Tables

Table 1: Correlation matrix between environmental characteristics and dissolution. All values are Spearman rank correlations for all dates and stations. ,

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Chlorophyll-a (g/L) | Depth (m) | Dissolved Oxygen (mg/L) | Salinity (psu) | Temperature (C) | Dissolution I (%) | Dissolution II (%) | Dissolution III (%) |
| Aragonite saturation () | 0.1 | 0.53\*\* | 0.53\*\* | 0.48\*\* | -0.11 | 0.08 | 0.34\* | -0.39\* |
| Chlorophyll-a (g/L) |  | 0.08 | 0.23 | -0.25 | -0.16 | -0.07 | 0.03 | -0.01 |
| Depth (m) |  |  | 0.22 | 0.44\*\* | -0.06 | 0.16 | 0.01 | -0.14 |
| Dissolved Oxygen (mg/L) |  |  |  | -0.22 | -0.44\*\* | -0.03 | 0.16 | -0.03 |
| Salinity (psu) |  |  |  |  | 0.01 | 0.3\* | 0 | -0.37\* |
| Temperature (C) |  |  |  |  |  | -0.05 | 0.04 | -0.02 |
| Dissolution I (%) |  |  |  |  |  |  | -0.67\*\* | -0.53\*\* |
| Dissolution II (%) |  |  |  |  |  |  |  | -0.13 |

Table 2: Environmental characteristics of sample stations in Puget Sound. Stations are grouped by exposure categories defined by multivariate clustering (Figure 2). Depth is the maximum sampled depth for seasonal CTD casts. Average (min/max) aragonite saturation state, salinity, chlorophyll-a, temperature, and oxygen values are also shown based on approximately nine visits to each site and different samples by depth from 2014 to 2016.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Station | lon/lat | Depth (m) | Aragonite saturation () | Salinity (psu) | Chlorophyll-a (g/L) | Temperature (C) | Dissolved Oxygen (mg/L) |
| mild exposure | 22 | -123/48.3 | 120 | 1.1 (0.7, 1.7) | 31.5 (29.4, 35.5) | 1.5 (0.2, 7.3) | 10.4 (8.1, 12.8) | 191.4 (107.3, 270.4) |
| moderate exposure | 8 | -122.6/47.9 | 129 | 1.2 (0.6, 2.9) | 30.1 (27.2, 31.3) | 3.8 (0, 20.8) | 11.7 (9.6, 14.9) | 227.7 (161.6, 388.3) |
|  | 28 | -122.5/47.7 | 189 | 1.1 (0.6, 2) | 30.2 (27.1, 32.8) | 2.6 (0.1, 14) | 11.9 (9.3, 14.6) | 211.2 (155.8, 348.5) |
|  | 38 | -122.7/47.3 | 98 | 1.1 (0.7, 2.9) | 29.7 (27.3, 31.8) | 1.9 (0.1, 11.7) | 12.8 (9.5, 15.6) | 220.7 (136.2, 432.3) |
| severe exposure | 4 | -122.6/48.2 | 84 | 0.9 (0.5, 2.7) | 27.9 (20.4, 30.5) | 4.9 (0.1, 43.9) | 11.6 (9.1, 16.2) | 205.9 (88.6, 447.3) |
|  | 12 | -123.1/47.4 | 121 | 0.9 (0.3, 3) | 29.1 (23.9, 30.7) | 4.1 (0, 47.6) | 11.5 (8.5, 20.9) | 163.5 (21.4, 464.5) |
|  | 402 | -123/47.4 | 50 | 0.9 (0.2, 2.6) | 28.6 (21.8, 30.5) | 6 (0, 116.4) | 11.9 (8.9, 21.8) | 175.3 (19, 465.6) |

*Table 3: (#tab:araminmod) Linear multiple regression models testing the additive effects of minimum observed aragonite saturation state, cohort year (factor), and months (factor) on extent of type III dissolution in pteropods. Results for four models are shown where the first two columns are for relationships grouped by cohort year (Figure 5, top row) and the second two columns are for relationships grouped by month (Figure 5, bottom row). Models in the first two columns included a year variable as a fixed effect and models in the second two columns included a month variable as a fixed effect, in addition to minimum aragonite saturation state as a fixed effect for all models. Separate models were also run with and without 2016 cohort-year data because of missing April observations in 2017 (the final month for the 2016 cohort). Values shown are parameter estimates and standard error for the predictors (left column) in each linear model. Sample size and R-squared values for each model are shown at the bottom.*

Table 4:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | By year | By year (no 2016) | By month | By month (no 2016) |
| Constant | 41.37 \*\*\* | 42.17 \*\*\* | 46.20 \*\*\* | 42.59 \*\*\* |
|  | (8.07) | (9.14) | (8.25) | (9.90) |
| Ara, min | -32.99 \*\* | -34.16 \*\* | -36.45 \*\*\* | -36.85 \*\* |
|  | (9.63) | (11.40) | (9.71) | (11.55) |
| 2015 | 13.91 \* | 13.93 \* |  |  |
|  | (6.38) | (6.51) |  |  |
| 2016 | 3.12 |  |  |  |
|  | (6.90) |  |  |  |
| Sep |  |  | -0.81 | 6.24 |
|  |  |  | (6.20) | (7.96) |
| Apr |  |  | 16.77 \* | 20.69 \* |
|  |  |  | (6.84) | (7.62) |
| N | 50 | 36 | 50 | 36 |
| R2 | 0.27 | 0.29 | 0.30 | 0.34 |
| \*\*\* p < 0.001; \*\* p < 0.01; \* p < 0.05. | | | | |

*Table 5: (#tab:cumstrmod) Linear multiple regression models testing the additive effects of minimum observed cumulative stress exposure (S, eqn. 2) and cohort year (factor) on extent of type III dissolution in pteropods. Results for two models are shown where the first includes 2016 data and the second does not because of missing April observations (Figure 7, bottom). Values shown are parameter estimates and standard error for the predictors (left column) in each linear model. Sample size and R-squared values for each model are shown at the bottom.*

Table 6:

|  |  |  |
| --- | --- | --- |
|  | By year | By year (no 2016) |
| Constant | 6.78 | 5.68 |
|  | (5.43) | (5.19) |
| St | 48.64 \*\*\* | 53.11 \*\*\* |
|  | (12.38) | (12.13) |
| 2015 | 10.69 | 10.44 |
|  | (6.22) | (5.88) |
| 2016 | 7.54 |  |
|  | (6.79) |  |
| N | 50 | 36 |
| R2 | 0.31 | 0.42 |
| \*\*\* p < 0.001; \*\* p < 0.01; \* p < 0.05. | | |