

Table 1 Summary of vent fluid data

Location	Host rock	T (°C)	pH	Mg (mmol kg ⁻¹)	Ca (mmol kg ⁻¹)	Na (mmol kg ⁻¹)	Cl (mmol kg ⁻¹)	SO ₄ (mmol kg ⁻¹)	H ₂ S (mmol kg ⁻¹)	CH ₄ (mmol kg ⁻¹)	H ₂ (mmol kg ⁻¹)	Reference
Sea water		7	8.0	54.0	10.4	475	553	28.6	0	4×10^{-7}	4×10^{-4}	
Lost City; 30° N MAR	Peridotite + gabbro	40–75	9–9.8	9–19	21.0–23.3	479–485	546–549	5.9–12.9	0.064	0.13–0.28	0.25–0.43	This work
Rainbow; 36° 14' N	Peridotite + gabbro	360	2.9–3.1				>750		<2.5	2.2	13.0	19
Broken Spur; 29° N MAR	Basalt	356–360		0	11.8–12.8	419–422	469		9.30	0.06	0.43	38
Lucky Strike;	Basalt	308–324	3.8–6.4	0	32.3–36.7	347–426	417–472		2.1–3.0	0.3–0.7	0.04–0.72	20
37° 17' N MAR		185–284	3.8–3.9	0	31.3–38.2	363–428	424–514		2.0–3.0	0.4–0.8	0.003–0.27	
Menez Gwen;	Basalt	275–284	4.2–4.8	0	29.7–33.1	312–319	357–381		1.3–1.8	1.5–2.1	0.02–0.05	20
37° 50' N MAR												
Conical seamount†	Peridotite	3	9.28					30–40	2.1	0.001		11, 12
Endeavour, JdF‡	Basalt	346–370	4.2–4.5	0	13.8–42.9	260–391	350–370	0–2	3.0–8.1	1.8–3.4	0.16–0.42	39–41
21° N EPR	Basalt	273–355	3.3–3.8	0	11.7–20.8	432–510	489–579	0–0.6	6.6–8.4	0.06–0.09	0.23–1.7	40, 41
Oman Ophiolite§	Peridotite	23	11.4–11.6	0.002–0.01	1.5–1.9	11.5–35.9	9.67–26.1	0.05–0.14				42
Experiments												
	Harzburgite	300	6.4–11.6	0.002–0.02	0.29–5.24	549–576	512–541	12.1–17.8	0.6–0.8	0.066	0.10–0.33	16
	Lherzolite	200	5.4–8.0	10.7–49.4	7.5–35.7	467–500	534–560	2.04–24.8	ND	ND	ND	16
	Basalt	350	4.8	0.050	18.3	492	581	0.069	7.3	1.0	0.2	43
Theoretical	Peridotite	350	6.5–6.6	0.07–0.1	27.6–35.6	471–543	550–612	≪1.0	3.2–6.3		20.96–164.9	17

Fluids were sampled in titanium, non gas-tight samplers with *Alvin*. Ten millilitres of fluid was drawn into 20-ml syringes and 10-ml headspace air was added. The samples were immediately frozen at -70°C to halt biological oxidation of gas species. Methane and H₂ values for Lost City are a minimum as gases were probably lost during sampling and/or diffusively during storage. H₂S concentrations are also minimum values because samples were not run onboard, but after ~2 weeks in cold storage. It is therefore likely that oxidation occurred. MAR, Mid-Atlantic Ridge; JdF, Juan de Fuca ridge; EPR, East Pacific Rise; ND, not detectable.

† Conical seamount is located in the Mariana forearc and contains sedimentary serpentine. It was drilled during Leg 125 of the Ocean Drilling Program. Trace element and stable isotopic compositions of carbonate chimney samples and serpentinized matrix material has been interpreted to reflect fluids with either a forearc mantle or subducted slab component, or both¹².

‡ Carbon isotopic values of $\delta^{13}\text{C}$ in CH₄ of -55% in the Endeavour fluids are interpreted to indicate a microbial source for the methane⁴⁰.

§ Meteoric fed springs emanate from serpentinized harzburgite. The spring waters are oversaturated with respect to both serpentine and brucite. Mixing of bicarbonate-rich fluids and surface water results in precipitation of calcite or aragonite.

|| This experimental work involved reaction of harzburgitic material and an Mg-free solution at 300°C , 500 bar, and a water-rock ratio of 10. The harzburgitic runs lasted 0–17,147 hours; additional experiments included reacting lherzolite with sea water at 200°C , 500 bar and at water-rock ratio of 10 for 0–4,869 h.