Supporting Information. Alfaro-Lucas, J.M., F. Pradillon, D. Zeppilli, L.N. Michel, P. Martínez-Arbizu, H. Tanaka, M. Foviaux, and J. Sarrazin. 2020. High environmental stress and productivity increase functional diversity along a deep-sea hydrothermal vent gradient. Ecology.

Appendix S2

Table S1. Functional indices used to measure functional diversity. Formulas for index computation, index relationships, properties, and interpretations can be found in the given references.

Measure	Goal	Properties	Interpretation	References
Functional richness (FRic)	FRic measures the volume of functional space.	FRic is very sensitive to the number of species and outliers. It does not consider species abundance.	High FRic values equal to high functional richness	Villéger et al. (2008); Mouchet et al. (2010)
Functional entities (FEs)	FEs measures the number of unique trait combinations.	FEs is very sensitive to the number of species. It does not consider species abundances.	High FEs may indicate high functional richness	Teixidó et al. (2018) and references therein
Functional evenness (FEve)	FEve measures the regularity of the distribution of species and abundances in the functional space.	FEve determines the distribution of species in the functional space independently of its volume. It considers species abundance. It is only weakly affected by species richness. Bounded between 0 and 1.	FEve is high when species and species abundance are regularly distributed in the functional space. Low values of FEve correspond to uneven of species and their abundance in the functional space.	Villéger et al., (2008); Mouchet et al. (2010)

Table S2. Species trait definitions.

Trait	Categories	Definition	Rationale	References
Adult motility	1 (Facultative)	Regularly non-mobile and only moving when necessary	This trait affects the ability of a species to access suitable habitat and nutritional sources. Species with high mobility may be less vulnerable to the environmental stress and predation.	Bates *et al.* (2010); Chapman *et al*. (2019)
	2 (Slow)	Regularly vagile slow swimmer, walker, or crawler		
	3 (Fast)	Regularly vagile fast swimmer and/or walker		
Maximum adult body size	0	0.02 - <0,3 mm	Size is fundamentally related to energy flow and nutrient cycling. It affects the physiological tolerance of organisms (thermal mass, barriers to diffusion, and limits anatomical, physiological or behavioral options). It is also closely related to dispersal and reproduction.	McGill *et al.* (2006); Gollner *et al.* (2015); McClain *et al.* (2018a); Chapman *et al*. (2019)
	1	≥0.3 - <1 mm		
	2	≥1 - <5 mm		
	3	≥5 - <10 mm		
	4	≥10 - <15 mm		
	5	≥15 - <20 mm		
	6	≥20 mm		
Feeding mechanism	Deposit	Mainly obtains food particles from the surface or buried food particles from the subsurface	Feeding mechanisms are indicators of ecosystem productivity or energy availability. A diverse community will likely harbor species with diverse feeding mechanisms and trophic levels.	Post (2002); McClain *et al.* (2018b); Chapman *et al*. (2019)
	Grazing	Scrapes or nibbles food from substrate		
	Predator	Mainly captures prey capable of resistance		

Table S3. Functional traits of species.

Species	Mobility	Size	Feeding	References
Amphisamytha lutzi	1	5	deposit feeder	Desbruyères et al. (2006) and references therein
Acrocirridae sp.	2	3	deposit feeder	Jumars et al. (2015); authors pers. obs.
Flabelligeridae sp.	2	2	deposit feeder	Desbruyères et al. (2006) and references therein
Glycera tesselata	2	4	predator	Desbruyères et al. (2006) and references therein
Branchipolynoe seepensis	3	6	deposit feeder	Desbruyères et al. (2006) and references therein
Branchinotogluma sp. 1	3	3	predator	Jumars et al. (2015); authors pers. obs.
Bathykermadeca sp.	3	4	predator	Jumars et al. (2015); authors pers. obs.
Lepidonotopodium sp.	3	4	predator	Jumars et al. (2015); authors pers. obs.
Macellicephala sp.	3	2	predator	Jumars et al. (2015); authors pers. obs.
Polynoidae sp. 1	3	4	predator	Jumars et al. (2015); authors pers. obs.
Phyllodocidae sp.	2	3	predator	Jumars et al. (2015); authors pers. obs.
Tomopteris sp. 1	3	2	predator	Jumars et al. (2015)
Tomopteris sp. 2	3	2	predator	Jumars et al. (2015)
Opheliidae sp.	1	3	deposit feeder	Jumars et al. (2015)
Nereididae sp.	3	3	predator	Jumars et al. (2015); Dr Shimabukuro pers. obs.
Prionospio unilamellata	1	5	deposit feeder	Desbruyères et al. (2006) and references therein
Laonice athecata	1	6	deposit feeder	Desbruyères et al. (2006) and references therein
Ophryotrocha cf. *platykephale*	2	2	grazer	Desbruyères et al. (2006) and references therein
Ophryotrocha fabriae	2	2	grazer	Desbruyères et al. (2006) and references therein
Capitella sp. 1	3	3	deposit feeder	Alfaro-Lucas et al. (2018); Dr Shimabukuro pers. obs.
Heptnerina confusa	3	1	grazer	Heptner & Ivanenko (2002)
cf. *Ambilimbus* sp.	2	0	grazer	Heptner & Ivanenko (2002)
cf. Kelliridae sp.	3	0	grazer	Heptner & Ivanenko (2002)
Cyclopina sp.	3	1	grazer	Heptner & Ivanenko (2002)

Cyclopoida sp.	3	1	grazer	Heptner & Ivanenko (2002)
Calanoida sp.	3	1	grazer	Heptner & Ivanenko (2002)
Smacigastes micheli	2	1	grazer	Heptner & Ivanenko (2002)
Tegastidae sp.	2	0	grazer	Heptner & Ivanenko (2002)
Bathylaophonte azorica	2	1	grazer	Heptner & Ivanenko (2002)
Tisbe sp. 1	3	0	grazer	Heptner & Ivanenko (2002)
Tisbe sp. 2	3	1	grazer	Heptner & Ivanenko (2002)
Donsiellinae sp.	2	1	grazer	Heptner & Ivanenko (2002)
Miraciidae sp.	2	1	grazer	Heptner & Ivanenko (2002)
Haifameira sp.	3	1	grazer	Heptner & Ivanenko (2002)
Ameiridae sp. 1	2	1	grazer	Heptner & Ivanenko (2002)
Ameiridae sp. 2	2	1	grazer	Heptner & Ivanenko (2002)
Ameiridae sp. 3	2	0	grazer	Heptner & Ivanenko (2002)
Ameiridae sp. 4	2	0	grazer	Heptner & Ivanenko (2002)
Ectinosomatidae sp. 1	2	0	grazer	Heptner & Ivanenko (2002)
Ectinosomatidae sp. 2	2	1	grazer	Heptner & Ivanenko (2002)
Archesola typhlops	2	0	grazer	Heptner & Ivanenko (2002)
Lobopleura sp.	2	1	grazer	Heptner & Ivanenko (2002)
Mesochra sp.	2	0	grazer	Heptner & Ivanenko (2002)
Aphotopontius sp.	3	1	grazer	Heptner & Ivanenko (2002); Limén et al. (2008); Gollner et al. (2015); Senokuchi et al. (2018)
Rimipontius sp.	3	1	grazer	Heptner & Ivanenko (2002); Limén et al. (2008); Gollner et al. (2015); Senokuchi et al. (2018)
Luckia striki	2	3	deposit feeder	Desbruyères et al. (2006) and references therein
Liljeborgiidae sp.	2	3	deposit feeder	Desbruyères et al. (2006); authors pers. Obs
Stegocephalidae sp.	2	3	deposit feeder	Desbruyères et al. (2006); authors pers. obs
cf. *Storthyngura* sp.	2	3	deposit feeder	Desbruyères et al. (2006) and references therein
Heteromesus sp.	2	3	deposit feeder	Desbruyères et al. (2006)
Asellota sp. 2	2	3	deposit feeder	Desbruyères et al. (2006)
Asellota sp. 4	2	3	deposit feeder	Desbruyères et al. (2006)
Obesutanais sigridae	1	2	deposit feeder	Desbruyères et al. (2006) and references therein
cf. *Typhlotanais incognitus*	2	2	deposit feeder	Desbruyères et al. (2006) and references therein
Thomontocypris excussa	3	1	grazer	Desbruyères et al. (2006) and references therein; Chapman et al. (2019); Dr Tanaka pers. obs.

Xylocythere sp.	3	1	grazer	Desbruyères et al. (2006) and references therein; Chapman et al. (2019); Dr Tanaka pers. obs.
Halacaridae sp.	2	1	predator	Desbruyères et al. (2006) and references therein
Chaetognatha sp.	1	3	predator	Desbruyères et al. (2006)
Cnidaria sp.	1	2	predator	Desbruyères et al. (2006) and references therein
Ophiuroidea sp.	2	3	deposit feeder	Desbruyères et al. (2006)
Lepetodrilus atlanticus	2	2	grazer	Desbruyères et al. (2006) and references therein
Pseudorimula midatlantica	2	3	grazer	Desbruyères et al. (2006) and references therein
Protolira valvatoides	2	2	grazer	Desbruyères et al. (2006) and references therein
Lurifax vitreus	2	2	grazer	Desbruyères et al. (2006) and references therein
Xylodiscula analoga	2	2	grazer	Desbruyères et al. (2006) and references therein
Lirapex costellatus	2	2	grazer	Desbruyères et al. (2006) and references therein
Divia briandi	2	3	grazer	Desbruyères et al. (2006) and references therein
Laeviphitus desbruyeresi	2	2	grazer	Desbruyères et al. (2006) and references therein
Halomonhystera sp.	2	0	deposit feeder	Wieser (1953); Zeppilli et al. (2015)
Theristus sp.	2	0	deposit feeder	Wieser (1953); Zeppilli et al. (2019)
Paracanthonchus sp.	2	0	predator	Wieser (1953); Zeppilli et al. (2015)
Chromadorita sp.	2	0	deposit feeder	Wieser (1953); Zeppilli et al. (2015)
Microlaimus sp.	2	0	grazer	Wieser (1953); Zeppilli et al. (2015)
Cephalochaetosoma sp.	2	0	deposit feeder	Wieser (1953); Zeppilli et al. (2015)
Epsilonema sp.	2	0	deposit feeder	Wieser (1953); Zeppilli et al. (2015)
Desmodora sp.	2	1	grazer	Wieser (1953); Zeppilli et al. (2015)
Oncholaimus dyvae	2	3	predator	Wieser (1953); Zeppilli et al. (2019)
Nemertea sp.	2	2	predator	Desbruyères et al. (2006)

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