# A decade of study on the condition of western Cuban coral reefs, with low human impact

Hansel Caballero Aragón, Susana Perera Valderrama, Dorka Cobián Rojas, Zaimiuri Hernández Gonzáles, Juliet Gónzalez-Méndez, Elena de la Guardia Llansó.

## Supplementary Materials

Table S1. Functional coefficient (FC) for each species of Guanahacabibes coral reefs, according to the criteria of González-Barrios and Álvarez-Fillip (2018).

| Species | FC |
|---|---|
| *Aagaricia agaricites* | 0.19 |
| *Acropora cervicornis* | 0.62 |
| *Agaricia granmahe* | 0.12 |
| *Agaricia lamarcki* | 0.08 |
| *Agaricia tenuifolia* | 0.26 |
| *Colpophyllia natans* | 0.26 |
| *Dichocoenia stockesi* | 0.15 |
| *Diploria laberyntiformis* | 0.28 |
| *Eusmilia fastigiata* | 0.23 |
| *Helioseris cucullata* | 0.03 |
| *Isophyllia sinuosa* | 0.07 |
| *Madracis decactis* | 0.28 |
| *Madracis mirabilis* | 0.16 |
| *Manicina areolata* | 0.17 |
| *Meandrina meandrites* | 0.12 |
| *Montastraea cavernosa* | 0.32 |
| *Mussa angulosa* | 0.09 |
| *Mycetophylia aliciae* | 0.06 |
| *Mycetophyllia danana* | 0.04 |
| *Mycetophyllia ferox* | 0.02 |
| *Mycetophyllia lamarckiana* | 0.04 |
| *Orbicella annularis* | 0.47 |
| *Orbicella Faveolata* | 0.42 |
| *Orbicella franksi* | 0.43 |
| *Porites astreoides* | 0.18 |
| *Porites divaricata* | 0.11 |
| *Porites furcata* | 0.11 |
| *Porites porites* | 0.22 |
| *Pseudodiploria strigosa* | 0.30 |
| *Scolymia lacera* | 0.09 |
| *Siderastrea radians* | 0.04 |
| *Siderastrea siderea* | 0.19 |
| *Stephanocoenia stockesi* | 0.08 |

Table S2. Mean (AVE) and standard deviation (SD) of living coral cover (%) per site and year. CP: Cuevas de Pedro, YE: Yemayá, VE: Veral, and VR: Verraco.

| Site | Year | AVE | SD |
| --- | --- | --- | --- |
| CP | 2008 | 23,3 | 6,6 |
| CP | 2010 | 21,2 | 8,9 |
| CP | 2011 | 21,9 | 7,7 |
| CP | 2012 | 22,1 | 6,3 |
| CP | 2013 | 22,3 | 6,3 |
| CP | 2014 | 22,0 | 7,9 |
| CP | 2015 | 21,3 | 3,5 |
| CP | 2016 | 17,8 | 3,6 |
| CP | 2017 | 17,6 | 6,9 |
| YE | 2008 | 19,7 | 4,5 |
| YE | 2010 | 22,2 | 7,6 |
| YE | 2011 | 21,6 | 5,7 |
| YE | 2012 | 22,2 | 7,1 |
| YE | 2013 | 22,5 | 9,6 |
| YE | 2014 | 19,2 | 5,3 |
| YE | 2015 | 18,2 | 4,6 |
| YE | 2016 | 15,1 | 4,1 |
| YE | 2017 | 14,6 | 4,1 |
| VE | 2008 | 16,0 | 8,8 |
| VE | 2010 | 14,1 | 4,1 |
| VE | 2011 | 14,3 | 4,4 |
| VE | 2012 | 16,7 | 5,1 |
| VE | 2013 | 14,7 | 6,6 |
| VE | 2014 | 14,3 | 3,4 |
| VE | 2015 | 16,0 | 6,6 |
| VE | 2016 | 14,9 | 9,2 |
| VE | 2017 | 14,6 | 8,0 |
| VR | 2008 | 13,0 | 2,9 |
| VR | 2010 | 14,1 | 4,1 |
| VR | 2011 | 16,0 | 6,9 |
| VR | 2012 | 14,4 | 4,8 |
| VR | 2013 | 13,9 | 4,9 |
| VR | 2014 | 14,4 | 6,4 |
| VR | 2015 | 15,9 | 4,7 |
| VR | 2016 | 13,8 | 6,5 |
| VR | 2017 | 13,8 | 5,5 |

Table S3. Pair wise test analysis for living coral cover. CP: Cuevas de Pedro, YE: Yemayá, VE: Veral, and VR: Verraco, s: site.

| Groups | t | P(perm) | perms |
|---|---|---|---|
| 2008, 2010 | 0.08 | 0.870 | 9834 |
| 2008, 2011 | 0.39 | 0.645 | 9826 |
| 2008, 2012 | 1.10 | 0.358 | 9835 |
| 2008, 2013 | 0.36 | 0.703 | 9822 |
| 2008, 2014 | 0.73 | 0.508 | 9825 |
| 2008, 2015 | 0.13 | 0.930 | 9839 |
| 2008, 2016 | 1.77 | 0.198 | 9841 |
| 2008, 2017 | 1.83 | 0.177 | 9829 |
| 2010, 2011 | 1.03 | 0.378 | 9832 |
| 2010, 2012 | 1.57 | 0.230 | 9847 |
| 2010, 2013 | 1.48 | 0.236 | 9821 |
| 2010, 2014 | 0.49 | 0.582 | 9830 |
| 2010, 2015 | 0.05 | 0.994 | 9859 |
| 2010, 2016 | 1.42 | 0.033 | 9833 |
| 2010, 2017 | 1.49 | 0.025 | 9830 |
| 2011, 2012 | 0.47 | 0.664 | 9849 |
| 2011, 2013 | 0.18 | 0.816 | 9850 |
| 2011, 2014 | 1.62 | 0.236 | 9834 |
| 2011, 2015 | 0.62 | 0.586 | 9833 |
| 2011, 2016 | 2.07 | 0.027 | 9830 |
| 2011, 2017 | 2.15 | 0.034 | 9847 |
| 2012, 2013 | 0.98 | 0.451 | 9814 |
| 2012, 2014 | 1.75 | 0.213 | 9838 |
| 2012, 2015 | 0.93 | 0.453 | 9814 |
| 2012, 2016 | 2.43 | 0.006 | 9814 |
| 2012, 2017 | 2.42 | 0.013 | 9836 |
| 2013, 2014 | 1.05 | 0.473 | 9835 |
| 2013, 2015 | 0.37 | 0.764 | 9843 |
| 2013, 2016 | 1.65 | 0.022 | 9829 |
| 2013, 2017 | 1.71 | 0.021 | 9835 |
| 2014, 2015 | 0.52 | 0.594 | 9835 |
| 2014, 2016 | 1.71 | 0.227 | 9843 |
| 2014, 2017 | 1.82 | 0.202 | 9854 |
| 2015, 2016 | 4.32 | 0.038 | 9838 |
| 2015, 2017 | 4.49 | 0.036 | 9849 |
| 2016, 2017 | 2.04 | 0.137 | 9795 |

Table S4. Mean (AVE) and standard deviation (SD) of fleshy algae index per site and year. CP: Cuevas de Pedro, YE: Yemayá, VE: Veral, and VR: Verraco.

| Site | Year | AVE | SD |
|------|------|-------|-------|
| CP | 2008 | 169,0 | 127,6 |
| CP | 2010 | 93,0 | 104,3 |
| CP | 2011 | 111,9 | 131,6 |
| CP | 2012 | 237,2 | 244,6 |
| CP | 2013 | 273,8 | 305,7 |
| CP | 2014 | 216,2 | 189,7 |
| CP | 2015 | 151,7 | 152,7 |
| CP | 2016 | 321,1 | 277,8 |
| CP | 2017 | 296,5 | 235,4 |
| YE | 2008 | 169,4 | 123,0 |
| YE | 2010 | 103,3 | 108,3 |
| YE | 2011 | 31,8 | 81,6 |
| YE | 2012 | 87,3 | 68,7 |
| YE | 2013 | 132,7 | 90,5 |
| YE | 2014 | 135,4 | 140,9 |
| YE | 2015 | 134,1 | 174,4 |
| YE | 2016 | 231,4 | 271,7 |
| YE | 2017 | 264,7 | 245,8 |
| VE | 2008 | 145,2 | 92,4 |
| VE | 2010 | 86,7 | 78,0 |
| VE | 2011 | 68,0 | 57,6 |
| VE | 2012 | 69,3 | 60,4 |
| VE | 2013 | 192,0 | 242,0 |
| VE | 2014 | 184,2 | 192,8 |
| VE | 2015 | 111,6 | 113,1 |
| VE | 2016 | 146,1 | 182,1 |
| VE | 2017 | 189,6 | 222,4 |
| VR | 2008 | 167,3 | 105,7 |
| VR | 2010 | 102,4 | 84,8 |
| VR | 2011 | 110,2 | 106,2 |
| VR | 2012 | 182,4 | 204,4 |
| VR | 2013 | 195,9 | 235,0 |
| VR | 2014 | 196,9 | 199,3 |
| VR | 2015 | 165,3 | 163,1 |
| VR | 2016 | 209,2 | 177,8 |
| VR | 2017 | 221,5 | 212,7 |

Table S5. Pair wise test analysis for fleshy algae index. CP: Cuevas de Pedro, YE: Yemayá, VE: Veral, and VR: Verraco, s: site.

| Within level 'CP' of factor 'site' | | | | Within level 'YE' of factor 's' | | | | Within level 'VE' of factor 's' | | | | Within level 'VR' of factor 's' | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Groups | t | P(perm) | perms | Groups | t | P(perm) | perms | Groups | t | P(perm) | perms | Groups | t | P(perm) | perms |
| 2008, 2010 | 2.18 | 0.032 | 152 | 2008, 2010 | 0.78 | 0.456 | 67 | 2008, 2010 | 1.62 | 0.111 | 132 | 2008, 2010 | 2.18 | 0.032 | 152 |
| 2008, 2011 | 0.06 | 0.958 | 343 | 2008, 2011 | 3.17 | 0.002 | 196 | 2008, 2011 | 3.44 | 0.001 | 158 | 2008, 2011 | 0.06 | 0.958 | 343 |
| 2008, 2012 | 3.18 | 0.001 | 408 | 2008, 2012 | 4.31 | 0.000 | 346 | 2008, 2012 | 4.69 | 0.000 | 282 | 2008, 2012 | 3.18 | 0.001 | 408 |
| 2008, 2013 | 4.08 | 0.000 | 434 | 2008, 2013 | 1.16 | 0.256 | 1361 | 2008, 2013 | 4.72 | 0.000 | 2403 | 2008, 2013 | 4.08 | 0.000 | 434 |
| 2008, 2014 | 6.04 | 0.000 | 236 | 2008, 2014 | 1.53 | 0.127 | 397 | 2008, 2014 | 7.49 | 0.000 | 410 | 2008, 2014 | 6.04 | 0.000 | 236 |
| 2008, 2015 | 3.06 | 0.002 | 235 | 2008, 2015 | 3.24 | 0.002 | 2114 | 2008, 2015 | 1.85 | 0.069 | 198 | 2008, 2015 | 3.06 | 0.002 | 235 |
| 2008, 2016 | 5.07 | 0.000 | 1339 | 2008, 2016 | 4.81 | 0.000 | 1804 | 2008, 2016 | 2.63 | 0.008 | 676 | 2008, 2016 | 5.07 | 0.000 | 1339 |
| 2008, 2017 | 5.49 | 0.000 | 1632 | 2008, 2017 | 5.62 | 0.000 | 1977 | 2008, 2017 | 7.01 | 0.000 | 365 | 2008, 2017 | 5.49 | 0.000 | 1632 |
| 2010, 2011 | 1.77 | 0.080 | 334 | 2010, 2011 | 2.40 | 0.019 | 199 | 2010, 2011 | 2.07 | 0.044 | 159 | 2010, 2011 | 1.77 | 0.080 | 334 |
| 2010, 2012 | 3.92 | 0.000 | 416 | 2010, 2012 | 3.32 | 0.001 | 345 | 2010, 2012 | 3.22 | 0.002 | 258 | 2010, 2012 | 3.92 | 0.000 | 416 |
| 2010, 2013 | 4.81 | 0.000 | 430 | 2010, 2013 | 0.64 | 0.532 | 954 | 2010, 2013 | 5.21 | 0.000 | 2413 | 2010, 2013 | 4.81 | 0.000 | 430 |
| 2010, 2014 | 7.74 | 0.000 | 252 | 2010, 2014 | 2.25 | 0.022 | 407 | 2010, 2014 | 8.75 | 0.000 | 426 | 2010, 2014 | 7.74 | 0.000 | 252 |
| 2010, 2015 | 4.47 | 0.000 | 240 | 2010, 2015 | 3.71 | 0.001 | 2124 | 2010, 2015 | 2.96 | 0.004 | 199 | 2010, 2015 | 4.47 | 0.000 | 240 |
| 2010, 2016 | 6.32 | 0.000 | 1375 | 2010, 2016 | 5.19 | 0.000 | 1848 | 2010, 2016 | 3.69 | 0.001 | 689 | 2010, 2016 | 6.32 | 0.000 | 1375 |
| 2010, 2017 | 6.82 | 0.000 | 1700 | 2010, 2017 | 6.02 | 0.000 | 2002 | 2010, 2017 | 7.86 | 0.000 | 382 | 2010, 2017 | 6.82 | 0.000 | 1700 |
| 2011, 2012 | 3.03 | 0.003 | 421 | 2011, 2012 | 0.29 | 0.777 | 330 | 2011, 2012 | 0.82 | 0.416 | 286 | 2011, 2012 | 3.03 | 0.003 | 421 |
| 2011, 2013 | 3.90 | 0.000 | 827 | 2011, 2013 | 1.03 | 0.320 | 967 | 2011, 2013 | 5.83 | 0.000 | 2507 | 2011, 2013 | 3.90 | 0.000 | 827 |
| 2011, 2014 | 5.29 | 0.000 | 490 | 2011, 2014 | 4.38 | 0.000 | 424 | 2011, 2014 | 9.52 | 0.000 | 476 | 2011, 2014 | 5.29 | 0.000 | 490 |
| 2011, 2015 | 2.72 | 0.008 | 485 | 2011, 2015 | 4.94 | 0.000 | 2275 | 2011, 2015 | 4.23 | 0.000 | 223 | 2011, 2015 | 2.72 | 0.008 | 485 |
| 2011, 2016 | 4.44 | 0.000 | 1421 | 2011, 2016 | 6.12 | 0.000 | 2005 | 2011, 2016 | 4.56 | 0.000 | 808 | 2011, 2016 | 4.44 | 0.000 | 1421 |
| 2011, 2017 | 4.94 | 0.000 | 1741 | 2011, 2017 | 6.87 | 0.000 | 2135 | 2011, 2017 | 8.20 | 0.000 | 435 | 2011, 2017 | 4.94 | 0.000 | 1741 |
| 2012, 2013 | 0.72 | 0.470 | 524 | 2012, 2013 | 1.40 | 0.175 | 1312 | 2012, 2013 | 5.92 | 0.000 | 2471 | 2012, 2013 | 0.72 | 0.470 | 524 |
| 2012, 2014 | 0.18 | 0.862 | 416 | 2012, 2014 | 5.58 | 0.000 | 418 | 2012, 2014 | 10.56 | 0.000 | 461 | 2012, 2014 | 0.18 | 0.862 | 416 |
| 2012, 2015 | 1.38 | 0.172 | 427 | 2012, 2015 | 5.97 | 0.000 | 1268 | 2012, 2015 | 4.94 | 0.000 | 211 | 2012, 2015 | 1.38 | 0.172 | 427 |
| 2012, 2016 | 0.21 | 0.831 | 2192 | 2012, 2016 | 7.55 | 0.000 | 1954 | 2012, 2016 | 5.45 | 0.000 | 773 | 2012, 2016 | 0.21 | 0.831 | 2192 |
| 2012, 2017 | 0.15 | 0.882 | 2505 | 2012, 2017 | 8.18 | 0.000 | 2168 | 2012, 2017 | 8.93 | 0.000 | 424 | 2012, 2017 | 0.15 | 0.882 | 2505 |
| 2013, 2014 | 1.10 | 0.280 | 424 | 2013, 2014 | 2.34 | 0.018 | 1487 | 2013, 2014 | 1.36 | 0.180 | 2199 | 2013, 2014 | 1.10 | 0.280 | 424 |
| 2013, 2015 | 2.25 | 0.028 | 448 | 2013, 2015 | 3.61 | 0.001 | 2659 | 2013, 2015 | 3.69 | 0.000 | 2385 | 2013, 2015 | 2.25 | 0.028 | 448 |
| 2013, 2016 | 0.45 | 0.651 | 2245 | 2013, 2016 | 4.29 | 0.000 | 2352 | 2013, 2016 | 2.31 | 0.024 | 2678 | 2013, 2016 | 0.45 | 0.651 | 2245 |
| 2013, 2017 | 0.68 | 0.499 | 2572 | 2013, 2017 | 5.56 | 0.000 | 2816 | 2013, 2017 | 0.09 | 0.927 | 1792 | 2013, 2017 | 0.68 | 0.499 | 2572 |
| 2014, 2015 | 1.99 | 0.051 | 272 | 2014, 2015 | 2.33 | 0.024 | 2195 | 2014, 2015 | 4.25 | 0.000 | 448 | 2014, 2015 | 1.99 | 0.051 | 272 |
| 2014, 2016 | 0.60 | 0.548 | 1395 | 2014, 2016 | 3.89 | 0.001 | 1804 | 2014, 2016 | 2.86 | 0.006 | 884 | 2014, 2016 | 0.60 | 0.548 | 1395 |
| 2014, 2017 | 0.52 | 0.611 | 1681 | 2014, 2017 | 4.97 | 0.000 | 1992 | 2014, 2017 | 1.65 | 0.106 | 355 | 2014, 2017 | 0.52 | 0.611 | 1681 |
| 2015, 2016 | 1.98 | 0.053 | 1532 | 2015, 2016 | 1.34 | 0.183 | 2130 | 2015, 2016 | 0.67 | 0.510 | 892 | 2015, 2016 | 1.98 | 0.053 | 1532 |
| 2015, 2017 | 2.19 | 0.030 | 1792 | 2015, 2017 | 2.19 | 0.034 | 4200 | 2015, 2017 | 4.42 | 0.000 | 407 | 2015, 2017 | 2.19 | 0.030 | 1792 |
| 2016, 2017 | 0.14 | 0.887 | 3059 | 2016, 2017 | 0.57 | 0.574 | 3647 | 2016, 2017 | 3.22 | 0.003 | 998 | 2016, 2017 | 0.14 | 0.887 | 3059 |

Table S6. Mean of coral species richness (per sample unit) per site and year. CP: Cuevas de Pedro, YE: Yemayá, VE: Veral, and VR: Verraco.

| Year | Site | AVE | SD |
|------|------|------|------|
| 2008 | CP | 5,67 | 1,54 |
| 2008 | YE | 5,93 | 2,19 |
| 2008 | VE | 5,29 | 1,61 |
| 2008 | VR | 4,60 | 1,06 |
| 2010 | CP | 6,20 | 1,70 |
| 2010 | YE | 5,93 | 1,58 |
| 2010 | VE | 5,07 | 1,44 |
| 2010 | VR | 4,20 | 0,94 |
| 2011 | CP | 6,40 | 0,91 |
| 2011 | YE | 5,40 | 0,99 |
| 2011 | VE | 4,93 | 1,75 |
| 2011 | VR | 5,07 | 1,39 |
| 2012 | CP | 5,63 | 1,50 |
| 2012 | YE | 5,87 | 1,81 |
| 2012 | VE | 6,20 | 2,21 |
| 2012 | VR | 4,60 | 1,24 |
| 2013 | CP | 5,91 | 1,54 |
| 2013 | YE | 6,33 | 1,91 |
| 2013 | VE | 4,53 | 1,77 |
| 2013 | VR | 4,94 | 1,26 |
| 2014 | CP | 5,80 | 1,57 |
| 2014 | YE | 5,53 | 1,30 |
| 2014 | VE | 4,73 | 1,03 |
| 2014 | VR | 4,80 | 1,78 |
| 2015 | CP | 6,07 | 1,53 |
| 2015 | YE | 4,69 | 1,62 |
| 2015 | VE | 4,81 | 1,56 |
| 2015 | VR | 5,00 | 2,30 |
| 2016 | CP | 5,20 | 1,42 |
| 2016 | YE | 5,09 | 2,12 |
| 2016 | VE | 5,73 | 1,58 |
| 2016 | VR | 5,46 | 1,85 |
| 2017 | CP | 6,60 | 1,40 |
| 2017 | YE | 6,07 | 1,49 |
| 2017 | VE | 6,27 | 1,83 |
| 2017 | VR | 6,38 | 2,29 |

Table S7. Pair wise test analysis for coral richness. CP: Cuevas de Pedro, YE: Yemayá, VE: Veral, and VR: Verraco, s: site.

| Within level 'CP' of factor 's' | | | | Within level 'YE' of factor 's' | | | | Within level 'VE' of factor 's' | | | | Within level 'VR' of factor 's' | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Groups | t | P(perm) | perms | Groups | t | P(perm) | perms | Groups | t | P(perm) | perms | Groups | t | P(perm) | perms |
| 2008, 2010 | 1.00 | 0.384 | 17 | 2008, 2010 | 0.10 | 1.000 | 17 | 2008, 2010 | 0.91 | 0.424 | 31 | 2008, 2010 | 0.62 | 0.642 | 12 |
| 2008, 2011 | 1.28 | 0.266 | 13 | 2008, 2011 | 0.40 | 0.786 | 17 | 2008, 2011 | 1.05 | 0.356 | 31 | 2008, 2011 | 0.42 | 0.785 | 13 |
| 2008, 2012 | 0.16 | 0.901 | 30 | 2008, 2012 | 0.09 | 1.000 | 17 | 2008, 2012 | 1.43 | 0.180 | 37 | 2008, 2012 | 0.80 | 0.531 | 11 |
| 2008, 2013 | 0.66 | 0.576 | 34 | 2008, 2013 | 0.17 | 0.939 | 21 | 2008, 2013 | 1.15 | 0.299 | 17 | 2008, 2013 | 0.84 | 0.414 | 27 |
| 2008, 2014 | 0.12 | 1.000 | 15 | 2008, 2014 | 0.71 | 0.572 | 15 | 2008, 2014 | 1.15 | 0.313 | 29 | 2008, 2014 | 0.45 | 0.732 | 18 |
| 2008, 2015 | 0.36 | 0.814 | 14 | 2008, 2015 | 1.90 | 0.068 | 38 | 2008, 2015 | 0.64 | 0.592 | 32 | 2008, 2015 | 0.10 | 1.000 | 17 |
| 2008, 2016 | 0.12 | 1.000 | 16 | 2008, 2016 | 1.64 | 0.123 | 35 | 2008, 2016 | 0.78 | 0.515 | 17 | 2008, 2016 | 1.40 | 0.184 | 30 |
| 2008, 2017 | 2.19 | 0.052 | 16 | 2008, 2017 | 0.32 | 0.777 | 30 | 2008, 2017 | 1.99 | 0.065 | 36 | 2008, 2017 | 4.25 | 0.001 | 30 |
| 2010, 2011 | Negative | | | 2010, 2011 | 0.38 | 0.806 | 13 | 2010, 2011 | 0.13 | 1.000 | 13 | 2010, 2011 | 1.01 | 0.391 | 12 |
| 2010, 2012 | 0.90 | 0.442 | 16 | 2010, 2012 | Negative | | | 2010, 2012 | 2.15 | 0.047 | 19 | 2010, 2012 | 0.17 | 1.000 | 10 |
| 2010, 2013 | 0.50 | 0.681 | 34 | 2010, 2013 | 0.29 | 0.849 | 18 | 2010, 2013 | 0.28 | 0.820 | 30 | 2010, 2013 | 1.49 | 0.172 | 26 |
| 2010, 2014 | 0.89 | 0.438 | 18 | 2010, 2014 | 0.78 | 0.525 | 15 | 2010, 2014 | 0.15 | 1.000 | 12 | 2010, 2014 | 0.91 | 0.438 | 16 |
| 2010, 2015 | 0.68 | 0.578 | 16 | 2010, 2015 | 2.20 | 0.036 | 32 | 2010, 2015 | 0.25 | 0.811 | 29 | 2010, 2015 | 0.50 | 0.701 | 17 |
| 2010, 2016 | 1.09 | 0.338 | 16 | 2010, 2016 | 1.96 | 0.076 | 27 | 2010, 2016 | 1.70 | 0.128 | 16 | 2010, 2016 | 1.91 | 0.090 | 29 |
| 2010, 2017 | 1.02 | 0.371 | 16 | 2010, 2017 | 0.29 | 0.802 | 26 | 2010, 2017 | 2.88 | 0.010 | 18 | 2010, 2017 | 4.98 | 0.000 | 17 |
| 2011, 2012 | 1.17 | 0.327 | 13 | 2011, 2012 | 0.34 | 0.822 | 15 | 2011, 2012 | 2.27 | 0.040 | 18 | 2011, 2012 | 1.19 | 0.310 | 13 |
| 2011, 2013 | 0.61 | 0.607 | 27 | 2011, 2013 | 0.60 | 0.619 | 19 | 2011, 2013 | 0.16 | 0.909 | 29 | 2011, 2013 | 0.38 | 0.799 | 31 |
| 2011, 2014 | 1.14 | 0.330 | 13 | 2011, 2014 | 0.41 | 0.786 | 12 | 2011, 2014 | Negative | | | 2011, 2014 | 0.11 | 1.000 | 18 |
| 2011, 2015 | 0.89 | 0.465 | 14 | 2011, 2015 | 1.93 | 0.067 | 30 | 2011, 2015 | 0.38 | 0.725 | 28 | 2011, 2015 | 0.19 | 0.929 | 20 |
| 2011, 2016 | 1.39 | 0.224 | 14 | 2011, 2016 | 1.73 | 0.095 | 27 | 2011, 2016 | 1.84 | 0.099 | 14 | 2011, 2016 | 1.00 | 0.357 | 30 |
| 2011, 2017 | 1.33 | 0.255 | 12 | 2011, 2017 | 0.10 | 1.000 | 26 | 2011, 2017 | 3.03 | 0.009 | 20 | 2011, 2017 | 3.60 | 0.001 | 29 |
| 2012, 2013 | 0.52 | 0.659 | 31 | 2012, 2013 | 0.27 | 0.855 | 19 | 2012, 2013 | 2.36 | 0.030 | 38 | 2012, 2013 | 1.68 | 0.123 | 26 |
| 2012, 2014 | 0.03 | 1.000 | 30 | 2012, 2014 | 0.70 | 0.573 | 16 | 2012, 2014 | 2.43 | 0.026 | 17 | 2012, 2014 | 1.04 | 0.358 | 17 |
| 2012, 2015 | 0.22 | 0.903 | 28 | 2012, 2015 | 2.01 | 0.059 | 34 | 2012, 2015 | 1.94 | 0.072 | 36 | 2012, 2015 | 0.60 | 0.624 | 19 |
| 2012, 2016 | 0.28 | 0.817 | 30 | 2012, 2016 | 1.76 | 0.108 | 33 | 2012, 2016 | 0.76 | 0.514 | 19 | 2012, 2016 | 2.07 | 0.063 | 28 |
| 2012, 2017 | 2.15 | 0.046 | 30 | 2012, 2017 | 0.26 | 0.817 | 27 | 2012, 2017 | 0.28 | 0.856 | 20 | 2012, 2017 | 5.27 | 0.000 | 28 |
| 2013, 2014 | 0.53 | 0.657 | 33 | 2013, 2014 | 0.90 | 0.421 | 17 | 2013, 2014 | 0.17 | 0.901 | 29 | 2013, 2014 | 0.19 | 0.918 | 34 |
| 2013, 2015 | 0.27 | 0.818 | 33 | 2013, 2015 | 2.07 | 0.048 | 42 | 2013, 2015 | 0.52 | 0.659 | 32 | 2013, 2015 | 0.48 | 0.632 | 39 |
| 2013, 2016 | 0.78 | 0.452 | 32 | 2013, 2016 | 1.79 | 0.091 | 36 | 2013, 2016 | 1.89 | 0.075 | 36 | 2013, 2016 | 0.76 | 0.489 | 30 |
| 2013, 2017 | 1.76 | 0.098 | 33 | 2013, 2017 | 0.51 | 0.611 | 36 | 2013, 2017 | 3.04 | 0.008 | 20 | 2013, 2017 | 3.50 | 0.003 | 30 |
| 2014, 2015 | 0.24 | 0.901 | 16 | 2014, 2015 | 1.58 | 0.124 | 30 | 2014, 2015 | 0.42 | 0.691 | 25 | 2014, 2015 | 0.25 | 0.869 | 22 |
| 2014, 2016 | 0.23 | 0.911 | 15 | 2014, 2016 | 1.42 | 0.189 | 25 | 2014, 2016 | 2.05 | 0.069 | 15 | 2014, 2016 | 0.75 | 0.480 | 36 |
| 2014, 2017 | 2.07 | 0.064 | 16 | 2014, 2017 | 0.51 | 0.680 | 24 | 2014, 2017 | 3.34 | 0.004 | 19 | 2014, 2017 | 2.76 | 0.013 | 34 |
| 2015, 2016 | 0.48 | 0.718 | 15 | 2015, 2016 | 0.02 | 1.000 | 26 | 2015, 2016 | 1.41 | 0.184 | 30 | 2015, 2016 | 0.92 | 0.375 | 38 |
| 2015, 2017 | 1.88 | 0.092 | 17 | 2015, 2017 | 1.99 | 0.060 | 30 | 2015, 2017 | 2.58 | 0.022 | 36 | 2015, 2017 | 2.67 | 0.018 | 39 |
| 2016, 2017 | 2.27 | 0.042 | 17 | 2016, 2017 | 1.79 | 0.092 | 27 | 2016, 2017 | 1.21 | 0.270 | 17 | 2016, 2017 | 2.06 | 0.057 | 30 |

Table S8. Relative abundance (%) of coral species per site and year. CP: Cuevas de Pedro, YE: Yemayá, VE: Veral, and VR: Verraco.

| Year | 2008 | 2008 | 2008 | 2008 | 2010 | 2010 | 2010 | 2010 | 2011 | 2011 | 2011 | 2011 | 2012 | 2012 | 2012 | 2012 | 2013 | 2013 | 2013 | 2013 | 2014 | 2014 | 2014 | 2014 | 2015 | 2015 | 2015 | 2015 | 2016 | 2016 | 2016 | 2016 | 2017 | 2017 | 2017 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Site | CP | YE | VE | VR | CP | YE | VE | VR | CP | YE | VE | VR | CP | YE | VE | VR | CP | YE | VE | VR | CP | YE | VE | VR | CP | YE | VE | VR | CP | YE | VE | VR | CP | YE | VE | VR |
| *Agaricia agaricites* | 12 | 19 | 6 | 16 | 20 | 20 | 17 | 24 | 16 | 32 | 28 | 16 | 25 | 19 | 28 | 20 | 26 | 14 | 38 | 33 | 31 | 27 | 33 | 22 | 20 | 34 | 29 | 18 | 27 | 18 | 23 | 17 | 28 | 25 | 22 | 19 |
| *Siderastrea siderea* | 10 | 14 | 18 | 39 | 17 | 15 | 18 | 27 | 16 | 20 | 19 | 26 | 21 | 25 | 14 | 9 | 17 | 20 | 18 | 16 | 12 | 16 | 17 | 25 | 9 | 8 | 13 | 30 | 17 | 20 | 19 | 26 | 14 | 20 | 20 | 26 |
| *Orbicella faveolata* | 34 | 17 | 29 | 10 | 20 | 22 | 24 | 15 | 20 | 18 | 10 | 17 | 17 | 13 | 13 | 24 | 19 | 24 | 13 | 11 | 10 | 14 | 14 | 12 | 20 | 10 | 8 | 6 | 7 | 19 | 17 | 11 | 5 | 9 | 12 | 8 |
| *Porites astreoides* | 12 | 6 | 17 | 17 | 18 | 17 | 12 | 10 | 10 | 4 | 17 | 22 | 16 | 17 | 14 | 25 | 13 | 6 | 12 | 22 | 18 | 18 | 11 | 19 | 14 | 21 | 13 | 15 | 13 | 17 | 8 | 16 | 15 | 18 | 9 | 12 |
| *Stephanocoenia intersepta* | 3 | 8 | 9 | 1 | 6 | 6 | 9 | 2 | 1 | 6 | 3 | 1 | 1 | 5 | 6 | 5 | 0 | 7 | 3 | 2 | 4 | 9 | 9 | 2 | 2 | 15 | 4 | 6 | 4 | 4 | 8 | 3 | 4 | 5 | 8 | 4 |
| *Porites porites* | 1 | 3 | 1 | 0 | 1 | 1 | 1 | 4 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 5 | 1 | 6 | 3 | 5 | 2 | 6 | 12 | 8 | 0 | 5 | 4 | 8 | 1 | 0 | 10 | 8 | 1 | 2 | 8 |
| *Montastraea cavernosa* | 11 | 3 | 2 | 9 | 2 | 3 | 2 | 2 | 4 | 2 | 5 | 3 | 3 | 3 | 3 | 4 | 5 | 4 | 1 | 2 | 2 | 1 | 0 | 2 | 5 | 2 | 6 | 3 | 4 | 3 | 3 | 2 | 3 | 2 | 2 | 3 |
| *Porites furcata* | 1 | 0 | 0 | 0 | 3 | 1 | 4 | 3 | 7 | 1 | 0 | 1 | 4 | 1 | 2 | 1 | 3 | 1 | 3 | 6 | 1 | 1 | 1 | 3 | 2 | 0 | 3 | 3 | 3 | 2 | 1 | 1 | 6 | 3 | 3 | 3 |
| *Orbicella annularis* | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 5 | 3 | 5 | 2 | 2 | 2 | 1 | 0 | 4 | 1 | 4 | 3 | 3 | 1 | 1 | 1 | 5 | 1 | 2 | 1 | 3 | 2 | 3 | 3 | 2 | 1 | 2 | 1 |
| *Colpophyllia natans* | 4 | 11 | 8 | 1 | 0 | 2 | 1 | 0 | 4 | 0 | 2 | 3 | 2 | 1 | 1 | 2 | 1 | 4 | 1 | 1 | 2 | 0 | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 |
| *Agaricia lamarcki* | 2 | 2 | 1 | 1 | 2 | 6 | 3 | 1 | 0 | 1 | 0 | 0 | 1 | 2 | 1 | 4 | 1 | 5 | 1 | 0 | 1 | 1 | 4 | 0 | 0 | 1 | 2 | 1 | 1 | 3 | 4 | 1 | 2 | 3 | 3 | 1 |
| *Millepora alcycornis* | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 2 | 4 | 5 | 3 | 3 | 4 | 3 | 1 | 3 | 4 | 6 | 2 |
| *Orbicella franksi* | 1 | 7 | 2 | 0 | 4 | 0 | 2 | 0 | 4 | 1 | 4 | 3 | 1 | 3 | 1 | 2 | 1 | 3 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 1 | 2 | 2 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 |
| *Meandrina meandrites* | 3 | 1 | 1 | 0 | 0 | 2 | 2 | 1 | 1 | 4 | 0 | 0 | 1 | 1 | 3 | 0 | 1 | 4 | 0 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 4 | 2 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| *Madracis decactis* | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 2 | 0 | 3 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 2 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| *Acropora cervicornis* | 0 | 2 | 0 | 0 | 1 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 3 | 2 | 0 | 0 | 4 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| *Pseudodiploria strigosa* | 0 | 0 | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 1 | 2 | 0 | 0 | 0 |
| *Diploria laberinthyformis* | 0 | 0 | 3 | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |
| *Agaricia tenufolia* | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| *Eusmillia fastigiata* | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 1 | 1 | 2 | 1 |
| *Manicina areolata* | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 2 |
| *Mycetophyllia danana* | 1 | 0 | 1 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| *Porites divaricata* | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 2 |
| *Dichocoenia stockesi* | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| *Mycetophyllia lamarckiana* | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| *Mussa angulosa* | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| *Siderastrea radians* | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |
| *Madracis mirabilis* | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| *Helioseris cucullata* | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| *Isophyllia rigida* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| *Mycetophyllia aliciae* | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Scolymia lacera* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| *Mycetophyllia ferox* | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Agaricia granmahe* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Table S9. Pair wise test analysis for coral relative abundance. CP: Cuevas de Pedro, YE: Yemayá, VE: Veral, and VR: Verraco, s: site.

| Within level 'CP' of factor 's' | | | | Within level 'YE' of factor 's' | | | | Within level 'VE' of factor 's' | | | | Within level 'VR' of factor 's' | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Groups | t | P(perm) | perms | Groups | t | P(perm) | perms | Groups | t | P(perm) | perms | Groups | t | P(perm) | perms |
| 2008, 2010 | 3.13 | 0.000 | 9943 | 2008, 2010 | 1.50 | 0.028 | 9934 | 2008, 2010 | 1.97 | 0.000 | 9944 | 2008, 2010 | 1.99 | 0.001 | 9944 |
| 2008, 2011 | 3.03 | 0.000 | 9950 | 2008, 2011 | 1.76 | 0.002 | 9937 | 2008, 2011 | 2.31 | 0.000 | 9935 | 2008, 2011 | 1.54 | 0.054 | 9940 |
| 2008, 2012 | 3.11 | 0.000 | 9947 | 2008, 2012 | 1.47 | 0.044 | 9936 | 2008, 2012 | 2.16 | 0.000 | 9940 | 2008, 2012 | 2.41 | 0.001 | 9951 |
| 2008, 2013 | 3.08 | 0.000 | 9949 | 2008, 2013 | 1.31 | 0.110 | 9945 | 2008, 2013 | 2.96 | 0.000 | 9950 | 2008, 2013 | 2.59 | 0.000 | 9943 |
| 2008, 2014 | 2.62 | 0.000 | 9943 | 2008, 2014 | 1.28 | 0.131 | 9944 | 2008, 2014 | 2.64 | 0.000 | 9945 | 2008, 2014 | 1.82 | 0.010 | 9954 |
| 2008, 2015 | 2.55 | 0.000 | 9944 | 2008, 2015 | 1.67 | 0.006 | 9951 | 2008, 2015 | 2.45 | 0.000 | 9937 | 2008, 2015 | 1.55 | 0.022 | 9934 |
| 2008, 2016 | 2.82 | 0.000 | 9941 | 2008, 2016 | 1.54 | 0.023 | 9945 | 2008, 2016 | 2.11 | 0.000 | 9943 | 2008, 2016 | 2.20 | 0.000 | 9942 |
| 2008, 2017 | 3.38 | 0.000 | 9938 | 2008, 2017 | 1.94 | 0.000 | 9950 | 2008, 2017 | 2.24 | 0.000 | 9947 | 2008, 2017 | 2.01 | 0.000 | 9923 |
| 2010, 2011 | 1.81 | 0.002 | 9952 | 2010, 2011 | 1.44 | 0.047 | 9953 | 2010, 2011 | 1.81 | 0.005 | 9933 | 2010, 2011 | 1.36 | 0.090 | 9944 |
| 2010, 2012 | 1.49 | 0.044 | 9949 | 2010, 2012 | 1.19 | 0.227 | 9953 | 2010, 2012 | 1.33 | 0.111 | 9934 | 2010, 2012 | 1.70 | 0.011 | 9943 |
| 2010, 2013 | 2.04 | 0.000 | 9939 | 2010, 2013 | 1.24 | 0.175 | 9936 | 2010, 2013 | 2.35 | 0.000 | 9948 | 2010, 2013 | 2.09 | 0.000 | 9926 |
| 2010, 2014 | 1.53 | 0.042 | 9949 | 2010, 2014 | 1.14 | 0.266 | 9950 | 2010, 2014 | 1.85 | 0.002 | 9946 | 2010, 2014 | 0.88 | 0.606 | 9938 |
| 2010, 2015 | 1.64 | 0.010 | 9934 | 2010, 2015 | 1.58 | 0.017 | 9944 | 2010, 2015 | 1.72 | 0.008 | 9948 | 2010, 2015 | 1.32 | 0.095 | 9943 |
| 2010, 2016 | 1.81 | 0.003 | 9955 | 2010, 2016 | 0.69 | 0.804 | 9953 | 2010, 2016 | 1.32 | 0.118 | 9953 | 2010, 2016 | 0.95 | 0.509 | 9948 |
| 2010, 2017 | 2.27 | 0.000 | 9942 | 2010, 2017 | 1.31 | 0.143 | 9955 | 2010, 2017 | 1.61 | 0.017 | 9967 | 2010, 2017 | 0.86 | 0.655 | 9942 |
| 2011, 2012 | 1.36 | 0.078 | 9945 | 2011, 2012 | 1.66 | 0.016 | 9943 | 2011, 2012 | 0.99 | 0.467 | 9939 | 2011, 2012 | 1.71 | 0.012 | 9955 |
| 2011, 2013 | 1.33 | 0.106 | 9964 | 2011, 2013 | 1.82 | 0.004 | 9950 | 2011, 2013 | 1.55 | 0.032 | 9949 | 2011, 2013 | 1.91 | 0.003 | 9950 |
| 2011, 2014 | 1.55 | 0.032 | 9945 | 2011, 2014 | 1.55 | 0.023 | 9948 | 2011, 2014 | 1.57 | 0.032 | 9947 | 2011, 2014 | 1.32 | 0.142 | 9935 |
| 2011, 2015 | 1.06 | 0.370 | 9953 | 2011, 2015 | 2.01 | 0.000 | 9957 | 2011, 2015 | 0.98 | 0.464 | 9946 | 2011, 2015 | 1.47 | 0.054 | 9948 |
| 2011, 2016 | 1.23 | 0.175 | 9939 | 2011, 2016 | 1.65 | 0.021 | 9940 | 2011, 2016 | 1.48 | 0.056 | 9945 | 2011, 2016 | 1.50 | 0.058 | 9955 |
| 2011, 2017 | 1.81 | 0.003 | 9937 | 2011, 2017 | 1.96 | 0.002 | 9948 | 2011, 2017 | 1.80 | 0.004 | 9940 | 2011, 2017 | 1.55 | 0.042 | 9947 |
| 2012, 2013 | 1.08 | 0.327 | 9947 | 2012, 2013 | 1.32 | 0.110 | 9936 | 2012, 2013 | 1.60 | 0.023 | 9954 | 2012, 2013 | 2.09 | 0.001 | 9940 |
| 2012, 2014 | 0.89 | 0.575 | 9958 | 2012, 2014 | 0.78 | 0.712 | 9949 | 2012, 2014 | 1.13 | 0.288 | 9971 | 2012, 2014 | 2.05 | 0.004 | 9952 |
| 2012, 2015 | 1.28 | 0.131 | 9950 | 2012, 2015 | 1.74 | 0.005 | 9940 | 2012, 2015 | 1.16 | 0.243 | 9950 | 2012, 2015 | 2.05 | 0.001 | 9940 |
| 2012, 2016 | 0.91 | 0.577 | 9927 | 2012, 2016 | 0.78 | 0.693 | 9944 | 2012, 2016 | 1.05 | 0.387 | 9954 | 2012, 2016 | 2.11 | 0.001 | 9933 |
| 2012, 2017 | 1.38 | 0.069 | 9954 | 2012, 2017 | 1.03 | 0.390 | 9953 | 2012, 2017 | 1.42 | 0.061 | 9949 | 2012, 2017 | 2.25 | 0.000 | 9928 |
| 2013, 2014 | 1.09 | 0.324 | 9946 | 2013, 2014 | 1.61 | 0.023 | 9941 | 2013, 2014 | 0.85 | 0.629 | 9956 | 2013, 2014 | 1.82 | 0.009 | 9947 |
| 2013, 2015 | 0.85 | 0.662 | 9939 | 2013, 2015 | 2.28 | 0.000 | 9955 | 2013, 2015 | 1.09 | 0.334 | 9949 | 2013, 2015 | 1.61 | 0.011 | 9961 |
| 2013, 2016 | 1.02 | 0.416 | 9957 | 2013, 2016 | 1.30 | 0.137 | 9942 | 2013, 2016 | 1.49 | 0.055 | 9953 | 2013, 2016 | 1.95 | 0.001 | 9962 |
| 2013, 2017 | 1.70 | 0.006 | 9947 | 2013, 2017 | 2.07 | 0.001 | 9951 | 2013, 2017 | 1.61 | 0.018 | 9960 | 2013, 2017 | 2.05 | 0.000 | 9943 |
| 2014, 2015 | 0.61 | 0.862 | 9939 | 2014, 2015 | 1.41 | 0.061 | 9945 | 2014, 2015 | 1.21 | 0.203 | 9950 | 2014, 2015 | 1.08 | 0.322 | 9933 |
| 2014, 2016 | 0.57 | 0.894 | 9949 | 2014, 2016 | 1.26 | 0.164 | 9956 | 2014, 2016 | 1.30 | 0.141 | 9942 | 2014, 2016 | 0.56 | 0.887 | 9953 |
| 2014, 2017 | 0.96 | 0.488 | 9946 | 2014, 2017 | 1.16 | 0.240 | 9940 | 2014, 2017 | 1.55 | 0.027 | 9952 | 2014, 2017 | 0.53 | 0.910 | 9941 |
| 2015, 2016 | 0.72 | 0.807 | 9951 | 2015, 2016 | 1.78 | 0.007 | 9957 | 2015, 2016 | 1.32 | 0.117 | 9943 | 2015, 2016 | 1.16 | 0.230 | 9944 |
| 2015, 2017 | 1.31 | 0.109 | 9950 | 2015, 2017 | 1.77 | 0.004 | 9950 | 2015, 2017 | 1.43 | 0.067 | 9956 | 2015, 2017 | 1.08 | 0.320 | 9934 |
| 2016, 2017 | 0.60 | 0.890 | 9944 | 2016, 2017 | 0.83 | 0.593 | 9934 | 2016, 2017 | 0.60 | 0.879 | 9954 | 2016, 2017 | 0.47 | 0.940 | 9880 |

Table S10. Relative abundance (%) of coral traits groups per site and year. CP: Cuevas de Pedro, YE: Yemayá, VE: Veral, and VR: Verraco.

| Year | 2008 | 2008 | 2008 | 2008 | 2010 | 2010 | 2010 | 2010 | 2011 | 2011 | 2011 | 2011 | 2012 | 2012 | 2012 | 2012 | 2013 | 2013 | 2013 | 2013 | 2014 | 2014 | 2014 | 2014 | 2015 | 2015 | 2015 | 2015 | 2016 | 2016 | 2016 | 2016 | 2017 | 2017 | 2017 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Site | CP | YE | VE | VR | CP | YE | VE | VR | CP | YE | VE | VR | CP | YE | VE | VR | CP | YE | VE | VR | CP | YE | VE | VR | CP | YE | VE | VR | CP | YE | VE | VR | CP | YE | VE | VR |
| Foliose-digitate species | 3 | 7 | 1 | 0 | 5 | 2 | 5 | 9 | 10 | 5 | 2 | 4 | 9 | 2 | 7 | 4 | 8 | 2 | 9 | 9 | 7 | 3 | 7 | 14 | 11 | 1 | 11 | 9 | 12 | 3 | 2 | 15 | 15 | 5 | 7 | 16 |
| Framework-building branching corals | 0 | 2 | 0 | 0 | 1 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 3 | 2 | 0 | 0 | 4 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| Massive reef framework-building corals | 35 | 23 | 31 | 10 | 24 | 23 | 28 | 18 | 29 | 22 | 19 | 23 | 19 | 18 | 15 | 25 | 24 | 28 | 16 | 13 | 14 | 17 | 16 | 12 | 28 | 13 | 13 | 9 | 10 | 23 | 21 | 15 | 6 | 11 | 15 | 10 |
| Non-framework-building corals | 30 | 31 | 25 | 36 | 44 | 44 | 35 | 39 | 29 | 39 | 49 | 38 | 42 | 41 | 47 | 51 | 43 | 27 | 52 | 57 | 54 | 49 | 50 | 41 | 39 | 60 | 47 | 39 | 45 | 41 | 42 | 37 | 50 | 51 | 42 | 39 |
| Secundary Massive reef framework-building corals | 32 | 37 | 43 | 54 | 27 | 29 | 32 | 34 | 30 | 33 | 30 | 35 | 28 | 38 | 30 | 20 | 24 | 41 | 23 | 20 | 21 | 30 | 26 | 32 | 18 | 26 | 30 | 43 | 31 | 32 | 34 | 33 | 26 | 32 | 36 | 35 |

Table S11. Pair wise test analysis for relative abundance of coral traits groups. CP: Cuevas de Pedro, YE: Yemayá, VE: Veral, and VR: Verraco, s: site.

| Within level 'CP' of factor 's' | | | | Within level 'YE' of factor 's' | | | | Within level 'VE' of factor 's' | | | | Within level 'VR' of factor 's' | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Groups | t | P(perm) | perms | Groups | t | P(perm) | perms | Groups | t | P(perm) | perms | Groups | t | P(perm) | perms |
| 2008, 2010 | 2.85 | 0.000 | 9950 | 2008, 2010 | 1.62 | 0.037 | 9961 | 2008, 2010 | 3.26 | 0.000 | 9961 | 2008, 2010 | 3.27 | 0.000 | 9959 |
| 2008, 2011 | 3.43 | 0.000 | 9954 | 2008, 2011 | 1.81 | 0.011 | 9952 | 2008, 2011 | 2.71 | 0.000 | 9958 | 2008, 2011 | 2.34 | 0.003 | 9958 |
| 2008, 2012 | 3.31 | 0.000 | 9943 | 2008, 2012 | 1.65 | 0.038 | 9954 | 2008, 2012 | 2.71 | 0.000 | 9947 | 2008, 2012 | 3.07 | 0.000 | 9943 |
| 2008, 2013 | 3.23 | 0.000 | 9950 | 2008, 2013 | 1.03 | 0.382 | 9959 | 2008, 2013 | 3.21 | 0.000 | 9950 | 2008, 2013 | 3.19 | 0.000 | 9953 |
| 2008, 2014 | 2.93 | 0.000 | 9945 | 2008, 2014 | 1.56 | 0.068 | 9947 | 2008, 2014 | 2.98 | 0.000 | 9968 | 2008, 2014 | 2.62 | 0.000 | 9949 |
| 2008, 2015 | 2.98 | 0.000 | 9943 | 2008, 2015 | 2.43 | 0.001 | 9952 | 2008, 2015 | 3.30 | 0.000 | 9944 | 2008, 2015 | 1.21 | 0.225 | 9956 |
| 2008, 2016 | 3.41 | 0.000 | 9958 | 2008, 2016 | 1.69 | 0.029 | 9945 | 2008, 2016 | 2.33 | 0.001 | 9962 | 2008, 2016 | 2.73 | 0.000 | 9947 |
| 2008, 2017 | 3.84 | 0.000 | 9958 | 2008, 2017 | 2.36 | 0.001 | 9938 | 2008, 2017 | 2.23 | 0.002 | 9948 | 2008, 2017 | 2.71 | 0.000 | 9964 |
| 2010, 2011 | 1.49 | 0.076 | 9966 | 2010, 2011 | 1.70 | 0.030 | 9954 | 2010, 2011 | 1.58 | 0.068 | 9958 | 2010, 2011 | 2.01 | 0.009 | 9970 |
| 2010, 2012 | 1.04 | 0.369 | 9957 | 2010, 2012 | 1.66 | 0.059 | 9972 | 2010, 2012 | 1.67 | 0.044 | 9963 | 2010, 2012 | 2.06 | 0.005 | 9962 |
| 2010, 2013 | 0.61 | 0.777 | 9949 | 2010, 2013 | 2.01 | 0.009 | 9958 | 2010, 2013 | 1.95 | 0.017 | 9964 | 2010, 2013 | 2.41 | 0.001 | 9961 |
| 2010, 2014 | 1.30 | 0.165 | 9952 | 2010, 2014 | 1.09 | 0.339 | 9960 | 2010, 2014 | 1.88 | 0.019 | 9949 | 2010, 2014 | 1.45 | 0.103 | 9964 |
| 2010, 2015 | 1.21 | 0.222 | 9951 | 2010, 2015 | 1.95 | 0.016 | 9955 | 2010, 2015 | 1.91 | 0.011 | 9952 | 2010, 2015 | 2.20 | 0.002 | 9958 |
| 2010, 2016 | 1.78 | 0.013 | 9957 | 2010, 2016 | 1.03 | 0.405 | 9953 | 2010, 2016 | 0.92 | 0.488 | 9950 | 2010, 2016 | 1.17 | 0.279 | 9957 |
| 2010, 2017 | 2.32 | 0.001 | 9963 | 2010, 2017 | 1.67 | 0.047 | 9958 | 2010, 2017 | 1.48 | 0.085 | 9934 | 2010, 2017 | 2.28 | 0.001 | 9962 |
| 2011, 2012 | 1.75 | 0.023 | 9963 | 2011, 2012 | 1.97 | 0.009 | 9961 | 2011, 2012 | 0.44 | 0.890 | 9952 | 2011, 2012 | 1.57 | 0.067 | 9955 |
| 2011, 2013 | 1.68 | 0.040 | 9947 | 2011, 2013 | 2.00 | 0.008 | 9952 | 2011, 2013 | 0.83 | 0.597 | 9959 | 2011, 2013 | 2.23 | 0.001 | 9960 |
| 2011, 2014 | 2.06 | 0.007 | 9946 | 2011, 2014 | 2.17 | 0.002 | 9967 | 2011, 2014 | 0.49 | 0.860 | 9953 | 2011, 2014 | 1.44 | 0.121 | 9969 |
| 2011, 2015 | 1.33 | 0.143 | 9963 | 2011, 2015 | 3.08 | 0.000 | 9954 | 2011, 2015 | 1.16 | 0.281 | 9958 | 2011, 2015 | 1.48 | 0.073 | 9958 |
| 2011, 2016 | 2.08 | 0.004 | 9956 | 2011, 2016 | 0.14 | 0.912 | 9957 | 2011, 2016 | 1.10 | 0.323 | 9953 | 2011, 2016 | 1.65 | 0.056 | 9954 |
| 2011, 2017 | 3.21 | 0.000 | 9957 | 2011, 2017 | 2.17 | 0.002 | 9946 | 2011, 2017 | 1.24 | 0.229 | 9964 | 2011, 2017 | 1.99 | 0.007 | 9958 |
| 2012, 2013 | 0.78 | 0.623 | 9971 | 2012, 2013 | 1.44 | 0.111 | 9961 | 2012, 2013 | 0.65 | 0.761 | 9970 | 2012, 2013 | 1.38 | 0.123 | 9954 |
| 2012, 2014 | 0.71 | 0.712 | 9961 | 2012, 2014 | 1.31 | 0.190 | 9960 | 2012, 2014 Negative | | | | 2012, 2014 | 1.92 | 0.011 | 9955 |
| 2012, 2015 | 1.60 | 0.042 | 9960 | 2012, 2015 | 2.23 | 0.010 | 9962 | 2012, 2015 | 1.14 | 0.294 | 9948 | 2012, 2015 | 1.96 | 0.005 | 9952 |
| 2012, 2016 | 0.66 | 0.749 | 9953 | 2012, 2016 | 1.66 | 0.056 | 9952 | 2012, 2016 | 0.84 | 0.581 | 9947 | 2012, 2016 | 2.06 | 0.002 | 9946 |
| 2012, 2017 | 1.36 | 0.135 | 9951 | 2012, 2017 | 1.77 | 0.041 | 9948 | 2012, 2017 | 0.51 | 0.855 | 9940 | 2012, 2017 | 2.53 | 0.000 | 9962 |
| 2013, 2014 | 0.86 | 0.556 | 9954 | 2013, 2014 | 2.10 | 0.007 | 9959 | 2013, 2014 Negative | | | | 2013, 2014 | 1.80 | 0.019 | 9963 |
| 2013, 2015 | 1.14 | 0.275 | 9928 | 2013, 2015 | 3.14 | 0.000 | 9975 | 2013, 2015 | 1.18 | 0.257 | 9960 | 2013, 2015 | 1.81 | 0.010 | 9960 |
| 2013, 2016 | 1.50 | 0.073 | 9955 | 2013, 2016 | 1.79 | 0.027 | 9950 | 2013, 2016 | 1.43 | 0.111 | 9971 | 2013, 2016 | 1.91 | 0.007 | 9955 |
| 2013, 2017 | 1.99 | 0.007 | 9961 | 2013, 2017 | 2.89 | 0.000 | 9950 | 2013, 2017 | 1.29 | 0.178 | 9951 | 2013, 2017 | 2.06 | 0.004 | 9945 |
| 2014, 2015 | 1.36 | 0.128 | 9966 | 2014, 2015 | 1.19 | 0.260 | 9951 | 2014, 2015 | 1.12 | 0.315 | 9964 | 2014, 2015 | 1.37 | 0.123 | 9955 |
| 2014, 2016 | 0.77 | 0.642 | 9940 | 2014, 2016 | 1.70 | 0.035 | 9951 | 2014, 2016 | 1.29 | 0.174 | 9953 | 2014, 2016 | 0.36 | 0.896 | 9958 |
| 2014, 2017 | 0.83 | 0.572 | 9962 | 2014, 2017 | 1.35 | 0.152 | 9954 | 2014, 2017 | 1.15 | 0.281 | 9946 | 2014, 2017 | 0.68 | 0.725 | 9959 |
| 2015, 2016 | 1.91 | 0.004 | 9952 | 2015, 2016 | 2.39 | 0.001 | 9947 | 2015, 2016 | 1.81 | 0.023 | 9960 | 2015, 2016 | 1.53 | 0.066 | 9954 |
| 2015, 2017 | 2.56 | 0.000 | 9946 | 2015, 2017 | 1.82 | 0.029 | 9954 | 2015, 2017 | 1.47 | 0.075 | 9957 | 2015, 2017 | 1.28 | 0.170 | 9959 |
| 2016, 2017 | 1.13 | 0.306 | 9949 | 2016, 2017 | 1.49 | 0.099 | 9916 | 2016, 2017 | 0.64 | 0.750 | 9943 | 2016, 2017 | 0.8187 | 0.592 | 9921 |

Table S12. Mean and standard deviation of the reef functional index per site and year. CP: Cuevas de Pedro, YE: Yemayá, VE: Veral, and VR: Verraco.

| Year | Site | AVE | SD |
|------|------|------|------|
| 2008 | CP | 0,50 | 0,04 |
| 2008 | YE | 0,43 | 0,05 |
| 2008 | VE | 0,44 | 0,07 |
| 2008 | VR | 0,40 | 0,04 |
| 2010 | CP | 0,40 | 0,03 |
| 2010 | YE | 0,40 | 0,04 |
| 2010 | VE | 0,37 | 0,02 |
| 2010 | VR | 0,34 | 0,04 |
| 2011 | CP | 0,41 | 0,02 |
| 2011 | YE | 0,38 | 0,03 |
| 2011 | VE | 0,37 | 0,04 |
| 2011 | VR | 0,39 | 0,03 |
| 2012 | CP | 0,40 | 0,03 |
| 2012 | YE | 0,40 | 0,04 |
| 2012 | VE | 0,39 | 0,03 |
| 2012 | VR | 0,37 | 0,05 |
| 2013 | CP | 0,41 | 0,03 |
| 2013 | YE | 0,41 | 0,04 |
| 2013 | VE | 0,38 | 0,03 |
| 2013 | VR | 0,38 | 0,05 |
| 2014 | CP | 0,40 | 0,04 |
| 2014 | YE | 0,41 | 0,03 |
| 2014 | VE | 0,37 | 0,03 |
| 2014 | VR | 0,37 | 0,04 |
| 2015 | CP | 0,43 | 0,03 |
| 2015 | YE | 0,40 | 0,04 |
| 2015 | VE | 0,35 | 0,04 |
| 2015 | VR | 0,37 | 0,06 |
| 2016 | CP | 0,38 | 0,04 |
| 2016 | YE | 0,38 | 0,04 |
| 2016 | VE | 0,38 | 0,03 |
| 2016 | VR | 0,37 | 0,03 |
| 2017 | CP | 0,40 | 0,03 |
| 2017 | YE | 0,38 | 0,02 |
| 2017 | VE | 0,39 | 0,03 |
| 2017 | VR | 0,39 | 0,02 |

Table S13. Pair wise test analysis for the reef functional index. CP: Cuevas de Pedro, YE: Yemayá, VE: Veral, and VR: Verraco, s: site.

| Within level 'CP' of factor 's' | | | | Within level 'YE' of factor 's' | | | | Within level 'VE' of factor 's' | | | | Within level 'VR' of factor 's' | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Groups | t | P(perm) | perms | Groups | t | P(perm) | perms | Groups | t | P(perm) | perms | Groups | t | P(perm) | perms |
| 2008, 2010 | 6.95 | 0.000 | 60 | 2008, 2010 | 1.57 | 0.136 | 46 | 2008, 2010 | 3.71 | 0.001 | 120 | 2008, 2010 | 4.54 | 0.000 | 49 |
| 2008, 2011 | 6.53 | 0.000 | 51 | 2008, 2011 | 3.24 | 0.003 | 50 | 2008, 2011 | 3.42 | 0.002 | 128 | 2008, 2011 | 0.98 | 0.366 | 38 |
| 2008, 2012 | 6.80 | 0.000 | 110 | 2008, 2012 | 1.83 | 0.082 | 48 | 2008, 2012 | 2.60 | 0.017 | 111 | 2008, 2012 | 1.98 | 0.066 | 46 |
| 2008, 2013 | 7.19 | 0.000 | 113 | 2008, 2013 | 0.88 | 0.399 | 49 | 2008, 2013 | 3.38 | 0.002 | 62 | 2008, 2013 | 1.49 | 0.157 | 86 |
| 2008, 2014 | 6.47 | 0.000 | 62 | 2008, 2014 | 1.23 | 0.240 | 42 | 2008, 2014 | 3.49 | 0.002 | 118 | 2008, 2014 | 2.08 | 0.055 | 40 |
| 2008, 2015 | 5.21 | 0.000 | 49 | 2008, 2015 | 1.87 | 0.080 | 90 | 2008, 2015 | 4.36 | 0.000 | 132 | 2008, 2015 | 1.76 | 0.087 | 48 |
| 2008, 2016 | 7.88 | 0.000 | 68 | 2008, 2016 | 2.57 | 0.014 | 93 | 2008, 2016 | 2.93 | 0.008 | 117 | 2008, 2016 | 2.16 | 0.045 | 70 |
| 2008, 2017 | 7.52 | 0.000 | 59 | 2008, 2017 | 3.07 | 0.007 | 83 | 2008, 2017 | 2.84 | 0.008 | 117 | 2008, 2017 | 1.20 | 0.274 | 28 |
| 2010, 2011 | 1.04 | 0.339 | 24 | 2010, 2011 | 2.12 | 0.052 | 32 | 2010, 2011 | 0.06 | 1.000 | 30 | 2010, 2011 | 4.10 | 0.000 | 40 |
| 2010, 2012 | 0.09 | 0.953 | 59 | 2010, 2012 | 0.35 | 0.760 | 33 | 2010, 2012 | 1.86 | 0.085 | 27 | 2010, 2012 | 2.08 | 0.054 | 42 |
| 2010, 2013 | 0.91 | 0.389 | 61 | 2010, 2013 | 0.73 | 0.499 | 37 | 2010, 2013 | 0.77 | 0.464 | 54 | 2010, 2013 | 2.63 | 0.012 | 89 |
| 2010, 2014 | 0.00 | 1.000 | 31 | 2010, 2014 | 0.64 | 0.563 | 29 | 2010, 2014 | 0.13 | 0.950 | 28 | 2010, 2014 | 2.61 | 0.017 | 36 |
| 2010, 2015 | 2.11 | 0.054 | 30 | 2010, 2015 | 0.35 | 0.769 | 67 | 2010, 2015 | 1.39 | 0.183 | 56 | 2010, 2015 | 1.83 | 0.081 | 45 |
| 2010, 2016 | 2.06 | 0.050 | 32 | 2010, 2016 | 1.59 | 0.124 | 69 | 2010, 2016 | 1.35 | 0.217 | 26 | 2010, 2016 | 2.54 | 0.020 | 66 |
| 2010, 2017 | 0.59 | 0.605 | 26 | 2010, 2017 | 1.94 | 0.074 | 56 | 2010, 2017 | 1.31 | 0.226 | 28 | 2010, 2017 | 4.42 | 0.000 | 36 |
| 2011, 2012 | 0.89 | 0.414 | 54 | 2011, 2012 | 1.69 | 0.113 | 32 | 2011, 2012 | 1.42 | 0.177 | 37 | 2011, 2012 | 1.29 | 0.220 | 39 |
| 2011, 2013 | 0.14 | 0.900 | 57 | 2011, 2013 | 2.66 | 0.017 | 37 | 2011, 2013 | 0.56 | 0.592 | 65 | 2011, 2013 | 0.72 | 0.509 | 77 |
| 2011, 2014 | 0.91 | 0.405 | 30 | 2011, 2014 | 3.26 | 0.003 | 30 | 2011, 2014 | 0.05 | 1.000 | 35 | 2011, 2014 | 1.31 | 0.219 | 34 |
| 2011, 2015 | 1.28 | 0.247 | 24 | 2011, 2015 | 1.73 | 0.097 | 62 | 2011, 2015 | 1.19 | 0.251 | 69 | 2011, 2015 | 1.12 | 0.302 | 42 |
| 2011, 2016 | 3.02 | 0.003 | 32 | 2011, 2016 | 0.00 | 1.000 | 59 | 2011, 2016 | 0.99 | 0.346 | 34 | 2011, 2016 | 1.44 | 0.175 | 58 |
| 2011, 2017 | 1.72 | 0.105 | 26 | 2011, 2017 | 0.37 | 0.766 | 45 | 2011, 2017 | 0.99 | 0.347 | 38 | 2011, 2017 | 0.17 | 0.889 | 49 |
| 2012, 2013 | 0.78 | 0.444 | 65 | 2012, 2013 | 1.04 | 0.337 | 36 | 2012, 2013 | 1.02 | 0.328 | 62 | 2012, 2013 | 0.49 | 0.643 | 92 |
| 2012, 2014 | 0.08 | 0.959 | 64 | 2012, 2014 | 1.02 | 0.344 | 30 | 2012, 2014 | 1.49 | 0.168 | 31 | 2012, 2014 | 0.17 | 0.899 | 42 |
| 2012, 2015 | 1.94 | 0.064 | 60 | 2012, 2015 | 0.01 | 1.000 | 66 | 2012, 2015 | 2.77 | 0.009 | 72 | 2012, 2015 | Negative | | |
| 2012, 2016 | 2.10 | 0.046 | 69 | 2012, 2016 | 1.27 | 0.229 | 68 | 2012, 2016 | 0.52 | 0.654 | 30 | 2012, 2016 | 0.09 | 0.968 | 37 |
| 2012, 2017 | 0.66 | 0.547 | 56 | 2012, 2017 | 1.48 | 0.156 | 52 | 2012, 2017 | 0.43 | 0.702 | 32 | 2012, 2017 | 1.23 | 0.243 | 64 |
| 2013, 2014 | 0.83 | 0.436 | 63 | 2013, 2014 | 0.25 | 0.842 | 32 | 2013, 2014 | 0.55 | 0.595 | 59 | 2013, 2014 | 0.37 | 0.743 | 81 |
| 2013, 2015 | 1.42 | 0.178 | 63 | 2013, 2015 | 1.05 | 0.310 | 75 | 2013, 2015 | 1.94 | 0.056 | 64 | 2013, 2015 | 0.45 | 0.684 | 92 |
| 2013, 2016 | 3.10 | 0.003 | 73 | 2013, 2016 | 2.06 | 0.053 | 77 | 2013, 2016 | 0.52 | 0.606 | 58 | 2013, 2016 | 0.44 | 0.691 | 76 |
| 2013, 2017 | 1.57 | 0.126 | 57 | 2013, 2017 | 2.50 | 0.018 | 64 | 2013, 2017 | 0.54 | 0.591 | 65 | 2013, 2017 | 0.62 | 0.589 | 68 |
| 2014, 2015 | 1.89 | 0.080 | 33 | 2014, 2015 | 1.03 | 0.326 | 58 | 2014, 2015 | 1.34 | 0.208 | 64 | 2014, 2015 | 0.15 | 0.918 | 43 |
| 2014, 2016 | 1.90 | 0.078 | 35 | 2014, 2016 | 2.35 | 0.030 | 64 | 2014, 2016 | 1.03 | 0.348 | 29 | 2014, 2016 | 0.09 | 0.956 | 64 |
| 2014, 2017 | 0.52 | 0.644 | 31 | 2014, 2017 | 3.25 | 0.003 | 49 | 2014, 2017 | 1.02 | 0.346 | 32 | 2014, 2017 | 1.30 | 0.217 | 55 |
| 2015, 2016 | 3.79 | 0.000 | 37 | 2015, 2016 | 1.31 | 0.204 | 73 | 2015, 2016 | 2.37 | 0.023 | 64 | 2015, 2016 | 0.08 | 0.974 | 39 |
| 2015, 2017 | 2.74 | 0.011 | 28 | 2015, 2017 | 1.52 | 0.141 | 54 | 2015, 2017 | 2.30 | 0.029 | 65 | 2015, 2017 | 1.04 | 0.342 | 69 |
| 2016, 2017 | 1.62 | 0.137 | 31 | 2016, 2017 | 0.26 | 0.806 | 56 | 2016, 2017 | 0.06 | 1.000 | 31 | 2016, 2017 | 1.51 | 0.167 | 24 |

Table S14. Mean (AVE) and standard deviation (SD) of abiotic variables per site and year. CP: Cuevas de Pedro, YE: Yemayá, VE: Veral, and VR: Verraco.

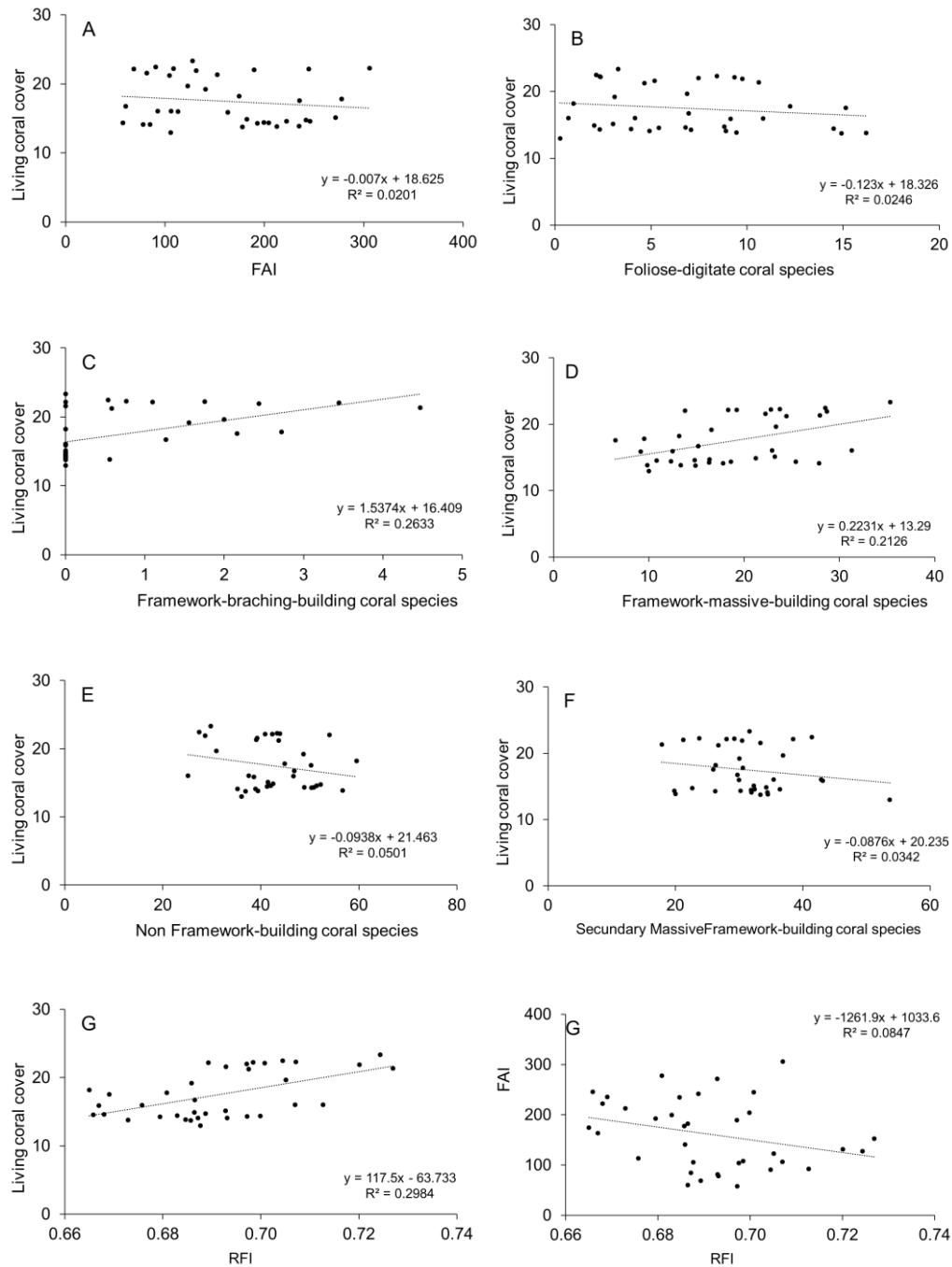| Variable | Sites | 2007 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Years | | | | |
| AVE WAVE (m) | CP | 0.44 | 0.33 | 0.47 | 0.59 | 0.42 | 0.68 | 0.44 | 0.23 | 0.74 |
| | YE | 0.41 | 0.31 | 0.43 | 0.55 | 0.42 | 0.64 | 0.45 | 0.21 | 0.74 |
| | VE | 0.31 | 0.29 | 0.43 | 0.42 | 0.26 | 0.40 | 0.24 | 0.17 | 0.48 |
| | VR | 0.44 | 0.33 | 0.47 | 0.59 | 0.42 | 0.68 | 0.44 | 0.23 | 0.74 |
| SD WAVE (m) | CP | 0.32 | 0.32 | 0.29 | 0.21 | 0.43 | 0.40 | 0.21 | 0.29 | 0.56 |
| | YE | 0.32 | 0.32 | 0.29 | 0.21 | 0.43 | 0.40 | 0.21 | 0.29 | 0.56 |
| | VE | 0.25 | 0.33 | 0.42 | 0.15 | 0.33 | 0.23 | 0.10 | 0.18 | 0.44 |
| | VR | 0.32 | 0.32 | 0.29 | 0.21 | 0.43 | 0.40 | 0.21 | 0.29 | 0.56 |
| AVE NSST (℃) | CP | 28.0 | 28.1 | 27.6 | 28.3 | 27.9 | 27.9 | 28.3 | 28.6 | 28.5 |
| | YE | 28.0 | 28.1 | 27.6 | 28.3 | 27.9 | 27.9 | 28.3 | 28.6 | 28.5 |
| | VE | 28.0 | 28.1 | 27.6 | 28.3 | 27.9 | 27.9 | 28.3 | 28.6 | 28.5 |
| | VR | 28.0 | 28.0 | 27.8 | 28.1 | 27.9 | 28.0 | 28.2 | 28.8 | 28.6 |
| SD NSST (℃) | CP | 1.3 | 1.8 | 1.7 | 1.8 | 1.3 | 1.0 | 1.5 | 1.4 | 1.4 |
| | YE | 1.3 | 1.8 | 1.7 | 1.8 | 1.3 | 1.0 | 1.5 | 1.4 | 1.4 |
| | VE | 1.3 | 1.8 | 1.7 | 1.8 | 1.3 | 1.0 | 1.5 | 1.4 | 1.4 |
| | VR | 1.2 | 1.7 | 1.6 | 1.6 | 1.3 | 0.9 | 1.4 | 1.3 | 1.3 |
| AVE DHW (℃) | CP | 1.2 | 4.8 | 0.8 | 0.0 | 1.2 | 0.0 | 0.0 | 3.7 | 3.5 |
| | YE | 1.1 | 3.8 | 0.8 | 0.0 | 0.9 | 0.0 | 0.0 | 3.5 | 1.9 |
| | VE | 0.9 | 3.3 | 1.6 | 0.0 | 0.0 | 0.0 | 0.0 | 3.6 | 3.3 |
| | VR | 0.9 | 2.8 | 0.9 | 0.0 | 0.9 | 0.0 | 0.0 | 4.1 | 3.6 |
| SD DHW (℃) | CP | 0.0 | 3.3 | 1.7 | 0.0 | 0.7 | 0.0 | 0.0 | 2.3 | 1.4 |
| | YE | 0.3 | 3.3 | 0.7 | 0.0 | 0.6 | 0.0 | 0.0 | 1.9 | 1.5 |
| | VE | 0.3 | 2.7 | 0.7 | 0.0 | 0.6 | 0.0 | 0.0 | 1.8 | 1.2 |
| | VR | 0.3 | 2.2 | 0.8 | 0.0 | 0.5 | 0.0 | 0.0 | 1.4 | 0.6 |
| AVE POC (mol m$^{-3}$) | CP | 41.3 | 37.1 | 39.6 | 35.2 | 41.2 | 46.5 | 37.0 | 37.7 | 44.5 |
| | YE | 41.9 | 37.1 | 39.6 | 35.2 | 39.6 | 46.5 | 37.0 | 37.1 | 44.5 |
| | VE | 38.7 | 36.0 | 35.8 | 33.2 | 38.0 | 42.8 | 34.4 | 35.1 | 46.4 |
| | VR | 40.6 | 36.7 | 35.8 | 35.1 | 32.6 | 43.9 | 34.1 | 35.0 | 45.9 |
| SD POC (mol m$^{-3}$) | CP | 7.8 | 8.8 | 6.9 | 7.0 | 13.7 | 13.2 | 7.2 | 6.0 | 9.6 |
| | YE | 7.2 | 8.8 | 6.9 | 7.0 | 10.8 | 13.2 | 7.2 | 6.2 | 9.6 |
| | VE | 7.4 | 8.2 | 8.4 | 6.7 | 12.1 | 14.4 | 9.0 | 6.3 | 12.7 |
| | VR | 9.2 | 8.2 | 5.5 | 5.9 | 8.1 | 10.9 | 9.1 | 5.8 | 16.1 |
| AVE CHL1 (mg m$^{-3}$) | CP | 0.13 | 0.11 | 0.12 | 0.11 | 0.12 | 0.15 | 0.11 | 0.11 | 0.14 |
| | YE | 0.12 | 0.13 | 0.12 | 0.12 | 0.12 | 0.13 | 0.11 | 0.12 | 0.14 |
| | VE | 0.13 | 0.12 | 0.12 | 0.12 | 0.13 | 0.15 | 0.12 | 0.12 | 0.15 |
| | VR | 0.14 | 0.14 | 0.11 | 0.15 | 0.12 | 0.14 | 0.11 | 0.12 | 0.16 |
| SD CHL1 (mg m$^{-3}$) | CP | 0.03 | 0.03 | 0.03 | 0.03 | 0.04 | 0.05 | 0.03 | 0.03 | 0.04 |
| | YE | 0.02 | 0.02 | 0.03 | 0.02 | 0.01 | 0.03 | 0.03 | 0.02 | 0.04 |
| | VE | 0.02 | 0.02 | 0.03 | 0.02 | 0.03 | 0.05 | 0.02 | 0.02 | 0.05 |
| | VR | 0.05 | 0.05 | 0.04 | 0.09 | 0.05 | 0.07 | 0.03 | 0.02 | 0.06 |
| AVE KD490 (m$^{-1}$) | CP | 0.029 | 0.028 | 0.030 | 0.027 | 0.029 | 0.034 | 0.028 | 0.028 | 0.033 |
| | YE | 0.030 | 0.027 | 0.029 | 0.025 | 0.028 | 0.034 | 0.028 | 0.027 | 0.032 |
| | VE | 0.028 | 0.027 | 0.026 | 0.024 | 0.026 | 0.031 | 0.026 | 0.025 | 0.033 |
| | VR | 0.030 | 0.029 | 0.026 | 0.027 | 0.027 | 0.031 | 0.027 | 0.027 | 0.034 |
| SD KD490 (m$^{-1}$) | CP | 0.004 | 0.005 | 0.004 | 0.005 | 0.007 | 0.007 | 0.005 | 0.003 | 0.006 |
| | YE | 0.005 | 0.004 | 0.004 | 0.004 | 0.006 | 0.008 | 0.006 | 0.003 | 0.006 |
| | VE | 0.004 | 0.005 | 0.005 | 0.004 | 0.007 | 0.009 | 0.006 | 0.002 | 0.008 |
| | VR | 0.005 | 0.005 | 0.004 | 0.007 | 0.008 | 0.010 | 0.006 | 0.003 | 0.009 |
| AVE PAR (E m$^{-2}$ day$^{-1}$) | CP | 41.6 | 43.8 | 41.7 | 42.0 | 42.1 | 41.3 | 42.5 | 42.8 | 42.2 |
| | YE | 41.1 | 43.2 | 41.0 | 41.0 | 41.0 | 41.0 | 41.6 | 41.4 | 40.6 |
| | VE | 40.5 | 42.4 | 40.5 | 40.2 | 39.3 | 40.6 | 40.6 | 40.2 | 40.6 |
| | VR | 41.1 | 42.2 | 41.3 | 40.0 | 39.9 | 40.9 | 42.4 | 41.3 | 41.5 |
| SD PAR (E m$^{-2}$ day$^{-1}$) | CP | 6.7 | 8.5 | 8.3 | 9.0 | 6.7 | 8.3 | 7.5 | 8.7 | 8.1 |
| | YE | 6.8 | 8.3 | 8.1 | 8.4 | 6.0 | 8.1 | 7.6 | 8.3 | 8.1 |
| | VE | 6.7 | 8.1 | 7.1 | 7.8 | 4.9 | 7.6 | 6.7 | 7.8 | 8.3 |
| | VR | 6.9 | 9.0 | 7.2 | 8.3 | 5.0 | 7.3 | 7.5 | 8.6 | 6.7 |

Figure S1. Correlation between biological variables of the Guanahacabibes study. FAI: fleshy algae index, RFI: reef functional index.

## References

González-Barrios FJ, Álvarez-Filip L. 2018. A framework for measuring coral species-specific contribution to reef functioning in the Caribbean. *Ecological Indicators 95*: 877–886 https://doi.org/10.1016/j.ecoli nd.2018.08.038