

Supplementary Information for

ASTRONOMICAL AND ATMOSPHERIC IMPACTS ON DEEP-SEA HYDROTHERMAL VENT INVERTEBRATES

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Supplementary Figure S1

Fig. S1. Normalized spectra of measured environmental variables with identified periodicity bands. Degrees of freedom used to generate the spectra ranged from 24 to 98 based on the length and resolution of the time series. The spectrum of currents was obtained from the mean of 4 mab and 30 mab data.

Supplementary Figure S2

Fig. S2. High-resolution bathymetric map of the Grotto active hydrothermal edifice and location of the TEMPO-mini site (black triangle). The 10 m high sulphide structure is located in the Main Endeavour Field vent field (47°56.958'N, 129°5.899'W) on the Juan de Fuca Ridge, northeast Pacific.

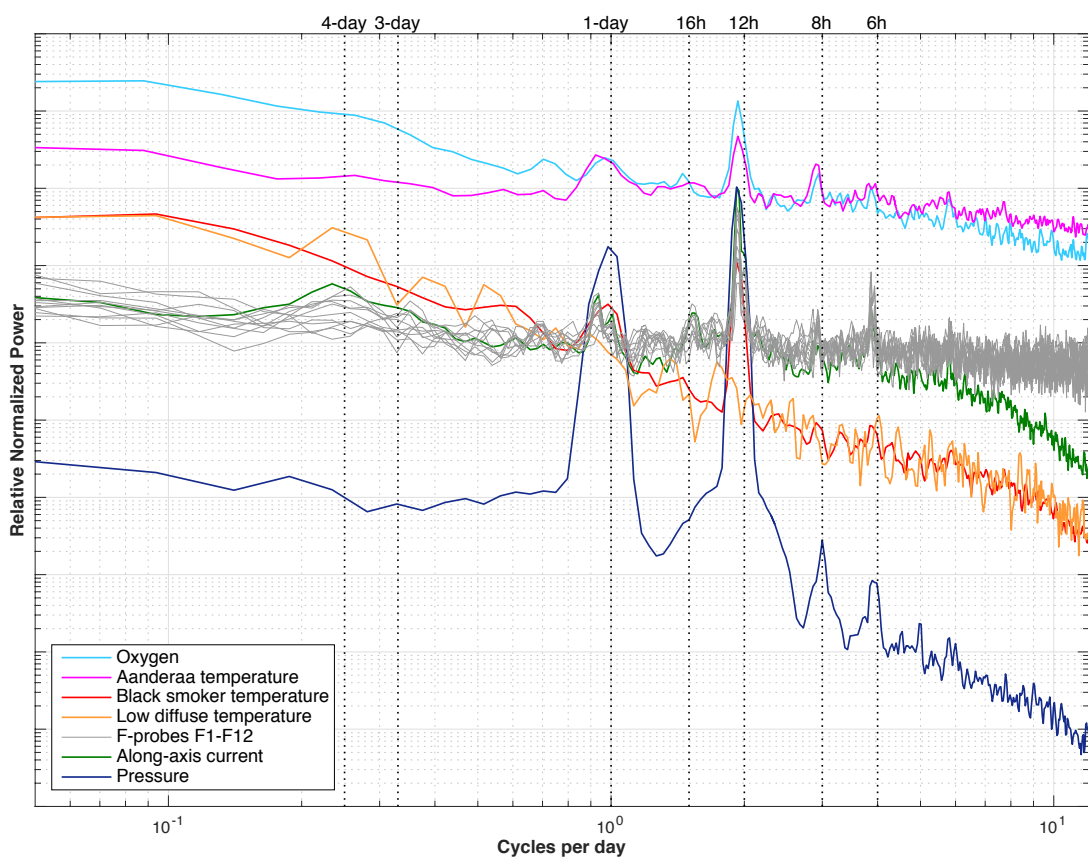
Supplementary Table S1

Table S1. List of instruments used in this study, summarizing the characteristics, the habitat conditions as well as the periods for each variable of interest, and the principal investigators responsible for the instruments.

Supplementary Video S1

Video S1. Footage of a medium view recorded by the TEMPO-mini ecological observatory module at 2186 m depth on the Grotto vent edifice (Main Endeavour Field). The camera was focused on a *Ridgeia piscesae* assemblage and associated fauna located near a hydrothermal

diffuse area. Emanating hydrothermal fluid that surrounds the community is visible as shimmering water.

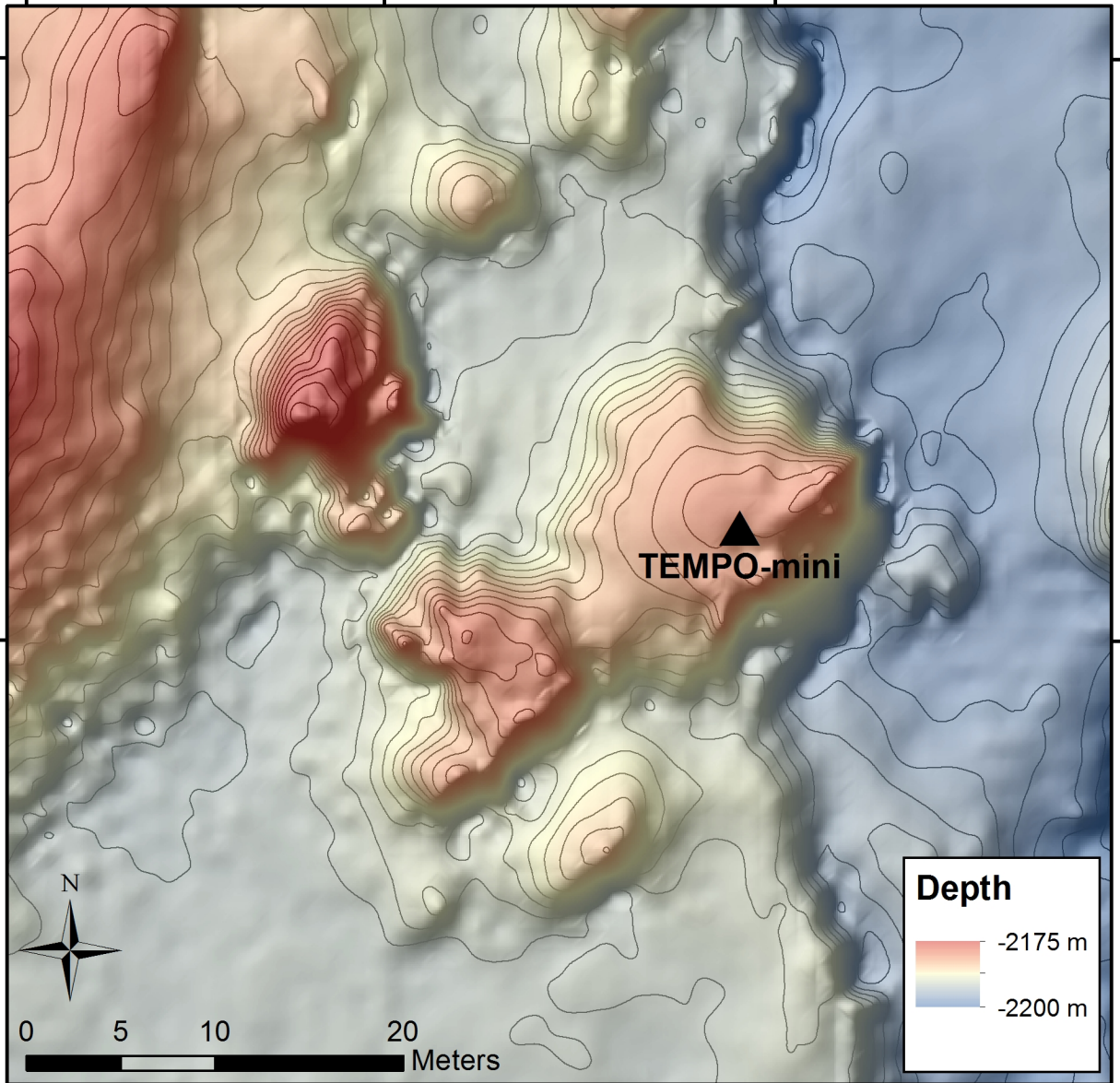


129°5'56"O

129°5'55"O

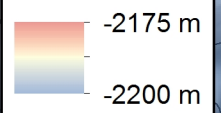
129°5'54"O

47°56'58"N



47°56'57"N

Depth



0 5 10 20 Meters

Table S1. List of instruments used in this study, summarizing the characteristics, the habitat conditions as well as the periods for each variable of interest, and the principal investigators responsible for the instruments.

| Instruments (units) | Sample interval | Acquisition frequency | min-max (mean \pm sd) | Main periods | Principal Investigators |
|---|--|-----------------------|--------------------------------------|------------------------------|-------------------------|
| BPR (bar) <i>Bottom Pressure Recorder</i> | Pressure | 1 second | 220.03-222.69 (221.32 \pm 3.78) | 3-4 day 12.4 h and 24.8 h | R.Thomson |
| ADCP (cm/s) <i>Acoustic Doppler Current Profiler</i> | Bottom currents | 1 second | 0.00-20.73 (4.99 \pm 2.83) | 3-4 day 12.4 h and 24.8 h | S. Mihály |
| BARS (°C) <i>Benthic and Resistivity Sensors</i> | Temperature black smoker | 20 seconds | 330.43-334.7 (332.58 \pm 0.64) | 12.4 h 24.8 h | M. Lilley |
| RAS (°C) <i>Remote Access Water Sampler</i> | Temperature diffuse flow | 1 second | 31.47-74.66 (45.71 \pm 5.76) | 12.4 h 24.8 h | D. Butterfield |
| F-probes (°C) F1-F12 | Temperature Siboglinidae assemblage | 1 hour | 1.6-13.6 (3.9 \pm 0.6) | 12.4 h 24.8 h | R. Lee |
| Andearaa Optode Temperature (°C) | Temperature Siboglinidae assemblage | 30 seconds | 1.93-4.96 (2.7 \pm 0.32) | 12.4 h 24.8 h | P-M. Sarradin |
| Andearaa Optode Oxygen (% saturation) | Oxygen Siboglinidae assemblage | 15 minutes | 1.53-22.07 (11.56 \pm 3.35) | 12.4 h 24.8 h | P-M. Sarradin |