Oct 2017, 02:06-17:24	10 Oct 2017, 01:50-17:30
AT39-01 download data time range	6 Apr 2014 12:06 – 12 Oct 2017 00:16	1 Apr 2014 13:17 – 10 Oct 2017 18:26	1 Apr 2014 14:18 – 10 Oct 2017 17:30
Previous clock reset and memory clear	6 Apr 2014, 12:04	1 Apr 2014, 13:20	1 Apr 2014, 14:17
AT39-01 clock check	12 Oct 2017, 00:22:00, logger 14.7 s ahead	10 Oct 2017, 18:27:24, logger 526.2 s ahead	10 Oct 2017, 17:32:34, logger 345.5 s ahead
AT39-01 clock reset and memory clear	12 Oct 2017, 02:02	10 Oct 2017, 20:29	10 Oct 2017, 19:12