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Supplement of

Sediment heterogeneity shapes spatial variability of resuspension-induced CO_2 production

Ines Bartl and Simon Thrush

Correspondence to: Ines Bartl (ines.bartl@auckland.ac.nz)

Supplementary material

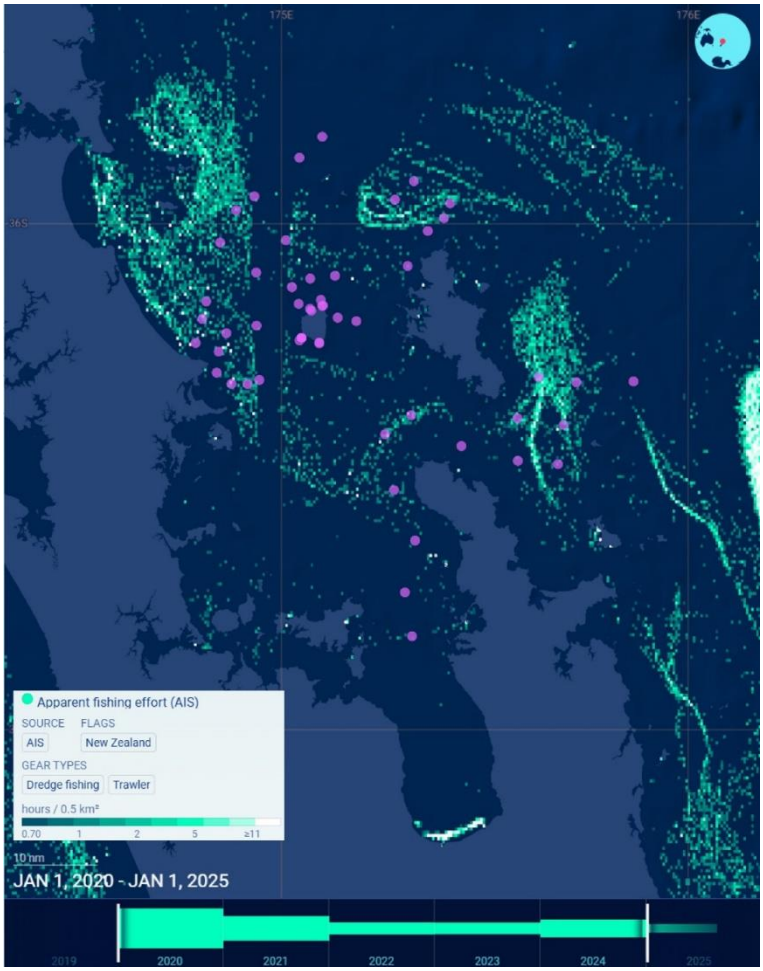

Figure S1: Apparent fishing hours extracted from Global Fishing Watch (Global Fishing Watch, 2025) for 2020-2024 for the gear type trawler and dredge fishing. Pink dots are the sites sampled in February and March 2024.

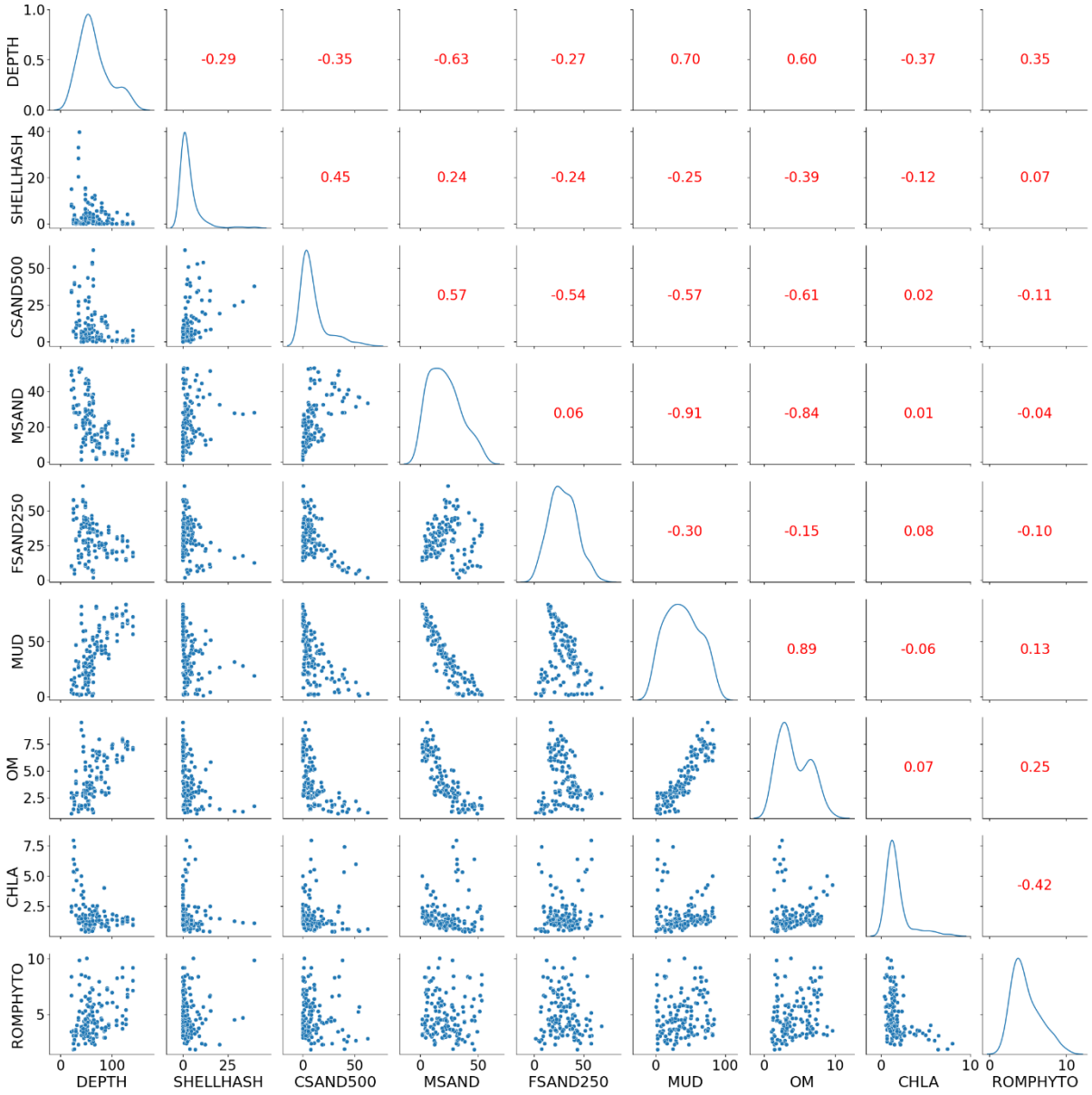

Figure S2: Contents of A) shell hash (>2000 µm), B) coarse sand (500 – 2000 µm), C) medium sand (250 – 500 µm) and D) fine sand (63 – 250 µm) at the sampling sites (black dots) in the Hauraki Gulf, New Zealand. Data were spatially interpolated using DIVA in Ocean Data View (Schlitzer, 2025).

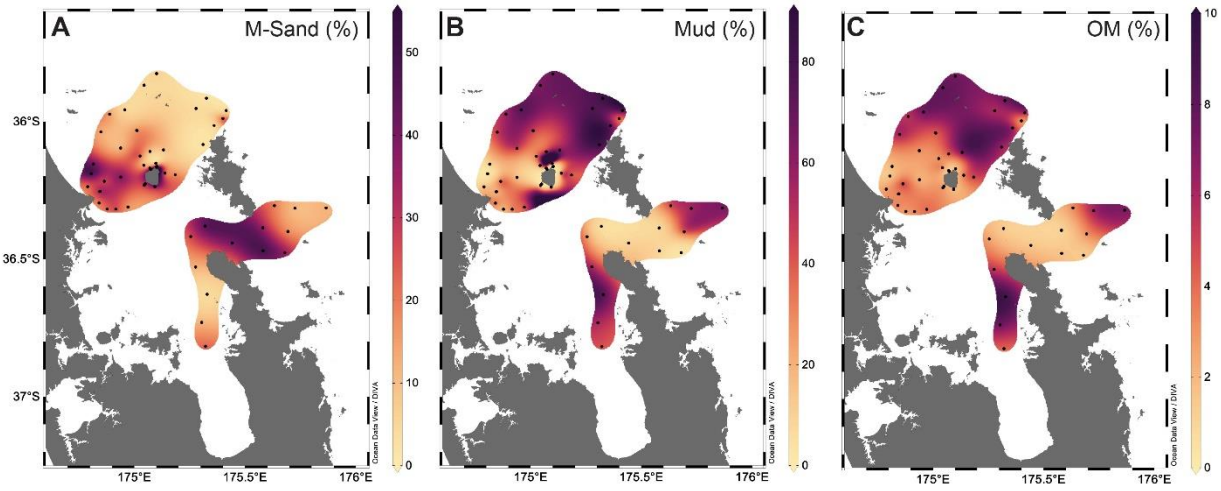

Figure S3: Contents of A) medium sand (M-Sand, 250 - 500 µm), B) mud (Mud, < 63 µm), and C) organic matter (OM) interpolated from the sampling sites (white dots) in the Hauraki Gulf, New Zealand. Data were spatially interpolated using DIVA in Ocean Data View (Schlitzer, 2025).

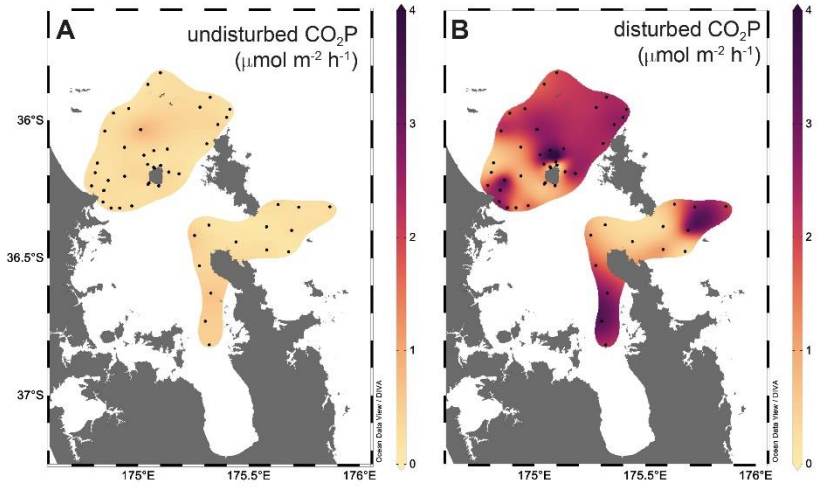

Figure S4: CO_2 production rates of undisturbed sediment from core incubations (A) and from disturbed sediments of resuspension treatment (B). Data were spatially interpolated using DIVA in Ocean Data View (Schlitzer, 2025).

Table S1: Metrics of BRT model runs with one of the three collinear features. Collinear features are organic matter content (OM), Mud content (Mud) and medium sand content (M-Sand). Presented are R^2, root mean squared error (RMSE) and feature importance ranked based on mean absolute SHAP values (mean |SHAP|).

Metric	BRT with OM	BRT with Mud	BRT with M-sand
R^2	0.58 ± 0.1	0.55 ± 0.1	0.57 ± 0.1
RMSE	0.54 ± 0.07	0.56 ± 0.07	0.55 ± 0.09
Feature importance (mean |SHAP|)	1. OM = 0.47 2. C-Sand = 0.13 3. Depth = 0.10 4. F-Sand = 0.09 5. OM:Phyto = 0.07 6. Chl.a = 0.04 7. S/G = 0.04	1. Mud = 0.35 2. C-Sand = 0.21 3. F-Sand = 0.11 4. Depth = 0.11 5. S/G = 0.06 6. Chl.a = 0.06 7. OM:Phyto = 0.05	1. M-Sand = 0.36 2. C-Sand = 0.17 3. Depth = 0.13 4. F-Sand = 0.09 5. S/G = 0.05 6. OM:Phyto = 0.05 7. Chl.a = 0.05

OM = organic matter content, C-Sand = coarse sand content, M-Sand = medium sand content, F-Sand = fine sand content, Mud = mud content, S/G = Shell hash and gravel content, Chl.a = Chlorophyll a concentration, OM:Phyto = organic matter-to-phytopigment ratio

References

Global Fishing Watch: www.globalfishingwatch.org, last access: 3 September 2025.

Schlitzer, R.: Ocean data view, 2025.