

Table S1. Temporal evolution (1981–2015) of the values (average \pm confidence interval) of in situ temperature (T_{is} , in $^{\circ}C$), salinity, oxygen (O_2 , in $\mu mol \cdot kg^{-1}$), pH in total scale at in situ conditions ($pH_{T_{is}}$), total alkalinity (A_T , in $\mu mol \cdot kg^{-1}$), total dissolved inorganic carbon (DIC, in $\mu mol \cdot kg^{-1}$) and anthropogenic CO_2 estimated with the ϕC_T^0 method (C_{ant} , in $\mu mol \cdot kg^{-1}$) for the layers considered in the Irminger basin (S1a) and the Iceland basin (S1b). The mean pressure (Press, in dbar) of the layer is also given. Values listed here were obtained by vertically and horizontally integrating each property within each layer, except for the $pH_{T_{is}}$ that was calculated using integrated values of DIC and A_T and referred to the mean Press of the layer over the studied time period to avoid the effects of the sampling strategy over the trend. Confront Fig. 1 of the main text for layer acronyms.

Year	Press	T_{is}	Salinity	O_2	$pH_{T_{is}}$	A_T	DIC	C_{ant}
SPMW ($\sigma_0 < 27.68 \text{ kg} \cdot \text{m}^{-3}$)								
1981	169	5.23 \pm 3.25	34.872 \pm 0.406	293 \pm 21	8.069 \pm 0.096	2302 \pm 12	2137 \pm 54	31.2 \pm 1.4
1991	234	5.53 \pm 1.33	34.984 \pm 0.110	280 \pm 20	8.058 \pm 0.032	2307 \pm 6	2144 \pm 13	34.8 \pm 8.1
1994	204	5.51 \pm 2.59	34.881 \pm 0.730	280 \pm 32	8.067 \pm 0.047	2303 \pm 32	2137 \pm 30	34.0 \pm 8.6
1997	240	5.89 \pm 4.18	34.950 \pm 0.270	274 \pm 25	8.060 \pm 0.079	2306 \pm 13	2140 \pm 56	34.1 \pm 14.6
2002	253	5.87 \pm 3.46	34.981 \pm 0.638	276 \pm 49	8.045 \pm 0.112	2308 \pm 33	2147 \pm 57	40.5 \pm 11.2
2004	271	5.86 \pm 3.85	34.964 \pm 1.066	277 \pm 47	8.040 \pm 0.098	2307 \pm 62	2149 \pm 72	43.2 \pm 12.1
2006	279	6.10 \pm 3.06	35.003 \pm 0.536	275 \pm 39	8.039 \pm 0.101	2306 \pm 28	2147 \pm 56	42.7 \pm 12.3
2008	196	5.94 \pm 5.06	34.991 \pm 1.497	283 \pm 58	8.039 \pm 0.110	2309 \pm 77	2151 \pm 89	48.4 \pm 12.0
2010	229	5.97 \pm 4.47	34.972 \pm 1.378	277 \pm 55	8.034 \pm 0.123	2308 \pm 70	2152 \pm 87	47.3 \pm 13.5
2012	163	5.49 \pm 5.68	34.920 \pm 1.654	283 \pm 67	8.031 \pm 0.102	2305 \pm 83	2154 \pm 67	49.6 \pm 12.7
2014	198	5.44 \pm 3.87	34.935 \pm 1.084	284 \pm 56	8.031 \pm 0.107	2307 \pm 52	2155 \pm 59	49.7 \pm 10.9
2015	215	5.43 \pm 0.81	35.020 \pm 0.069	295 \pm 14	8.019 \pm 0.030	2309 \pm 8	2162 \pm 6	57.4 \pm 6.4
uLSW ($27.68 \leq \sigma_0 < 27.76 \text{ kg} \cdot \text{m}^{-3}$)								
1981	791	3.56 \pm 0.71	34.862 \pm 0.085	293 \pm 17	8.040 \pm 0.029	2301 \pm 5	2150 \pm 7	29.3 \pm 3.0
1991	616	3.73 \pm 0.78	34.899 \pm 0.059	292 \pm 21	8.048 \pm 0.026	2302 \pm 4	2147 \pm 9	30.5 \pm 7.8
1994	601	3.73 \pm 0.77	34.891 \pm 0.068	282 \pm 19	8.034 \pm 0.033	2302 \pm 4	2152 \pm 7	29.4 \pm 9.5
1997	734	3.72 \pm 0.79	34.886 \pm 0.072	283 \pm 22	8.035 \pm 0.028	2302 \pm 5	2152 \pm 9	28.5 \pm 10.7
2002	818	3.90 \pm 0.70	34.903 \pm 0.062	280 \pm 20	8.022 \pm 0.027	2303 \pm 4	2156 \pm 7	32.0 \pm 8.0
2004	910	3.86 \pm 0.79	34.898 \pm 0.074	278 \pm 20	8.013 \pm 0.019	2303 \pm 6	2160 \pm 8	33.7 \pm 6.3
2006	868	3.97 \pm 0.70	34.913 \pm 0.060	280 \pm 17	8.015 \pm 0.018	2301 \pm 5	2157 \pm 6	33.6 \pm 6.8
2008	808	4.02 \pm 0.63	34.915 \pm 0.055	286 \pm 18	8.015 \pm 0.025	2304 \pm 5	2160 \pm 6	39.9 \pm 9.6
2010	856	4.03 \pm 0.70	34.919 \pm 0.067	281 \pm 17	8.009 \pm 0.017	2304 \pm 4	2162 \pm 5	38.5 \pm 7.7
2012	769	4.07 \pm 0.64	34.925 \pm 0.054	285 \pm 18	8.007 \pm 0.023	2304 \pm 3	2162 \pm 4	42.3 \pm 9.5
2014	791	3.98 \pm 0.54	34.909 \pm 0.051	286 \pm 20	8.006 \pm 0.022	2304 \pm 4	2163 \pm 4	42.3 \pm 10.9
2015	733	3.77 \pm 0.56	34.904 \pm 0.039	301 \pm 20	8.011 \pm 0.035	2304 \pm 5	2162 \pm 8	49.2 \pm 11.2
cLSW ($27.76 \leq \sigma_0 < 27.81 \text{ kg} \cdot \text{m}^{-3}$)								
1981	1516	3.48 \pm 0.18	34.917 \pm 0.035	281 \pm 5	8.017 \pm 0.020	2304 \pm 2	2151 \pm 4	23.2 \pm 3.6
1991	1388	3.28 \pm 0.52	34.885 \pm 0.072	291 \pm 17	8.023 \pm 0.022	2301 \pm 6	2148 \pm 6	26.3 \pm 8.9
1994	1298	3.10 \pm 0.58	34.871 \pm 0.068	294 \pm 19	8.019 \pm 0.037	2301 \pm 5	2150 \pm 6	26.5 \pm 12.1
1997	1442	3.16 \pm 0.60	34.876 \pm 0.065	291 \pm 18	8.018 \pm 0.025	2301 \pm 5	2151 \pm 5	27.6 \pm 8.8
2002	1441	3.38 \pm 0.64	34.907 \pm 0.067	281 \pm 13	8.006 \pm 0.015	2302 \pm 3	2155 \pm 5	26.1 \pm 3.4
2004	1458	3.44 \pm 0.54	34.914 \pm 0.057	278 \pm 11	7.999 \pm 0.016	2304 \pm 6	2159 \pm 7	27.8 \pm 3.0
2006	1439	3.56 \pm 0.45	34.931 \pm 0.056	278 \pm 8	7.999 \pm 0.014	2302 \pm 4	2157 \pm 3	27.1 \pm 2.9
2008	1453	3.56 \pm 0.38	34.929 \pm 0.033	279 \pm 8	7.997 \pm 0.010	2306 \pm 5	2160 \pm 5	30.2 \pm 3.8
2010	1444	3.61 \pm 0.55	34.935 \pm 0.056	277 \pm 8	7.995 \pm 0.014	2306 \pm 4	2162 \pm 4	30.0 \pm 3.6
2012	1445	3.64 \pm 0.35	34.940 \pm 0.040	274 \pm 5	7.989 \pm 0.013	2306 \pm 2	2163 \pm 3	30.2 \pm 3.7
2014	1404	3.67 \pm 0.38	34.943 \pm 0.033	274 \pm 8	7.989 \pm 0.016	2306 \pm 3	2163 \pm 3	29.8 \pm 4.6
2015	1594	3.59 \pm 0.25	34.929 \pm 0.027	280 \pm 3	7.988 \pm 0.024	2305 \pm 6	2164 \pm 5	33.0 \pm 4.3
ISOW ($27.81 \leq \sigma_0 < 27.88 \text{ kg} \cdot \text{m}^{-3}$)								
1981	2132	3.13 \pm 0.79	34.944 \pm 0.052	279 \pm 14	7.997 \pm 0.031	2307 \pm 6	2154 \pm 7	18.7 \pm 2.1
1991	2239	3.06 \pm 0.46	34.937 \pm 0.032	279 \pm 9	8.005 \pm 0.034	2306 \pm 5	2150 \pm 6	14.9 \pm 6.6
1994	2210	2.94 \pm 0.66	34.917 \pm 0.040	280 \pm 13	8.003 \pm 0.022	2304 \pm 5	2150 \pm 9	19.0 \pm 14.0
1997	2243	2.92 \pm 0.46	34.910 \pm 0.029	284 \pm 10	7.998 \pm 0.026	2305 \pm 4	2153 \pm 4	19.9 \pm 5.1
2002	2177	2.95 \pm 0.60	34.918 \pm 0.043	281 \pm 10	7.992 \pm 0.025	2304 \pm 3	2154 \pm 4	19.6 \pm 4.9
2004	2107	2.93 \pm 0.78	34.916 \pm 0.061	280 \pm 14	7.985 \pm 0.034	2306 \pm 8	2159 \pm 6	22.7 \pm 4.8
2006	2117	3.04 \pm 0.56	34.930 \pm 0.030	281 \pm 12	7.985 \pm 0.027	2304 \pm 4	2156 \pm 4	22.2 \pm 5.3
2008	2101	3.06 \pm 0.48	34.932 \pm 0.025	282 \pm 8	7.983 \pm 0.021	2306 \pm 3	2159 \pm 4	25.1 \pm 4.4
2010	2108	3.04 \pm 0.52	34.930 \pm 0.031	281 \pm 9	7.982 \pm 0.026	2307 \pm 4	2161 \pm 5	24.9 \pm 4.4
2012	2093	3.08 \pm 0.52	34.935 \pm 0.027	277 \pm 8	7.976 \pm 0.024	2307 \pm 4	2162 \pm 3	24.6 \pm 4.4
2014	2034	3.09 \pm 0.55	34.937 \pm 0.033	277 \pm 13	7.976 \pm 0.024	2307 \pm 4	2162 \pm 3	24.2 \pm 7.1
2015	2156	3.09 \pm 0.25	34.935 \pm 0.006	279 \pm 2	7.976 \pm 0.042	2307 \pm 11	2162 \pm 11	25.5 \pm 13.6
DSOW ($\sigma_0 \geq 27.88 \text{ kg} \cdot \text{m}^{-3}$)								
1981	2735	1.99 \pm 0.57	34.892 \pm 0.020	298 \pm 5	7.984 \pm 0.028	2302 \pm 2	2152 \pm 10	17.6 \pm 4.0
1991	2857	2.00 \pm 0.70	34.897 \pm 0.022	294 \pm 12	7.994 \pm 0.029	2302 \pm 5	2148 \pm 7	14.6 \pm 5.6
1994	2645	1.80 \pm 0.69	34.873 \pm 0.016	299 \pm 9	7.990 \pm 0.024	2300 \pm 3	2148 \pm 5	17.8 \pm 7.6
1997	2853	1.98 \pm 0.74	34.890 \pm 0.018	296 \pm 8	7.984 \pm 0.015	2302 \pm 4	2152 \pm 4	19.2 \pm 5.4
2002	2764	1.91 \pm 0.70	34.886 \pm 0.028	294 \pm 12	7.982 \pm 0.036	2301 \pm 3	2152 \pm 3	17.7 \pm 3.2
2004	2773	1.71 \pm 0.79	34.868 \pm 0.045	299 \pm 16	7.976 \pm 0.032	2301 \pm 7	2155 \pm 6	22.0 \pm 2.1
2006	2794	2.19 \pm 0.60	34.907 \pm 0.007	292 \pm 11	7.973 \pm 0.021	2303 \pm 3	2155 \pm 3	21.3 \pm 3.3
2008	2750	2.21 \pm 0.72	34.913 \pm 0.011	294 \pm 12	7.968 \pm 0.021	2305 \pm 3	2160 \pm 3	25.1 \pm 3.5
2010	2733	2.08 \pm 0.72	34.896 \pm 0.022	297 \pm 14	7.970 \pm 0.034	2304 \pm 4	2158 \pm 4	25.8 \pm 3.2
2012	2718	2.17 \pm 0.73	34.909 \pm 0.017	292 \pm 14	7.961 \pm 0.025	2305 \pm 4	2162 \pm 3	25.9 \pm 4.1
2014	2798	2.04 \pm 0.84	34.905 \pm 0.030	295 \pm 16	7.961 \pm 0.027	2304 \pm 4	2162 \pm 2	26.7 \pm 5.0
2015	2739	1.94 \pm 0.75	34.916 \pm 0.023	290 \pm 15	7.959 \pm 0.028	2306 \pm 7	2166 \pm 4	25.1 \pm 8.3

Table S1b. The same as S1a for the Iceland basin.

Year	Press	T _{is}	Salinity	O ₂	pH _{Tis}	A _T	DIC	C _{ant}
SPMW ($\sigma_0 < 27.68 \text{ kg}\cdot\text{m}^{-3}$)								
1981	382	6.48 ± 3.25	35.013 ± 0.123	262 ± 26	8.045 ± 0.089	2306 ± 10	2140 ± 57	29.0 ± 9.1
1991	387	6.46 ± 2.38	34.993 ± 0.168	255 ± 25	8.026 ± 0.046	2309 ± 8	2150 ± 22	33.7 ± 14.1
1994	385	6.59 ± 2.73	34.981 ± 0.215	255 ± 30	8.030 ± 0.078	2309 ± 10	2147 ± 44	34.7 ± 13.7
1997	421	7.42 ± 4.97	35.093 ± 0.190	246 ± 24	8.036 ± 0.096	2314 ± 10	2144 ± 65	31.6 ± 22.5
2002	411	7.26 ± 3.12	35.083 ± 0.166	253 ± 43	8.026 ± 0.102	2313 ± 10	2148 ± 52	37.7 ± 20.9
2004	369	7.21 ± 3.73	35.068 ± 0.227	247 ± 43	8.014 ± 0.094	2312 ± 12	2152 ± 53	38.7 ± 20.6
2006	373	7.39 ± 3.51	35.058 ± 0.180	246 ± 48	8.011 ± 0.104	2311 ± 13	2151 ± 56	39.9 ± 20.5
2008	386	7.10 ± 4.00	35.079 ± 0.227	255 ± 32	8.012 ± 0.092	2315 ± 14	2157 ± 53	44.5 ± 19.8
2010	372	6.95 ± 3.97	35.029 ± 0.225	251 ± 37	8.006 ± 0.092	2311 ± 13	2157 ± 58	43.4 ± 20.1
2012	388	6.93 ± 4.56	35.025 ± 0.175	251 ± 37	8.001 ± 0.092	2309 ± 11	2157 ± 65	44.4 ± 21.8
2014	368	6.84 ± 3.09	35.051 ± 0.158	257 ± 43	8.006 ± 0.094	2313 ± 10	2160 ± 48	47.2 ± 21.3
uLSW ($27.68 \leq \sigma_0 < 27.76 \text{ kg}\cdot\text{m}^{-3}$)								
1981	960	4.30 ± 0.72	34.949 ± 0.068	265 ± 10	8.010 ± 0.028	2303 ± 6	2155 ± 10	24.0 ± 7.7
1991	957	4.19 ± 0.73	34.932 ± 0.067	264 ± 14	8.010 ± 0.013	2305 ± 4	2158 ± 6	24.0 ± 3.4
1994	947	4.19 ± 0.60	34.933 ± 0.043	260 ± 15	8.005 ± 0.016	2305 ± 3	2160 ± 6	24.5 ± 3.9
1997	1012	4.27 ± 0.52	34.943 ± 0.035	258 ± 13	8.009 ± 0.011	2306 ± 3	2159 ± 5	21.1 ± 2.9
2002	1002	4.28 ± 0.69	34.944 ± 0.064	260 ± 13	7.998 ± 0.013	2304 ± 4	2161 ± 4	26.0 ± 3.2
2004	967	4.15 ± 0.64	34.927 ± 0.055	263 ± 17	7.995 ± 0.010	2303 ± 5	2162 ± 7	28.1 ± 3.2
2006	960	4.21 ± 0.76	34.936 ± 0.065	265 ± 18	7.992 ± 0.014	2303 ± 7	2163 ± 8	30.2 ± 4.8
2008	1001	4.16 ± 0.72	34.928 ± 0.072	269 ± 16	7.994 ± 0.010	2306 ± 5	2165 ± 6	33.5 ± 4.0
2010	1005	4.17 ± 0.68	34.929 ± 0.068	270 ± 15	7.992 ± 0.011	2305 ± 6	2165 ± 7	34.8 ± 3.6
2012	1031	4.22 ± 0.61	34.934 ± 0.050	266 ± 13	7.986 ± 0.009	2303 ± 5	2165 ± 6	33.4 ± 2.6
2014	1009	4.22 ± 0.57	34.934 ± 0.047	268 ± 13	7.986 ± 0.009	2306 ± 3	2168 ± 6	36.3 ± 3.9
cLSW ($27.76 \leq \sigma_0 < 27.81 \text{ kg}\cdot\text{m}^{-3}$)								
1981	1620	3.59 ± 0.43	34.953 ± 0.061	277 ± 5	8.008 ± 0.022	2302 ± 7	2148 ± 5	19.7 ± 6.4
1991	1664	3.45 ± 0.34	34.923 ± 0.055	277 ± 7	8.003 ± 0.024	2304 ± 5	2154 ± 5	20.9 ± 6.2
1994	1657	3.41 ± 0.33	34.916 ± 0.056	276 ± 6	7.995 ± 0.025	2304 ± 5	2157 ± 6	21.1 ± 6.2
1997	1710	3.39 ± 0.38	34.913 ± 0.047	278 ± 8	8.008 ± 0.018	2304 ± 4	2152 ± 4	20.2 ± 4.6
2002	1719	3.38 ± 0.45	34.915 ± 0.055	278 ± 9	7.996 ± 0.018	2303 ± 4	2155 ± 4	23.3 ± 5.3
2004	1769	3.35 ± 0.41	34.908 ± 0.044	277 ± 7	7.991 ± 0.016	2302 ± 5	2157 ± 5	24.2 ± 4.9
2006	1713	3.42 ± 0.45	34.917 ± 0.056	278 ± 5	7.990 ± 0.016	2302 ± 5	2157 ± 6	25.7 ± 6.8
2008	1746	3.43 ± 0.44	34.920 ± 0.051	279 ± 6	7.989 ± 0.015	2306 ± 4	2161 ± 4	28.0 ± 5.3
2010	1754	3.45 ± 0.49	34.923 ± 0.050	277 ± 5	7.987 ± 0.015	2306 ± 5	2161 ± 4	27.8 ± 6.1
2012	1742	3.52 ± 0.45	34.934 ± 0.049	273 ± 3	7.982 ± 0.013	2304 ± 4	2161 ± 4	26.2 ± 5.8
2014	1752	3.51 ± 0.47	34.934 ± 0.039	273 ± 3	7.982 ± 0.018	2307 ± 4	2164 ± 4	27.6 ± 6.3
ISOW ($\sigma_0 \geq 27.81 \text{ kg}\cdot\text{m}^{-3}$)								
1981	2193	3.02 ± 0.38	34.975 ± 0.023	275 ± 10	7.980 ± 0.036	2308 ± 3	2156 ± 6	15.9 ± 6.3
1991	2493	2.93 ± 0.28	34.962 ± 0.024	269 ± 10	7.978 ± 0.034	2315 ± 11	2164 ± 12	15.2 ± 5.3
1994	2537	2.91 ± 0.25	34.958 ± 0.014	269 ± 10	7.976 ± 0.031	2314 ± 11	2164 ± 13	15.2 ± 10.9
1997	2557	2.91 ± 0.27	34.959 ± 0.017	272 ± 8	7.983 ± 0.031	2313 ± 10	2160 ± 11	14.7 ± 3.2
2002	2560	2.91 ± 0.25	34.960 ± 0.023	271 ± 9	7.972 ± 0.032	2313 ± 11	2164 ± 12	17.4 ± 4.3
2004	2650	2.88 ± 0.26	34.952 ± 0.034	270 ± 14	7.969 ± 0.026	2312 ± 17	2165 ± 15	17.7 ± 7.4
2006	2561	2.92 ± 0.25	34.960 ± 0.031	271 ± 10	7.968 ± 0.027	2312 ± 12	2165 ± 12	18.3 ± 6.0
2008	2568	2.94 ± 0.19	34.961 ± 0.026	273 ± 9	7.966 ± 0.034	2316 ± 8	2169 ± 10	22.1 ± 6.9
2010	2533	2.94 ± 0.25	34.960 ± 0.032	273 ± 11	7.964 ± 0.031	2314 ± 9	2169 ± 8	22.0 ± 8.4
2012	2489	2.98 ± 0.26	34.968 ± 0.030	270 ± 7	7.961 ± 0.031	2313 ± 9	2168 ± 9	20.7 ± 5.5
2014	2613	2.94 ± 0.23	34.964 ± 0.029	269 ± 11	7.961 ± 0.032	2318 ± 14	2173 ± 13	21.6 ± 6.3