

Table DR 1. Biofacies, percentages of important benthic foraminifera and isotope data at ODP Site 758

Sample	mbsf	Age (Ma)	Biofacies	Factor	E. exigua %	N. umbonifera %	U. proboscidea %	d13C (BF)	d18O (BF)
1H-1, 04-06	0.04	0.0015	Gs	1 (+ve)	8.08	0.18	0	0.59	2.5
1H-1, 13-15	0.13	0.0072	Gs	1 (+ve)	5.77	0	0	0.42	2.92
1H-1, 25-27	0.25	0.0148	Pm	9 (+ve)	1.26	0	0.72	0.15	3.48
1H-1, 48-50	0.48	0.0295	Mb	10 (+ve)	3.42	0	1.62	-0.04	4.26
1H-1, 77-79	0.77	0.0481	Mb	10 (+ve)	2.46	0	2.46	0.21	4.06
1H-1, 107-109	1.07	0.0673	Cw	8 (+ve)	1.96	0	10.44	0.12	3.85
1H-2, 03-05	1.53	0.0969	Cc	3 (+ve)	0	0	24.35	0.06	3.74
1H-2, 47-49	1.97	0.1253	Cc	3 (+ve)	0	0	27.21	0.3	3.66
1H-2, 98-100	2.48	0.1587	Ee	5 (-ve)	4.95	0	17.22	0.32	3.33
1H-3, 05-07	3.05	0.1964	Cw	8 (+ve)	0.83	0	6.48	-0.3	4.18
1H-3, 53-55	3.53	0.2285	Cc	3 (+ve)	0	0	20.31	-0.21	3.86
1H-3, 98-100	3.98	0.2592	Cw	8 (+ve)	2.67	0	9.14	0.15	3.07
1H-4, 05-07	4.55	0.2986	Cw	8 (+ve)	4.76	0	8.47	-0.16	3.35
1H-4, 48-50	4.98	0.3289	Cw	8 (+ve)	2.35	0	12.92	-0.35	3.89
1H-4, 98-100	5.48	0.3648	Cw	8 (+ve)	4.16	0	10.49	-0.16	3.71
1H-CC, 05-07	5.8	0.3882	Cw	8 (+ve)	8.06	0	10.33	-0.22	3.44
2H-1, 05-07	6.05	0.4069	Ee	5 (-ve)	9.72	0	14.23	-0.1	3.6
2H-1, 48-50	6.48	0.4392	Pm	9 (+ve)	6.45	0	2.3	-0.44	3.89
2H-1, 98-100	6.98	0.4778	Ee	5 (-ve)	4.47	0	16.61	0.43	3.39
2H-2, 04-06	7.54	0.522	Mb	10 (+ve)	12.46	0	6.8	-0.11	3.99
2H-2, 48-50	7.98	0.5571	Cw	8 (+ve)	10.23	0	10.02	0.15	3.21
2H-2, 98-100	8.48	0.5972	Ee	5 (-ve)	11.18	0	13.98	0.07	3.45
2H-3, 05-07	9.05	0.6424	Cw	8 (+ve)	3.58	0	9.04	-0.33	4.12
2H-3, 48-50	9.48	0.6759	Cw	8 (+ve)	5.57	0	11.67	0.19	2.89
2H-3, 98-100	9.98	0.7139	Mb	10 (+ve)	10.05	0	6.26	-0.1	4.09
2H-4, 05-07	10.55	0.7556	Ee	5 (-ve)	12.42	0	18.06	-0.12	3.55
2H-4, 48-50	10.98	0.7855	Mb	10 (+ve)	12.67	0	6.5	-0.31	4.11
2H-4, 98-100	11.48	0.8185	Mb	10 (+ve)	9.88	0	6.48	-0.13	3.56
2H-5, 04-06	12.04	0.8537	Mb	10 (+ve)	8.6	0	2.81	-0.28	3.32
2H-5, 48-50	12.48	0.8809	Mb	10 (+ve)	8.36	0	7.32	-0.26	3.51
2H-5, 98-100	12.98	0.9117	Cw	8 (+ve)	15.61	0	10.98	-0.33	3.7
2H-6, 06-08	13.56	0.948	Cw	8 (+ve)	6.72	0	12.48	-0.11	3.55
2H-6, 48-50	13.98	0.9753	Cw	8 (+ve)	7.58	0.54	13.72	-0.09	3.58
2H-6, 98-100	14.48	1.0093	Cw	8 (+ve)	8.62	0	8.62	0.07	3.75
2H-7, 05-07	15.05	1.0507	Cw	8 (+ve)	9.06	0	11.94	-0.26	3.83
2H-7, 45-47	15.45	1.082	Cc	3 (+ve)	6.71	0	22.51	0.05	3.42
2H-7, 75-77	15.75	1.1066	Cw	8 (+ve)	10.3	0	11.19	-0.04	3.58
2H-CC, 05-07	15.82	1.1125	Mb	10 (+ve)	9.5	0	1.67	0.02	3.54
3H-1, 05-07	15.95	1.1237	Cw	8 (+ve)	2.28	0	10.08	0.24	3.21
3H-1, 48-50	16.08	1.1351	Ee	5 (-ve)	12.55	0	19.52	0.2	3.3
3H-1, 98-100	16.58	1.1808	Cw	8 (+ve)	0	0	12.12	-0.12	3.71
3H-2, 04-06	17.14	1.2353	Cw	8 (+ve)	9.38	0	10.07	-0.22	3.78
3H-2, 48-50	17.58	1.28	Ee	5 (-ve)	14.34	0	22.51	-0.03	3.31
3H-2, 98-100	18.08	1.3321	Ee	5 (-ve)	16.5	0	23.18	0.25	3.41
3H-3, 04-06	18.64	1.3915	Cc	3 (+ve)	2.64	0	19.89	-0.15	3.52
3H-3, 48-50	19.08	1.4379	Ee	5 (-ve)	10.76	0	19.44	-0.08	3.6
3H-3, 97-99	19.57	1.4889	Ee	5 (-ve)	6.35	0	17.43	0.1	3.23
3H-4, 05-07	20.15	1.5471	Cc	3 (+ve)	2.51	0	22.94	0	3.58
3H-4, 48-50	20.58	1.5882	Cw	8 (+ve)	3.53	0.37	14.31	-0.17	3.64
3H-4, 97-99	21.07	1.6329	Ee	5 (+ve)	2.64	0	18.46	-0.03	3.88
3H-5, 05-07	21.65	1.6825	Up	1 (-ve)	5.28	0	27.87	0.26	2.93
3H-5, 48-50	22.08	1.7169	Cc	3 (+ve)	2.72	0	21.34	0.13	3.27
3H-5, 98-100	22.58	1.7545	Cc	3 (+ve)	3.92	0.16	22.19	0	3.88
3H-6, 04-06	23.14	1.7935	Cc	3 (+ve)	4.11	0	25.61	0.2	3.56
3H-6, 48-50	23.58	1.822	Cc	3 (+ve)	3.31	0	21.79	0.14	3.49
3H-6, 97-99	24.07	1.8517	Ee	5 (-ve)	9.72	0	11.88	-0.2	4.06
3H-7, 05-07	24.65	1.8842	Pm	9 (+ve)	16.04	0.16	3.44	-0.15	3.59
3H-7, 48-50	25.08	1.9066	Mb	10 (+ve)	3.09	0	5.42	-0.4	3.7
3H-CC, 05-07	25.2	1.9126	Mb	10 (+ve)	12.13	0.66	8.64	0.08	3.78
4H-1, 06-08	25.26	1.9156	Pm	9 (+ve)	4.07	0	1.42	-0.05	3.5
4H-1, 27-29	25.47	1.9257	Pm	9 (+ve)	8.18	0.62	6.33	0.11	3.46
4H-1, 68-70	25.88	1.9446	Pm	9 (+ve)	6.62	0.21	3.93	-0.16	3.31
4H-1, 94-96	26.14	1.9561	Pm	9 (+ve)	11.34	0	1.05	-0.14	3.39
4H-1, 118-120	26.38	1.9781	Sa	5 (+ve)	2.54	0.51	3.05	0.09	3.37
4H-2, 04-06	26.74	2.0047	Gs	1 (+ve)	7.73	1.02	0.81	0.32	3.01
4H-2, 33-35	27.03	2.026	Gs	1 (+ve)	7.98	0.57	0.38	0.22	3.41
4H-2, 63-65	27.33	2.0482	Pm	9 (+ve)	11.9	0.53	0.71	-0.45	3.67
4H-2, 94-96	27.64	2.0712	Pm	9 (+ve)	13.76	0.4	1.21	-0.19	3.36
4H-2, 124-126	27.94	2.0935	Pm	9 (+ve)	9.84	0	1.23	-0.05	3.29
4H-3, 04-06	28.24	2.1159	Pm	9 (+ve)	7.37	0	0.76	-0.31	3.62
4H-3, 83-85	29.03	2.1749	Pm	9 (+ve)	10.62	0	0.64	-0.21	3.3
4H-4, 08-10	29.78	2.2315	Pm	9 (+ve)	15.13	0.77	0.38	0.09	2.84
4H-4, 73-75	30.43	2.2808	Pm	9 (+ve)	13.8	0	0.63	0.12	3.28
4H-5, 73-75	31.93	2.3971	Nu	11 (+ve)	6.71	24.95	12.47	0.38	3.14
4H-6, 05-07	32.75	2.4619	Pm	9 (+ve)	3.88	0.41	3.06	-0.31	3.66
4H-6, 73-75	33.43	2.5168	Ee	5 (-ve)	6.28	0	14.13	-0.36	3.47
4H-7, 3-5	34.23	2.5825	Mb	10 (+ve)	5.1	2.26	6.04	-0.36	3.03
4H-7, 48-50	34.68	2.62	Ee	5 (-ve)	8.36	3.83	13.49	-0.02	2.99
4H-CC, 05-07	34.8	2.6302	Mb	10 (+ve)	5.05	2.72	8.94	-0.14	3.24
5H-1, 05-07	34.85	2.6343	Nu	11 (+ve)	7.56	14.73	1.35	-0.39	3.12
5H-1, 73-75	35.53	2.6921	Mb	10 (+ve)	5.41	7.71	1.64	0.01	2.71
5H-2, 04-06	36.34	2.7618	Mb	10 (+ve)	5.15	1.93	2.73	-0.06	2.94
5H-2, 73-75	37.03	2.8210	Nu	11 (+ve)	6.8	11.55	4.53	0.15	2.0

5H-6, 72-74	43.02	3.3475	Up	1 (-ve)	3.27	3.08	21.77	-0.21	2.42
5H-7, 03-05	43.83	3.4889	Up	1 (-ve)	2.81	10.62	14.83	0.14	2.59
5H-7, 67-69	44.47	3.6164	Up	1 (-ve)	3.56	3.18	22.66	0.08	2.65
5H-CC, 07-09	44.57	3.6366	Up	1 (-ve)	3.03	4.69	20.71	0.17	2.57
6H-1, 04-06	44.44	3.6164	Up	1 (-ve)	2.93	8.45	15	0.14	2.72
6H-1, 72-74	45.12	3.75	Sa	5 (+ve)	1.69	3.2	7.53	0.37	2.45
6H-2, 05-07	45.95	3.8702	Up	1 (-ve)	5.51	6.5	19.09	0.08	2.59
6H-2, 73-75	46.63	3.9576	Sa	5 (+ve)	4.6	5.03	9.19	0.26	2.5
6H-3, 04-06	47.44	4.0465	Up	1 (-ve)	2.83	1.24	19.08	0.32	2.44
6H-3, 74-76	48.14	4.1113	Up	1 (-ve)	4.23	0	14.11	0.3	2.41
6H-4, 03-05	48.93	4.1726	Up	1 (+ve)	3.35	8.47	16.23	-0.03	2.53
6H-4, 76-78	49.66	4.22	Sa	5 (+ve)	6.57	5.75	6.16	-0.07	2.55
6H-5, 05-07	50.45	4.2628	Sa	5 (+ve)	3.11	2.94	8.29	-0.25	2.42
6H-5, 77-79	51.17	4.2958	Gs	1 (+ve)	1.56	3.9	2.73	0.27	2.38
6H-6, 04-06	51.94	4.3262	Gs	1 (+ve)	2.36	3.74	3.35	0.17	2.5
6H-6, 77-79	52.67	4.352	Gs	1 (+ve)	2.78	2.78	3.17	0.18	2.44
6H-7, 05-07	53.45	4.3778	Sa	5 (+ve)	2.44	5.69	2.44	0.41	2.34
6H-7, 48-50	53.88	4.3919	Sa	5 (+ve)	4.18	0	4.18	0.34	2.56
6H-CC, 08-10	54	4.3959	Up	1 (-ve)	2.1	2.52	15.54	0.2	2.43
7H-1, 04-06	54.04	4.3972	Up	1 (-ve)	3.17	4.07	14.48	0.02	2.54
7H-1, 72-74	54.72	4.4205	Gs	1 (+ve)	1.93	4.82	3.86	0.22	2.62
7H-2, 04-06	55.51	4.4503	Sa	5 (+ve)	3.92	3.92	2.7	0.51	2.35
7H-2, 73-75	56.2	4.48	Gs	1 (+ve)	3.7	2.59	2.27	0.15	2.63
7H-3, 04-06	57.01	4.5205	Up	1 (-ve)	0	0	12.57	0.15	2.5
7H-3, 73-75	57.7	4.5591	Gs	1 (+ve)	0.96	2.88	1.68	0.06	2.46
7H-4, 05-07	58.82	4.6276	Gs	1 (+ve)	3.59	1.63	0		
7H-4, 73-75	59.2	4.6518	Up	1 (-ve)	4.67	2.85	15.05		
7H-5, 05-07	60.02	4.7044	Gs	1 (+ve)	3.98	1.89	1.68	0.33	2.52
7H-5, 74-76	60.71	4.7478	Gs	1 (+ve)	6.01	1.8	2.4	0.26	2.46
7H-6, 05-07	61.52	4.7956	Up	1 (-ve)	1.89	0.52	9.79	0.3	2.67
7H-6, 74-76	62.21	4.8336	Gs	1 (+ve)	3.96	2.64	6.39	0.02	2.8
7H-7, 05-07	63.05	4.89	Gs	1 (+ve)	3.03	0	2.23	-0.32	2.98
7H-7, 48-50	63.53	4.9333	Gs	1 (+ve)	3.56	3.56	0	-0.11	2.56
7H-CC, 13-15	63.7	4.9499	Gs	1 (+ve)	2.55	3.24	3.24	-0.24	2.71
8H-1, 06-08	63.76	4.956	Gs	1 (+ve)	1.39	2.23	1.67		
8H-1, 73-75	64.43	5.0225	Gs	1 (+ve)	2.57	2.06	2.31	0.05	2.59
8H-2, 03-05	65.23	5.0989	Gs	1 (+ve)	3.09	1.55	2.58	0	2.44
8H-2, 72-74	65.92	5.1618	Gs	1 (+ve)	2.58	2.32	3.87	-0.15	2.59
8H-3, 03-05	66.73	5.2326	Gs	1 (+ve)	2.63	1.31	2.19	0.61	2.58
8H-3, 73-75	67.43	5.2909	Gs	1 (+ve)	3.53	2.65	4.12	0.21	2.69
8H-4, 03-05	68.23	5.3546	Gs	1 (+ve)	0	2.67	4.45	0.12	2.44
8H-4, 74-76	68.94	5.4089	Gs	1 (+ve)	2.99	2	0	0.26	2.5
8H-5, 05-07	69.75	5.4679	Gs	1 (+ve)	2.52	1.68	3.08	0.22	2.62
8H-5, 73-75	70.43	5.5157	Gs	1 (+ve)	3.26	2.54	3.62	0.03	2.81

Table DR 2. VARIMAX rotated factor scores of eleven significant factors at ODP Site 758

Species	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8	Factor 9	Factor 10	Factor 11
Anomalina globulosa	0.24585	-0.10866	-0.01027	0.27034	0.06069	0.30827	-0.22171	0.3931	-0.07223	-0.17855	-0.01473
Astronionon umbilicatum	0.24519	0.00067	0.06875	-0.11207	-0.17867	0.45933	0.08803	-0.43492	0.09774	0.23341	-0.02899
Cassidulina carinata	-0.06909	-0.01557	0.80245	-0.12728	0.03527	-0.01396	-0.08606	-0.11581	-0.1035	-0.23924	-0.0037
Chrysalogonium equisetiformis	0.3789	-0.25442	-0.20294	-0.23684	0.17997	-0.50277	-0.26237	-0.02449	-0.1405	-0.00956	0.19543
Cibicides bradyi	0.1551	0.0115	-0.3575	0.17444	0.29493	0.14183	0.14207	-0.3679	0.15646	-0.1755	-0.07673
C. cicatricosus	-0.06771	0.1169	-0.06311	-0.05129	-0.02332	0.60985	0.36507	0.10791	0.09768	0.02782	0.0157
C. kullenbergi	0.39229	-0.39038	-0.15793	-0.23079	0.13107	-0.28017	0.05886	0.18915	-0.08064	0.05713	-0.16615
C. wuellerstorfi	-0.0702	-0.06872	0.0226	-0.00611	0.00056	0.03885	0.02474	0.7231	-0.02293	-0.03541	-0.04666
Dentalina stimulea	0.27276	-0.10857	0.11048	-0.26276	0.13588	-0.23607	-0.06115	-0.28783	0.01147	0.44626	0.16118
Eggerella bradyi	0.23687	0.00279	0.1076	0.51463	0.13807	-0.13955	0.20263	-0.23274	-0.05676	-0.11048	0.35639
Epistominella exigua	-0.19832	0.252	-0.19362	0.25268	-0.47785	0.18453	0.05748	-0.15719	-0.12733	-0.18171	-0.22576
Globocassidulina subglobosa	0.70994	-0.07282	-0.14424	-0.02878	0.11247	-0.15564	-0.13267	-0.13242	0.1246	-0.23377	-0.11828
Gyroidinoides nitidula	-0.19524	-0.02295	0.76187	0.11343	-0.0173	-0.02698	0.23923	0.18013	0.04733	0.00258	-0.12642
G. orbicularis	0.17595	-0.12653	-0.03229	-0.01125	0.04248	-0.00489	0.09686	-0.13557	-0.03176	0.0218	0.09956
Karrerella bradyi	-0.14135	0.19231	-0.09336	-0.13642	0.26513	-0.24871	-0.0662	-0.22402	0.54175	0.02426	-0.24677
Laticarinina pauperata	-0.00622	-0.06244	-0.13497	-0.03415	-0.24486	-0.39628	0.28912	0.00635	0.02812	-0.25129	-0.29022
Melonis barleeanum	0.0325	0.02682	-0.07391	-0.03875	0.06992	0.00674	0.03519	-0.02921	-0.10577	0.71888	0.03135
M. pompilioides	-0.17289	0.2757	0.01662	-0.27723	0.48769	0.46358	0.01853	-0.01232	-0.10331	-0.18076	-0.15139
Nuttallides umbonifera	-0.10437	-0.28473	-0.16012	-0.1368	0.0897	-0.01602	0.00713	-0.17528	-0.16729	0.08511	0.68068
Oridorsalis umbonatus	0.63178	-0.12445	-0.17372	-0.17894	-0.03703	-0.17653	-0.3053	-0.1909	-0.02673	0.0891	0.02112
Pleurostomella acuminata	0.36302	-0.23634	-0.15421	-0.28987	0.25699	-0.38465	-0.18011	-0.14415	-0.1273	0.32599	0.14778
P. alternans	0.28501	-0.18609	-0.30546	-0.38465	0.11433	-0.33218	-0.10927	-0.08317	-0.18684	0.11681	0.27787
P. brevis	0.20897	-0.32542	-0.14876	0.00865	0.39042	-0.15192	-0.28895	-0.13264	-0.34304	0.3062	-0.1774
P. obtusa	0.33035	-0.35243	-0.1626	-0.26206	0.29295	-0.147	-0.18611	-0.00587	-0.25126	0.30844	-0.11673
Pullenia bulloides	0.5152	-0.06278	0.36517	-0.34766	0.06264	-0.12489	-0.24328	-0.06889	-0.14363	0.09487	0.01756
P. osloensis	-0.08521	0.02751	-0.06893	0.22008	-0.37974	-0.10513	-0.15384	-0.17722	-0.30788	-0.00248	-0.57314
P. quinqueloba	0.29387	-0.09946	-0.14499	-0.00245	0.18664	-0.05782	-0.20868	0.04669	-0.1258	0.08268	0.05677
P. salisburyi	-0.02028	0.22593	-0.09737	-0.04449	-0.32038	0.12585	-0.14041	-0.05294	0.02493	0.02081	0.10595
Pyrgo depressa	0.13268	0.62781	-0.08956	0.1273	0.29089	-0.19809	0.19986	0.07752	-0.29845	0.07706	0.08085
P. murrhina	0.07855	0.15776	-0.02356	0.10415	0.00669	0.03766	0.00515	-0.02645	0.82297	-0.11561	-0.05695
Pyrulina fusiformis	0.09325	-0.44576	-0.23082	0.22334	0.08736	-0.00368	-0.05302	-0.28747	-0.0299	-0.01603	0.20412
Quinqueloculina lamarckiana	0.11659	-0.18281	0.01482	0.68517	-0.07614	-0.09269	0.10049	-0.03107	0.23744	-0.0635	-0.17275
Sigmoilopsis schlumbergeri	-0.04158	-0.09184	0.08277	0.06711	-0.03826	0.09719	0.78982	0.01698	0.00376	0.04874	0.01284
Sphaeroidina bulloides	0.0978	-0.15003	0.29619	-0.21768	0.0273	0.02295	0.20637	0.39942	0.07635	0.15177	-0.19834
Stilostomella abyssorum	0.00474	-0.22147	-0.06665	0.03476	0.63951	0.03256	-0.12074	-0.10003	-0.02739	0.24614	0.14747
Textularia agglutinans	0.0723	0.728	-0.08047	-0.04928	-0.06359	0.07057	-0.12087	-0.14229	0.16978	0.0452	-0.09539
Uvigerina hispida	0.13308	-0.09051	-0.09298	-0.12638	-0.01816	0.15489	0.42687	0.06002	-0.05171	-0.36028	-0.04642
U. hispido-costata	-0.34283	0.36987	0.0165	0.38383	-0.18664	0.21205	0.19215	0.30481	0.2175	-0.05919	-0.06746
U. proboscidea	-0.7723	-0.14727	0.18222	-0.1826	0.04626	-0.04635	-0.0658	0.06712	-0.11658	-0.16342	-0.00646
% Variance	12.31	9.19	8.3	8.04	7.9	7.85	7.31	7.28	6.8	6.6	6.19