**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 S3

### Isotope analyses:

For relatively large taxa, muscle tissue was used. Guts and calcareous structures were removed manually whenever possible. Inorganic carbon present in samples can be a source of bias in carbon stable isotope analysis. "Champagne tests" were used to highlight the presence of carbonates in tissues (Jaschinski et al. 2008) and, when positive, samples were acidified by exposing them to HCl vapors for 48 h in an airtight container (Hedges & Stern 1984). After acidification, a second "champagne test" series was run. When the second test was still positive, we proceeded with direct acidification (0.2 ml of 10% HCl added directly to the sample in a silver cup) (Jaschinski et al 2008). Isotope analyses were done at the University of Liege (Belgium) using a vario MICRO cube (Elementar, Germany) elemental combustion system coupled to an IsoPrime100 (Elementar, United Kingdom) isotope ratio mass spectrometer. Isotope ratios were expressed using the widespread δ notation (Coplen 2010), in ‰ and relative to the international references Vienna Pee Dee Belemnite (for carbon), Atmospheric Air (for nitrogen) and Vienna Canyon Diablo Troilite (for sulfur). IAEA (International Atomic Energy Agency, Vienna, Austria) certified reference materials sucrose (IAEA-C-6; $\delta^{13}C$ = -10.8 ± 0.5‰; mean ± SD), ammonium sulphate (IAEA-N-1; $\delta^{15}N$ = 0.4 ± 0.2‰; mean ± SD), and silver sulfide (IAEA-S-1 $\delta^{34}S$ = -0.3‰) were used as primary analytical standards. Sulfanilic acid (Sigma-Aldrich; $\delta^{13}C$ = -25.6 ± 0.4‰; $\delta^{15}N$ = -0.13 ± 0.4‰; $\delta^{34}S$ = 5.9 ± 0.5‰; means ± SD) was used as a secondary analytical standard. Standard deviations on multi-batch replicate measurements of secondary and internal lab standards (seabass muscle) were interspersed with samples (one replicate of each standard every 15 analyses) were 0.2‰ for both $\delta^{13}C$, 0.3‰ for $\delta^{15}N$ and 0.5‰ for $\delta^{34}S$.

**Table S1.** Stable isotope mean±standard deviations values for $\delta^{13}C$, $\delta^{15}N$ and $\delta^{34}S$ for active, intermediate, periphery and far sites. N= number of samples. Code= number representing species at Appendix S3: Fig. S1.

| Species | N | Site | Code | $\delta^{13}C$ | $\delta^{15}N$ | $\delta^{34}S$ |
|---|---|---|---|---|---|---|
| *Amphisamytha lutzi* | 12 | Active | 10 | -24.37±2.68 | 4.87±0.45 | 3.54±0.76 |
| *Bathymodiolus azoricus* | 3 | Active | - | -32.09±0.28 | -7.69±1.43 | 5.99±2.43 |
| *Branchipolynoe seepensis* | 1 | Active | 4 | -29.34 | -7.05 | 2.65 |
| *Glycera tesselata* | 1 | Active | 6 | -28.41 | 7.18 | 5.25 |
| *Lepetodrilus atlanticus* | 1 | Active | 5 | -28.92 | 1.76 | |
| *Protolira valvatoides* | 2 | Active | 7 | -27.24±0.21 | 1.96±0.16 | 6.35±1.21 |
| *Pseudorimula midatlantica* | 2 | Active | 2 | -31.92±0.67 | 0.81±1.31 | 4.21 |
| *Smacigastes micheli* | 1 | Active | 1 | -34.57 | 3.24 | |
| *Oncholaimus dyvae* | 1 | Active | 11 | -22.73 | 5.02 | 3.58 |
| *Lirapex costellatus* | 1 | Active | 9 | -24.78 | 4.11 | 6.76 |
| Nemertea sp. | 1 | Active | 12 | -18.97 | 4.83 | |
| *Prionospio unilamellata* | 1 | Active | 8 | -27.24 | 3.20 | |
| *Ophryotrocha fabriae* | 1 | Active | 3 | -31.47 | 3.38 | |
| *Amphisamytha lutzi* | 12 | Intermediate | 10 | -24.79±0.77 | 0.75±1.46 | 6.71±1.14 |
| *Bathymodiolus azoricus* | 23 | Intermediate | - | -32.01±1.30 | -8.04±5.70 | 5.09±1.74 |
| *Branchipolynoe seepensis* | 18 | Intermediate | 4 | -30.56±1.52 | -6.65±1.50 | 3.40±1.45 |
| *Glycera tesselata* | 5 | Intermediate | 6 | -24.18±0.63 | 4.95±0.32 | 4.74±0.13 |
| *Lepetodrilus atlanticus* | 1 | Intermediate | 5 | -26.94 | 1.86 | 3.55 |
| *Protolira valvatoides* | 7 | Intermediate | 7 | -26.25±0.38 | 1.60±0.24 | 5.31±0.91 |
| *Pseudorimula midatlantica* | 3 | Intermediate | 2 | -29.46±1.35 | 1.08±0.57 | 2.82±0.49 |
| Nemertea sp. | 2 | Intermediate | 12 | -21.39±1.06 | 3.72±1.06 | 4.05 |
| *Aphotopontius* sp. | 1 | Intermediate | 13 | -23.10 | 1.23 | |
| *Ophryotrocha fabriae* | 1 | Intermediate | 3 | -28.24 | 0.90 | |
| *Oncholaimus dyvae* | 1 | Intermediate | 11 | -23.30 | 3.08 | 3.82 |
| Liljeborgiidae sp. | 1 | Periphery | 18 | -21.35 | 8.33 | |
| *Lepidonotopodium* sp. | 1 | Far | 17 | -17.39 | 9.89 | 14.03 |
| *Luckia striki* | 1 | Far | 15 | -20.89 | 6.26 | 11.91 |
| *cf. Storthyngura* sp. | 1 | Far | 14 | -22.77 | 6.94 | 11.25 |
| *Heteromesus* sp. | 1 | Far | 16 | -19.32 | 5.70 | |

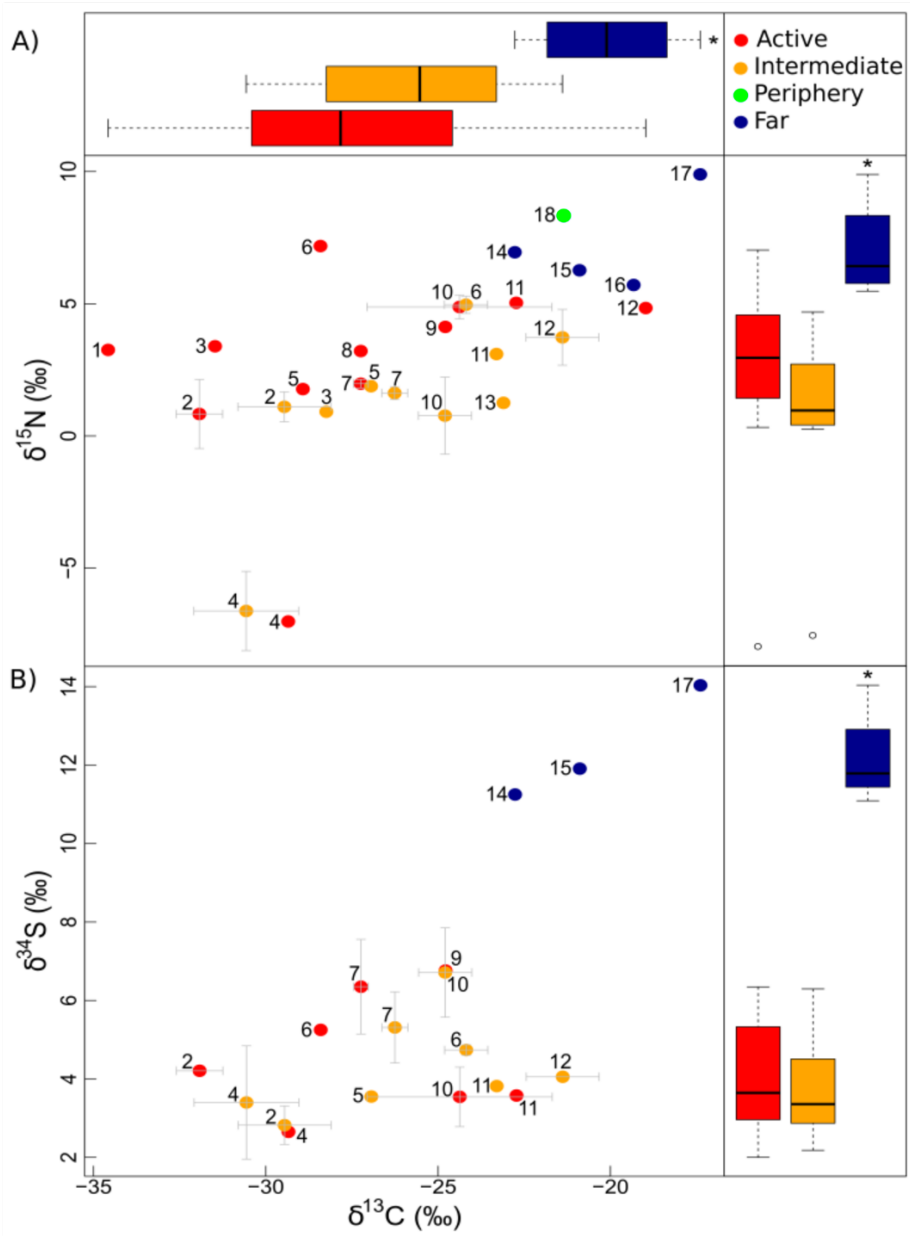


**Figure S1.** Stable isotope biplots of taxa at the sites included in this study. A. Biplot of $\delta^{13}C$ and $\delta^{14}N$ values with boxplots showing the distribution of the $\delta^{13}C$ (upper boxplots) and $\delta^{14}N$ (right boxplots) values at each site. B. Biplots of the $\delta^{13}C$ and $\delta^{34}S$ values with boxplots of the distribution of the $\delta^{34}S$ (right boxplots) values at each site. Asterisks indicate sites with statistically different means ($p>0.05$). 1. *Smacigastes micheli*. 2. *Pseudorimula midatlantica*. 3. *Ophryotrocha fabriae*. 4. *Branchipolynoe seepensis*. 5. *Lepetodrilus atlanticus*. 6. *Glycera tesselata*. 7. *Protolira valvatoides*. 8. *Prionospio unilamellata*. 9. *Lirapex costellatus*. 10. *Amphisamytha lutzi*. 11. *Oncholaimus dyvae*. 12. Nemertea sp. 13. *Aphotopontius* sp. 14. cf. *Storthyngura* sp. 15. *Luckia striki*. 16. *Heteromesus* sp. 17. *Lepidonotopodium* sp. 18. Liljeborgiidae sp.

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