

Supplementary Table S1. Novaya Zemlya

	CO2 emission	Temperature	WEOC	MBC	pH	Moisture
CO2 emission	1.000000					
Temperature	0.096006	1.000000				
WEOC	0.064681	-0.006803	1.000000			
MBC	0.210795	0.269766	-0.277711	1.000000		
pH	0.171284	0.104237	0.034641	0.534143	1.000000	
Moisture	0.376780	0.049045	-0.016098	0.293271	-0.274802	1.000000

Supplementary Table S2. Heiss Island

	CO2 emission	Temperature	WEOC	MBC	pH	Moisture
CO2 emission	1.000000					
Temperature	0.230802	1.000000				
WEOC	0.185400	0.008384	1.000000			
MBC	0.512794	0.075314	0.621024	1.000000		
pH	0.128127	-0.102226	0.272073	0.014930	1.000000	
Moisture	0.558109	-0.021042	0.702022	0.840699	0.126845	1.000000

Supplementary Table S3. Hooker Island

	CO2 emission	Temperature	WEOC	MBC	pH	Moisture
CO2 emission	1.000000					
Temperature	0.548832	1.000000				
WEOC	0.212303	-0.141420	1.000000			
MBC	0.446942	0.157067	0.744983	1.000000		
pH	0.242071	-0.146482	0.077014	0.082068	1.000000	
Moisture	0.737586	0.301643	0.502596	0.716041	0.227703	1.000000

Supplementary Table S4. Microbial diversity indices

	Observed	Chao1	ACE	Shannon	Simpson	InvSimpson	Fisher
Hooker_Island_1	420.00000	423.00000	420.91804	5.55546	0.99281	139.02334	87.22105
Hooker_Island_2	275.00000	276.50000	275.64453	4.90819	0.98335	60.05830	54.68733
Hooker_Island_3	478.00000	480.50000	478.72967	5.76626	0.99523	209.44805	98.00051
Hooker_Island_4	468.00000	471.00000	468.92422	5.66257	0.99392	164.60530	93.74004
Hooker_Island_5	535.00000	535.54545	535.65185	5.85494	0.99534	214.62439	110.00272
Hooker_Island_6	350.00000	351.20000	350.62032	5.53143	0.99437	177.58597	74.96858
Hooker_Island_7	460.00000	465.25000	461.18633	5.68298	0.99440	178.64065	91.43908
Hooker_Island_8	464.00000	469.60000	465.33062	5.74030	0.99507	202.64778	97.23268
Hooker_Island_9	468.00000	473.25000	469.20480	5.72237	0.99446	180.60450	98.91427
Novaya_Zemlya_1	104.00000	104.00000	104.17365	2.56843	0.77284	4.40221	15.23095
Novaya_Zemlya_10	54.00000	54.00000	54.24541	0.89675	0.27228	1.37416	7.05127
Novaya_Zemlya_11	105.00000	105.00000	105.19431	3.28576	0.91735	12.09854	16.06541
Novaya_Zemlya_12	125.00000	125.00000	125.14798	3.13755	0.88023	8.34957	18.84468
Novaya_Zemlya_13	37.00000	39.00000	39.62199	0.39499	0.11286	1.12722	4.42383
Novaya_Zemlya_14	124.00000	125.50000	124.66860	2.79194	0.76270	4.21402	20.42766
Novaya_Zemlya_15	47.00000	47.00000	47.00000	0.49417	0.13718	1.15899	5.86791
Novaya_Zemlya_16	92.00000	92.00000	92.00000	3.17568	0.92718	13.73321	12.95456
Novaya_Zemlya_17	128.00000	128.00000	128.15315	3.58163	0.93574	15.56256	21.25083
Novaya_Zemlya_18	154.00000	154.00000	154.00000	3.77482	0.92814	13.91646	28.38889
Novaya_Zemlya_19	125.00000	126.00000	125.31677	1.79696	0.49591	1.98376	19.61448
Novaya_Zemlya_2	165.00000	165.25000	165.31517	3.15549	0.88416	8.63274	26.26483
Novaya_Zemlya_20	51.00000	52.00000	51.40821	0.55753	0.16723	1.20081	6.61265
Novaya_Zemlya_21	52.00000	53.00000	52.46918	0.49334	0.14197	1.16546	6.70702
Novaya_Zemlya_22	90.00000	90.00000	90.21615	1.12103	0.31135	1.45211	12.67677
Novaya_Zemlya_23	119.00000	119.00000	119.14626	3.43770	0.88269	8.52430	21.88189
Novaya_Zemlya_24	253.00000	254.00000	253.50031	4.72662	0.98039	50.99612	49.78833
Novaya_Zemlya_25	82.00000	82.25000	82.59439	1.24264	0.36552	1.57610	11.16341
Novaya_Zemlya_3	163.00000	164.00000	163.29630	3.32098	0.87502	8.00129	26.87810
Novaya_Zemlya_4	194.00000	194.00000	194.14925	3.34251	0.84822	6.58834	33.79352

Novaya_Zemlya_5	220.00000	220.00000	220.00000	4.37430	0.97411	38.62463	39.50228
Novaya_Zemlya_6	83.00000	83.00000	83.00000	0.70253	0.18962	1.23398	10.97295
Novaya_Zemlya_7	172.00000	173.50000	172.50230	3.36724	0.89511	9.53408	28.02837
Novaya_Zemlya_8	113.00000	113.00000	113.17979	3.52268	0.94448	18.01297	18.00565
Novaya_Zemlya_9	148.00000	148.25000	148.33557	3.77522	0.95910	24.45075	23.92705
Heiss_Island_1	489.00000	498.00000	490.78902	5.81711	0.99541	217.73495	102.41070
Heiss_Island_10	481.00000	494.75000	483.32777	5.67690	0.99412	170.15610	97.96096
Heiss_Island_11	426.00000	428.50000	426.75552	5.57507	0.99332	149.77397	86.17301
Heiss_Island_12	447.00000	448.87500	447.96925	5.61622	0.99367	158.07314	89.16769
Heiss_Island_13	430.00000	431.42857	430.77930	5.59947	0.99391	164.22225	87.28989
Heiss_Island_14	625.00000	638.12500	628.12891	5.93051	0.99512	204.73629	125.77947
Heiss_Island_15	542.00000	542.76923	542.95068	5.71526	0.99343	152.20838	106.48680
Heiss_Island_16	562.00000	575.20000	564.01115	5.78458	0.99416	171.11251	111.04079
Heiss_Island_17	602.00000	615.00000	604.98890	5.82058	0.99429	175.08519	118.07336
Heiss_Island_18	574.00000	579.07692	576.56150	5.75678	0.99406	168.31778	112.18740
Heiss_Island_19	564.00000	575.00000	566.49288	5.76393	0.99379	160.96272	111.03534
Heiss_Island_2	443.00000	454.25000	444.81101	5.74617	0.99534	214.77726	93.21146
Heiss_Island_20	529.00000	532.60000	530.66559	5.67034	0.99296	141.99055	103.93549
Heiss_Island_21	576.00000	577.75000	577.34477	5.85176	0.99464	186.73609	116.46463
Heiss_Island_22	464.00000	471.00000	465.32344	5.65035	0.99421	172.65354	93.17111
Heiss_Island_23	401.00000	405.20000	402.30398	5.42398	0.99185	122.77064	78.32529
Heiss_Island_24	429.00000	431.14286	430.08378	5.28230	0.98573	70.05607	82.52687
Heiss_Island_25	494.00000	509.60000	497.06622	5.67450	0.99365	157.42295	98.79735
Heiss_Island_3	472.00000	478.60000	474.68043	5.63902	0.99327	148.65332	96.07013
Heiss_Island_4	448.00000	463.00000	449.95084	5.39518	0.98814	84.29943	87.50485
Heiss_Island_5	364.00000	371.00000	365.09829	5.39702	0.99136	115.75816	75.02330
Heiss_Island_6	497.00000	502.62500	498.94537	5.85330	0.99581	238.52813	105.28619
Heiss_Island_7	472.00000	481.16667	474.24138	5.72508	0.99474	190.20757	99.54676
Heiss_Island_8	492.00000	505.00000	495.23057	5.78720	0.99507	202.67504	103.63317
Heiss_Island_9	579.00000	586.20000	580.44878	5.97419	0.99597	248.07042	121.54835