

Supplementary material

Table S1. Biogeochemistry data available in the literature for the study sites

Location	SMTZ (cm)	GH	$\delta^{13}\text{C}_M$ (‰)	$\delta^{13}\text{C}_G$ (‰)	[CH ₄] (mM)	Diffusive fluxes (mmol.m ⁻² .yr ⁻¹)		
						CH ₄	SO ₄ ²⁻	sulfide
Mercator MV	+80 ^a	-	-33.8 to -38.8 ^b					
Gemini MV	+90 ^a				0-62 ^d			
Meknès MV		-	-48.9 to -52.8 ^b					
Ginsburg MV			-35 to -56 ^f		0-130 ^d	2223 ^e		
Jesus Baraza MV			-24 to -32 ^f					
Capt. Arutyunov MV	25-40 ^c	+	-46 to -52 ^b	-52.0 to -50.5 ^b	0-85 ^d	40700 ^c	70800 ^c	70200 ^c
			-48.3 to -48.4 ^d			6268.7 ^e		
Carlos Ribeiro MV	20-55 ^e	+	-23 to -66 ^f		75-120 ^e	445-3614 ^e		
			-51.9 to -69 ^b					
Bonjardim MV	45-70 ^c	+	-50 to -64 ^f	-52.7 ^b	0-62 ^e	7600 ^c	38800;86700 ^c	29900;79500 ^c
			-49.4 to -52.7 ^b			459.42 ^e		
			-49.6 ^d					
Porto MV		+	-51.7 to -55.6 ^b	-54.9 ^b				

a) Van Rensbergen et al., 2005; b) Nuzzo et al., 2009; c) Niemman et al., 2006; d) Hensen et al. 2007; e) Vanneste et al., 2011 f) Stadnitskaia et al., 2006

Table S2. Isotope signature of several chemosynthetic species found at cold seeps (CS) and reduced sediments (RS). EP: Eastern Pacific; IP: Indo-Pacific Ocean; NEA: North East Atlantic; NP: North Pacific; NWP: North Western Pacific; SEP: South Eastern Pacific; WA: Western Atlantic; WP: Western Pacific. References: 1- this study; 2 - Sahling et al., 2003; 3 - Levin and Michener, 2002; 4 - Vetter and Fry, 1998; 5 - Conway et al., 1989; 6 - Thurber et al., 201; 7 - Dando et al., 1986; 8 - Duperron et al., 2007; 9 - Compton et al., 2004; 10 - Olu Le Roy et al., 2004; 11 - Carlier et al., 2010 ; 12 Decker and Olu, 2010 ; 13 - Sellanes et al., 2008; 14 - Spiro et al., 1986; 15 - Cary et al., 1989 ; 16 - Cavanaugh et al., 1992; 17 - Olu et al., 2009; 18 - MacAvoy et al., 2008; 19 - Schmaljohann et al., 1990; 20 - Gebruk et al., 2003.

	$\delta^{13}\text{C}$	$\delta^{15}\text{N}$	$\delta^{34}\text{S}$	Location	Site	Depth (m)	Ref.
BIVALVIA							
Solemyidae							
<i>Acharax gadirae</i>	-34.7 to -27.2	-3.4 to 2.7	-25.7 to 11.9	NEA	Gulf of Cadiz	556-3902	CS 1
<i>Acharax</i> sp.	-36.1 to -34.7	0.1 to 1.0		WP	Sea of Okhotsk	382	CS 2
<i>Acharax</i> sp.	-33.5	0.6 to 6.6		NP	Gulf of Alaska	4413-4447	CS 3
<i>Solemya elarraichenis</i>	-34.0 to -32.1	2.0 to 6.1	-16.5 to 2.2	NEA	Gulf of Cadiz	358-1115	CS 1
<i>Solemya reidi</i>			-30.4	EP	Sewage outfall	90	RS 4
<i>Solemya velum</i>	-33.9 to -31.5	-9.8 to -7.7	-31 to -28.2	WA	Salt Marsh	?	RS 5
Solemyidae und	-32.3 to -30.7	-0.7 to 4.4		WP	NZ methane seeps	1040-1056	CS 6
Lucinidae							
<i>Lucinoma asapeus</i>	-29.8	4.4	4.3	NEA	Gulf of Cadiz	358	CS 1
<i>Lucinoma borealis</i>	-29.0 to -24.1			NEA		0.5	RS 7
<i>Lucinoma kazani</i>	-30.5 to -28.2			NEA	Eastern Mediterranean	507-1691	CS 8
<i>Divaricella irpex</i>	-23.1	-0.9		IP	Roebuck Bay	3.5 – 8.5	RS 9
<i>Myrtea amorpha</i>	-30.1 to -27.7	-1.0 to 1.4		NEA	Eastern Mediterranean	1950- 2025	CS 10; 11
<i>Pseudomiltha</i> sp.			-10.6	WA	Lousiana slope	400-700 m	CS 4
Thyasiridae							
<i>Thyasira vulcolutre</i>	-35.9 to -34.4	2.1 to 5.6	-27.6 to 1.3	NEA	Gulf of Cadiz		CS 1
<i>Conchocele bisecta</i>	-33.1	4.2		NWP	Sea of Okhotsk	700	CS 2
<i>Thyasira</i> und					Haakon Mosby MV		CS 12
<i>Thyasira methanophila</i>	-35.4	10.2		SEP	CMSA	710-926	CS 13
<i>Thyasira sarsi</i>	-39.5 to -28.2			NEA	Norwegian fjord	60	14

<i>Thyasira striata</i>	-28.9	-5.2	-6.0	NEA	Eastern Mediterranean	2025	CS	11
Mytilidae								
<i>"Bathymodiolus " mauritanicus</i>	-52.4 to -48.9	-1.0 to 0.9	16.8 to 18.3	NEA	Gulf of Cadiz		CS	1
<i>Bathymodiolus</i> sp.			10.5	WA	Lousiana slope		CS	3
<i>Bathymodiolus</i> sp.			8.2		Brine seeps		CS	15
<i>Bathymodiolus</i> sp.	-35.6 to -32.7	-10.5 to -4.2		NA	Mid Atlantic Ridge		HV	16
<i>Bathymodiolus boomerang</i>	-67.0 to -62.4	-3.1 to 0.3		NEA	Gulf of Guinea		CS	17
<i>Bathymodiolus childressi</i>	-63.5 to -43.7	-16.1 to 3.7		WA	Gulf of Mexico (4 sites)		CS	18
SIBOGLINIDAE								
<i>Siboglinum</i> Ib	-35.9 to -33-1	0.2 to 12.2	-8.4 to 6.5	NEA	Gulf of Cadiz		CS	1
<i>Siboglinum</i> Ia	-38.2	3.0	1.1	NEA	Gulf of Cadiz		CS	1
<i>Siboglinum</i> Id	-49.8	4.2	6.0	NEA	Gulf of Cadiz		CS	1
<i>Siboglinum</i> If	-38.7	-1.3	-16.8	NEA	Gulf of Cadiz		CS	1
<i>Siboglinum</i> cf. <i>poseidoni</i>	-44.5 to -41.0	2.7 to 3.6	-8.2 to 3.6	NEA	Gulf of Cadiz		CS	1
<i>Siboglinum poseidoni</i>	-78.3 to -73.6			NEA			RS	19
Siboglinidae	-38.2 to 61.0	-2.7 to 2.5		NP	Gulf of Alaska	4413-4447	CS	3
<i>Lamelisabella denticulata</i>	-43.7 to -35.2	-0.6 to 6.6	-11.8 to -7-7	NEA	Gulf of Cadiz		CS	1
<i>Polybrachia</i> sp.1	-36.9	-1.1	2.5	NEA	Gulf of Cadiz		CS	1
<i>Siboglinum atlanticum</i>	-45.8							13
<i>Siboglinum plumosum</i>	-43.4 to -39.0	4.2 to 7.0		NWP	Sea of Okhotsk	382-392	CS	2
<i>Lamellibrachia</i> sp.	-22.9							13
<i>Lamellibrachia</i> sp.	-35.9 to -28.8	2.2 to 4.9		IP	NZ methane seeps	800-1050	CS	6
<i>Oligobrachia haakonmosbiensis</i>	-56.1 to -51.1			NEA	Haakon Mosby MV		CS	20
Sclerolinidae	-38.0 to -30.5	0.8 to 1.2		NWP	Sea of Okhotsk	1522	CS	2
<i>Sclerolinum contortum</i>	-48.3 to -34.9			NEA	Haakon Mosby MV		CS	20
<i>Escarpia southwardae</i>	-36.2 to -24.2	2.5 to 2.9		NEA	Gulf of Guinea		CS	17
Frenulata und	-66.6 to -36.1	-4.4 to 7.3			NZ methane seeps	800-1050	CS	6

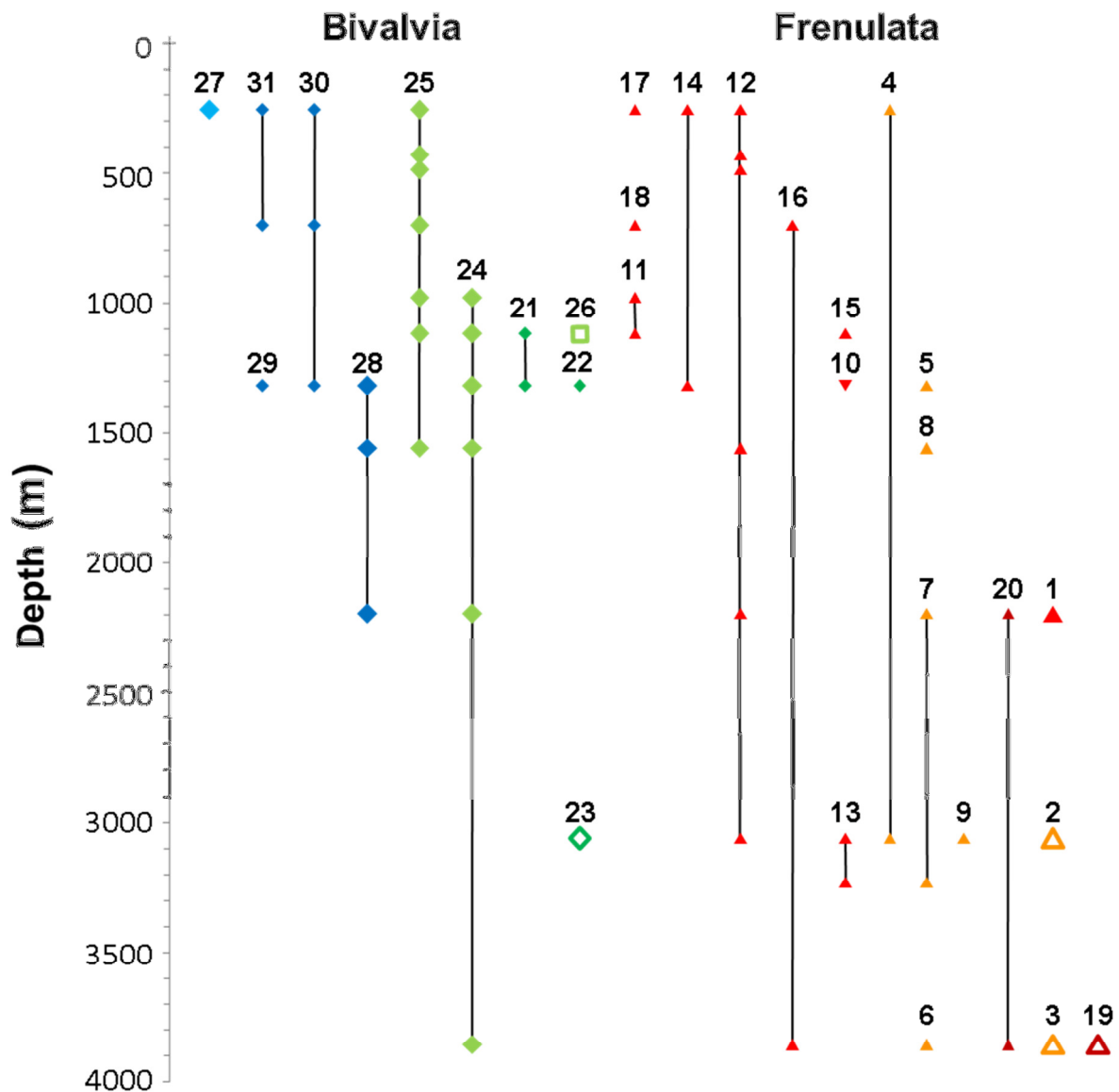


Figure S1. Bathymetric ranges of all chemosymbiotic species known from the Gulf of Cadiz.

Siboglinidae: 1. *Bobmarleya gadensis*; 2. *Lamelisabella* sp.; 3. *Lamelisabella denticulata*; 4. *Polybrachia* sp.1; 5. *Polybrachia* sp.2; 6. *Polybrachia* sp.3; 7. *Polybrachia* Va; 8. *Polybrachia* Vb; 9. *Polybrachia* Vc; 10. *Siboglinum* cf. *poseidoni*; 11. *Siboglinum* Ia; 12. *Siboglinum* Ib; 13. *Siboglinum* Ic; 14. *Siboglinum* Id; 15. *Siboglinum* Ie; 16. *Siboglinum* If; 17. *Siboglinum* sp.1; 18. *Siboglinum* sp.2; 19. *Spirobrachia tripeira*; 20. Undetermined IIa.

Bivalvia: 21. *Isorropodon megadesmus*; 22. *Isorropodon perplexum*; 23. *Christineconcha regab*; 24. *Acharax gadirae*; 25. *Solemya (Petrasma) elarraichensis*; 26. “*Bathymodiolus mauritanicus*”; 27. *Lucinoma asapheus*; 28. *Thyasira vulcolutre*; 29. *Spinaxinus sentosus*; 30. *Axinulus croulinensis* (mixotrophic species); 31. *Thyasira granulosa* (mixotrophic species).

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