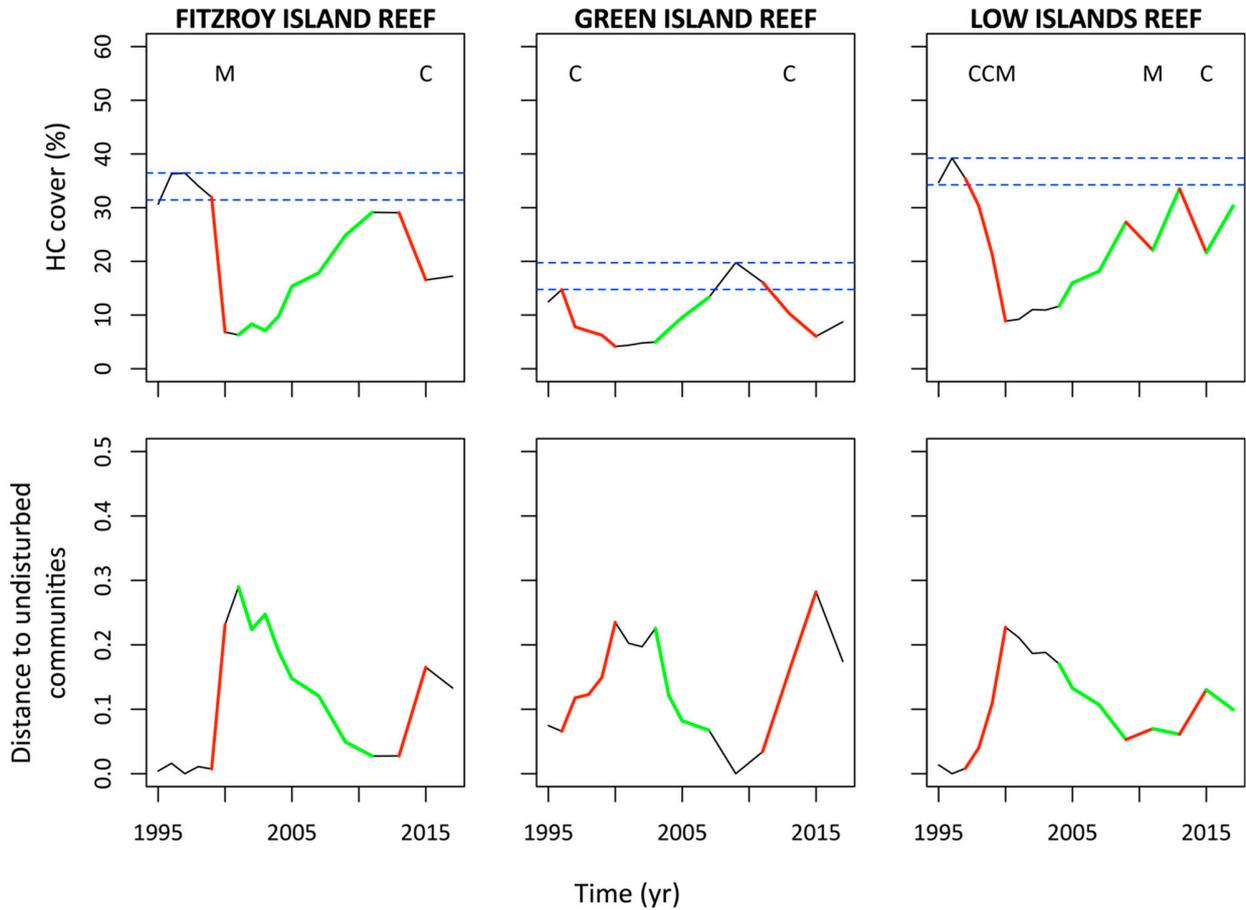


1 Mellin C. et al.

2 SUPPLEMENTARY MATERIAL

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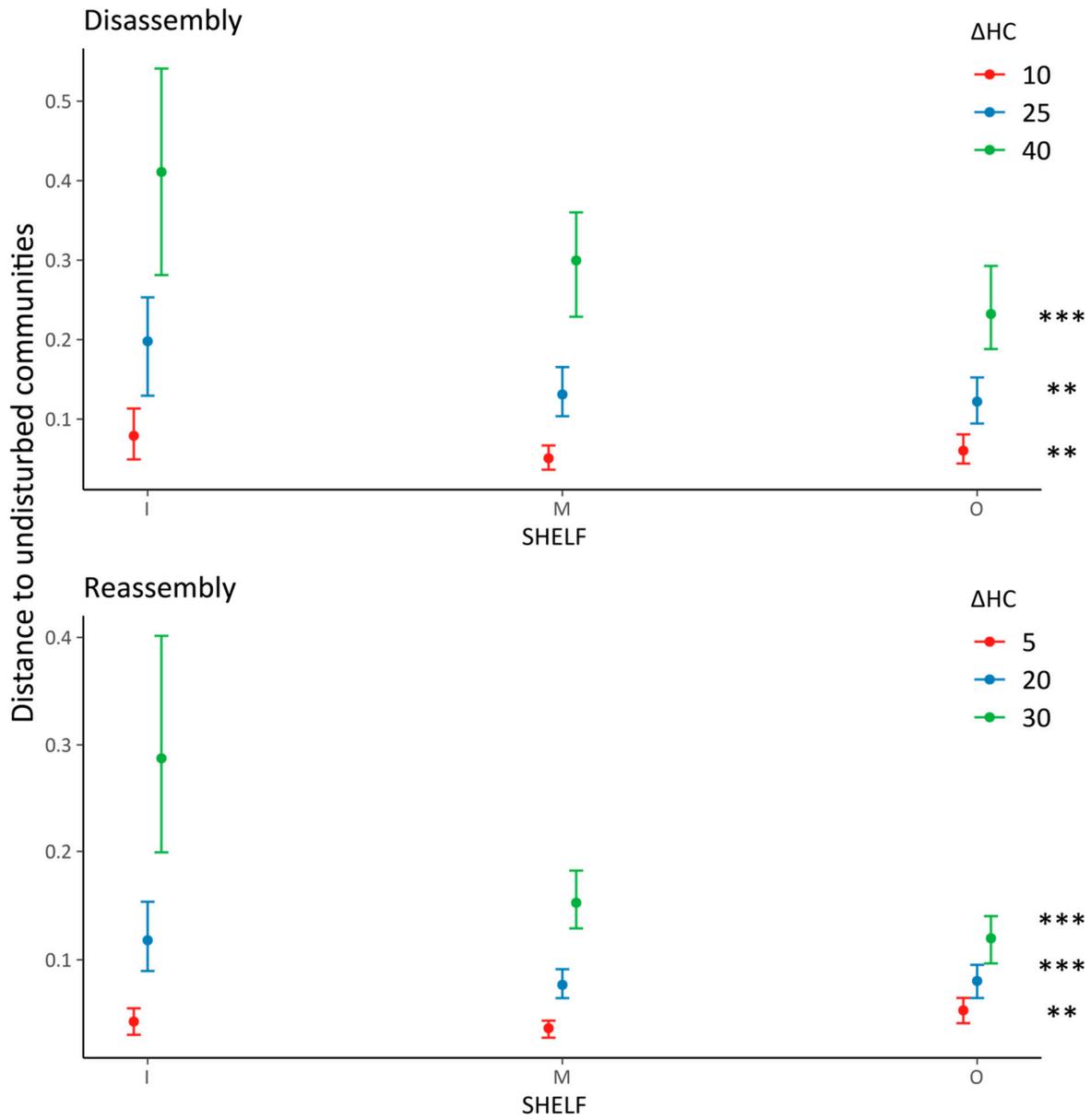


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7 **Figure S1.** Calculation of the Bray–Curtis distance to pre-disturbance communities from the 1996-2017
8 time series: example of the first three reefs in the dataset. Where hard coral cover lies between its
9 maximum, HC_{max} , and $HC_{max}-5\%$ (dotted blue lines), coral communities are considered pre-
10 disturbance. Sections of the time-series indicated in red correspond to hard coral cover decline /
11 community disassembly, those in green to hard coral cover recovery / community reassembly.
12 Letters (top panel) indicate acute disturbances with C: crown-of-thorns outbreaks; M: multiple (i.e.,
13 occurrence of more than one acute disturbance between two consecutive surveys).

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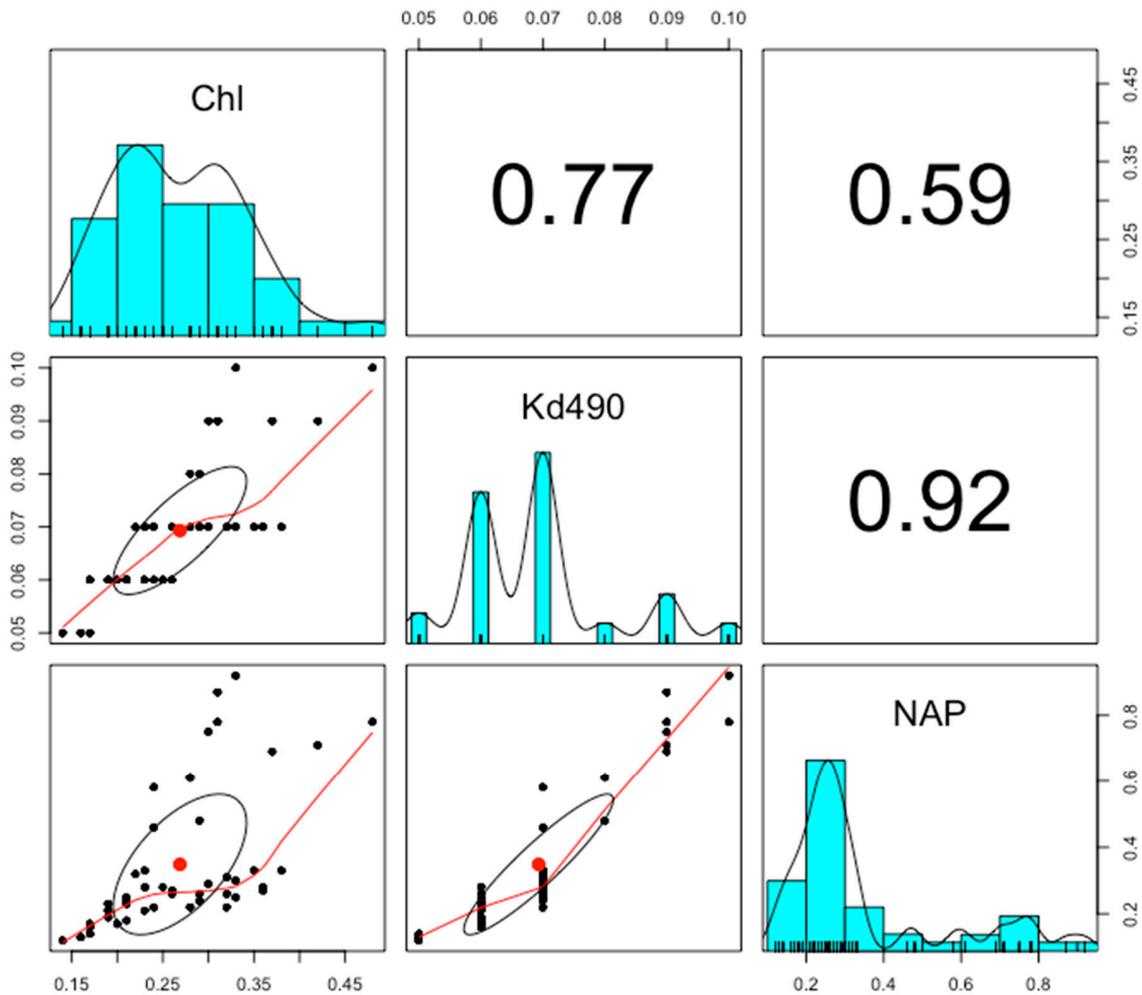
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18 **Figure S2.** Interaction plots for the hierarchical linear models of ΔHC as a function of *SHELF* and the
19 Bray-Curtis distance to pre-disturbance communities corresponding to disassembly and reassembly
20 respectively. For each level of ΔHC tested, asterisks indicate significant cross-shelf differences in
21 disassembly or reassembly (**: $P < 0.01$; ***: $P < 0.001$).



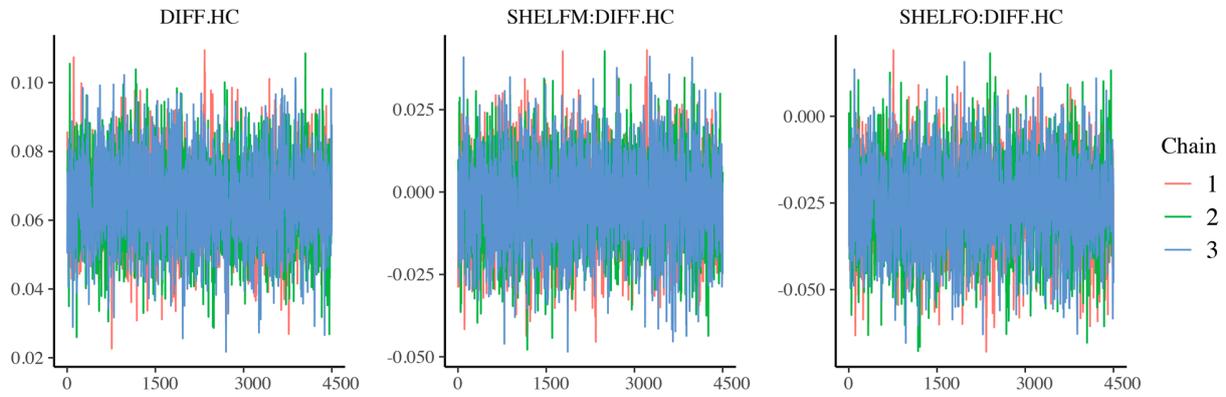
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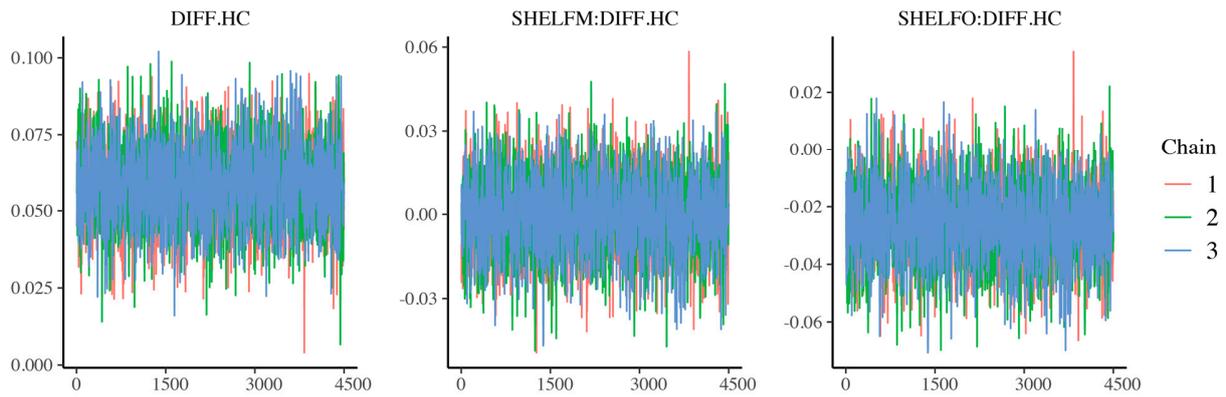
25 **Figure S3.** Multicollinearity among water quality indices. Pearson's correlation coefficients are
 26 indicated above the diagonal; scatter plots and non-linear regression (GAM) are shown below the
 27 diagonal, and individual variable distributions (histograms) are indicated on the diagonal. With Chl:
 28 long-term average of chlorophyll-a concentration, Kd490: long-term average of light attenuation at
 29 490 nm, NAP: non-algal particulates.

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DISASSEMBLY



REASSEMBLY



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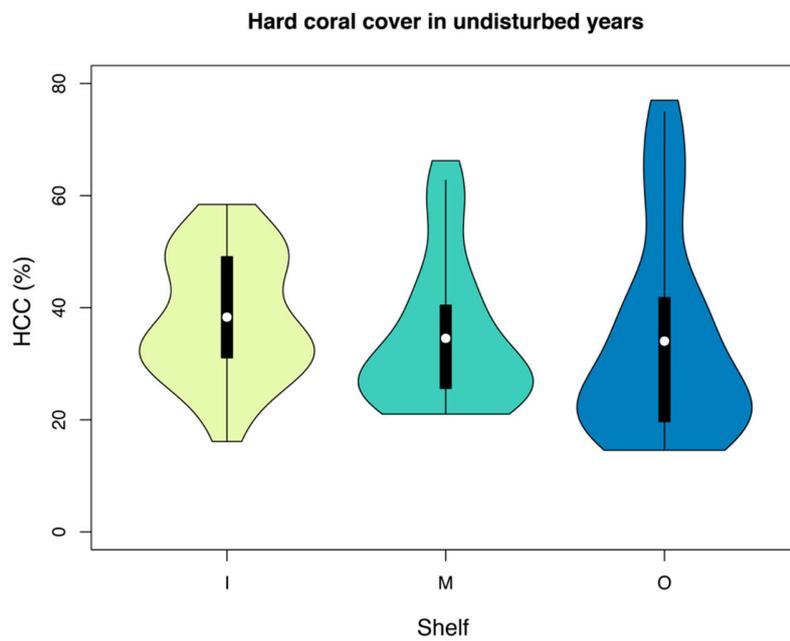
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33 **Figure S4.** Trace plots for posterior parameter estimates in the first model set based on three parallel

34 chains and N = 5000 iterations (500 for burn-in, not shown).

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39 **Figure S5.** Distribution of hard coral cover (HCC) in pre-disturbance years (i.e., when HCC differs
40 from its maximum by less than 5%) across shelf levels (I: inner shelf; M: mid shelf, O: outer shelf).

41 Violin plots represent data density, with plot width being proportional to the amount of data. Thick
42 vertical lines represent the interquartile range, and the white dot the median.

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