

Appendix A

U.S. GEOTRACES EPZT: CTD Temperature and Conductivity Corrections Summary

Sta/ Cast	ITS-90 Temperature Coefficients		Conductivity Coefficients		
	$\text{corT} = \text{tp1} * \text{corP} + \text{t0}$		$\text{corC} = \text{c2} * \text{C}^2 + \text{c1} * \text{C} + \text{c0}$		
	tp1	t0	c2	c1	c0
001/02	-1.3432e-07	-0.001033	3.16731e-06	-3.16884e-04	0.005466
001/04	-1.3432e-07	-0.001025	3.16731e-06	-3.16884e-04	0.005466
001/06	-1.3432e-07	-0.001023	3.16731e-06	-3.16884e-04	0.005466
001/08	-1.3432e-07	-0.001021	3.16731e-06	-3.16884e-04	0.005466
001/10	-1.3432e-07	-0.001015	3.16731e-06	-3.16884e-04	0.005466
001/11	-1.3432e-07	-0.001013	3.16731e-06	-3.16884e-04	0.005466
001/13	-1.3432e-07	-0.001003	3.16731e-06	-3.16884e-04	0.005466
001/15	-1.3432e-07	-0.000998	3.16731e-06	-3.16884e-04	0.005466
002/02	-1.3432e-07	-0.000990	3.16731e-06	-3.16884e-04	0.005466
002/05	-1.3432e-07	-0.000986	3.16731e-06	-3.16884e-04	0.005466
003/05	-1.3432e-07	-0.000975	3.16731e-06	-3.16884e-04	0.005466
003/07	-1.3432e-07	-0.000971	3.16731e-06	-3.16884e-04	0.005466
004/02	-1.3432e-07	-0.000968	3.16731e-06	-3.16884e-04	0.005466
004/04	-1.3432e-07	-0.000963	3.16731e-06	-3.16884e-04	0.005466
005/02	-1.3432e-07	-0.000956	3.16731e-06	-3.16884e-04	0.005466
005/04	-1.3432e-07	-0.000950	3.16731e-06	-3.16884e-04	0.005466
005/06	-1.3432e-07	-0.000949	3.16731e-06	-3.16884e-04	0.005466
006/02	-1.3432e-07	-0.000934	3.16731e-06	-3.16884e-04	0.005466
007/02	-1.3432e-07	-0.000924	3.16731e-06	-3.16884e-04	0.005466
007/04	-1.3432e-07	-0.000916	3.16731e-06	-3.16884e-04	0.005466
007/06	-1.3432e-07	-0.000913	3.16731e-06	-3.16884e-04	0.005466
007/10	-1.3432e-07	-0.000905	3.16731e-06	-3.16884e-04	0.005466
007/12	-1.3432e-07	-0.000901	3.16731e-06	-3.16884e-04	0.005466
008/02	-1.3432e-07	-0.000891	3.16731e-06	-3.16884e-04	0.005466
009/02	-1.3432e-07	-0.000881	3.16731e-06	-3.16884e-04	0.005466
009/04	-1.3432e-07	-0.000876	3.16731e-06	-3.16884e-04	0.005466
009/06	-1.3432e-07	-0.000873	3.16731e-06	-3.16884e-04	0.005466
009/10	-1.3432e-07	-0.000864	3.16731e-06	-3.16884e-04	0.005466
010/02	-1.3432e-07	-0.000854	3.16731e-06	-3.16884e-04	0.005466
011/02	-1.3432e-07	-0.000844	3.16731e-06	-3.16884e-04	0.005466
011/04	-1.3432e-07	-0.000839	3.16731e-06	-3.16884e-04	0.005466
011/06	-1.3432e-07	-0.000836	3.16731e-06	-3.16884e-04	0.005466
011/08	-1.3432e-07	-0.000833	3.16731e-06	-3.16884e-04	0.005466
011/10	-1.3432e-07	-0.000830	3.16731e-06	-3.16884e-04	0.005466
011/11	-1.3432e-07	-0.000827	3.16731e-06	-3.16884e-04	0.005466
011/13	-1.3432e-07	-0.000821	3.16731e-06	-3.16884e-04	0.005466
011/15	-1.3432e-07	-0.000820	3.16731e-06	-3.16884e-04	0.005466
012/02	-1.3432e-07	-0.000809	3.16731e-06	-3.16884e-04	0.005466
013/02	-1.3432e-07	-0.000799	3.16731e-06	-3.16884e-04	0.005466
013/04	-1.3432e-07	-0.000794	3.16731e-06	-3.16884e-04	0.005466
013/06	-1.3432e-07	-0.000791	3.16731e-06	-3.16884e-04	0.005466
013/10	-1.3432e-07	-0.000783	3.16731e-06	-3.16884e-04	0.005466

Sta/ Cast	ITS-90 Temperature Coefficients		Conductivity Coefficients		
	corT = tp1*corP + t0		corC = c2*C ² + c1*C + c0		
	tp1	t0	c2	c1	c0
014/02	-1.3432e-07	-0.000772	3.16731e-06	-3.16884e-04	0.005466
015/02	-1.3432e-07	-0.000762	3.16731e-06	-3.16884e-04	0.005466
015/04	-1.3432e-07	-0.000757	3.16731e-06	-3.16884e-04	0.005466
015/06	-1.3432e-07	-0.000754	3.16731e-06	-3.16884e-04	0.005466
015/10	-1.3432e-07	-0.000746	3.16731e-06	-3.16884e-04	0.005466
016/02	-1.3432e-07	-0.000736	3.16731e-06	-3.16884e-04	0.005466
017/02	-1.3432e-07	-0.000725	3.16731e-06	-3.16884e-04	0.005466
017/04	-1.3432e-07	-0.000720	3.16731e-06	-3.16884e-04	0.005466
017/06	-1.3432e-07	-0.000717	3.16731e-06	-3.16884e-04	0.005466
017/09	-1.3432e-07	-0.000710	3.16731e-06	-3.16884e-04	0.005466
018/01	-1.3432e-07	-0.000697	3.16731e-06	-3.16884e-04	0.005466
018/04	-1.3432e-07	-0.000689	3.16731e-06	-3.16884e-04	0.005466
018/06	-1.3432e-07	-0.000686	3.16731e-06	-3.16884e-04	0.005466
018/08	-1.3432e-07	-0.000682	3.16731e-06	-3.16884e-04	0.005466
018/10	-1.3432e-07	-0.000679	3.16731e-06	-3.16884e-04	0.005466
018/11	-1.3432e-07	-0.000676	3.16731e-06	-3.16884e-04	0.005466
018/13	-1.3432e-07	-0.000670	3.16731e-06	-3.16884e-04	0.005466
018/17	-1.3432e-07	-0.000666	3.16731e-06	-3.16884e-04	0.005466
019/01	-1.3432e-07	-0.000656	3.16731e-06	-3.16884e-04	0.005466
020/02	-1.3432e-07	-0.000651	3.16731e-06	-3.16884e-04	0.005466
020/04	-1.3432e-07	-0.000645	3.16731e-06	-3.16884e-04	0.005466
020/06	-1.3432e-07	-0.000642	3.16731e-06	-3.16884e-04	0.005466
020/09	-1.3432e-07	-0.000635	3.16731e-06	-3.16884e-04	0.005466
021/02	-1.3432e-07	-0.000622	3.16731e-06	-3.16884e-04	0.005466
021/04	-1.3432e-07	-0.000617	3.16731e-06	-3.16884e-04	0.005466
021/06	-1.3432e-07	-0.000614	3.16731e-06	-3.16884e-04	0.005466
021/09	-1.3432e-07	-0.000607	3.16731e-06	-3.16884e-04	0.005466
022/02	-1.3432e-07	-0.000597	3.16731e-06	-3.16884e-04	0.005466
023/01	-1.3432e-07	-0.000588	3.16731e-06	-3.16884e-04	0.005466
023/04	-1.3432e-07	-0.000581	3.16731e-06	-3.16884e-04	0.005466
023/06	-1.3432e-07	-0.000577	3.16731e-06	-3.16884e-04	0.005466
023/10	-1.3432e-07	-0.000568	3.16731e-06	-3.16884e-04	0.005466
024/02	-1.3432e-07	-0.000558	3.16731e-06	-3.16884e-04	0.005466
025/02	-1.3432e-07	-0.000548	3.16731e-06	-3.16884e-04	0.005466
025/04	-1.3432e-07	-0.000543	3.16731e-06	-3.16884e-04	0.005466
025/06	-1.3432e-07	-0.000540	3.16731e-06	-3.16884e-04	0.005466
025/09	-1.3432e-07	-0.000532	3.16731e-06	-3.16884e-04	0.005466
026/02	-1.3432e-07	-0.000518	3.16731e-06	-3.16884e-04	0.005466
026/07	-1.3432e-07	-0.000509	3.16731e-06	-3.16884e-04	0.005466
026/08	-1.3432e-07	-0.000507	3.16731e-06	-3.16884e-04	0.005466
026/10	-1.3432e-07	-0.000503	3.16731e-06	-3.16884e-04	0.005466
026/12	-1.3432e-07	-0.000500	3.16731e-06	-3.16884e-04	0.005466
026/13	-1.3432e-07	-0.000497	3.16731e-06	-3.16884e-04	0.005466
026/15	-1.3432e-07	-0.000492	3.16731e-06	-3.16884e-04	0.005466
026/17	-1.3432e-07	-0.000490	3.16731e-06	-3.16884e-04	0.005466

Sta/ Cast	ITS-90 Temperature Coefficients		Conductivity Coefficients		
	corT = tp1*corP + t0		corC = c2*C ² + c1*C + c0		
	tp1	t0	c2	c1	c0
027/02	-1.3432e-07	-0.000481	3.16731e-06	-3.16884e-04	0.005466
028/02	-1.3432e-07	-0.000471	3.16731e-06	-3.16884e-04	0.005466
028/04	-1.3432e-07	-0.000466	3.16731e-06	-3.16884e-04	0.005466
028/06	-1.3432e-07	-0.000463	3.16731e-06	-3.16884e-04	0.005466
028/09	-1.3432e-07	-0.000455	3.16731e-06	-3.16884e-04	0.005466
029/02	-1.3432e-07	-0.000445	3.16731e-06	-3.16884e-04	0.005466
030/02	-1.3432e-07	-0.000438	3.16731e-06	-3.16884e-04	0.005466
030/04	-1.3432e-07	-0.000432	3.16731e-06	-3.16884e-04	0.005466
030/06	-1.3432e-07	-0.000429	3.16731e-06	-3.16884e-04	0.005466
030/11	-1.3432e-07	-0.000418	3.16731e-06	-3.16884e-04	0.005466
031/02	-1.3432e-07	-0.000407	3.16731e-06	-3.16884e-04	0.005466
032/02	-1.3432e-07	-0.000392	3.16731e-06	-3.16884e-04	0.005466
032/04	-1.3432e-07	-0.000387	3.16731e-06	-3.16884e-04	0.005466
032/06	-1.3432e-07	-0.000383	3.16731e-06	-3.16884e-04	0.005466
032/10	-1.3432e-07	-0.000374	3.16731e-06	-3.16884e-04	0.005466
033/02	-1.3432e-07	-0.000365	3.16731e-06	-3.16884e-04	0.005466
034/02	-1.3432e-07	-0.000355	3.16731e-06	-3.16884e-04	0.005466
034/06	-1.3432e-07	-0.000346	3.16731e-06	-3.16884e-04	0.005466
035/02	-1.3432e-07	-0.000335	3.16731e-06	-3.16884e-04	0.005466
036/02	-1.3432e-07	-0.000325	3.16731e-06	-3.16884e-04	0.005466
036/04	-1.3432e-07	-0.000319	3.16731e-06	-3.16884e-04	0.005466
036/06	-1.3432e-07	-0.000316	3.16731e-06	-3.16884e-04	0.005466
036/08	-1.3432e-07	-0.000311	3.16731e-06	-3.16884e-04	0.005466
036/10	-1.3432e-07	-0.000308	3.16731e-06	-3.16884e-04	0.005466
036/11	-1.3432e-07	-0.000305	3.16731e-06	-3.16884e-04	0.005466
036/13	-1.3432e-07	-0.000299	3.16731e-06	-3.16884e-04	0.005466
036/15	-1.3432e-07	-0.000298	3.16731e-06	-3.16884e-04	0.005466

Appendix B

Summary of U.S. GEOTRACES EPZT CTD Oxygen Time Constants (time constants in seconds)

Pressure Hysteresis (τ_h)	Temperature		Pressure Gradient (τ_p)	O ₂ Gradient (τ_{og})	Velocity (τ_{dp})	Thermal Diffusion (τ_{dT})
50.0	Long(τ_{TL})	Short(τ_{Ts})	4.0	0.50	8.00	200.00
	300.0					300.0

U.S. GEOTRACES EPZT: Conversion Equation Coefficients for CTD Oxygen (refer to Equation 1.7.4.0)

Sta/ Cast	O _c Slope (C ₁)	Offset (C ₃)	P _h coeff (C ₂)	T _l coeff (C ₄)	T _s coeff (C ₅)	P _l coeff (C ₆)	$\frac{dO_c}{dt}$ coeff (C ₇)	$\frac{dP}{dt}$ coeff (C ₈)	T _{dT} coeff (C ₉)
001/02	5.694e-04	-0.2394	0.0829	-3.301e-03	2.091e-03	-6.305e-03	-5.804e-04	-6.305e-03	-7.688e-03
001/04	1.386e-04	-0.0590	0.8495	-1.532e-02	9.480e-02	1.482e-01	3.837e-03	1.482e-01	3.212e-04
001/06	5.094e-04	-0.2122	0.0781	-1.071e-03	6.226e-03	5.078e-03	2.040e-04	5.078e-03	-1.735e-03
001/08	7.939e-04	-0.3339	0.1395	5.691e-03	-2.518e-02	-3.083e-02	1.428e-04	-3.083e-02	-1.388e-03
001/10	5.174e-04	-0.2188	0.3963	-6.243e-03	1.076e-02	3.509e-02	1.386e-03	3.509e-02	-2.368e-03
001/11	5.721e-04	-0.2382	-0.0301	5.412e-04	-1.586e-03	-1.870e-02	-1.113e-04	-1.870e-02	-3.167e-03
001/13	5.579e-04	-0.2351	0.3338	-3.281e-03	4.177e-03	-2.296e-03	2.171e-04	-2.296e-03	-6.651e-03
001/15	5.621e-04	-0.2319	-0.0919	1.063e-03	-8.794e-04	-2.083e-02	5.053e-04	-2.083e-02	-5.111e-03
002/02	1.862e-04	-0.0788	1.3060	1.267e-01	-5.549e-02	-1.515e+00	3.008e-04	-1.515e+00	1.133e-02
002/05	2.138e-04	-0.0877	-0.3517	-1.244e-01	1.905e-01	1.715e-01	-3.367e-03	1.715e-01	-1.484e-01
003/05	4.026e-04	-0.1713	4.1906	-7.509e-02	1.023e-01	1.736e+00	3.516e-04	1.736e+00	-1.111e-01
003/07	2.784e-05	-0.0110	-0.7538	-1.625e-01	3.442e-01	2.155e-01	-7.104e-03	2.155e-01	-3.904e-01
004/02	4.438e-04	-0.1879	0.3955	2.065e-02	-6.393e-03	-2.790e-01	5.891e-04	-2.790e-01	1.831e-03
004/04	1.564e-03	-0.6594	0.1177	-3.512e-02	-2.489e-02	1.289e-01	8.150e-03	1.289e-01	-4.325e-02
005/02	2.138e-04	-0.0898	0.0624	1.550e-02	4.115e-02	-3.891e-01	2.171e-03	-3.891e-01	-2.309e-02
005/04	7.763e-05	-0.0326	0.5537	-1.479e-03	1.156e-01	-1.494e-01	-6.853e-03	-1.494e-01	-1.284e-02
005/06	5.669e-04	-0.2391	0.1398	-1.853e-02	1.831e-02	-9.871e-03	-3.051e-03	-9.871e-03	-2.656e-02
006/02	5.504e-04	-0.2326	0.2262	5.157e-04	1.418e-03	7.787e-03	2.884e-04	7.787e-03	-3.380e-04
007/02	5.784e-04	-0.2406	-0.0518	-1.970e-03	1.033e-03	-1.309e-02	5.899e-05	-1.309e-02	-6.729e-03
007/04	3.850e-04	-0.1633	0.3341	7.134e-04	1.990e-02	-7.662e-02	-1.745e-03	-7.662e-02	-9.061e-03
007/06	6.689e-04	-0.2821	0.1572	4.415e-04	-9.048e-03	2.367e-02	1.550e-03	2.367e-02	3.106e-03
007/10	5.893e-04	-0.2451	-0.0168	4.414e-04	-2.379e-03	-1.113e-02	1.821e-04	-1.113e-02	-2.070e-03
007/12	5.893e-04	-0.2451	-0.0168	4.414e-04	-2.379e-03	-1.113e-02	1.821e-04	-1.113e-02	-2.070e-03
008/02	5.534e-04	-0.2338	0.3439	-6.290e-03	7.982e-03	2.823e-02	-1.893e-03	2.823e-02	-4.854e-03
009/02	5.593e-04	-0.2367	0.2584	-2.176e-04	1.426e-03	4.705e-03	-5.177e-04	4.705e-03	-8.516e-04
009/04	5.054e-04	-0.2179	0.6881	-2.738e-03	9.255e-03	4.841e-02	-1.665e-03	4.841e-02	1.749e-03
009/06	6.116e-04	-0.2612	0.4527	-3.181e-03	-1.363e-04	5.276e-02	1.152e-03	5.276e-02	6.530e-04
009/10	5.798e-04	-0.2422	-0.0424	-3.188e-03	2.347e-03	-1.067e-02	-3.361e-03	-1.067e-02	-7.796e-03
010/02	6.028e-04	-0.2583	0.4603	-3.389e-03	8.865e-04	5.463e-02	1.148e-04	5.463e-02	1.581e-03
011/02	5.578e-04	-0.2379	0.3878	4.342e-04	8.513e-04	1.473e-02	9.167e-04	1.473e-02	7.301e-04
011/04	4.964e-04	-0.2122	0.5323	6.136e-04	6.257e-03	6.788e-03	7.566e-04	6.788e-03	9.640e-05
011/06	5.781e-04	-0.2523	0.8736	2.434e-04	-1.842e-04	1.662e-02	1.252e-03	1.662e-02	-8.045e-04
011/08	5.715e-04	-0.2398	-0.0133	-3.376e-03	3.403e-03	-7.639e-03	9.019e-05	-7.639e-03	-1.008e-02
011/10	5.765e-04	-0.2437	0.1277	-4.393e-04	1.860e-05	5.714e-03	-2.312e-03	5.714e-03	-1.127e-03
011/11	7.149e-04	-0.2947	-0.2886	1.328e-03	-1.234e-02	1.467e-02	9.579e-04	1.467e-02	5.521e-03
011/13	4.974e-04	-0.2248	2.0902	1.810e-03	5.711e-03	3.406e-02	-6.059e-04	3.406e-02	2.021e-03

Sta/ Cast	O_c Slope (C ₁)	Offset (C ₃)	P_h coeff (C ₂)	T_l coeff (C ₄)	T_s coeff (C ₅)	P_l coeff (C ₆)	$\frac{dO_c}{dt}$ coeff (C ₇)	$\frac{dP}{dt}$ coeff (C ₈)	T_{dT} coeff (C ₉)
011/15	5.753e-04	-0.2406	-0.0295	-1.205e-03	9.486e-04	-9.543e-03	-8.554e-06	-9.543e-03	-5.299e-03
012/02	4.692e-04	-0.2022	0.7270	5.048e-04	9.002e-03	2.014e-02	-2.628e-03	2.014e-02	1.753e-03
013/02	5.314e-04	-0.2266	0.3904	1.742e-03	1.912e-03	6.904e-03	2.832e-04	6.904e-03	9.639e-04
013/04	6.104e-04	-0.2562	0.1584	-5.973e-04	-2.585e-03	3.093e-02	5.757e-04	3.093e-02	2.867e-03
013/06	5.341e-04	-0.2275	0.6563	8.742e-04	2.525e-03	3.900e-02	1.174e-03	3.900e-02	4.344e-03
013/10	5.852e-04	-0.2446	-0.0137	1.043e-03	-1.920e-03	-9.258e-03	2.561e-04	-9.258e-03	-1.965e-03
014/02	5.823e-04	-0.2483	0.5572	-3.700e-03	3.200e-03	3.997e-02	-1.455e-03	3.997e-02	1.362e-04
015/02	5.729e-04	-0.2377	-0.0300	4.419e-04	-2.634e-04	-1.275e-03	2.991e-04	-1.275e-03	-1.055e-03
015/04	5.487e-04	-0.2250	0.1070	-5.021e-04	2.287e-03	8.379e-03	-1.164e-03	8.379e-03	-6.891e-05
015/06	5.471e-04	-0.2364	0.7350	-2.177e-04	2.557e-03	2.579e-02	3.100e-05	2.579e-02	1.641e-03
015/10	5.627e-04	-0.2303	-0.0833	6.467e-04	2.030e-04	-1.141e-02	-1.298e-03	-1.141e-02	-2.082e-03
016/02	5.320e-04	-0.2206	0.1629	-3.851e-04	3.606e-03	8.515e-04	-8.814e-04	8.515e-04	-1.043e-03
017/02	5.649e-04	-0.2405	0.3284	2.262e-04	7.248e-04	1.280e-03	6.489e-04	1.280e-03	-1.576e-03
017/04	5.552e-04	-0.2313	0.1093	1.336e-03	-9.129e-07	1.171e-02	5.517e-04	1.171e-02	2.274e-03
017/06	5.386e-04	-0.2263	0.2743	-8.101e-04	3.574e-03	8.904e-03	-9.493e-04	8.904e-03	3.183e-04
017/09	5.618e-04	-0.2327	-0.0823	9.934e-04	-1.134e-04	-1.079e-02	1.205e-03	-1.079e-02	-1.905e-03
018/01	5.643e-04	-0.2341	-0.1295	1.689e-03	-1.064e-03	-1.295e-02	8.972e-04	-1.295e-02	-1.354e-03
018/04	5.365e-04	-0.2204	-0.1303	7.590e-04	2.057e-03	-5.099e-03	9.156e-04	-5.099e-03	-1.237e-03
018/06	5.793e-04	-0.2361	-0.1651	5.963e-04	-1.023e-03	8.679e-03	1.376e-03	8.679e-03	1.155e-04
018/08	5.798e-04	-0.2483	0.1682	3.730e-03	-3.855e-03	3.552e-03	3.783e-03	3.552e-03	2.748e-03
018/10	6.003e-04	-0.2605	0.0543	2.358e-03	-3.713e-03	1.202e-03	1.360e-03	1.202e-03	1.447e-03
018/11	6.180e-04	-0.2765	0.7126	9.656e-04	-3.105e-03	2.269e-02	-1.376e-04	2.269e-02	2.074e-03
018/13	9.599e-04	-0.4848	2.7893	-1.713e-02	-1.645e-03	1.993e-01	-4.235e-03	1.993e-01	4.368e-03
018/17	5.984e-04	-0.2577	-0.1102	3.046e-03	-4.423e-03	-5.063e-03	1.990e-03	-5.063e-03	1.526e-03
019/01	5.875e-04	-0.2610	0.4998	1.815e-03	-1.896e-03	6.225e-03	1.225e-03	6.225e-03	4.855e-04
020/02	5.999e-04	-0.2605	0.1528	-5.651e-04	-8.961e-04	1.224e-03	-2.582e-03	1.224e-03	-1.775e-03
020/04	5.607e-04	-0.2387	0.0783	1.385e-03	9.749e-05	-6.153e-03	4.286e-04	-6.153e-03	-1.489e-03
020/06	5.914e-04	-0.2524	0.4669	1.112e-04	-9.647e-04	2.288e-02	-3.373e-04	2.288e-02	1.733e-03
020/09	6.087e-04	-0.2690	0.1414	-2.572e-04	-1.463e-03	-3.638e-03	-1.352e-03	-3.638e-03	-2.242e-03
021/02	5.742e-04	-0.2440	0.1636	1.145e-03	-9.007e-04	-1.026e-03	2.859e-04	-1.026e-03	-3.824e-04
021/04	5.824e-04	-0.2461	0.0683	2.575e-03	-2.711e-03	-6.485e-03	7.715e-04	-6.485e-03	-3.232e-04
021/06	5.778e-04	-0.2413	0.0719	2.076e-03	-2.026e-03	-5.561e-03	-2.569e-04	-5.561e-03	-4.398e-04
021/09	5.560e-04	-0.2292	-0.1582	-1.625e-03	2.932e-03	-1.016e-02	-2.203e-03	-1.016e-02	-5.030e-03
022/02	6.058e-04	-0.2659	0.7151	-4.698e-03	3.281e-03	3.689e-02	-1.540e-03	3.689e-02	-2.159e-03
023/01	5.891e-04	-0.2513	-0.0006	2.159e-03	-2.824e-03	-6.809e-03	5.690e-04	-6.809e-03	5.867e-04
023/04	5.918e-04	-0.2548	0.2920	1.056e-03	-1.614e-03	5.722e-03	2.169e-05	5.722e-03	-1.119e-04
023/06	5.794e-04	-0.2462	0.2358	1.646e-03	-1.582e-03	7.133e-03	2.841e-04	7.133e-03	9.356e-04
023/10	5.508e-04	-0.2266	-0.1739	1.964e-03	-2.482e-04	-1.270e-02	6.855e-04	-1.270e-02	-1.475e-03
024/02	5.459e-04	-0.2293	0.0343	1.775e-03	5.386e-04	1.691e-03	1.838e-03	1.691e-03	3.001e-04
025/02	5.890e-04	-0.2557	0.3412	1.877e-03	-2.209e-03	5.518e-04	7.568e-04	5.518e-04	1.369e-04
025/04	6.186e-04	-0.2706	0.4828	1.462e-04	-2.251e-03	2.256e-02	-5.177e-05	2.256e-02	4.922e-04
025/06	6.413e-04	-0.2809	0.4660	5.626e-04	-4.107e-03	3.379e-02	1.186e-03	3.379e-02	2.202e-03
025/09	5.800e-04	-0.2463	-0.1377	1.017e-03	-1.033e-03	-1.345e-02	-1.512e-03	-1.345e-02	-1.671e-03
026/02	5.766e-04	-0.2431	-0.0664	2.642e-03	-2.439e-03	-4.974e-03	1.192e-03	-4.974e-03	6.927e-04
026/07	5.830e-04	-0.2484	0.1120	2.446e-03	-2.592e-03	2.828e-03	3.632e-04	2.828e-03	1.001e-03
026/08	6.323e-04	-0.2767	0.5617	1.487e-03	-4.303e-03	1.744e-02	1.146e-04	1.744e-02	1.358e-03
026/10	5.948e-04	-0.2567	-0.0749	2.493e-03	-3.272e-03	-9.824e-03	2.378e-04	-9.824e-03	4.133e-04
026/12	5.735e-04	-0.2391	0.0605	1.677e-03	-1.280e-03	-1.991e-03	1.544e-04	-1.991e-03	8.202e-05

Sta/ Cast	O_c Slope (C ₁)	Offset (C ₃)	P_h coeff (C ₂)	T_l coeff (C ₄)	T_s coeff (C ₅)	P_l coeff (C ₆)	$\frac{dO_c}{dt}$ coeff (C ₇)	$\frac{dP}{dt}$ coeff (C ₈)	T_{dT} coeff (C ₉)
026/13	5.904e-04	-0.2520	0.0749	2.187e-03	-2.715e-03	3.961e-03	1.191e-03	3.961e-03	1.108e-03
026/15	5.906e-04	-0.1768	-4.3759	2.260e-03	-5.312e-03	-8.320e-02	-1.108e-03	-8.320e-02	-2.488e-03
026/17	5.795e-04	-0.2462	-0.1315	2.094e-03	-2.052e-03	-1.195e-02	-1.434e-04	-1.195e-02	3.862e-05
027/02	5.937e-04	-0.2594	0.5650	-6.626e-04	1.653e-04	2.225e-02	-1.024e-03	2.225e-02	-5.773e-05
028/02	5.694e-04	-0.2390	-0.1920	-5.887e-04	1.086e-03	-9.023e-03	-2.137e-03	-9.023e-03	-2.928e-03
028/04	5.498e-04	-0.2271	-0.2206	8.851e-04	8.501e-04	-6.915e-03	4.154e-04	-6.915e-03	-1.215e-03
028/06	5.644e-04	-0.2333	0.2501	-1.162e-03	2.066e-03	-2.577e-06	-1.864e-03	-2.577e-06	-2.310e-03
028/09	5.633e-04	-0.2348	-0.2010	-1.647e-03	2.581e-03	-1.441e-02	-4.995e-03	-1.441e-02	-4.063e-03
029/02	5.639e-04	-0.2465	1.1038	-2.880e-03	4.455e-03	2.786e-02	-3.476e-03	2.786e-02	-2.472e-03
030/02	4.946e-04	-0.1828	-0.3973	3.533e-03	1.097e-03	-1.668e-02	6.838e-04	-1.668e-02	1.752e-03
030/04	5.613e-04	-0.2321	-0.1783	2.462e-03	-1.549e-03	6.418e-03	2.739e-03	6.418e-03	1.896e-03
030/06	5.545e-04	-0.2276	0.0604	1.045e-03	3.576e-04	1.889e-04	-1.929e-03	1.889e-04	-5.262e-05
030/11	5.486e-04	-0.2210	-0.2209	2.606e-03	-1.098e-03	-1.449e-02	-3.532e-04	-1.449e-02	4.647e-04
031/02	5.196e-04	-0.2064	-0.3926	1.642e-03	1.671e-03	-4.239e-03	3.014e-04	-4.239e-03	4.500e-04
032/02	5.561e-04	-0.2355	0.6105	1.039e-03	6.227e-04	5.732e-03	-2.678e-03	5.732e-03	-2.523e-04
032/04	5.317e-04	-0.2074	0.1827	9.579e-04	1.609e-03	4.277e-03	2.274e-04	4.277e-03	-7.378e-04
032/06	5.599e-04	-0.2309	-0.1092	9.855e-04	-9.404e-05	-3.461e-04	-1.063e-03	-3.461e-04	8.894e-04
032/10	5.788e-04	-0.2442	-0.0927	3.910e-04	-2.204e-04	-1.803e-02	-2.590e-03	-1.803e-02	-2.391e-03
033/02	5.583e-04	-0.2293	-0.1000	1.656e-03	-5.234e-04	-2.554e-03	1.206e-03	-2.554e-03	-2.987e-04
034/02	5.530e-04	-0.2277	-0.0700	2.738e-03	-1.300e-03	-5.729e-03	9.192e-04	-5.729e-03	2.875e-04
034/06	5.566e-04	-0.2289	-0.2150	2.175e-03	-1.062e-03	-1.910e-02	-9.893e-04	-1.910e-02	-6.552e-04
035/02	5.773e-04	-0.2450	-0.0634	1.709e-03	-1.513e-03	7.466e-04	9.330e-04	7.466e-04	6.923e-04
036/02	5.964e-04	-0.2638	0.2837	1.948e-03	-2.663e-03	-1.736e-03	-1.107e-03	-1.736e-03	6.160e-04
036/04	5.678e-04	-0.2409	-0.0434	1.229e-03	-5.392e-04	-2.308e-04	-3.974e-04	-2.308e-04	4.332e-05
036/06	5.632e-04	-0.2374	-0.0224	1.588e-03	-7.808e-04	-4.304e-03	-1.336e-03	-4.304e-03	4.455e-04
036/08	6.150e-04	-0.2769	-0.1035	1.542e-03	-3.061e-03	-1.868e-02	-2.723e-03	-1.868e-02	-7.531e-04
036/10	6.013e-04	-0.2632	0.0572	8.690e-04	-1.831e-03	-2.105e-03	-3.073e-03	-2.105e-03	-2.660e-04
036/11	5.051e-04	-0.1900	-0.2341	1.051e-03	2.841e-03	-8.924e-03	-3.752e-04	-8.924e-03	-9.357e-04
036/13	8.913e-04	-0.4092	0.6793	-9.795e-03	-4.005e-03	1.353e-01	-2.563e-03	1.353e-01	-4.083e-04
036/15	5.439e-04	-0.2182	-0.2216	8.170e-04	8.672e-04	-2.154e-02	-2.478e-03	-2.154e-02	-1.896e-03

Appendix C

U.S. GEOTRACES EPZT: Bottle Quality Comments

Comments from the Sample Logs and the results of SIO/STS's data investigations are included in this report. Units stated in these comments are degrees Celsius for temperature, micromoles per kilogram for oxygen and micromoles per liter for Silicate, Nitrate, Nitrite, and Phosphate. The sample number is the cast number times 100 plus the bottle number. Investigation of data may include comparison of bottle salinity and oxygen data with CTD data, review of data plots of the station profile and adjoining stations, and re-reading of charts (i.e. nutrients).

Comments from other analysts, submitted through the shipboard data website with their sample values, are also included in this table.

Quality codes in this table are from the coding scheme developed for the World Ocean Circulation Experiment Hydrographic Programme (WHP) [Joyce94]. These flags can also be found at http://cchdo.ucsd.edu/woce_flags.html.

In addition, non-standard quality codes "A" and "B" were used for several properties where the analysts desired to mark them as "Above" or "Below" detection limits for the analysis methods used.

Station /Cast	Sample No.	Property	Quality Code	Comment
1/1	101	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)
1/1	102	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)
1/1	103	bottle	2	Spigot leaking.
1/1	103	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)
1/1	104	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)
1/1	105	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)
1/1	106	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)
1/1	107	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)
1/1	108	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)
1/1	109	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)

Station /Cast	Sample No.	Property	Quality Code	Comment
1/1	110	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)
1/1	111	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)
1/1	112	salt	2	Value matches duplicate. (Analyst: Salt 12 thimble came out with cap. Probable contamination.)
1/1	113	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)
1/1	114	no2	4	Other nutrient values higher than expected, no analytical problems noted. Salt fine, perhaps mis-sampled for nutrients only.
1/1	114	no3	4	Value higher than expected, no analytical problems noted. Salt fine, perhaps mis-sampled for nutrients only.
1/1	114	po4	4	Value higher than expected, no analytical problems noted. Salt fine, perhaps mis-sampled for nutrients only.
1/1	114	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)
1/1	114	sio3	4	Value higher than expected, no analytical problems noted. Salt fine, perhaps mis-sampled for nutrients only.
1/1	115	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)
1/1	116	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)
1/1	117	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)
1/1	118	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)
1/1	119	dfe2_mops	5	sample lost due to broken tubing
1/1	119	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)
1/1	120	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)
1/1	121	dfe2_mops	5	sample lost due to broken tubing
1/1	121	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)
1/1	122	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)
1/1	123	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)

Station /Cast	Sample No.	Property	Quality Code	Comment
1/1	124	dfe2_mops	5	sample lost due to broken tubing
1/1	124	salt	2	Salinity values for cast are ok: all samples are deep, and all dups within 0.004 of each other. (Analyst: All samples appear to have been collected in random order.)
1/2	201	salt	2	Value matches CTD data. (Analyst: thimble popped out with cap. Reading suspect.)
1/2	207	bottle	2	Niskin leaky.
1/2	208	bottle	2	Niskin leaky.
1/5	501	dfe2_mops	5	No data (ND) reported
1/5	501	salt	2	Value matches duplicate and CTD data. (Analyst: Salt 1 rim chipped and rough. Seal may have been compromised.)
1/5	507	bottle	2	Bottle hanging but full when recovered.
1/6	601	bottle	2	Niskin vent open.
1/6	604	salt	2	Value matches CTD data. (Analyst: Salt 28 thimble came out with cap. Readings a bit farther apart than normal.)
1/6	608	bottle	2	Niskin leaky.
1/8	802	salt	2	Value matches CTD data. (Analyst: Salt 2 - Readings erratic with initial jump. Seems high.)
1/8	807	salt	2	Value matches CTD data. (Analyst: Salt 7 - Readings kept climbing. Probably contamination. Source not clear.)
1/8	809	bottle	2	Niskin leaky.
1/10	1001	salt	2	Values match each other (duplicates) and CTD data. (Analyst: Salts 25 and 26 exhibit the same pattern of climbing readings. Lots of particulate matter in sample.)
1/10	1002	salt	2	Values match each other (duplicates) and CTD data. (Analyst: Salts 25 and 26 exhibit the same pattern of climbing readings. Lots of particulate matter in sample.)
1/10	1005	salt	2	Value matches duplicate and CTD data. (Analyst: Salt 29 - Readings kept increasing. High particle count in sample.)
1/10	1007	bottle	2	Niskin leaky.
1/10	1008	bottle	2	Niskin leaky.
1/10	1009	salt	2	Value matches duplicate and CTD data. (Analyst: Salt 33 - Thimble popped out early. Reading kept climbing. Probable contamination.)
1/10	1012	bottle	2	Niskin leaky.
1/11	1109	bottle	2	Niskin top not sealed, leaky.
1/11	1109	o2	3	Value low, does not match duplicate or CTD data. No analytical errors noted.
1/13	1302	bottle	2	Niskin leaky.
1/13	1304	salt	2	Deep cast, value is within 0.001 of CTD data. (Analyst: Salt 16 - Thimble popped out while cap was being removed. Probable contamination. Should be closer to salt 15 in value.)
1/13	1309	bottle	2	Niskin top not sealed, leaky.
1/14	1407	dfe2_mops	5	sample lost due to broken tubing
1/14	1409	dfe2_mops	5	sample lost due to broken tubing
1/14	1411	dfe2_mops	5	sample lost due to broken tubing
1/14	1415	dfe2_mops	5	sample lost due to broken tubing
1/14	1419	dfe2_mops	5	sample lost due to broken tubing
1/14	1421	dfe2_mops	5	sample lost due to broken tubing
1/14	1423	dfe2_mops	5	sample lost due to broken tubing
1/15	1504	o2	3	deep bottle o2 appears to be slightly high (1.5 umol/kg) vs nearby bottles and CTD; code questionable.

Station /Cast	Sample No.	Property	Quality Code	Comment
1/15	1508	bottle	2	Niskin leaky.
1/15	1509	salt	2	Deep cast, value within 0.002 of CTD data. (Analyst: Salt 9 - thimble came out and water poured from thimble down bottle. Contaminated. Watched 5 samples increase each read. Suspect actual reading should be closer to 1.98428)
1/25	2525	bottle	2	CTD data for Surface FISH sample from 001/04 (30-ODF) down-cast.
2/1	101	bottle	2	Leaking from spigot.
2/1	102	dfe2_syr	6	Reported as GT No. 2252, but assume it is 2253.
2/1	105	salt	2	Value matches duplicate and CTD data. (Analyst: Salt 5 - Thimble loosened by cap threads. Very wet. Possible contamination.)
2/1	106	dfe2_syr	2	Duplicate values reported, used first value
2/1	110	dfe2_syr	2	Duplicate values reported, used first value
2/1	113	dfe	2	Note: Calibrated for higher concentrations
2/1	114	dfe2_syr	6	Reported as GT No. 2559, corrected to 2259
2/1	117	dfe	2	Note: Calibrated for higher concentrations
2/1	118	dfe2_syr	2	Duplicate values reported, used first value
2/1	121	bottle	2	Air leaking from top ball.
2/1	121	dfe	2	Note: Calibrated for higher concentrations
2/1	122	dfe2_syr	2	Duplicate values reported, used first value
2/2	204	bottle	2	Niskin leaky.
2/2	208	bottle	2	Niskin leaky.
2/2	211	sbe35rt	3	SBE35RT +0.07/-0.02 vs CTDT1/CTDT2; unstable SBE35RT reading in a gradient.
2/5	501	bottle	4	Bottle did not close: 3 NO-confirms, with carousel repositioned between each attempt.
2/5	502	bottle	4	Bottle did not close: 3 NO-confirms, with carousel repositioned between each attempt.
2/5	503	bottle	4	Bottle did not close: 3 NO-confirms, with carousel repositioned between each attempt.
2/5	504	bottle	4	Bottle did not close: 3 NO-confirms, with carousel repositioned between each attempt.
2/5	512	bottle	9	Bottle closed, but no samples collected.
2/25	2525	bottle	2	CTD data for Surface FISH sample from 002/05 (30-ODF) up-cast.
2/25	2525	dfe	2	Note: Calibrated for higher concentrations
3/1	103	dfe	2	Note: Calibrated for higher concentrations
3/1	104	salt	2	Value matches duplicate and CTD data. (Analyst: Salt 4 - Thimble came out with cap. Thimble and cap were full of brackish water. Probable contamination.)
3/1	107	dfe	2	Note: Calibrated for higher concentrations
3/1	109	dfe	2	Note: Calibrated for higher concentrations
3/1	113	bottle	2	Still leaking from top ball.
3/1	113	dfe	2	Note: Calibrated for higher concentrations
3/1	113	no2	2	Sampled out of sequence. File fixed so that values match duplicates and CTD data.
3/1	113	no3	2	Sampled out of sequence. File fixed so that values match duplicates and CTD data.
3/1	113	po4	2	Sampled out of sequence. File fixed so that values match duplicates and CTD data.
3/1	113	salt	2	Sampled out of sequence. File fixed so that values match duplicates and CTD data.

Station /Cast	Sample No.	Property	Quality Code	Comment
3/1	113	sio3	3	Values should be duplicates but are approx. 2uM different. Not sure which is correct.
3/1	114	sio3	3	Values should be duplicates but are approx. 2uM different. Not sure which is correct.
3/1	115	dfe	2	Note: Calibrated for higher concentrations
3/1	115	dfe2_btl	5	No data (ND) reported
3/1	115	no2	2	Sampled out of sequence. File fixed so that values match duplicates and CTD data.
3/1	115	no3	2	Sampled out of sequence. File fixed so that values match duplicates and CTD data.
3/1	115	po4	2	Sampled out of sequence. File fixed so that values match duplicates and CTD data.
3/1	115	salt	2	Sampled out of sequence. File fixed so that values match duplicates and CTD data.
3/1	115	sio3	2	Sampled out of sequence. File fixed so that values match duplicates and CTD data.
3/1	119	dfe	2	Note: Calibrated for higher concentrations
3/1	119	no2	2	Sampled out of sequence. File fixed so that values match duplicates and CTD data.
3/1	119	no3	2	Sampled out of sequence. File fixed so that values match duplicates and CTD data.
3/1	119	po4	2	Sampled out of sequence. File fixed so that values match duplicates and CTD data.
3/1	119	salt	2	Sampled out of sequence. File fixed so that values match duplicates and CTD data.
3/1	119	sio3	2	Sampled out of sequence. File fixed so that values match duplicates and CTD data.
3/1	121	dfe	2	Note: Calibrated for higher concentrations
3/1	121	no2	2	Sampled out of sequence. File fixed so that values match duplicates and CTD data.
3/1	121	no3	2	Sampled out of sequence. File fixed so that values match duplicates and CTD data.
3/1	121	po4	2	Sampled out of sequence. File fixed so that values match duplicates and CTD data.
3/1	121	salt	2	Sampled out of sequence. File fixed so that values match duplicates and CTD data.
3/1	121	sio3	2	Sampled out of sequence. File fixed so that values match duplicates and CTD data.
3/5	504	bottle	4	Bottle did not close: repositioned carousel twice, total 3x NO-confirms.
3/5	510	o2	3	Bottle close to surface bottle value, appears to be too high for sharp gradient on both down and up casts. Analyst noted no obvious errors.
3/5	510	sbe35rt	3	SBE35RT +0.105/+0.065 vs CTDT1/CTDT2; unstable SBE35RT reading in a gradient.
3/5	512	bottle	4	Bottle did not close, but did confirm.
3/7	704	bottle	4	Bottle did not close; confirmed, but apparent mechanical issue with carousel.
3/7	709	sbe35rt	3	SBE35RT +0.025/-0.045 vs CTDT1/CTDT2; unstable SBE35RT reading in a gradient.
3/7	710	bottle	4	Bottle did not close; confirmed, but apparent mechanical issue with carousel.

Station /Cast	Sample No.	Property	Quality Code	Comment
3/7	712	bottle	4	Bottle did not close; confirmed, but apparent mechanical issue with carousel.
3/25	2525	bottle	2	CTD data for Surface FISH sample from 003/07 (30-ODF) up-cast.
3/25	2525	dfe	2	Analyzed separately with calibration for lower concentrations
4/1	107	bottle	2	Air leak.
4/1	113	dfe	2	Verified with repeat analysis
4/1	115	dfe2_btl	5	No data (ND) reported
4/1	117	dfe2_btl	5	No data (ND) reported
4/1	119	dfe2_btl	5	No data (ND) reported
4/1	122	bottle	2	Leaked when pressurized, snapped ball.
4/2	206	bottle	4	Mistrip: deck saw bottle trip at surface.
4/2	206	no2	4	Mistrip.
4/2	206	no3	4	Mistrip.
4/2	206	o2	4	Mistrip.
4/2	206	po4	4	Mistrip.
4/2	206	salt	4	Mistrip.
4/2	206	sio3	4	Mistrip.
4/4	403	bottle	2	Niskin leaky.
4/4	412	bottle	2	Niskin leaky.
4/4	413	corer	2	some sediments recovered, but partially emptied upon retrieval.
4/25	2525	bottle	2	CTD data for Surface FISH sample from 004/04 (30-ODF) up-cast.
5/1	109	dfe2_btl	5	never analyzed
5/1	111	dfe2_btl	5	never analyzed
5/1	115	dfe	2	Verified with repeat analysis
5/1	116	dfe2_syr	5	never analyzed
5/2	205	o2	4	Flask 696 neck cracked. Value high, probable exposure to air.
5/2	205	salt	2	Value matches CTD. (Analyst: Salt 5 - readings erratic and unpredictably variable.)
5/2	209	salt	2	Value approx. 0.003 low compared to CTD data; gradient. (Analyst: Salt 9 - Readings kept climbing.)
5/2	212	bottle	2	Niskin bottom seal leak.
5/4	410	sbe35rt	3	SBE35RT -0.08 vs CTD1/CTDT2; unstable SBE35RT reading in a gradient.
5/4	412	bottle	2	Niskin leaky.
5/5	509	no2	2	Sampling error, drawn into tube 11.
5/5	509	no3	2	Sampling error, drawn into tube 11.
5/5	509	po4	2	Sampling error, drawn into tube 11.
5/5	509	salt	2	Sampling error, drawn into tube 11.
5/5	509	sio3	2	Sampling error, drawn into tube 11.
5/5	511	dfe	2	Verified with repeat analysis
5/5	511	no2	5	Sampling error, none drawn.
5/5	511	no3	5	Sampling error, none drawn.
5/5	511	po4	5	Sampling error, none drawn.
5/5	511	salt	5	Sampling error, none drawn.
5/5	511	sio3	5	Sampling error, none drawn.
5/5	513	no2	3	Values should be duplicates but are approx. 1.2uM different. Not sure which is correct.
5/5	513	no3	3	Values should be duplicates but are approx. 3uM different. Not sure which is correct.
5/5	514	no2	3	Values should be duplicates but are approx. 1.2uM different. Not sure which is correct.

Station /Cast	Sample No.	Property	Quality Code	Comment
5/5	514	no3	3	Values should be duplicates but are approx. 3uM different. Not sure which is correct.
5/5	515	bottle	2	Handle leaking.
5/5	516	dfe2_syr	5	never analyzed
5/5	520	bottle	4	Did not fire.
5/6	603	bottle	2	Niskin leaky.
5/6	612	bottle	2	Niskin leaking badly. Water feels anomalously warm.
5/6	613	corer	5	no sediments recovered from corer.
5/25	2525	bottle	2	CTD data for Surface FISH sample from 005/06 (30-ODF) up-cast.
6/1	120	bottle	4	GoFlo in position 20 did not fire. No samples taken.
6/1	121	salt	2	samples recorded during salt run were labeled 20-23, but goflo position 20 was not sampled. re-aligned samples with correct depth, all samples now agree with CTD values.
6/1	122	salt	2	samples recorded during salt run were labeled 20-23, but goflo position 20 was not sampled. re-aligned samples with correct depth, all samples now agree with CTD values.
6/1	123	salt	2	samples recorded during salt run were labeled 20-23, but goflo position 20 was not sampled. re-aligned samples with correct depth, all samples now agree with CTD values.
6/1	124	salt	2	samples recorded during salt run were labeled 20-23, but goflo position 20 was not sampled. re-aligned samples with correct depth, all samples now agree with CTD values.
6/2	203	bottle	2	Niskin leaky.
6/25	2525	bottle	2	CTD data for Surface FISH sample from 006/02 (30-ODF) up-cast.
7/2	203	bottle	2	Niskin slightly leaky, bottom end cap.
7/2	211	bottle	2	Niskin slightly leaky, bottom end cap.
7/5	523	dfe2_btl	5	never analyzed
7/6	602	bottle	2	Niskin slightly leaky.
7/8	807	salt	4	Value approx. 0.01 high compared to duplicate and CTD data. (Analyst: Salt 7 - Readings very erratic and slow to stabilize.)
7/8	814	bottle	4	Mistrip.
7/8	814	no2	4	Other nutrient values high compared to duplicate.
7/8	814	no3	4	Value high compared to duplicate.
7/8	814	po4	4	Value high compared to duplicate.
7/8	814	salt	4	Value approx. 0.005 lower than duplicate. Mistrip.
7/8	814	sio3	4	Value high compared to duplicate.
7/11	1109	dfe2_btl	5	never analyzed
7/11	1119	dfe	2	Verified with repeat analysis
7/11	1123	dfe	2	Verified with repeat analysis
7/12	1203	bottle	2	Bottom cap leak.
7/12	1211	bottle	2	Bottom cap leak.
7/12	1212	bottle	4	Bottle did not close.
7/25	2525	bottle	2	CTD data for Surface FISH sample from 007/05 (GT-C) up-cast.
8/2	201	bottle	2	Slight bottom cap leak.
8/2	203	bottle	2	Niskin bottom leak.
8/2	210	sbe35rt	3	SBE35RT -0.03 vs CTDT1/CTDT2; unstable SBE35RT reading in a gradient.
8/25	2525	bottle	2	CTD data for Surface FISH sample from 008/02 (30-ODF) up-cast.
9/1	105	dfe2_btl	2	Duplicate values reported, used first value
9/2	203	bottle	2	Bottom cap leak.
9/4	403	bottle	2	Bottom cap leak.

Station /Cast	Sample No.	Property	Quality Code	Comment
9/4	408	sbe35rt	3	SBE35RT -0.10/-0.11 vs CTD1/CTD2; very unstable SBE35RT reading in a gradient.
9/4	410	salt	2	Value matches CTD data (Analyst: Salt 10 - Readings erratic.)
9/6	609	sbe35rt	3	SBE35RT +0.11/-0.40 vs CTD1/CTD2; very unstable SBE35RT reading in a gradient.
9/9	905	salt	2	Value matches duplicate and CTD data. (Analyst: Salt 5 - Thimble came out with cap. Readings erratic.)
9/9	913	dfe	2	Verified with repeat analysis
9/9	919	bottle	2	Top ball not seated properly, snapped.
9/10	1011	bottle	2	Slight leak from bottom end cap.
9/25	2525	bottle	2	CTD data for Surface FISH sample from 009/05 (GT-C) up-cast.
10/1	103	salt	2	Value matches duplicate and CTD data. (Analyst: Salt 10 - Thimble came out with cap. Readings rose rapidly during first sample. Possible contamination.)
10/1	108	no2	2	nut tubes 8 and 10 apparently both sampled from goflo in position 8.
10/1	108	no3	2	nut tubes 8 and 10 apparently both sampled from goflo in position 8.
10/1	108	po4	2	nut tubes 8 and 10 apparently both sampled from goflo in position 8.
10/1	108	sio3	2	nut tubes 8 and 10 apparently both sampled from goflo in position 8.
10/1	110	no2	2	nut tube 12 apparently sampled from goflo in position 10.
10/1	110	no3	2	nut tube 12 apparently sampled from goflo in position 10.
10/1	110	po4	2	nut tube 12 apparently sampled from goflo in position 10.
10/1	110	sio3	2	nut tube 12 apparently sampled from goflo in position 10.
10/1	112	no2	5	goflo in position 12 apparently not sampled.
10/1	112	no3	5	goflo in position 12 apparently not sampled.
10/1	112	po4	5	goflo in position 12 apparently not sampled.
10/1	112	sio3	5	goflo in position 12 apparently not sampled.
10/2	203	bottle	2	Leak at bottle end cap.
10/2	207	sbe35rt	3	SBE35RT +0.03 vs CTD1/CTD2; unstable SBE35RT reading.
10/2	209	sbe35rt	3	SBE35RT +0.025 vs CTD1/CTD2; unstable SBE35RT reading in a gradient.
10/2	210	sbe35rt	3	SBE35RT -0.04/-0.03 vs CTD1/CTD2; very unstable SBE35RT reading in a gradient.
10/2	211	bottle	2	Leak at bottle end cap.
10/25	2525	bottle	2	CTD data for Surface FISH sample from 010/02 (30-ODF) up-cast.
11/1	106	salt	2	Deep cast. Value within 0.002 of duplicate. (Analyst: Salt 6 - Readings erratic.)
11/1	111	salt	3	Value approx. 0.005 lower than duplicate.
11/1	119	dfe2_btl	2	3514+1h: value was 0.00
11/4	409	sbe35rt	3	SBE35RT -0.28/-0.33 vs CTD1/CTD2; unstable SBE35RT reading in a gradient.
11/4	411	bottle	2	Bottom cap leak.
11/5	512	dfe2_syr	5	never analyzed
11/6	604	sbe35rt	3	SBE35RT -0.08/-0.075 vs CTD1/CTD2; very unstable SBE35RT reading in a gradient.
11/6	605	sbe35rt	3	SBE35RT -0.095/-0.085 vs CTD1/CTD2; very unstable SBE35RT reading in a gradient.
11/6	611	bottle	2	Slight leak at bottom end cap.
11/6	612	bottle	2	Slight leak at bottom end cap.
11/8	803	bottle	2	Bottom end cap leak.
11/8	811	bottle	2	Bottom end cap leak.
11/9	904	dfe2_syr	5	never analyzed

Station /Cast	Sample No.	Property	Quality Code	Comment
11/9	915	dfe	2	Verified with repeat analysis
11/9	917	dfe	2	Verified with repeat analysis
11/9	924	dfe2_syr	4	first sample; bubble in line
11/10	1001	bottle	2	Bottom end cap leak.
11/10	1002	bottle	2	Top end cap leak.
11/10	1004	salt	2	Value matches duplicate and CTD data. (Analyst: Salt 28 - Thimble popped out wet. Possible contamination.)
11/11	1103	bottle	2	Bottom end cap leak.
11/11	1108	bottle	2	Big leak on bottom end cap.
11/11	1111	bottle	2	Top end cap leak.
11/13	1307	bottle	2	Bottom end cap leak.
11/13	1310	bottle	4	Bottle did not close, lanyard on wrong latch.
11/13	1312	bottle	2	Slight bottom end cap leak.
11/25	2525	bottle	2	CTD data for Surface FISH sample from 011/05 (GT-C) up-cast.
11/25	2525	dfe	2	Verified with repeat analysis
12/25	2525	bottle	2	CTD data for Surface FISH sample from 012/02 (30-ODF) up-cast.
13/1	119	bottle	4	mistrip: nutrients revealed incorrect values.
13/1	119	dfe2_btl	4	anomalous high value: bottle mis-tripped.
13/1	119	no2	4	mistrip.
13/1	119	no3	4	mistrip.
13/1	119	po4	4	mistrip.
13/1	119	salt	4	mistrip.
13/1	119	sio3	4	mistrip.
13/1	120	bottle	4	mistrip: nutrients revealed incorrect values.
13/1	120	no2	4	mistrip.
13/1	120	no3	4	mistrip.
13/1	120	po4	4	mistrip.
13/1	120	salt	4	mistrip.
13/1	120	sio3	4	mistrip.
13/1	121	dfe	2	Verified with repeat analysis
13/1	122	bottle	2	Leaked when bottom recovered, ball re-snapped in van.
13/2	201	salt	3	Values approx. 0.003 high compared to CTD data.
13/2	202	salt	3	Values approx. 0.003 high compared to CTD data.
13/2	206	bottle	2	Winch overshoot NIS-6 firing depth by 11m, went back down to trip.
13/4	406	sbe35rt	3	SBE35RT -0.045/-0.04 vs CTDT1/CTDT2; unstable SBE35RT reading in a gradient.
13/5	501	dfe	2	Verified with repeat analysis
13/5	503	dfe	2	Verified with repeat analysis
13/5	508	dfe2_syr	4	mis-trip
13/6	608	sbe35rt	3	SBE35RT +0.07/+0.09 vs CTDT1/CTDT2; very unstable SBE35RT reading in a gradient.
13/9	912	salt	2	Value matches duplicate and CTD data. (Analyst: Salt 12 - Thimble came out with cap, very wet. Probably contamination.)
13/9	919	bottle	2	Bottle did not open all the way.
13/10	1005	salt	3	Value approx. 0.005 high compared to CTD data.
13/25	2525	bottle	2	CTD data for Surface FISH sample from 013/05 (GT-C) up-cast.
13/25	2525	dfe	2	Verified with repeat analysis
14/1	117	bottle	2	Lanyard tight.
14/2	208	sbe35rt	3	SBE35RT +0.025 vs CTDT1/CTDT2; unstable SBE35RT reading in a gradient.

Station /Cast	Sample No.	Property	Quality Code	Comment
14/2	210	sbe35rt	3	SBE35RT +0.08/+0.075 vs CTD1/CTD2; unstable SBE35RT reading in a gradient.
14/25	2525	bottle	2	CTD data for Surface FISH sample from 014/02 (30-ODF) up-cast.
15/1	108	dfe2_syr	2	2 values reported, used the first value
15/1	112	dfe2_syr	2	2 values reported, used the first value
15/1	123	dfe	2	Verified with repeat analysis
15/2	203	salt	3	Value approx. 0.003 high compared to CTD data.
15/2	210	salt	2	Value matches CTD data. (Analyst: Salt 10 - Thimble popped out early. Probable contamination.)
15/5	523	dfe	2	Verified with repeat analysis
15/6	603	salt	2	Value matches CTD data. (Analyst: Salt 27 - Contamination, cause unknown.)
15/6	605	sbe35rt	3	SBE35RT -0.03 vs CTD1/CTD2; somewhat unstable SBE35RT reading in a gradient.
15/6	607	sbe35rt	3	SBE35RT -0.02/-0.03 vs CTD1/CTD2; unstable SBE35RT reading in a gradient.
15/9	910	dfe2_syr	2	2 values reported, used the first (A) value
15/9	912	dfe2_syr	2	2 values reported, used the first (A) value
15/9	916	dfe2_syr	2	2 values reported, used the first (A) value
15/9	921	dfe	2	Verified with repeat analysis
15/9	922	dfe2_syr	2	2 values reported, used the first (A) value
15/9	924	salt	4	Value is approx. 0.03 higher than duplicate and CTD data. (Analyst: Salt 24 - Readings erratic and kept climbing slowly.)
15/10	1011	sbe35rt	3	SBE35RT -0.015 vs CTD1/CTD2, reading seems stable, but large difference for this deep. Code questionable.
15/10	1013	bottle	4	Deck: Lost sediment core as corer came out of the water; "missed it by that much".
15/10	1013	corer	3	corer barrel shifted as it exited water, but some scrapped sediments saved from inside the barrel.
15/25	2525	bottle	2	CTD data for Surface FISH sample from 015/05 (GT-C) up-cast.
16/1	105	salt	3	Value is approx. 0.005 higher than duplicate. (Analyst: salt 5 - Readings kept climbing. Thimble came out full of water. Probable contamination.)
16/1	115	bottle	2	Leaked when removed air valves, re-snapped bottom ball.
16/2	208	sbe35rt	3	SBE35RT +0.025 vs CTD1/CTD2; somewhat unstable SBE35RT reading in a gradient.
16/25	2525	bottle	2	CTD data for Surface FISH sample from 016/02 (30-ODF) up-cast.
17/1	101	as_3	B	As(III) value <0.01, below detection limit
17/1	105	as_3	B	As(III) value <0.01, below detection limit
17/1	105	bottle	4	Mistrip.
17/1	105	no2	4	Potential mistrip, confirmed with salts.
17/1	105	no3	4	Potential mistrip, confirmed with salts.
17/1	105	po4	4	Potential mistrip, confirmed with salts.
17/1	105	salt	4	Value approx. 0.02 lower than duplicate, CTD data.
17/1	105	sio3	4	Potential mistrip, confirmed with salts.
17/1	106	dfe2_syr	5	missing label on syringe, not analyzed.
17/1	107	bottle	4	Bottom ball leaked, snapped in van. Nutrients revealed mistrip.
17/1	107	dfe	2	"Analytically sound, but questionable GoFlo bottle!"
17/1	107	no2	4	Mistrip.
17/1	107	no3	4	Mistrip.
17/1	107	po4	4	Mistrip.
17/1	107	salt	4	Mistrip.

Station /Cast	Sample No.	Property	Quality Code	Comment
17/1	107	sio3	4	Mistrip.
17/1	109	bottle	2	Bottom ball leaks when pressurized.
17/1	113	as_3	B	As(III) value <0.01, below detection limit
17/1	113	dfe	2	Verified with repeat analysis
17/1	116	salt	2	Value matches duplicate and CTD data. (Analyst: Salt 16 - Thimble came out with cap, very wet. Suspect liquid from thimble ran into bottle.)
17/1	120	bottle	4	Mistrip revealed with nutrient data.
17/1	120	dfe2_syr	4	Mis-trip
17/1	120	no2	4	Mistrip.
17/1	120	no3	4	Mistrip.
17/1	120	po4	4	Mistrip.
17/1	120	salt	4	Mistrip.
17/1	120	sio3	4	Mistrip.
17/1	122	salt	3	Value approx. 0.005 lower than duplicate.
17/4	404	sbe35rt	3	SBE35RT -0.105/-0.125 vs CTD1/CTD2; very unstable SBE35RT reading in a gradient.
17/5	505	bottle	4	Mistrip revealed by nutrient and salt data.
17/5	505	no2	4	Other nutrient values low compared to duplicate, mistrip.
17/5	505	no3	4	Value low compared to duplicate, mistrip.
17/5	505	po4	4	Value low compared to duplicate, mistrip.
17/5	505	salt	4	Value approx. 0.06 higher than duplicate, mistrip.
17/5	505	sio3	4	Value low compared to duplicate, mistrip.
17/5	511	salt	3	Value approx. 0.01 higher than duplicate, gradient.
17/6	608	sbe35rt	3	SBE35RT -0.045/-0.055 vs CTD1/CTD2; somewhat unstable SBE35RT reading in a gradient.
17/6	610	sbe35rt	3	SBE35RT -0.025/-0.035 vs CTD1/CTD2; somewhat unstable SBE35RT reading in a gradient.
17/8	803	bottle	4	Mistrip revealed with nutrient data.
17/8	803	dfe	2	"Analytically sound, but questionable GoFlo bottle!"
17/8	803	no2	4	Mistrip.
17/8	803	no3	4	Mistrip.
17/8	803	po4	4	Mistrip.
17/8	803	salt	4	Mistrip.
17/8	803	sio3	4	Mistrip.
17/8	807	as_3	B	As(III) value <0.01, below detection limit
17/8	809	as_3	B	As(III) value <0.01, below detection limit
17/8	809	bottle	2	Leaked from bottom, snapped bottom ball.
17/8	810	salt	4	Value is approx. 0.006 higher than duplicate. (Analyst: Salt 10 - Thimble came out with cap, dry salt present. Possible contamination.)
17/8	811	as_3	B	As(III) value <0.01, below detection limit
17/8	813	bottle	2	Snapped bottom ball, leaking.
17/8	813	dfe	2	"Analytically sound, but questionable GoFlo bottle!"
17/8	815	as_3	B	As(III) value <0.01, below detection limit
17/8	815	bottle	2	Leaky spigot.
17/8	815	dfe	2	Verified with repeat analysis
17/8	817	as_3	B	As(III) value <0.01, below detection limit
17/8	820	bottle	9	Spigot broke off, no samples taken.
17/9	902	bottle	2	Leaky spigot. Post-sampling, discovered spine leak in NIS-2; replaced with NIS-22 before station 18.
17/25	2525	bottle	2	CTD data for Surface FISH sample from 017/05 (GT-C) up-cast.
18/2	201	bottle	4	Nutrient data revealed mistrip.

Station /Cast	Sample No.	Property	Quality Code	Comment
18/2	201	no2	4	Mistrip.
18/2	201	no3	4	Mistrip.
18/2	201	po4	4	Mistrip.
18/2	201	salt	4	Mistrip.
18/2	201	sio3	4	Mistrip.
18/2	207	bottle	4	Re-snapped top ball. Nutrients revealed mistrip.
18/2	207	no2	4	Mistrip.
18/2	207	no3	4	Mistrip.
18/2	207	po4	4	Mistrip.
18/2	207	salt	4	Mistrip.
18/2	207	sio3	4	Mistrip.
18/2	221	bottle	4	Nutrient data revealed mistrip.
18/2	221	no2	4	Mistrip.
18/2	221	no3	4	Mistrip.
18/2	221	po4	4	Mistrip.
18/2	221	salt	4	Mistrip.
18/2	221	sio3	4	Mistrip.
18/2	223	as_3	B	As(III) value <0.01, below detection limit
18/2	223	bottle	2	Noise from spigot.
18/2	224	bottle	2	Still leaking when pressurized.
18/4	407	sbe35rt	3	SBE35RT +0.045/+0.025 vs CTD1/CTD2; unstable SBE35RT reading in a gradient.
18/5	507	bottle	2	Snap top ball.
18/5	516	bottle	2	Leaking from bottom when air plug removed.
18/5	521	dfe	2	"Analytically sound, but questionable GoFlo bottle!"
18/5	523	bottle	2	Making noise, bottom ball.
18/6	604	sbe35rt	3	SBE35RT -0.05/-0.085 vs CTD1/CTD2; very unstable SBE35RT reading in a gradient.
18/6	606	sbe35rt	3	SBE35RT -0.035/-0.03 vs CTD1/CTD2; somewhat unstable SBE35RT reading in a gradient.
18/9	911	bottle	3	Value approx. 0.005 higher than duplicate.
18/9	913	bottle	2	Leaky spigot.
18/9	919	bottle	2	Neoprene rubber broke.
18/11	1112	sbe35rt	3	SBE35RT -0.025 vs CTD1/CTD2; somewhat unstable SBE35RT reading.
18/13	1305	bottle	2	Large nipples still pushed in and dripping on recovery.
18/13	1306	bottle	2	Large nipples still pushed in and dripping on recovery.
18/13	1308	sbe35rt	3	SBE35RT +0.02/-0.03 vs CTD1/CTD2; all 3 readings disagree, in a gradient. Only coded SBE35RT questionable.
18/13	1309	sbe35rt	3	SBE35RT -0.75/-0.055 vs CTD1/CTD2; unstable SBE35RT reading in a gradient.
18/13	1310	sbe35rt	3	SBE35RT -0.02/-0.04 vs CTD1/CTD2; somewhat unstable SBE35RT reading in a gradient.
18/14	1411	salt	3	Value approx. 0.006 higher than duplicate.
18/14	1413	as_3	B	As(III) value <0.01, below detection limit
18/14	1417	dfe	2	Verified with repeat analysis
18/14	1419	as_3	B	As(III) value <0.01, below detection limit
18/14	1420	bottle	2	Leaked about 1 liter.
18/14	1422	salt	4	Value is approx. 0.003 higher than duplicate. (Analyst: Salt 22 - Thimble came out with cap. Probable contamination.)

Station /Cast	Sample No.	Property	Quality Code	Comment
18/17	1704	bottle	2	dFell sample collected in a bottle, later filtered in the lab by J.Moffett (not the same as Acropak-filtered on GT-C GoFlos).
18/17	1705	bottle	2	dFell sample collected in a bottle, later filtered in the lab by J.Moffett (not the same as Acropak-filtered on GT-C GoFlos). Remainder sample pressure-filtered through 0.45um/47mm diam. Supor Filter, 15L collected in 20L cubitainer for Th/Pa/Nd/REE/LDEO_Archive (may be separated into 3 distinct samples after returning to LDEO). 60mL removed from cubitainer for Th/Pa colloids, acidified w/Saville-distilled 6M HCl. Filter/particles saved for Sherrell Partic.TM analysis.
18/17	1706	bottle	2	dFell sample collected in a bottle, later filtered in the lab by J.Moffett (not the same as Acropak-filtered on GT-C GoFlos).
18/25	2525	bottle	2	CTD data for Surface FISH sample from 018/05 (GT-C) up-cast.
19/1	101	noaa_uf	B	Mn is less than 0.35nM - below detection limit
19/1	102	noaa_uf	B	Mn is less than 0.35nM - below detection limit
19/1	103	noaa_uf	B	Mn is less than 0.35nM - below detection limit
19/1	104	noaa_uf	B	Mn is less than 0.35nM - below detection limit
19/1	105	noaa_uf	B	Mn is less than 0.35nM - below detection limit
19/1	106	noaa_uf	B	Mn is less than 0.35nM - below detection limit
19/1	107	noaa_uf	B	Mn is less than 0.35nM - below detection limit
19/1	108	noaa_uf	B	Mn is less than 0.35nM - below detection limit
19/1	109	noaa_uf	B	Mn is less than 0.35nM - below detection limit
19/1	110	noaa_uf	B	Mn is less than 0.35nM - below detection limit
19/1	111	noaa_uf	B	Mn is less than 0.35nM - below detection limit
19/1	112	noaa_uf	B	Mn is less than 0.35nM - below detection limit
20/1	107	salt	3	Value approx. 0.004 higher than duplicate.
20/1	117	as_3	B	As(III) value <0.01, below detection limit
20/5	506	salt	2	Value matches duplicate and CTD data. (Analyst: Salt 6 - Thimble came out with cap, wet. Readings erratic. Probable contamination.)
20/8	804	salt	3	Value approx. 0.006 higher than duplicate.
20/25	2525	bottle	2	CTD data for Surface FISH sample from 020/05 (GT-C) up-cast.
21/1	106	bottle	2	Spigot leaky.
21/5	503	dfe	2	Verified with repeat analysis
21/5	517	bottle	2	Shrimp in bottle ended up in Acropak, removed before sampling.
21/5	517	dfe	2	Verified with repeat analysis
21/6	607	sbe35rt	3	SBE35RT -0.02/+0.01 vs CTDT1/CTDT2; all 3 readings disagree, in a gradient. Only coded SBE35RT questionable.
21/8	801	as_3	B	As(III) value <0.01, below detection limit
21/8	813	dfe	2	Verified with repeat analysis
21/8	821	as_3	B	As(III) value <0.01, below detection limit
21/9	913	corer	2	very little sediment recovered, probably due to sediment leaking out on its way up.
21/25	2525	bottle	2	CTD data for Surface FISH sample from 021/05 (GT-C) up-cast.
22/2	205	sbe35rt	3	SBE35RT -0.035 vs CTDT1/CTDT2; unstable SBE35RT reading in a gradient.
22/2	207	sbe35rt	3	SBE35RT -0.02/-0.03 vs CTDT1/CTDT2; somewhat unstable SBE35RT reading in a gradient.
22/25	2525	bottle	2	CTD data for Surface FISH sample from 022/02 (ODF) up-cast.
23/2	218	salt	3	Value approx. 0.008 higher than duplicate and CTD data.
23/6	609	bottle	4	Bottle did not close, lanyard caught on latch.
23/6	610	sbe35rt	3	SBE35RT -0.045/-0.05 vs CTDT1/CTDT2; somewhat unstable SBE35RT reading in a gradient.

Station /Cast	Sample No.	Property	Quality Code	Comment
23/9	904	salt	3	Value approx. 0.013 higher than duplicate and CTD data.
23/10	1013	corer	2	very little sediment recovered, probably due to sediment leaking out on its way up.
24/2	206	sbe35rt	3	SBE35RT -0.035 vs CTD1/CTD2; somewhat unstable SBE35RT reading in a gradient.
25/1	109	salt	3	Value approx. 0.008 higher than duplicate and CTD data.
25/2	208	sbe35rt	3	SBE35RT +0.003 vs CTD1/CTD2; somewhat unstable SBE35RT reading for deep data.
25/2	211	sbe35rt	3	SBE35RT +0.004 vs CTD1/CTD2; unstable SBE35RT reading for deep data.
25/4	406	sbe35rt	3	SBE35RT -0.04 vs CTD1/CTD2; somewhat unstable SBE35RT reading in a gradient.
25/8	804	salt	3	Value approx. 0.004 higher than duplicate and CTD data.
25/8	807	salt	3	Value approx. 0.005 higher than duplicate and CTD data.
25/8	809	salt	3	Value approx. 0.004 higher than duplicate and CTD data.
25/8	814	salt	3	Value approx. 0.004 higher than duplicate and CTD data.
25/8	816	salt	3	Value approx. 0.004 higher than duplicate and CTD data.
25/8	821	salt	3	Value approx. 0.004 higher than duplicate and CTD data.
25/8	823	salt	3	Value approx. 0.004 higher than duplicate and CTD data.
25/9	908	bottle	2	Leaky.
25/9	908	salt	3	Value approx. 0.003 higher than expected based on CTD trace.
26/1	103	salt	3	Value approx. 0.013 lower than duplicate and CTD data.
26/1	122	salt	3	Value approx. 0.005 higher than duplicate and CTD data.
26/2	208	bottle	2	Leaky.
26/10	1008	bottle	2	Bottom end cap leak.
26/10	1009	salt	3	Value approx. 0.003 higher than duplicate and CTD data. (Analyst: Salt 33 - Thimble came out with cap. Possible contamination.)
26/11	1103	salt	2	Value corresponds with CTD trace. (Analyst: Salt 3 - Thimble came out with cap. Wet. Probable contamination.)
26/11	1104	salt	3	Value approx. 0.008 higher than duplicate and CTD data.
26/11	1110	salt	3	Value approx. 0.013 higher than duplicate and CTD data.
26/12	1208	salt	3	Value approx. 0.004 lower than duplicate and CTD data.
26/17	1706	salt	2	Value matches CTD data. (Analyst: Salt 6 - Thimble came out with cap. Probable contamination.)
27/1	103	salt	4	Value approx. 0.006 higher than duplicate and CTD data. (Analyst: Salt 3 - Thimble popped half way out early, full of water. Possible contamination.)
28/1	110	salt	4	Value approx. 0.008 higher than duplicate and CTD data. (Analyst: Salt 10 - Thimble came out with cap, full of water. Possible contamination.)
28/1	113	bottle	2	Did not slow down to trip bottles.
28/1	114	bottle	2	Did not slow down to trip bottles.
28/1	121	salt	2	Value matches duplicate and CTD data. (Analyst: Salt 21 - Thimble came out with cap, full of water. Probable contamination.)
28/4	405	sbe35rt	3	SBE35RT +0.04 vs CTD1/CTD2; somewhat unstable SBE35RT reading in a gradient.
28/4	406	sbe35rt	3	SBE35RT -0.04 vs CTD1/CTD2; somewhat unstable SBE35RT reading in a gradient.
28/4	407	sbe35rt	3	SBE35RT -0.01/-0.03 vs CTD1/CTD2; unstable SBE35RT reading in a gradient.
28/5	522	salt	3	Value approx. 0.003 higher than duplicate and CTD trace.

Station /Cast	Sample No.	Property	Quality Code	Comment
28/6	607	sbe35rt	3	SBE35RT +0.05/-0.01 vs CTD1/CTD2, and CTDS1-CTDS2 are stable; SBE35RT reading coded questionable.
28/8	801	bottle	2	nutrient, salt and dfe data indicate "odd" (Acropak) goflos hooked onto carousel latches with wrong "even" (membrane) goflos; sample 1 tripped at the shallowest level instead of the deepest. CTD trip data modified to realign bottles with proper trip depths.
28/8	803	bottle	2	nutrient, salt and dfe data indicate "odd" (Acropak) goflos hooked onto carousel latches with wrong "even" (membrane) goflos; sample 3 tripped one level deeper than intended. CTD trip data modified to realign bottles with proper trip depths.
28/8	805	bottle	2	nutrient, salt and dfe data indicate "odd" (Acropak) goflos hooked onto carousel latches with wrong "even" (membrane) goflos; sample 5 tripped one level deeper than intended. CTD trip data modified to realign bottles with proper trip depths.
28/8	806	bottle	4	Mistrip confirmed with salt and nutrient data.
28/8	806	no2	4	Mistrip.
28/8	806	no3	4	Mistrip.
28/8	806	po4	4	Mistrip.
28/8	806	salt	4	Mistrip. (Analyst: Salt 6 - Readings erratic.)
28/8	806	sio3	4	Mistrip.
28/8	807	bottle	4	Unrelated to lanyard issue, this bottle is a mistrip (mtm). nutrient, salt and dfe data indicate "odd" (Acropak) goflos hooked onto carousel latches with wrong "even" (membrane) goflos; sample 7 tripped one level deeper than intended. CTD trip data modified to realign bottles with proper trip depths.
28/8	807	no2	4	Mistrip.
28/8	807	no3	4	Mistrip.
28/8	807	po4	4	Mistrip.
28/8	807	salt	4	Mistrip.
28/8	807	sio3	4	Mistrip.
28/8	809	bottle	2	nutrient, salt and dfe data indicate "odd" (Acropak) goflos hooked onto carousel latches with wrong "even" (membrane) goflos; sample 9 tripped one level deeper than intended. CTD trip data modified to realign bottles with proper trip depths.
28/8	811	bottle	2	nutrient, salt and dfe data indicate "odd" (Acropak) goflos hooked onto carousel latches with wrong "even" (membrane) goflos; sample 11 tripped one level deeper than intended. CTD trip data modified to realign bottles with proper trip depths.
28/8	813	bottle	2	nutrient, salt and dfe data indicate "odd" (Acropak) goflos hooked onto carousel latches with wrong "even" (membrane) goflos; sample 13 tripped one level deeper than intended. CTD trip data modified to realign bottles with proper trip depths.
28/8	815	bottle	2	nutrient, salt and dfe data indicate "odd" (Acropak) goflos hooked onto carousel latches with wrong "even" (membrane) goflos; sample 15 tripped one level deeper than intended. CTD trip data modified to realign bottles with proper trip depths.
28/8	817	bottle	2	nutrient, salt and dfe data indicate "odd" (Acropak) goflos hooked onto carousel latches with wrong "even" (membrane) goflos; sample 17 tripped one level deeper than intended. CTD trip data modified to realign bottles with proper trip depths.

Station /Cast	Sample No.	Property	Quality Code	Comment
28/8	819	bottle	2	nutrient, salt and dfe data indicate "odd" (Acropak) goflos hooked onto carousel latches with wrong "even" (membrane) goflos; sample 19 tripped one level deeper than intended. CTD trip data modified to realign bottles with proper trip depths.
28/8	821	bottle	2	nutrient, salt and dfe data indicate "odd" (Acropak) goflos hooked onto carousel latches with wrong "even" (membrane) goflos; sample 21 tripped one level deeper than intended. CTD trip data modified to realign bottles with proper trip depths.
28/8	823	bottle	2	nutrient, salt and dfe data indicate "odd" (Acropak) goflos hooked onto carousel latches with wrong "even" (membrane) goflos; sample 23 tripped one level deeper than intended. CTD trip data modified to realign bottles with proper trip depths.
29/1	109	salt	2	Value approx. 0.005 lower than duplicate; gradient. (Analyst: Salt 9 - Thimble came out with cap. Possible contamination.)
29/1	114	bottle	2	Had to re-snap ball.
29/2	205	sbe35rt	3	SBE35RT +0.025 vs CTD1/CTD2; unstable SBE35RT reading in a gradient.
29/2	206	sbe35rt	3	SBE35RT +0.03/+0.02 vs CTD1/CTD2; unstable SBE35RT reading in a gradient.
29/2	207	sbe35rt	3	SBE35RT +0.06 vs CTD1/CTD2; somewhat unstable SBE35RT reading in a gradient.
30/2	212	salt	2	Value matches CTD data. (Analyst: Salt 12 - Thimble came out with cap. Possible contamination.)
30/4	405	sbe35rt	3	SBE35RT +0.075/+0.085 vs CTD1/CTD2; somewhat unstable SBE35RT reading in a gradient.
30/5	511	bottle	2	Did not spit.
30/5	521	bottle	2	Did not spit.
30/5	521	salt	3	Value is approx. 0.016 higher than duplicate and CTD trace.
30/5	523	bottle	2	Did not spit.
30/6	611	bottle	2	Niskin leaking at top.
30/8	801	bottle	2	Did not spit.
30/8	806	bottle	4	Mistrip confirmed with nutrient and salt data.
30/8	806	no2	4	Mistrip.
30/8	806	no3	4	Mistrip.
30/8	806	po4	4	Mistrip.
30/8	806	salt	4	Value approx. 0.016 lower than duplicate and CTD trace. Mistrip.
30/8	806	sio3	4	Mistrip.
30/8	819	bottle	2	Did not spit, leaky spigot.
30/8	821	bottle	2	Did not spit.
30/8	823	bottle	2	Leaky spigot.
30/8	824	salt	2	Value matches duplicate and CTD trace. (Analyst: Salt 24 - Thimble came out with cap. Probable contamination.)
30/10	1003	bottle	2	Did not spit.
30/10	1004	salt	3	Value approx. 0.006 higher than duplicate and CTD trace.
30/10	1006	salt	3	Value approx. 0.003 higher than duplicate. (Analyst: Salt 6 - Thimble came out with cap. Probable contamination.)
30/10	1009	bottle	2	Did not spit.
30/10	1017	bottle	2	Did not spit.
31/1	104	bottle	2	GF#03 Had to re-snap bottom ball, leaking outside.
31/1	109	bottle	2	GF#08 did not spit.
31/1	115	bottle	2	GF#18 did not spit.

Station /Cast	Sample No.	Property	Quality Code	Comment
31/1	121	bottle	2	GF#21 did not spit.
31/2	206	sbe35rt	3	SBE35RT +0.04/+0.03 vs CTD1/CTD2; unstable SBE35RT reading in a gradient.
32/5	515	bottle	2	GF#29 did not spit much.
32/5	519	bottle	2	GF#33 did not spit.
32/5	523	bottle	2	GF#01 did not spit much.
32/9	901	bottle	2	GF#05 did not spit.
32/9	904	salt	3	Value approx. 0.005 higher than duplicate and CTD trace.
32/9	909	bottle	2	GF#19 top ball leaking.
32/9	917	salt	4	Value approx. 0.012 higher than duplicate and CTD trace. (Analyst: Salt 17 - Thimble came out with cap. Wet. Readings erratic. Probable contamination.)
32/9	921	bottle	2	GF#01 did not spit.
32/9	921	salt	4	Value approx. 0.006 higher than duplicate and CTD trace. (Analyst: Salt 21 - Thimble popped out early. Readings erratic. Possible contamination.)
32/9	923	bottle	2	GF#03 did not spit.
33/1	123	bottle	2	GF#05 did not spit.
33/2	207	sbe35rt	3	SBE35RT -0.025/-0.04 vs CTD1/CTD2; somewhat unstable SBE35RT reading in a gradient.
34/1	117	bottle	2	GF#01 did not spit.
34/1	119	bottle	2	GF#03 did not spit.
34/1	120	salt	3	Value approx. 0.004 higher than duplicate and CTD trace.
34/1	121	bottle	2	GF#05 did not spit.
34/2	206	sbe35rt	3	SBE35RT -0.025/-0.03 vs CTD1/CTD2; somewhat unstable SBE35RT reading in a gradient.
34/2	211	bottle	2	Leaky top cap.
34/5	513	salt	2	Value matches duplicate and CTD trace. (Analyst: Salt 13 - Thimble loose in bottle. Possible contamination.)
34/5	515	bottle	2	GF#01 did not spit.
34/5	519	bottle	2	GF#05 did not spit.
34/6	606	o2	3	May be a duplicate draw from niskin 5.
35/1	113	bottle	2	GF#01 did not spit.
35/1	117	bottle	2	GF#05 did not spit.
35/1	121	bottle	2	GF#11 did not spit at all.
35/2	205	sbe35rt	3	SBE35RT -0.06/-0.055 vs CTD1/CTD2; very unstable SBE35RT reading in a gradient.
35/2	208	sbe35rt	3	SBE35RT +0.045/+0.05 vs CTD1/CTD2; somewhat unstable SBE35RT reading in a gradient.
35/2	212	o2	5	Flask broken, sample lost.
36/1	101	as_3	B	As(III) value <0.01, below detection limit
36/1	103	as_3	B	As(III) value <0.01, below detection limit
36/1	106	as_3	B	As(III) value <0.01, below detection limit
36/1	108	as_3	B	As(III) value <0.01, below detection limit
36/1	110	as_3	B	As(III) value <0.01, below detection limit
36/1	110	salt	2	Value matches duplicate and CTD trace. (Analyst: Salt 10 - Thimble came out with cap. Wet. Probable contamination.)
36/1	112	as_3	B	As(III) value <0.01, below detection limit
36/1	113	as_3	B	As(III) value <0.01, below detection limit
36/1	113	bottle	2	GF#03 leaking, snapped bottom ball, did not spit.
36/1	114	bottle	2	GF#18 stop cock leaking.
36/1	115	bottle	2	GF#05 did not spit.

Station /Cast	Sample No.	Property	Quality Code	Comment
36/1	116	as_3	B	As(III) value <0.01, below detection limit
36/1	118	as_3	B	As(III) value <0.01, below detection limit
36/1	120	as_3	B	As(III) value <0.01, below detection limit
36/1	121	bottle	2	GF#13 did not spit much.
36/1	121	salt	2	Value matches duplicate and CTD trace. (Analyst: Salt 21 - Thimble came out with cap. Wet. Readings erratic. Possible contamination.)
36/1	122	as_3	B	As(III) value <0.01, below detection limit
36/1	124	as_3	B	As(III) value <0.01, below detection limit
36/1	124	salt	3	Value is approx. 0.005 higher than duplicate and CTD trace.
36/4	406	sbe35rt	3	SBE35RT +0.065/+0.075 vs CTD1/CTD2; very unstable SBE35RT reading in a gradient.
36/4	408	sbe35rt	3	SBE35RT -0.025/-0.045 vs CTD1/CTD2; somewhat unstable SBE35RT reading in a gradient.
36/4	410	sbe35rt	3	SBE35RT -0.025 vs CTD1/CTD2; somewhat unstable SBE35RT reading in a gradient.
36/5	511	bottle	2	GF#03 did not spit.
36/5	513	bottle	2	GF#05 did not spit.
36/6	605	sbe35rt	3	SBE35RT -0.09 vs CTD1/CTD2; very unstable SBE35RT reading in a gradient.
36/9	902	as_3	B	As(III) value <0.01, below detection limit
36/9	902	salt	4	Value is approx. 0.004 higher than duplicate and CTD trace. (Analyst: Salt 2 - Thimble came out with cap. Possible contamination.)
36/9	904	as_3	B	As(III) value <0.01, below detection limit
36/9	906	as_3	B	As(III) value <0.01, below detection limit
36/9	907	bottle	2	GF#01 did not spit much.
36/9	908	as_3	B	As(III) value <0.01, below detection limit
36/9	911	bottle	2	GF#05 did not spit.
36/9	912	as_3	B	As(III) value <0.01, below detection limit
36/9	913	bottle	2	GF#07 did not spit much.
36/9	914	as_3	B	As(III) value <0.01, below detection limit
36/9	916	as_3	B	As(III) value <0.01, below detection limit
36/9	917	bottle	2	GF#13 did not spit much.
36/9	918	as_3	B	As(III) value <0.01, below detection limit
36/9	920	as_3	B	As(III) value <0.01, below detection limit
36/9	922	as_3	B	As(III) value <0.01, below detection limit
36/9	923	bottle	2	GF#29 did not spit much.
36/9	924	as_3	B	As(III) value <0.01, below detection limit
36/11	1110	bottle	2	Bottom end cap leak.
36/11	1111	bottle	2	Bottom end cap leak.
36/13	1305	sbe35rt	3	SBE35RT +0.045 vs CTD1/CTD2; very unstable SBE35RT reading in a gradient.
36/13	1306	sbe35rt	3	SBE35RT -0.02 vs CTD1/CTD2; unstable SBE35RT reading in a gradient.
36/13	1307	sbe35rt	3	SBE35RT +0.08/+0.075 vs CTD1/CTD2; unstable SBE35RT reading in a gradient.
36/13	1310	bottle	2	Bottom end cap leak.
36/13	1311	bottle	2	Top end cap leak.

References

Joyc94.

Joyce, T., ed. and Corry, C., ed., "Requirements for WOCE Hydrographic Programme Data Reporting," Report WHPO 90-1, WOCE Report No. 67/91, pp. 52-55, WOCE Hydrographic Programme Office, Woods Hole, MA, USA (May 1994, Rev. 2). UNPUBLISHED MANUSCRIPT.

Appendix D

U.S. GEOTRACES EPZT: Pre-Cruise Sensor Laboratory Calibrations

ODF/30L CTD 569 Sensors - Table of Contents			
CTD Sensor	Manufacturer and Model No.	Serial Number	Appendix D Page (Un-Numbered)
*PRESS (Pressure)	Digiquartz 401K-105	569-75672	1-3
*T1 (Primary Temperature)	Sea-Bird SBE3 <i>plus</i>	03P-2333	4
*C1 (Primary Conductivity)	Sea-Bird SBE4C	04-2659	5
*O2 (Dissolved Oxygen)	Sea-Bird SBE43	43-0875	6
T2 (Secondary Temperature)	Sea-Bird SBE3 <i>plus</i>	03P-2202	7
C2 (Secondary Conductivity)	Sea-Bird SBE4C	04-3399	8
*REFT-A (Reference Temperature)	Sea-Bird SBE35RT	3528706-0034	9
*REFT-B (Reference Temperature)	Sea-Bird SBE35RT	3516590-0011	10
*TRANS-B (Transmissometer)	WET Labs C-Star	CST-400DR	11-12

* data reported for these sensors during U.S. GEOTRACES EPZT

Pressure Calibration Report

STS/ODF Calibration Facility

SENSOR SERIAL NUMBER: 0569

CALIBRATION DATE: 29-JUL-2013

Mfg: SEABIRD Model: 09P CTD Prs s/n: 75672

C1= -4.262217E+4

C2= -2.383807E-1

C3= 1.107273E-2

D1= 3.735278E-2

D2= 0.000000E+0

T1= 3.044501E+1

T2= -4.104917E-4

T3= 3.738515E-6

T4= 9.322246E-9

T5= 0.000000E+0

AD590M= 1.28617E-2

AD590B= -8.28826E+0

Slope = 1.00000000E+0

Offset = 0.00000000E+0

Calibration Standard: Mfg: RUSKA Model: 2400 s/n: 34336

$t0 = t1 + t2 * td + t3 * td * td + t4 * td * td * td$

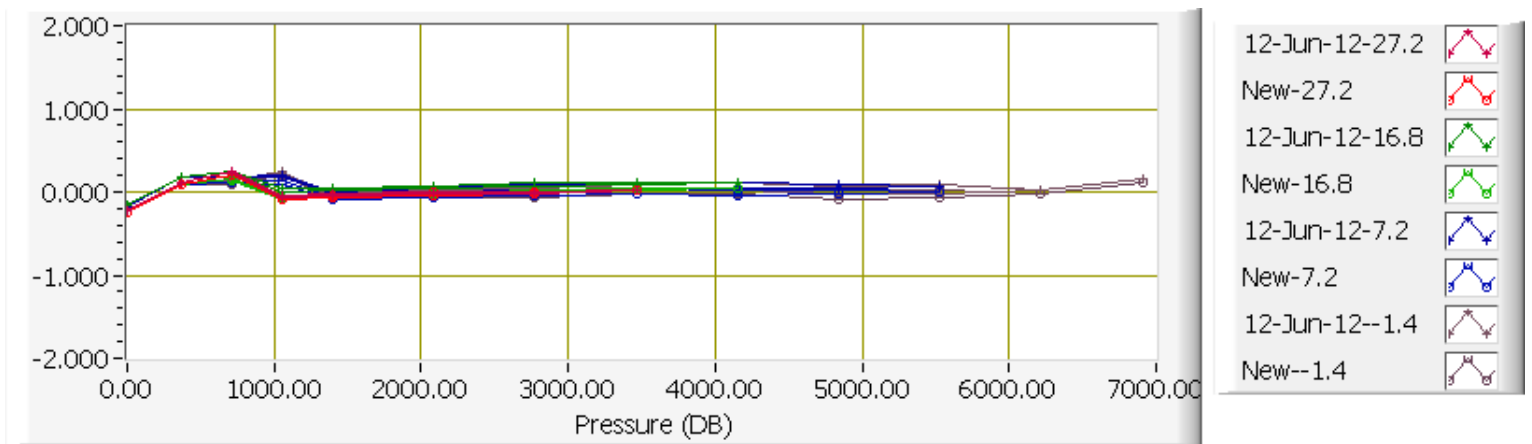
$w = 1 - t0 * t0 * f * f$

Pressure = (0.6894759 * ((c1 + c2 * td + c3 * td * td) * w * (1 - (d1 + d2 * td) * w) - 14.7)

Sensor Output	Standard	Sensor New_Coefs	Standard-Sensor Prev Coefs	Standard-Sensor NEW Coefs	Sensor_Temp	Bath_Temp
32861.133	0.16	0.42	-0.23	-0.26	28.57	27.235
33064.106	364.94	364.85	0.12	0.09	28.59	27.235
33254.414	709.11	708.89	0.24	0.21	28.60	27.236
33443.699	1053.27	1053.35	-0.06	-0.08	28.60	27.236
33631.625	1397.51	1397.56	-0.02	-0.05	28.62	27.236
34003.872	2085.97	2085.98	0.00	-0.01	28.62	27.236
34371.508	2774.48	2774.49	0.00	-0.01	28.65	27.237
34734.651	3463.09	3463.05	0.03	0.03	28.65	27.238
34371.515	2774.48	2774.50	-0.01	-0.02	28.65	27.238
34003.896	2085.97	2086.01	-0.03	-0.04	28.65	27.238
33631.649	1397.51	1397.59	-0.05	-0.07	28.66	27.238
33443.721	1053.27	1053.36	-0.07	-0.09	28.68	27.239
33254.435	709.11	708.90	0.23	0.20	28.68	27.239
33064.124	364.94	364.85	0.12	0.09	28.68	27.239
32858.663	0.16	0.40	-0.15	-0.24	18.21	16.747
33061.613	364.94	364.85	0.18	0.09	18.21	16.746
33251.928	709.11	708.95	0.25	0.16	18.22	16.746

Sensor Output	Standard	Sensor New_Coefs	Standard-Sensor Prev Coefs	Standard-Sensor NEW Coefs	Sensor_Temp	Bath_Temp
33441.140	1053.27	1053.33	0.03	-0.06	18.22	16.746
33629.050	1397.52	1397.56	0.04	-0.05	18.22	16.746
34001.249	2085.97	2085.99	0.07	-0.02	18.23	16.746
34368.810	2774.49	2774.47	0.11	0.02	18.23	16.746
34731.915	3463.09	3463.05	0.12	0.04	18.23	16.745
35090.694	4151.76	4151.73	0.11	0.04	18.23	16.745
34731.926	3463.09	3463.07	0.10	0.02	18.23	16.745
34368.834	2774.49	2774.51	0.06	-0.02	18.23	16.746
34001.265	2085.97	2086.02	0.04	-0.05	18.23	16.746
33629.063	1397.52	1397.58	0.03	-0.07	18.23	16.745
33441.158	1053.27	1053.35	0.01	-0.08	18.23	16.745
33251.940	709.11	708.97	0.23	0.14	18.23	16.744
33061.628	364.94	364.86	0.17	0.08	18.24	16.744
32855.539	0.16	0.41	-0.18	-0.25	8.69	7.229
33058.456	364.94	364.84	0.17	0.10	8.69	7.229
33248.775	709.10	709.00	0.18	0.11	8.69	7.229
33437.836	1053.26	1053.13	0.21	0.13	8.69	7.229
33625.842	1397.51	1397.58	0.01	-0.07	8.69	7.229
33997.992	2085.96	2085.99	0.05	-0.04	8.69	7.229
34365.516	2774.47	2774.47	0.08	-0.00	8.70	7.229
34728.567	3463.07	3463.03	0.12	0.04	8.70	7.229
35087.306	4151.73	4151.70	0.11	0.03	8.70	7.229
35441.840	4840.46	4840.44	0.10	0.02	8.70	7.229
35792.302	5529.24	5529.24	0.07	0.00	8.70	7.228
35441.868	4840.46	4840.49	0.04	-0.03	8.70	7.228
35087.339	4151.73	4151.77	0.04	-0.04	8.69	7.228
34728.605	3463.08	3463.11	0.05	-0.03	8.69	7.227
34365.544	2774.47	2774.53	0.03	-0.05	8.69	7.227
33998.016	2085.96	2086.04	0.00	-0.08	8.69	7.226
33625.857	1397.51	1397.61	-0.02	-0.10	8.69	7.226
33437.856	1053.26	1053.17	0.17	0.10	8.69	7.226
33248.777	709.11	709.00	0.18	0.11	8.69	7.226
33058.474	364.94	364.88	0.14	0.07	8.69	7.226
32851.988	0.16	0.41	-0.23	-0.25	-0.02	-1.414
33054.911	364.95	364.86	0.11	0.09	-0.01	-1.414
33245.218	709.12	709.02	0.13	0.10	-0.01	-1.414
33434.230	1053.29	1053.09	0.22	0.19	-0.01	-1.414
33622.256	1397.54	1397.61	-0.03	-0.07	-0.01	-1.414
33994.384	2086.01	2086.03	0.03	-0.02	0.00	-1.414
34361.898	2774.54	2774.55	0.04	-0.01	0.01	-1.414
34724.923	3463.15	3463.12	0.09	0.04	0.01	-1.414
35083.628	4151.83	4151.78	0.11	0.06	0.01	-1.414
35438.158	4840.57	4840.56	0.07	0.01	0.01	-1.414
35788.579	5529.37	5529.34	0.09	0.03	0.01	-1.415
36135.085	6218.25	6218.26	0.03	-0.02	0.01	-1.414

Sensor Output	Standard	Sensor New_Coefs	Standard-Sensor Prev Coefs	Standard-Sensor NEW Coefs	Sensor_Temp	Bath_Temp
36477.652	6907.15	6907.05	0.15	0.11	0.01	-1.414
36135.093	6218.25	6218.28	0.02	-0.03	0.01	-1.415
35788.629	5529.37	5529.44	-0.01	-0.07	0.01	-1.414
35438.209	4840.57	4840.66	-0.03	-0.09	0.01	-1.415
35083.670	4151.83	4151.86	0.03	-0.02	0.01	-1.414
34724.949	3463.15	3463.16	0.04	-0.01	0.01	-1.414
34361.927	2774.54	2774.60	-0.01	-0.06	0.01	-1.414
33994.407	2086.01	2086.08	-0.03	-0.07	-0.00	-1.415
33622.273	1397.54	1397.64	-0.06	-0.10	-0.00	-1.415
33434.222	1053.29	1053.07	0.25	0.21	0.00	-1.414
33245.220	709.12	709.03	0.12	0.10	-0.00	-1.414
33054.908	364.95	364.86	0.11	0.09	-0.01	-1.415
32851.969	0.16	0.36	-0.18	-0.20	-0.00	-1.415



Temperature Calibration Report

STS/ODF Calibration Facility

SENSOR SERIAL NUMBER: 2333

CALIBRATION DATE: 20-Aug-2013

Mfg: SEABIRD Model: 03

Previous cal: 14-May-13

Calibration Tech: CAL

ITS-90_COEFFICIENTS	IPTS-68_COEFFICIENTS ITS-T90	
g = 4.33445229E-3	a = 4.33464292E-3	
h = 6.42607195E-4	b = 6.42815984E-4	
i = 2.36892570E-5	c = 2.37216855E-5	
j = 2.36630976E-6	d = 2.36788147E-6	
f0 = 1000.0	Slope = 1.0	Offset = 0.0

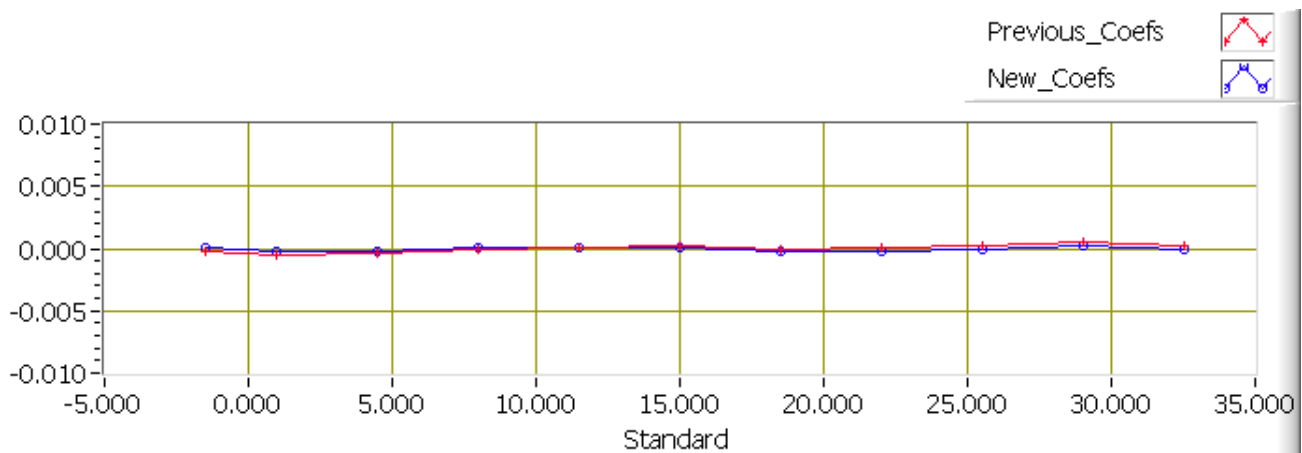
Calibration Standard: Mfg: ASL Model: F18 s/n: 245-5149

Temperature ITS-90 = $1/[g+h[\ln(f_0/f)]+i[\ln^2(f_0/f)]+j[\ln^3(f_0/f)]] - 273.15$ (°C)

Temperature IPTS-68 = $1/[a+b[\ln(f_0/f)]+c[\ln^2(f_0/f)]+d[\ln^3(f_0/f)]] - 273.15$ (°C)

T68 = 1.00024 * T90 (-2 to -35 Deg C)

SBE3 Freq	SPRT ITS-T90	SBE3 ITS-T90	SPRT-SBE3 OLD Coefs	SPRT-SBE3 NEW Coefs
2866.8252	-1.4969	-1.4971	-0.00025	0.00015
3031.9216	1.0034	1.0036	-0.00052	-0.00017
3274.4583	4.5040	4.5042	-0.00044	-0.00017
3530.7891	8.0066	8.0064	-0.00004	0.00014
3801.1108	11.5081	11.5080	0.00003	0.00012
4085.1372	15.0014	15.0012	0.00016	0.00014
4384.7979	18.5053	18.5055	-0.00005	-0.00016
4699.0732	22.0042	22.0044	0.00002	-0.00017
5028.9871	25.5060	25.5061	0.00026	-0.00001
5374.2617	29.0045	29.0043	0.00052	0.00020
5735.6150	32.5035	32.5036	0.00027	-0.00008



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SENSOR SERIAL NUMBER: 2659
CALIBRATION DATE: 28-Aug-13

SBE4 CONDUCTIVITY CALIBRATION DATA
PSS 1978: C(35,15,0) = 4.2914 Seimens/meter

GHIJ COEFFICIENTS

g = -1.01196119e+001
h = 1.42654861e+000
i = -1.17273496e-003
j = 1.54999667e-004
CPcor = -9.5700e-008 (nominal)
CTcor = 3.2500e-006 (nominal)

ABCDM COEFFICIENTS

a = 3.40836838e-006
b = 1.42365610e+000
c = -1.01140513e+001
d = -8.49616190e-005
m = 5.3
CPcor = -9.5700e-008 (nominal)

BATH TEMP (ITS-90)	BATH SAL (PSU)	BATH COND (Siemens/m)	INST FREQ (kHz)	INST COND (Siemens/m)	RESIDUAL (Siemens/m)
0.0000	0.0000	0.00000	2.66531	0.00000	0.00000
-1.0000	34.7398	2.79899	5.17207	2.79898	-0.00001
1.0000	34.7402	2.97008	5.28683	2.97009	0.00001
15.0000	34.7412	4.26337	6.08420	4.26339	0.00001
18.5000	34.7411	4.60947	6.28031	4.60945	-0.00001
29.0001	34.7404	5.69130	6.85696	5.69129	-0.00000
32.5001	34.7364	6.06364	7.04441	6.06364	0.00000

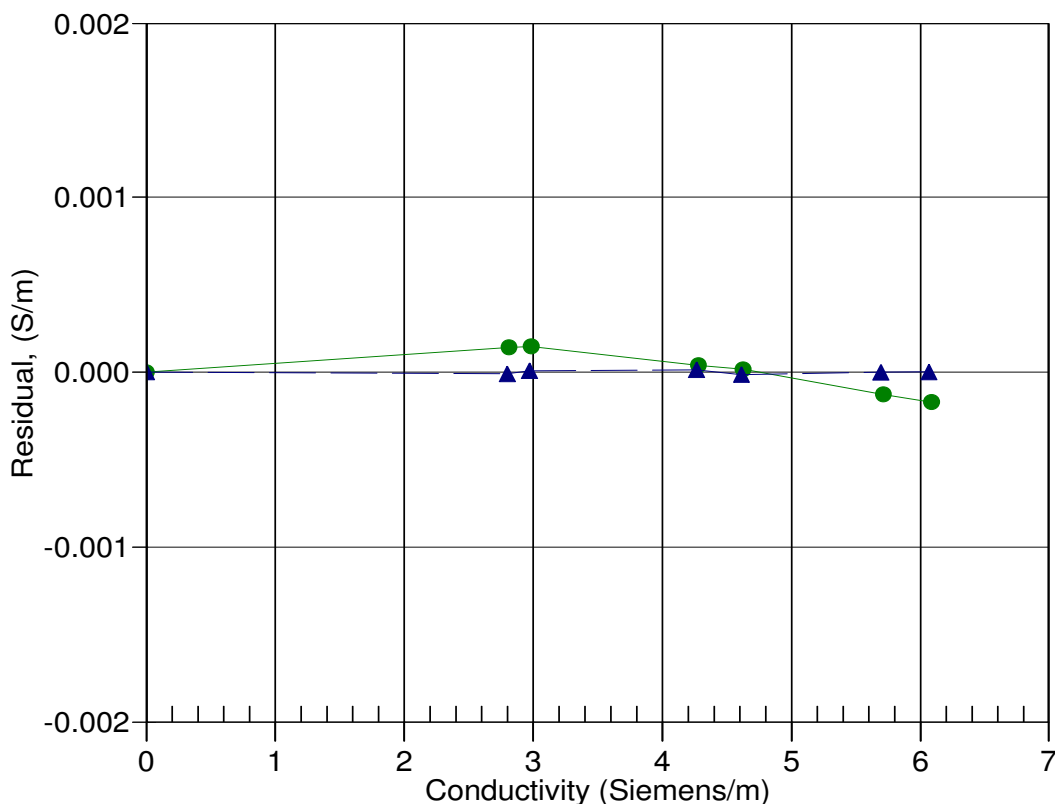
Conductivity = $(g + hf^2 + if^3 + jf^4) / 10(1 + \delta t + \epsilon p)$ Siemens/meter

Conductivity = $(af^m + bf^2 + c + dt) / [10(1 + \epsilon p)]$ Siemens/meter

t = temperature[°C]; p = pressure[decibars]; δ = CTcor; ϵ = CPcor;

Residual = (instrument conductivity - bath conductivity) using g, h, i, j coefficients

Date, Slope Correction



20-Feb-13 1.0000055
28-Aug-13 1.0000000

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SENSOR SERIAL NUMBER: 0875
CALIBRATION DATE: 13-Sep-13

SBE 43 OXYGEN CALIBRATION DATA

COEFFICIENTS

Soc = 0.4576

Voffset = -0.5165

Tau20 = 0.95

A = -3.6815e-003

B = 1.9772e-004

C = -3.0113e-006

E nominal = 0.036

NOMINAL DYNAMIC COEFFICIENTS

D1 = 1.92634e-4 H1 = -3.30000e-2

D2 = -4.64803e-2 H2 = 5.00000e+3

H3 = 1.45000e+3

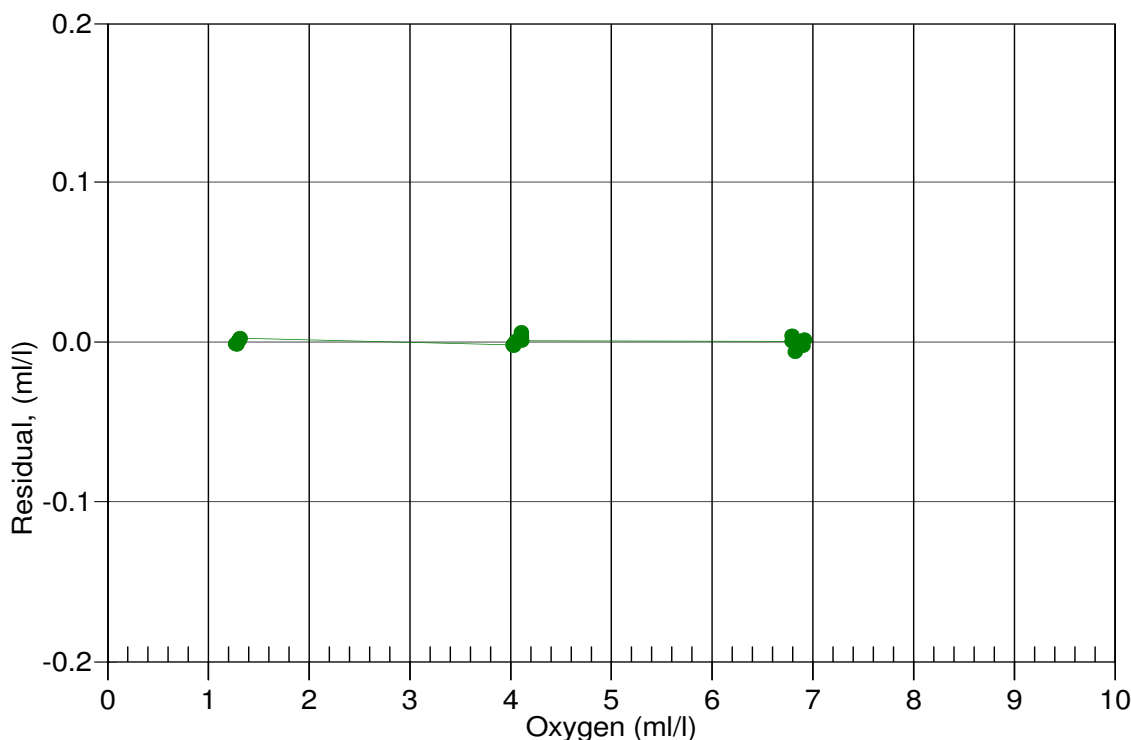
BATH OX (ml/l)	BATH TEMP ITS-90	BATH SAL PSU	INSTRUMENT OUTPUT(VOLTS)	INSTRUMENT OXYGEN(ml/l)	RESIDUAL (ml/l)
1.27	2.00	0.00	0.804	1.27	-0.00
1.28	6.00	0.00	0.841	1.27	-0.00
1.28	12.00	0.00	0.896	1.28	-0.00
1.30	20.00	0.00	0.973	1.30	0.00
1.31	26.00	0.00	1.030	1.32	0.00
1.32	30.00	0.00	1.069	1.32	0.00
4.03	2.00	0.00	1.432	4.03	-0.00
4.03	6.00	0.00	1.543	4.03	-0.00
4.05	12.00	0.00	1.716	4.05	0.00
4.11	20.00	0.00	1.956	4.11	0.01
4.11	26.00	0.00	2.123	4.11	0.00
4.11	30.00	0.00	2.238	4.11	0.00
6.79	2.00	0.00	2.061	6.79	0.00
6.79	6.00	0.00	2.249	6.80	0.00
6.81	12.00	0.00	2.533	6.81	-0.00
6.83	20.00	0.00	2.903	6.82	-0.01
6.90	30.00	0.00	3.406	6.90	-0.00
6.92	26.00	0.00	3.221	6.92	0.00

Oxygen (ml/l) = Soc * (V + Voffset) * (1.0 + A * T + B * T² + C * T³) * OxSol(T,S) * exp(E * P / K)

V = voltage output from SBE43, T = temperature [deg C], S = salinity [PSU], K = temperature [Kelvin]

OxSol(T,S) = oxygen saturation [ml/l], P = pressure [dbar], Residual = instrument oxygen - bath oxygen

Date, Delta Ox (ml/l)



13-Sep-13 1.0000

Temperature Calibration Report

STS/ODF Calibration Facility

SENSOR SERIAL NUMBER: 2202

CALIBRATION DATE: 20-Aug-2013

Mfg: SEABIRD Model: 03

Previous cal: 21-May-13

Calibration Tech: CAL

ITS-90_COEFFICIENTS	IPTS-68_COEFFICIENTS ITS-T90	
g = 4.35827590E-3	a = 4.35847436E-3	
h = 6.46176984E-4	b = 6.46388903E-4	
i = 2.35597772E-5	c = 2.35925289E-5	
j = 2.24861242E-6	d = 2.25017477E-6	
f0 = 1000.0	Slope = 1.0	Offset = 0.0

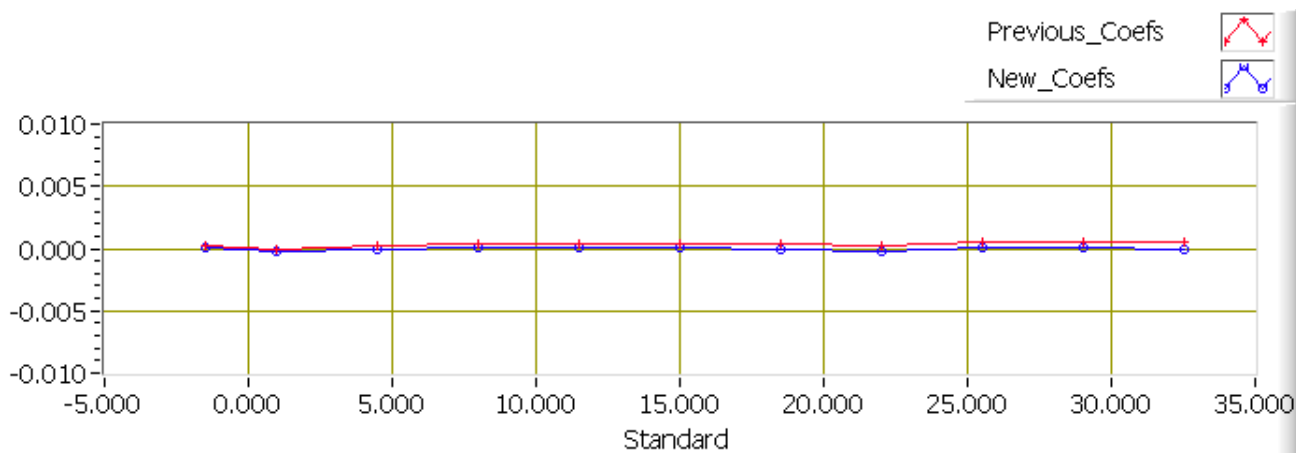
Calibration Standard: Mfg: ASL Model: F18 s/n: 245-5149

Temperature ITS-90 = $1/[g+h[\ln(f_0/f)]+i[\ln^2(f_0/f)]+j[\ln^3(f_0/f)]] - 273.15$ (°C)

Temperature IPTS-68 = $1/[a+b[\ln(f_0/f)]+c[\ln^2(f_0/f)]+d[\ln^3(f_0/f)]] - 273.15$ (°C)

T68 = 1.00024 * T90 (-2 to -35 Deg C)

SBE3 Freq	SPRT ITS-T90	SBE3 ITS-T90	SPRT-SBE3 OLD Coefs	SPRT-SBE3 NEW Coefs
2963.7114	-1.4969	-1.4970	0.00018	0.00011
3133.6946	1.0034	1.0036	-0.00002	-0.00016
3383.3374	4.5040	4.5041	0.00016	-0.00007
3647.1108	8.0066	8.0064	0.00042	0.00013
3925.1956	11.5081	11.5081	0.00038	0.00003
4217.2893	15.0014	15.0013	0.00042	0.00005
4525.3564	18.5053	18.5053	0.00038	-0.00003
4848.3958	22.0042	22.0044	0.00027	-0.00016
5187.4116	25.5060	25.5060	0.00050	0.00005
5542.1528	29.0045	29.0044	0.00055	0.00009
5913.2974	32.5035	32.5035	0.00046	-0.00004



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SENSOR SERIAL NUMBER: 3399
CALIBRATION DATE: 27-Aug-13

SBE4 CONDUCTIVITY CALIBRATION DATA
PSS 1978: C(35,15,0) = 4.2914 Seimens/meter

GHIJ COEFFICIENTS

g = -1.01550688e+001
h = 1.53620039e+000
i = -2.40970655e-003
j = 2.69156986e-004
CPcor = -9.5700e-008 (nominal)
CTcor = 3.2500e-006 (nominal)

ABCDM COEFFICIENTS

a = 5.48535536e-007
b = 1.52981722e+000
c = -1.01420638e+001
d = -8.13503595e-005
m = 6.3
CPcor = -9.5700e-008 (nominal)

BATH TEMP (ITS-90)	BATH SAL (PSU)	BATH COND (Siemens/m)	INST FREQ (kHz)	INST COND (Siemens/m)	RESIDUAL (Siemens/m)
0.0000	0.0000	0.00000	2.57480	0.00000	0.00000
-1.0000	34.7609	2.80053	4.99269	2.80052	-0.00001
1.0000	34.7614	2.97172	5.10341	2.97172	-0.00000
15.0000	34.7623	4.26569	5.87274	4.26570	0.00001
18.5000	34.7624	4.61199	6.06196	4.61200	0.00001
29.0000	34.7623	5.69447	6.61821	5.69441	-0.00006
32.5000	34.7557	6.06662	6.79887	6.06666	0.00004

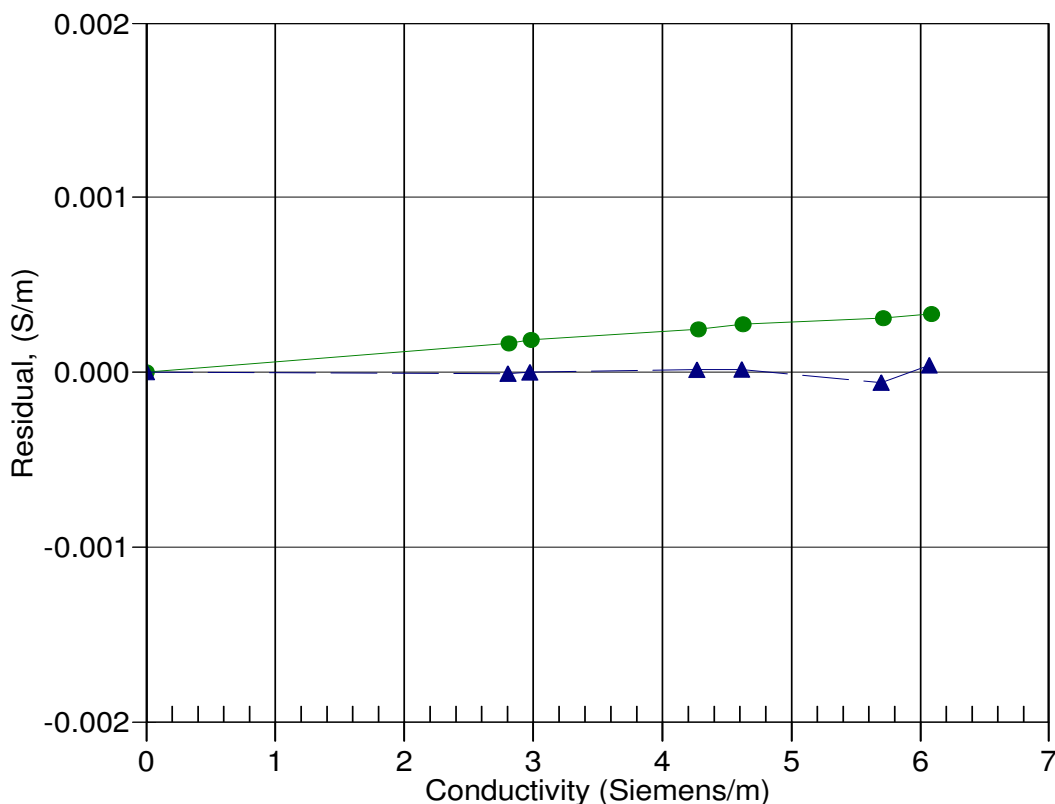
Conductivity = $(g + hf^2 + if^3 + jf^4) / 10(1 + \delta t + \epsilon p)$ Siemens/meter

Conductivity = $(af^m + bf^2 + c + dt) / [10(1 + \epsilon p)]$ Siemens/meter

t = temperature[°C]; p = pressure[decibars]; δ = CTcor; ϵ = CPcor;

Residual = (instrument conductivity - bath conductivity) using g, h, i, j coefficients

Date, Slope Correction



● 20-Feb-13 0.9999436
▲ 27-Aug-13 1.0000000

Temperature Calibration Report

STS/ODF Calibration Facility

SENSOR SERIAL NUMBER: 0034

CALIBRATION DATE: 18-Jun-2013

Mfg: SEABIRD Model: 35

Previous cal: 07-Dec-12

Calibration Tech: CAL

ITS-90_COEFFICIENTS

a0 = 4.397003089E-3

a1 = -1.190275919E-3

a2 = 1.813764110E-4

a3 = -1.011904489E-5

a4 = 2.167420508E-7

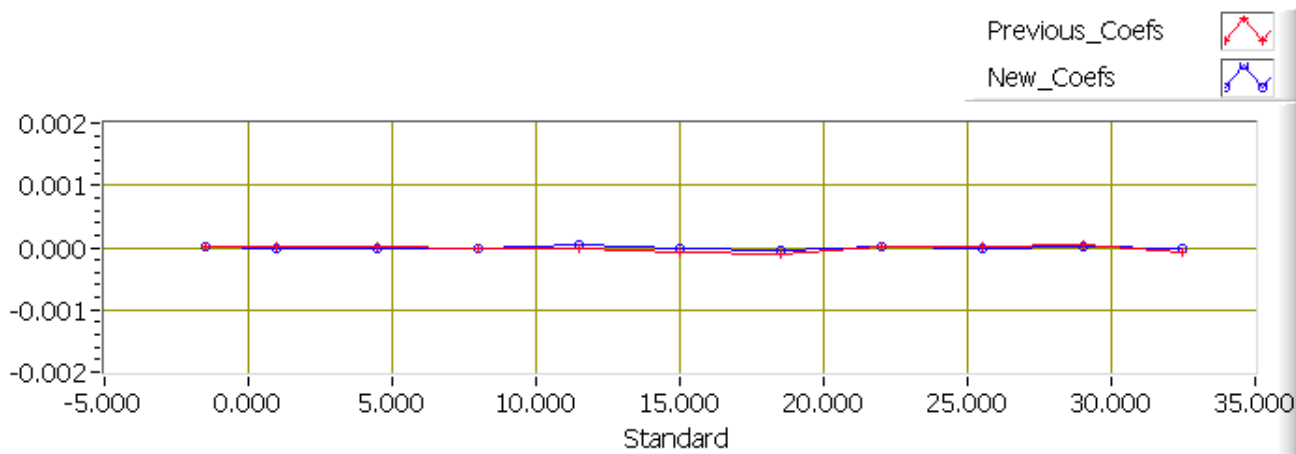
Slope = 1.000000 Offset = 0.000000

Calibration Standard: Mfg: ASL Model: F18 s/n: 245-5149

Calibration Standard: Mfg: ASL Model: F18 s/n: 245-5149

Temperature ITS-90 = $1/[a_0 + a_1[\ln(f)] + a_2[\ln^2(f)] + a_3[\ln^3(f)] + a_4[\ln^4(f)]] - 273.15$ (°C)

SBE35 Count	SPRT ITS-T90	SBE35 ITS-T90	SPRT-SBE35 OLD Coefs	SPRT-SBE35 NEW Coefs
716838.6659	-1.5025	-1.5025	0.00001	0.00001
642388.7534	0.9977	0.9977	0.00003	-0.00001
552221.8919	4.4985	4.4985	0.00001	-0.00002
475988.6132	7.9993	7.9993	-0.00003	-0.00000
411364.5191	11.5013	11.5013	-0.00001	0.00006
356570.8333	14.9962	14.9962	-0.00009	-0.00001
309816.6856	18.4974	18.4974	-0.00012	-0.00006
269921.2202	21.9969	21.9968	0.00001	0.00003
235773.4779	25.4961	25.4962	0.00001	-0.00001
206474.8573	28.9949	28.9949	0.00005	0.00002
181267.4388	32.4938	32.4938	-0.00008	-0.00001



Temperature Calibration Report

STS/ODF Calibration Facility

SENSOR SERIAL NUMBER: 0011

CALIBRATION DATE: 18-Jun-2013

Mfg: SEABIRD Model: 35

Previous cal: 07-Dec-12

Calibration Tech: CAL

ITS-90_COEFFICIENTS

a0 = 4.943006005E-3

a1 = -1.360822866E-3

a2 = 2.010795666E-4

a3 = -1.114346435E-5

a4 = 2.364998519E-7

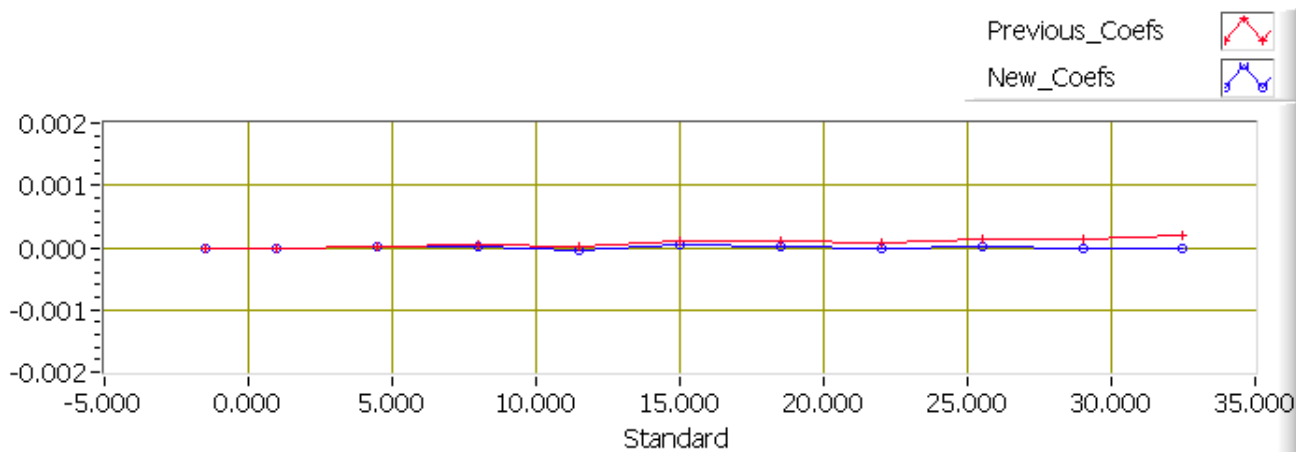
Slope = 1.000000 Offset = 0.000000

Calibration Standard: Mfg: ASL Model: F18 s/n: 245-5149

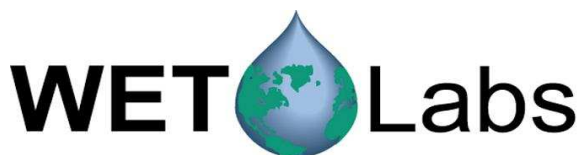
Calibration Standard: Mfg: ASL Model: F18 s/n: 245-5149

Temperature ITS-90 = $1/[a_0 + a_1[\ln(f)] + a_2[\ln^2(f)] + a_3[\ln^3(f)] + a_4[\ln^4(f)]] - 273.15$ (°C)

SBE35 Count	SPRT ITS-T90	SBE35 ITS-T90	SPRT-SBE35 OLD Coefs	SPRT-SBE35 NEW Coefs
790244.8256	-1.5025	-1.5025	-0.00000	-0.00000
707510.8124	0.9977	0.9977	-0.00001	-0.00000
607389.7035	4.4985	4.4984	0.00001	0.00001
522826.4216	7.9993	7.9993	0.00004	0.00001
451217.9235	11.5013	11.5014	0.00001	-0.00005
390577.8366	14.9962	14.9961	0.00012	0.00004
338895.6623	18.4974	18.4974	0.00011	0.00001
294848.4583	21.9969	21.9969	0.00007	-0.00003
257197.2567	25.4961	25.4961	0.00013	0.00001
224932.8734	28.9949	28.9949	0.00014	0.00000
197209.9015	32.4938	32.4938	0.00019	-0.00000



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C-Star Calibration

Date **September 13, 2013** S/N# **CST-400DR** Pathlength **25 cm**

Analog output

V_d **0.060 V**
 V_{air} **4.773 V**
 V_{ref} **4.658 V**

Temperature of calibration water **22.0 °C**
Ambient temperature during calibration **22.6 °C**

Relationship of transmittance (Tr) to beam attenuation coefficient (c), and pathlength (x , in meters): **$Tr = e^{-cx}$**

To determine beam transmittance: **$Tr = (V_{sig} - V_{dark}) / (V_{ref} - V_{dark})$**

To determine beam attenuation coefficient: **$c = -1/x * \ln(Tr)$**

V_d Meter output with the beam blocked. This is the offset.

V_{air} Meter output in air with a clear beam path.

V_{ref} Meter output with clean water in the path.

Temperature of calibration water: temperature of clean water used to obtain V_{ref} .

Ambient temperature: meter temperature in air during the calibration.

V_{sig} Measured signal output of meter.

Transmissometer Air Calibration M&B Calculator

STS	13 Nov. 2013		CST-400DR			
Readings	Factory Cal Sheet Info		AVG Deck/Lab Readings			Avg. Value
Air	4.773		4.742	4.743	4.743	4.743
Water	4.685					N/A
Blocked	0.060		0.055	0.055	0.055	0.055
Air Temp.	18.801	18.792	18.797	18.795	18.800	18.792
M	19.608		Air Temp. Average			18.796
B	-1.078					

Transmissometer Air Calibration M&B Calculator

STS	13 Nov. 2013		CST-400DR			
Readings	Factory Cal Sheet Info		AVG Deck/Lab Readings			Avg. Value
Air	4.773		4.741			
Water	4.658		N/A			
Blocked	0.06		0.055			
Air Temp.	20.346	20.360	20.370	20.368	20.372	20.377
M	19.730		Air Temp. Average			20.366
B	-1.085					

Transmissometer Air Calibration M&B Calculator

STS	24 Nov. 2013		CST-400DR			
Readings	Factory Cal Sheet Info		AVG Deck/Lab Readings			Avg. Value
Air	4.773		4.740	4.737	4.739	4.739
Water	4.685					N/A
Blocked	0.060		0.055	0.055	0.055	0.055
Air Temp.	23.707	23.682	23.621	23.785	23.677	23.680
M	19.625		Air Temp. Average			23.692
B	-1.079					

Transmissometer Air Calibration M&B Calculator

STS	06 Dec. 2013		CST-400DR			
Readings	Factory Cal Sheet Info		AVG Deck/Lab Readings			Avg. Value
Air	4.773		4.737	4.737	4.737	4.737
Water	4.685					N/A
Blocked	0.060		0.055	0.055	0.055	0.055
Air Temp.	27.314	27.329	27.347	27.360	27.362	27.347
M	19.632		Air Temp. Average			27.343
B	-1.080					

Transmissometer Air Calibration M&B Calculator

STS	18 Dec. 2013		CST-400DR			
Readings	Factory Cal Sheet Info		AVG Deck/Lab Readings			Avg. Value
Air	4.773		4.730	4.730	4.727	4.729
Water	4.685					N/A
Blocked	0.060		0.055	0.055	0.055	0.055
Air Temp.	30.160	30.157	30.217	30.302	30.218	30.220
M	19.665		Air Temp. Average			30.212
B	-1.082					