

## **Auxiliary Material for**

### **Relating sulfate and methane dynamics to geology: the accretionary prism offshore SW Taiwan**

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## Introduction

This data set contains geochemical data analyzed from cores collected during Leg 2 of *MD147/MARCO POLO 1/IMAGES XII* cruise of R/V *Marion Dufresne* and R/V *Ocean Researcher I* in offshore SW Taiwan. All analytical data are tabulated in this Auxiliary Material (Ts01, Ts02, Ts03 and Ts04).

1. Ts01: Headspace methane and ethane concentrations and carbon isotopic data of CH<sub>4</sub> and CO<sub>2</sub> in the three long piston cores at the MD sites (Corresponding figures: Figure 2 and 3).
  - 1.1 Column “Depth”, cmbsf, centimeters below sea floor.
  - 1.2 Column “C1/(C2+C3)”, ratio of methane concentrations (C1) to the sum of ethane (C2) and propane (C3) concentrations.
2. Ts02: Porewater concentrations, POC content and porosity in the three long piston cores at the MD sites (Corresponding figure: Figure 2).
3. Ts03: Porewater concentrations and porosity in the four short piston cores at the ORI sites (Corresponding figure: Figure 2).
4. Ts04: Analytical results of reference sites (Corresponding figure: Figure 2).

**Ts01.** Headspace methane and ethane concentrations and carbon isotopic data of CH<sub>4</sub> and CO<sub>2</sub> in the three long piston cores at the MD sites. b.d.l. is below detection limit.

MD05-2912 (Tai-Nan Ridge)	Depth (cmbsf)	CH <sub>4</sub> (mM)	C <sub>2</sub> H <sub>6</sub> (μM)	C <sub>1</sub> /(C <sub>2</sub> +C <sub>3</sub> )	δ <sup>13</sup> C-CH <sub>4</sub> , ‰ vs. V-PDB	δ <sup>13</sup> C-CO <sub>2</sub> , ‰ vs. V-PDB
	0-50	0.12	b.d.l.	-	-	-
	50-100	0.041	b.d.l.	-	-	-
	100-150	0.055	b.d.l.	-	-	-15.7
	150-200	0.041	b.d.l.	-	-	-
	200-250	0.068	b.d.l.	-	-	-
	250-300	0.049	b.d.l.	-	-	-
	300-350	0.035	b.d.l.	-	-	-
	350-400	0.049	b.d.l.	-	-	-
	400-450	0.086	b.d.l.	-	-	-
	450-500	0.038	b.d.l.	-	-	-
	500-550	0.066	b.d.l.	-	-	-
	550-600	0.024	b.d.l.	-	-	-
	600-650	0.12	b.d.l.	-	-	-
	650-700	0.14	b.d.l.	-	-	-
	700-750	0.19	b.d.l.	-	-	-
	750-800	0.14	b.d.l.	-	-	-
	800-850	0.16	b.d.l.	-	-	-
	850-900	0.16	b.d.l.	-	-	-
	900-950	0.30	b.d.l.	-	-	-
	950-1000	0.92	b.d.l.	-	-95.0	-
	1000-1050	0.73	b.d.l.	-	-	-
	1050-1100	0.90	b.d.l.	-	-	-
	1100-1150	0.87	b.d.l.	-	-	-
	1150-1200	1.26	b.d.l.	-	-	-
	1200-1250	1.26	b.d.l.	-	-	-
	1250-1300	1.26	b.d.l.	-	-	-
	1300-1350	0.57	b.d.l.	-	-	-
	1350-1400	0.45	b.d.l.	-	-	-
	1400-1450	1.16	b.d.l.	-	-	-
	1450-1500	0.78	b.d.l.	-	-54.4	-27.4
	1500-1550	0.59	b.d.l.	-	-	-
	1550-1600	1.02	b.d.l.	-	-	-
	1600-1650	0.52	b.d.l.	-	-	-
	1650-1700	1.18	b.d.l.	-	-	-
	1700-1750	0.49	b.d.l.	-	-	-
	1750-1800	0.24	b.d.l.	-	-	-
	1800-1850	0.68	b.d.l.	-	-	-
	1850-1900	1.08	b.d.l.	-	-	-
	1900-1950	0.23	b.d.l.	-	-	-
	1950-2000	0.97	b.d.l.	-	-	-
	2000-2050	1.75	b.d.l.	-	-60.8	-28.7
	2050-2100	0.70	b.d.l.	-	-	-
	2100-2150	0.54	b.d.l.	-	-	-
	2150-2200	1.07	b.d.l.	-	-	-
	2200-2250	1.21	b.d.l.	-	-	-
	2250-2300	1.02	b.d.l.	-	-	-
	2300-2350	0.79	b.d.l.	-	-	-
	2350-2400	1.57	b.d.l.	-	-	-
	2400-2450	0.65	b.d.l.	-	-	-
	2450-2500	1.26	b.d.l.	-	-	-
	2500-2550	0.82	b.d.l.	-	-	-
	2550-2600	1.44	b.d.l.	-	-	-
	2600-2650	1.47	b.d.l.	-	-59.7	-25.4
	2650-2700	1.41	b.d.l.	-	-	-
	2700-2750	0.77	b.d.l.	-	-	-
	2750-2800	0.86	b.d.l.	-	-	-
	2800-2850	0.72	b.d.l.	-	-	-
	2850-2900	1.14	b.d.l.	-	-	-
	2900-2950	0.72	b.d.l.	-	-	-
	2950-3000	0.96	b.d.l.	-	-57.0	-24.8

(Continued)

MD05-2911 (Yung-An Ridge)	Depth (cmbsf)	CH <sub>4</sub> (mM)	C <sub>2</sub> H <sub>6</sub> (μM)	C <sub>1</sub> /(C <sub>2</sub> +C <sub>3</sub> )	δ <sup>13</sup> C-CH <sub>4</sub> , (‰ vs. V-PDB)	δ <sup>13</sup> C-CO <sub>2</sub> , (‰ vs. V-PDB)
	9-12	0.04	b.d.l.	-	-	-
	68-71	0.15	0.10	-	-	-
	109-112	0.18	b.d.l.	-	-	-
	159-162	0.19	0.10	-	-	-
	209-212	0.11	0.15	-	-	-
	259-262	0.11	0.20	-	-	-
	309-312	0.09	0.21	-	-	-
	359-362	0.12	b.d.l.	-	-	-
	409-412	0.18	0.41	-	-	-
	459-462	0.30	0.73	-	-	-
	509-512	0.56	b.d.l.	-	-	-
	559-562	1.55	0.50	3,073	-82.5	b.d.l.
	609-612	1.36	0.94	-	-	-
	659-662	1.58	0.90	-	-	-
	709-712	1.87	b.d.l.	-	-	-
	759-762	1.56	1.06	-	-	-
	809-812	1.38	0.75	-	-	-
	859-862	1.38	0.84	-	-	-
	909-912	1.38	1.23	-	-	-
	959-962	1.66	0.43	3,489	-73.2	-29.9
	1009-1012	0.97	b.d.l.	-	-	-
	1059-1062	1.56	b.d.l.	-	-	-
	1109-1112	1.11	0.60	-	-	-
	1159-1162	1.25	b.d.l.	-	-	-
	1259-1262	1.54	0.55	2,782	-70.1	-29.5
	1309-1312	1.73	1.23	-	-	-
	1359-1362	0.86	0.46	-	-	-
	1409-1412	2.14	0.44	-	-	-
	1459-1462	1.82	b.d.l.	-	-	-
	1509-1512	1.62	0.25	-	-	-
	1609-1612	1.46	0.86	-	-	-
	1659-1662	0.97	b.d.l.	-	-	-
	1709-1712	2.06	b.d.l.	-	-	-
	1759-1762	2.11	b.d.l.	-	-67.0	-19.7
	1859-1862	1.73	0.37	-	-	-
	1959-1062	1.44	b.d.l.	-	-	-
	2009-2012	1.59	1.05	-	-	-
	2059-2062	1.57	1.01	1,555	-62.3	-23.6
	2109-2112	0.73	0.96	-	-	-
	2159-2162	1.52	1.16	-	-	-
	2209-2212	1.81	b.d.l.	-	-	-
	2259-2262	0.85	b.d.l.	-	-	-
	2309-2312	1.88	0.64	2,934	-62.1	-24.7
	2359-2362	1.88	1.05	-	-	-

(Continued)

MD05-2913 (Good Weather Ridge)	Depth (cmbsf)	CH <sub>4</sub> (mM)	C <sub>2</sub> H <sub>6</sub> (μM)	C <sub>1</sub> /(C <sub>2</sub> +C <sub>3</sub> )	δ <sup>13</sup> C-CH <sub>4</sub> , (‰ vs. V-PDB)	δ <sup>13</sup> C-CO <sub>2</sub> , (‰ vs. V-PDB)
	0-50	0.014	b.d.l.	-	-	-
	50-100	0.0071	b.d.l.	-	-	-
	100-143	0.0046	b.d.l.	-	-	-
	147-200	0.0034	b.d.l.	-	-	-
	200-250	0.019	b.d.l.	-	-	-
	250-300	0.014	b.d.l.	-	-	-
	300-350	0.020	b.d.l.	-	-	-
	350-400	0.014	b.d.l.	-	-	-
	400-450	0.039	b.d.l.	-	-	-
	450-500	0.053	b.d.l.	-	-	-
	500-550	0.133	b.d.l.	-	-	-
	550-600	0.344	b.d.l.	-	-	-
	600-650	1.029	0.518	1,988	-85.2	-
	650-700	0.571	b.d.l.	-	-	-
	700-750	0.543	b.d.l.	-	-	-
	750-800	0.424	b.d.l.	-	-	-
	800-850	0.193	b.d.l.	-	-	-
	850-900	0.471	b.d.l.	-	-	-
	900-950	0.550	b.d.l.	-	-	-
	950-1000	0.754	0.559	1,350	-64.6	-
	1000-1050	0.583	b.d.l.	-	-	-
	1050-1100	0.558	b.d.l.	-	-	-
	1100-1150	0.475	b.d.l.	-	-	-
	1200-1268	0.508	b.d.l.	-	-	-
	1259-1262	1.034	0.341	3,034	-62.1	-25.1

**Ts02.** Porewater concentrations, POC content and porosity in the three long piston cores at the MD sites.

MD05-2912 (Tai-Nan Ridge)	Depth (cmbsf)	Sulfate (mM)	Depth (cmbsf)	Iodide (mM)	Depth (cmbsf)	Chloride (mM)	Depth (cmbsf)	POC (%)	Depth (cmbsf)	Porosity
	9	29	8	0.002	9	542	7	0.42	7	0.64
	109	29	158	0.003	209	544	57	0.38	57	0.67
	309	27	308	0.008	409	536	107	0.35	107	0.61
	359	25	458	0.015	609	545	157	0.37	157	0.67
	409	24	608	0.023	809	530	207	0.36	207	0.62
	609	15	708	0.027	1009	545	257	0.37	257	0.61
	1159	1.1	758	0.031	1209	541	407	0.33	407	0.61
	1559	1.4	858	0.040	1409	557	457	0.38	457	0.65
	2059	1.5	908	0.041	1709	545	507	0.40	507	0.64
	2559	1.6	1058	0.052	1809	541	607	0.39	607	0.63
	2959	<0.1	1158	0.067	2009	541	707	0.39	657	0.66
			1208	0.063	2209	556	807	0.42	707	0.64
			1358	0.079	2409	537	907	0.41	807	0.65
			1458	0.109	2609	537	1107	0.44	907	0.66
			1558	0.110	2809	524	1207	0.50	1057	0.58
			1658	0.105	3009	526	1307	0.35	1107	0.64
			1758	0.101			1407	0.39	1157	0.68
			1808	0.104			1507	0.46	1207	0.63
			1858	0.116			1607	0.43	1257	0.65
			2008	0.119			1707	0.44	1307	0.58
			2208	0.126			1807	0.43	1357	0.62
			2358	0.129			1907	0.45	1407	0.61
			2408	0.146			2007	0.47	1507	0.58
			2458	0.140			2107	0.46	1557	0.65
			2508	0.178			2207	0.56	1607	0.63
			2558	0.151			2307	0.64	1657	0.70
			2608	0.146			2407	0.47	1707	0.67
			2658	0.156			2507	0.39	1757	0.65
			2958	0.049			2607	0.42	1807	0.66
							2707	0.47	1857	0.66
							2807	0.40	1907	0.67
							2907	0.38	1957	0.66
							3007	0.51	2007	0.66
									2057	0.65
									2107	0.63
									2157	0.66
									2207	0.69
									2257	0.68
									2307	0.65
									2357	0.68
									2407	0.67
									2457	0.66
									2507	0.65
									2557	0.68
									2607	0.68
									2657	0.63
									2707	0.71
									2757	0.65
									2807	0.65
									2857	0.64
									2907	0.63
									2957	0.60
									3007	0.57







**Ts03. Porewater concentrations and porosity in the four short piston cores at the ORI sites.**

	Depth (cmbsf)	CH <sub>4</sub> (mM)	SO <sub>4</sub> <sup>2-</sup> (mM)	I <sup>-</sup> (mM)	Cl <sup>-</sup> (mM)	Porosity
ORI-860-1 (Tai-Nan Ridge)	10-16	0.0043	27	0.004	608	0.56
	43-49	0.0072	26	0.004	600	0.47
	70-76	0.0057	25	0.005	566	0.53
	103-109	0.0064	26	0.005	572	0.51
	130-136	0.0049	26	0.006	575	0.56
	163-169	0.006	26	0.009	577	0.55
	190-196	0.0058	25	0.01	563	0.53
	223-229	0.01	24	0.02	566	0.49
	250-256	0.0067	21	0.03	569	0.47
	283-289	0.0049	17	0.05	558	0.51
	310-316	0.0063	14	0.06	572	0.44
	343-349	0.008	9.5	0.08	563	0.44
	370-376	0.013	7.1	0.09	577	0.45
	ORI-860-2 (Tai-Nan Ridge)	10-16	0.0046			
43-49		0.0035	27	0	575	0.50
70-76		0.0053				0.50
103-109		0.019	27	0.007	558	0.52
130-136		0.0065				0.53
163-169		0.011	26	0.02	575	0.45
190-196		0.0058				0.45
223-229		0.0055	23	0.044	592	0.48
250-256		0.0074				0.52
283-289		0.013	16	0.073	575	0.50
310-316		0.015				0.48
343-349		0.014	11	0.13	580	0.49
370-376		0.017				0.49
ORI-860-18 (Yung-An Ridge)		10-16	b.d.l.			
	43-49	b.d.l.	27	0.005	563	0.62
	70-76	0.0005				0.58
	103-109	b.d.l.	26	0.009	566	0.53
	130-136	b.d.l.				0.60
	163-169	b.d.l.	25	0.016	561	0.64
	190-196	b.d.l.				0.61
	223-229	b.d.l.	23	0.027	575	0.52
	250-256	0.0019				0.51
	283-289	0.0035	17	0.048	563	0.54
	310-316	0.0073				0.46
	343-349	0.013	11	0.073	566	0.53
	370-376	0.068				0.43
	403-409	1.8				0.51
ORI-860-21 (Yung-An Ridge)	10-16	0.0011	24	0.015	569	0.67
	43-49	0.0014	24	0.022	569	0.67
	70-76	0.0007	22	0.028	552	0.66
	103-109	0.0013	22	0.034	566	0.64
	130-136	0.0008	22	0.039	589	0.64
	163-169	0.0003	21	0.044	577	0.64
	190-196	0.0004	19	0.05	572	0.64
	223-229	b.d.l.	17	0.056	561	0.62
	250-256	b.d.l.	16	0.066	569	0.62
	283-289	b.d.l.	13	0.081	569	0.61
	310-316	b.d.l.	10	0.091	563	0.59
	343-349	0.0017	7	0.11	566	0.60
	370-376	b.d.l.	5	0.12	572	0.57
	403-409	0.031	1.7	0.13	572	0.58
430-436	0.48	1.2	0.14	561	0.55	

b.d.l.= below detection limit.

**Ts04. Analytical results of reference sites**

Site	Depth (cmbsf)	POC (%)	Site	Depth (cmbsf)	POC (%)	Site	Depth (cmbsf)	[Cl <sup>-</sup> ] (mM)
ORI-697-G23	20-30	0.30	ORI-718-G22	31-40	0.40	ORI-860-4	10-16	558
(Tai-Nan Ridge)	70-80	0.33	(Yung-An Ridge)	81-90	0.37	(reference)	103-109	575
	120-130	0.25		131-140	0.53		163-169	572
	170-180	0.34		281-290	0.62		223-229	558
	220-230	0.33		331-340	0.53		283-289	561
	270-280	0.49		381-390	0.67		370-376	546
	320-330	0.25						
	370-380	0.44						