**SUPPLEMENTARY INFORMATION**

# Silicon consumption kinetics by marine sponges: an assessment of their role at the ecosystem level

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## S1. Intended vs assayed DSi concentrations.

The DSi concentration steps that we intended to test were 2.6, 10, 20, 40, 70, 90, 130, 175, 210, 275 $\mu$M Si for *H. simulans* and 2.8, 10, 20, 40, 70, 90, 130, 175, 210, 275, 330, 430, 570 $\mu$M Si for *S. ficus*. However, the DSi concentration finally tested were 2.6, 8, 21, 44, 67, 90, 130, 175, 210, 275 $\mu$M Si for *H. simulans* and 2.8, 8, 20, 42, 65, 87, 130, 175, 210, 275, 330, 434, 566 $\mu$M Si for *S. ficus*. The reasons for the small deviations between intended and assayed DSi concentrations were due to two logistic constraints. First, the DSi concentration in the water of the Bay, which was used as base to prepare the experimental DSi solutions, raised from 1.7 to 3.6 $\mu$M while the experiment lasted. Second, there were small transfers of water from one experimental DSi step to the followed one. When one DSi concentration step finished, we transferred each sponge within a small volume of water from the incubation aquarium to the 200L barrel, which had previously been filled with the next (higher) DSi concentration. In order to avoid a fatal exposure to air during the transfer of the sponges, it was unavoidable to deliver a small water volume (76 ± 15 mL) from the small incubation aquaria (i.e., with lower DSi concentration) into the 200L barrel were the new (higher) DSi concentration was being prepared. These two motives systematically caused a slight deviation (-1.15 ± 6.66 %) in the actual concentrations to which the sponges were finally assayed relative to the theoretically intended DSi concentrations for the experiment.

**S2**. **Summary of morphometric parameters.**

**Table S1.** Summary of volume, wet weight, dry weight, and ash weight data for the set of individuals of each sponge species used in the experiments.

| Species | Individual | Volume (mL) | Wet Weight (g) | Dry Weight (g) | Ash Weight (g) |
|---|---|---|---|---|---|
| *Haliclona simulans* | 1 | 10.5 | 4.91 | 0.564 | 0.375 |
| | 2 | 5.5 | 2.96 | 0.298 | 0.186 |
| | 3 | 7.0 | 4.90 | 0.467 | 0.292 |
| | 4 | 5.0 | 3.01 | 0.356 | 0.219 |
| | 5 | 4.5 | 2.71 | 0.327 | 0.211 |
| | 6 | 6.0 | 2.90 | 0.283 | 0.170 |
| | 7 | 6.5 | 3.25 | 0.358 | 0.221 |
| | 8 | 8.5 | 3.60 | 0.428 | 0.301 |
| | 9 | 6.5 | 3.15 | 0.332 | 0.201 |
| | 10 | 9.0 | 6.13 | 0.656 | 0.414 |
| | 11 | 4.5 | 1.51 | 0.154 | 0.094 |
| | 12 | 11.0 | 7.15 | 0.785 | 0.451 |
| | 13 | 9.5 | 6.26 | 0.631 | 0.407 |
| *Suberites ficus* | 1 | 7.5 | 3.04 | 0.653 | 0.475 |
| | 2 | 13.0 | 8.36 | 1.140 | 0.792 |
| | 3 | 4.5 | 1.83 | 0.352 | 0.266 |
| | 4 | 35.5 | 33.24 | 3.119 | 1.950 |
| | 5 | 9.5 | 5.28 | 0.842 | 0.589 |
| | 6 | 25.0 | 25.65 | 2.902 | 1.891 |
| | 7 | 6.5 | 4.17 | 0.767 | 0.520 |
| | 8 | 4.5 | 1.85 | 0.337 | 0.248 |
| | 9 | 14.0 | 9.84 | 1.372 | 0.954 |
| | 10 | 6.0 | 2.53 | 0.503 | 0.396 |
| | 11 | 15.5 | 11.29 | 1.572 | 1.168 |
| | 12 | 12.0 | 7.48 | 1.333 | 0.903 |
| | 13 | 11.0 | 7.75 | 0.962 | 0.634 |

**S3. Adjustments of DSi consumption rates during P2.**

As part of the DSi (from ca. 6 to 43%) initially provided at a given concentration step was consumed by the sponges during P1, the consumption during P2 started from a DSi concentration somewhat lower than that of P1, making consumption rates during P1 and P2 comparable only if a readjustment is applied, particularly at DSi concentrations below 40 $\mu$M. To render P1 and P2 rates comparable, we fitted the empirical P2 consumption of each individual to a non-linear regression model by goodness of fit and used the resulting model to project the expected DSi consumption rate at the slightly higher DSi concentration provided at the beginning of each P1 period.

**S4. Comparison of average-derived and individual-derived kinetics models.**

This section summarizes the statistics of the goodness of fit to a Michaelis-Menten model for the DSi consumption rates by the sponges *Haliclona simulans* and *Suberites ficus* as a function of the experimental DSi availability. For comparative purposes, Table S2 shows the statistics of the goodness of fit when the model was calculated from either the average DSi consumption rate of all individuals of each species at each DSi concentration step (averaged response; see also Figs. 6 and 7 in the main article) or from the individuals responses (individual responses; see Fig. S1). Note that the value of the main parameters of the kinetics ($V_{max}$ and $K_m$) remain very similar and consistently significant in both cases. In the case of the individual responses, the large dispersion of values (Fig. S1) is lowering the value of the $r^2$ for the model in both species. However, the relationship keeps statistically significant and still the best fitting model for the data.

**Table S2**. Comparative summary of the statistics for the goodness of fit to a Michaelis-Menten model for the relationship between experimental DSi availability and DSi consumption rate in the sponge species *H. simulans* and *S. ficus*. For each species the value of the intensity of the relationship ($r^2$) and its statistical significance ($p$) is given when the model is calculated from the averaged response of all assayed individuals and from the set of individual responses. In each case, the values of the main parameters governing the model (i.e., maximum velocity= $V_{max}$ and half-saturation constant= $K_m$) and their significance ($p$) are also listed.

| | $r^2$ | $p$ | $V_{max}$ | $p$ | $K_m$ | $p$ |
|---|---|---|---|---|---|---|
| ***Haliclona simulans*** | | | | | | |
| Averaged response | 0.956 | <0.0001 | 0.390 ± 0.031 | <0.0001 | 45.918 ± 11.977 | 0.0050 |
| Individual responses | 0.714 | <0.0001 | 0.390 ± 0.023 | <0.0001 | 45.844 ± 8.851 | <0.0001 |
| ***Suberites ficus*** | | | | | | |
| Averaged response | 0.989 | <0.0001 | 0.480 ± 0.018 | <0.0001 | 108.229 ± 12.122 | <0.0001 |
| Individual responses | 0.464 | <0.0001 | 0.479 ± 0.047 | <0.0001 | 107.346 ± 30.969 | 0.0007 |

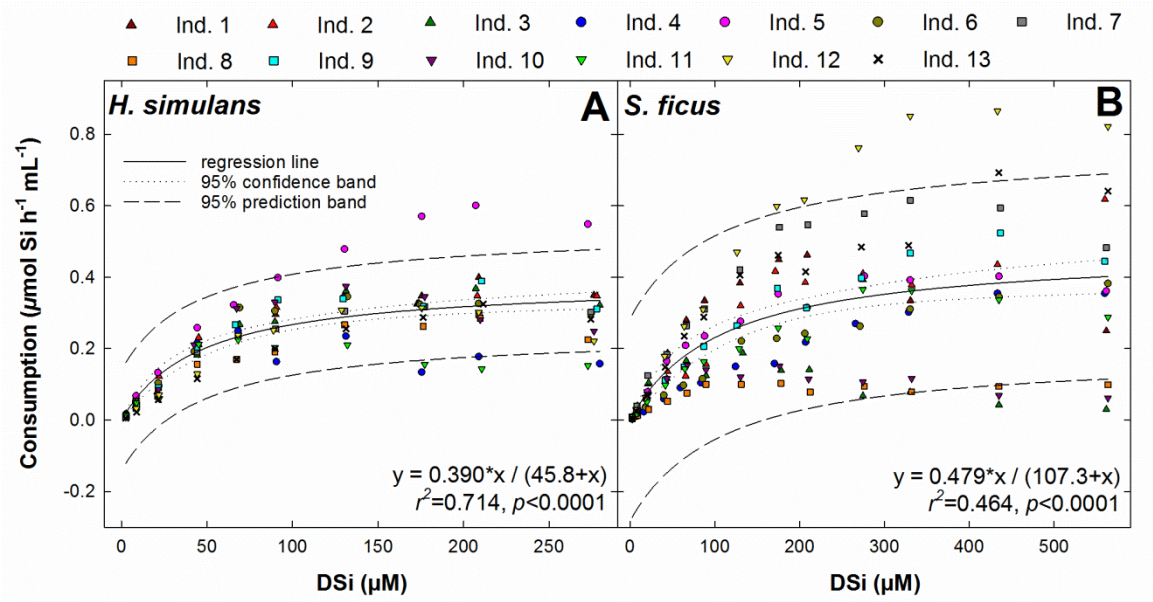


**Figure S1.** Summary of the statistically significant goodness of fit for the relationship between DSi availability and DSi consumption rate in *Haliclona simulans* **(A)** and *Suberites ficus* **(B).** In both cases, the best fit indicates a hyperbolic model that matches the Michaelis-Menten equation and it has been calculated from the sets of individuals (ind.) responses at each DSi concentration step. For a comparison with the model calculated from the averaged response at each DSi step, see Figs. 6 and 7 and Table S2.