**Supplementary Information**

**High coral recruitment despite coralline algal loss under extreme environmental conditions**

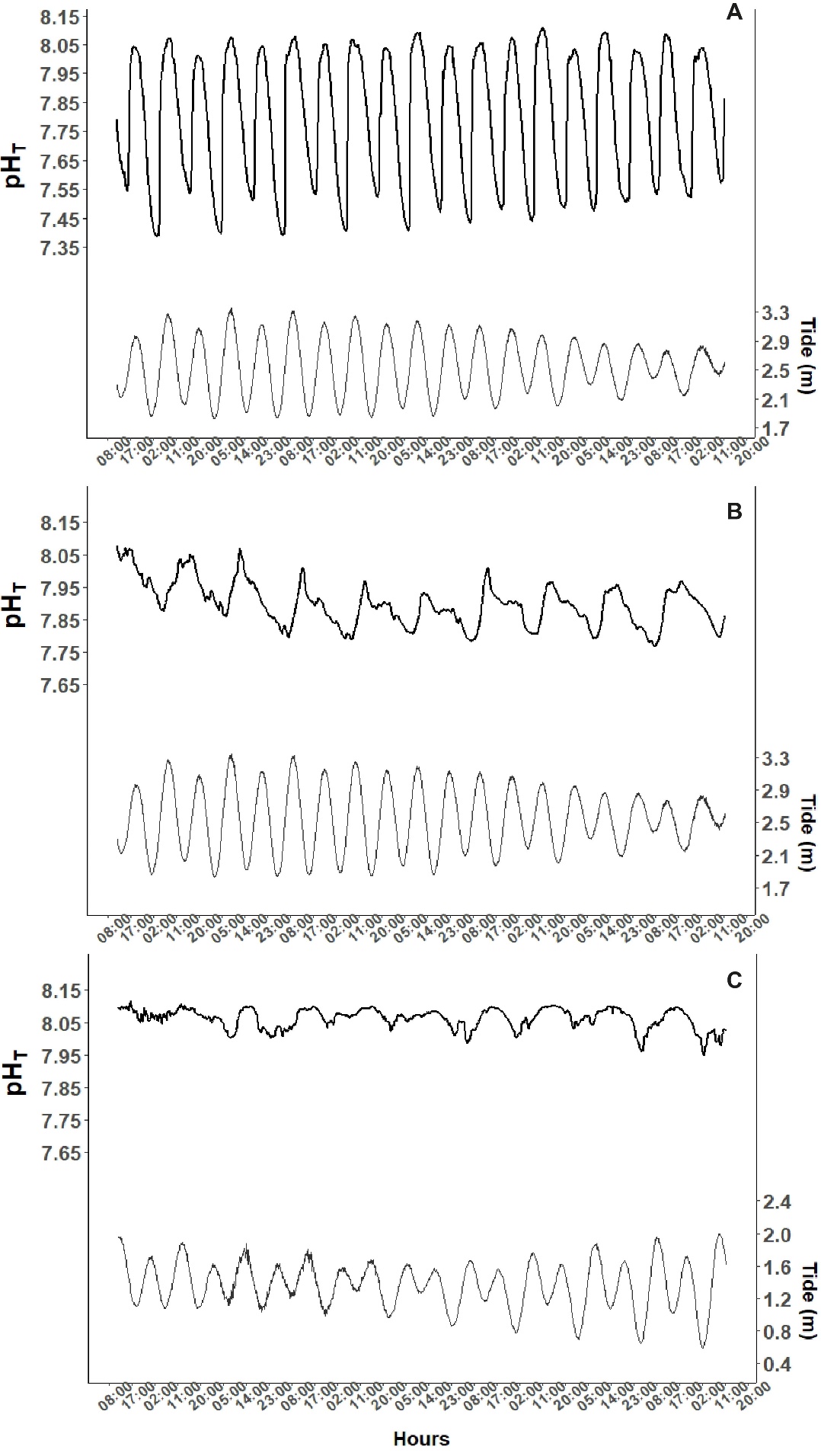
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**1**ENTROPIE – UMR 9220 (CNRS, IRD, UR, UNC, IFREMER), Institut de Recherche pour le Développement, 98848 Nouméa, New-Caledonia

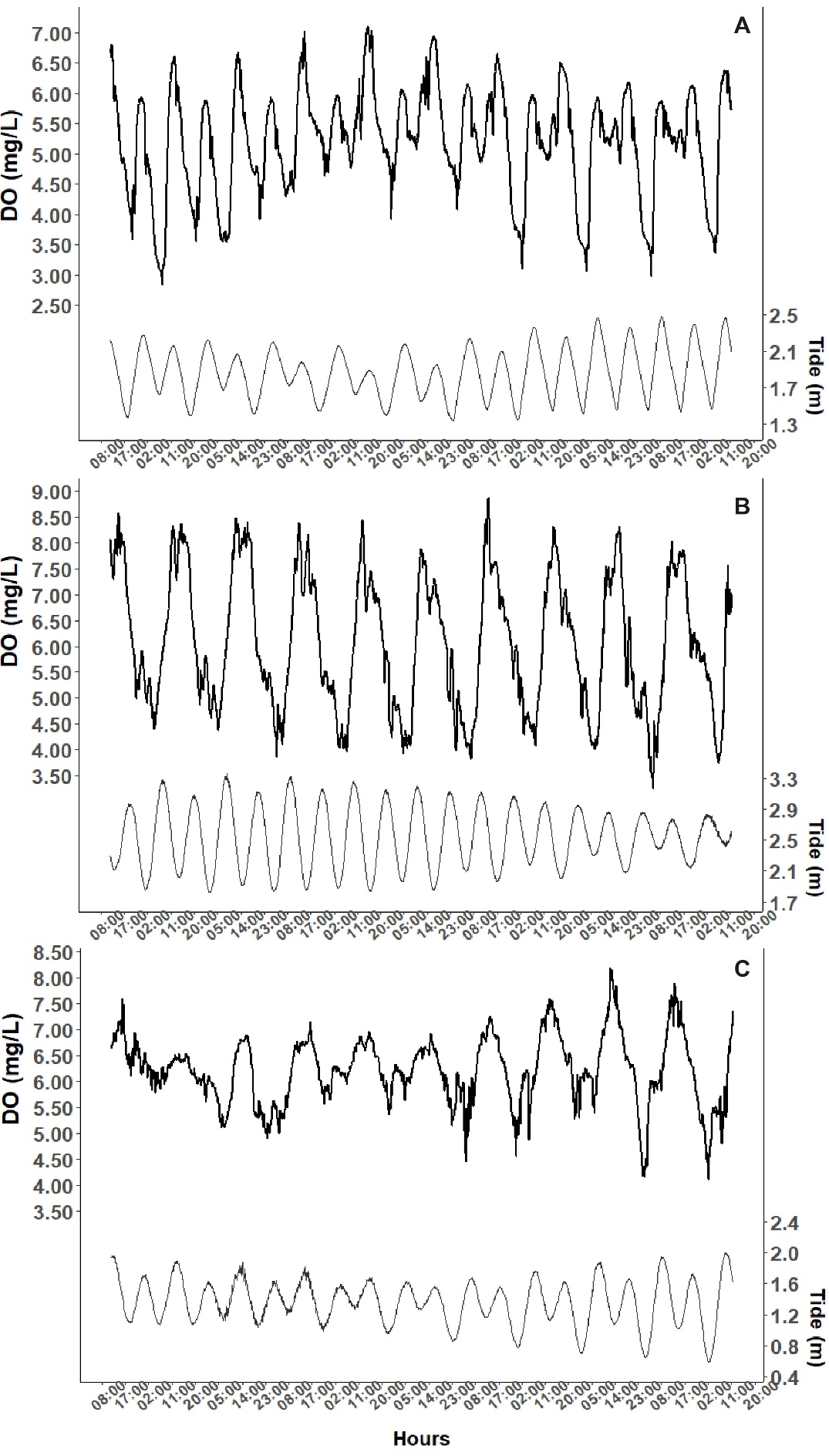
**2** LEMAR – UMR 6539 (CNRS, IRD, UBO, IFREMER), Institut Universitaire Européen de la Mer, 29280 Plouzané, France **3** Red Sea Research Center (RSRC), King Abdullah University of Science and Technology (KAUST), Thuwal 23955-6900, Saudi Arabia

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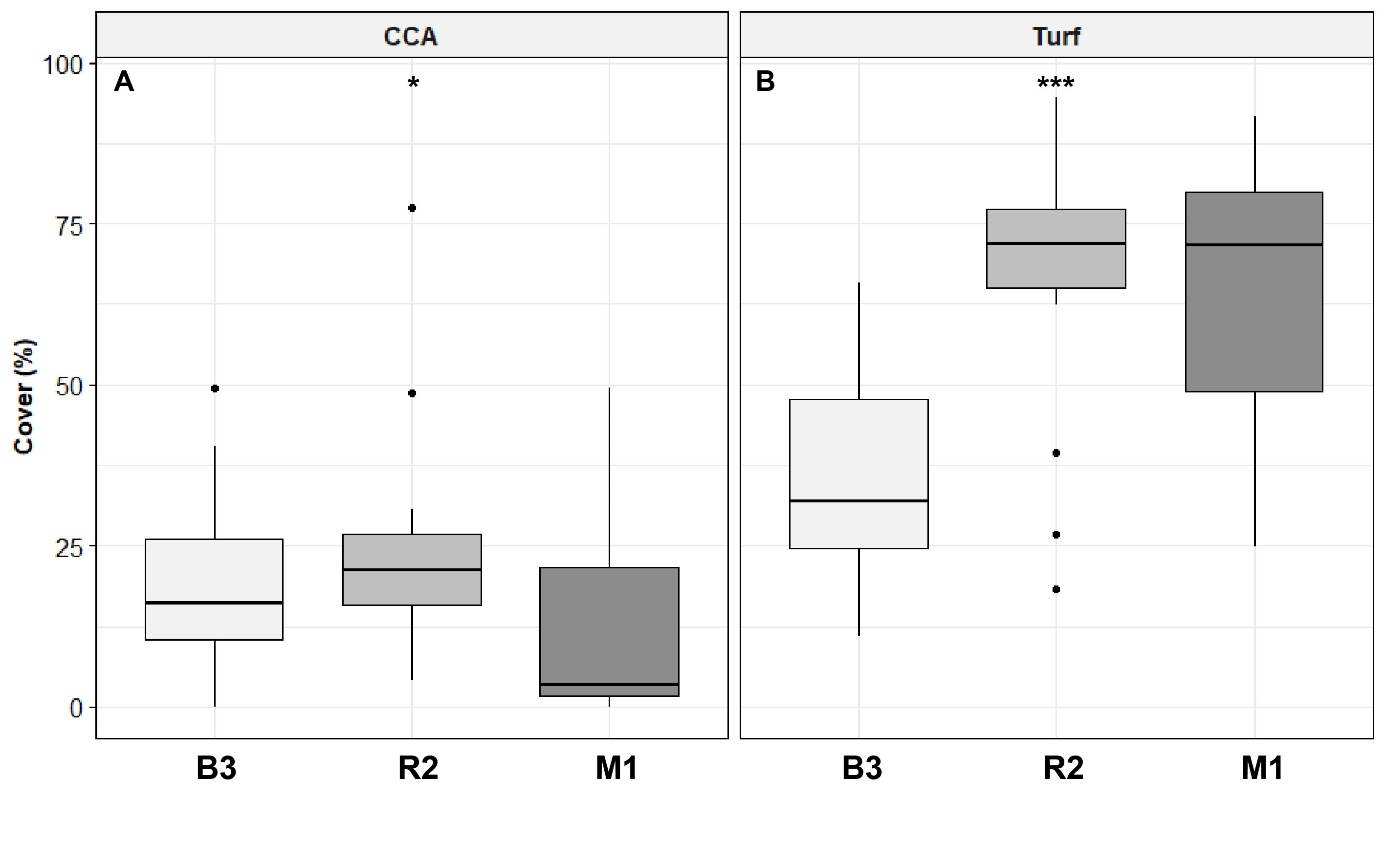
**Supplementary Information: Figures**

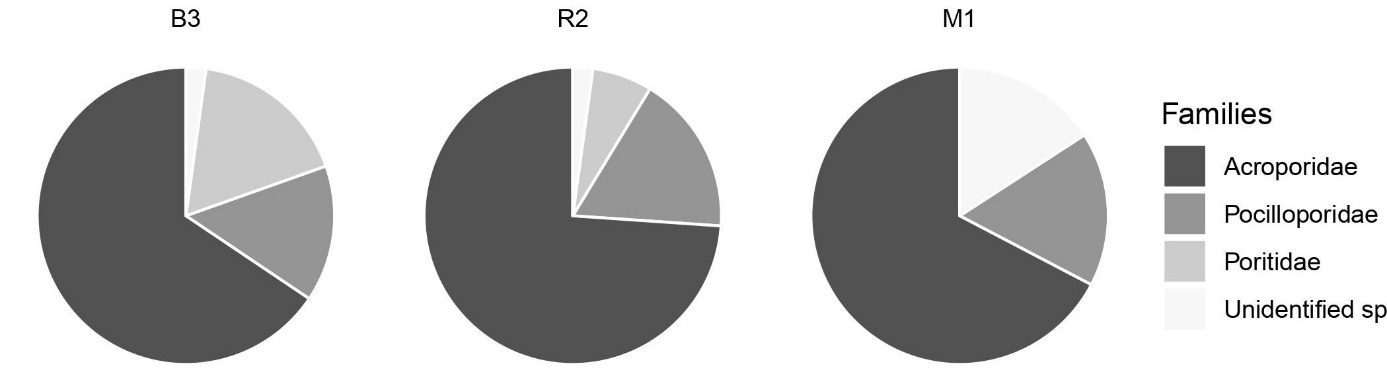


**Figure S1**| An example of the seawater pHT coupled with the tidal variations, measured during 11 days at the end of March 2019 at St B3 and St R2 (**A** and **B**) and 11 days in January 2019 at St M1 (**C**).



**Figure S2|** An example of the seawater dissolved oxygen concentrations, coupled with the tidal variations, measured during 11 days at the beginning of April 2019 at B3 (**A**), the end of March 2019 at St R2 (**B**) and at the end of January 2019 at St M1 (**C**).

**Figure S3|** CCA (A) and Turf percent cover (B) measured on the bottom sides of the tiles after ca. two years of tile immersion at stations B3, R2, and M1 (number of tiles n = 15, 20, and 19, respectively). Data are median values ± 25th and 75th percentiles (box), minimum and maximum values (whiskers), and outliers (dots). Stars represent statistical significance (see Table S3).

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**Figure S4|** Mean relative abundances (%) of the coral families which settled on the tiles (all sides pooled) during the two years of tile immersion in Bouraké (B3) and stations R2 and M1.

**Supplementary Information: Tables**

**Table S1|** List of coral species identified in the Bouraké lagoon (B3) and at sites R2 and M1.

**CORALS (Scleractinians)**

**Clade Complex**

**Family Genus Species Site**

Acroporidae *Acropora aculeus* (Dana, 1846) B3-M1

Acroporidae *Acropora cf. acuminata* (Verrill, 1864) R2

Acroporidae *Acropora aspera* (Dana, 1846) B3-R2-M1

Acroporidae *Acropora austera* (Dana, 1846) R2

Acroporidae *Acropora carduus* (Dana, 1846) B3

Acroporidae *Acropora cerealis* (Dana, 1846) B3-M1

Acroporidae *Acropora divaricata* (Dana, 1846) B3-M1

Acroporidae *Acropora echinata* (Dana, 1846) B3

Acroporidae *Acropora florida* (Dana, 1846) R2-M1

Acroporidae *Acropora gemmifera* (Brook, 1892) R2

Acroporidae *Acropora grandis* (Brook, 1892) R2-M1

Acroporidae *Acropora horrida* (Dana, 1846) B3-R2-M1

Acroporidae *Acropora humilis* (Dana, 1846) B3-R2-M1

Acroporidae *Acropora kirstyae* Veron & Wallace, 1984 B3-R2-M1

Acroporidae *Acropora latistella* (Brook, 1892) R2

Acroporidae *Acropora cf. longycyathus* (Milne Edwards, 1860) R2

Acroporidae *Acropora microphthalma* (Verrill, 1869) B3-R2-M1

Acroporidae *Acropora millepora* (Ehrenberg, 1834) R2-M1

Acroporidae *Acropora muricata* (Linnaeus, 1758) B3-R2-M1

Acroporidae *Acropora nana* (Studer, 1879) B3

Acroporidae *Acropora polystoma* (Brook, 1891) R2

Acroporidae *Acropora pulchra* (Brook, 1891) B3-R2-M1

Acroporidae *Acropora robusta* (Dana, 1846) R2

Acroporidae *Acropora retusa* (Dana, 1846) R2

Acroporidae *Acropora samoensis* (Brook, 1891) B3-R2-M1

Acroporidae *Acropora cf. secale* (Studer, 1878) R2-M1

Acroporidae *Acropora tenuis* (Dana, 1846) B3-R2-M1

Acroporidae *Acropora tortuosa* (Dana, 1846) M1

Acroporidae *Acropora valida* (Dana, 1846) B3-R2-M1

Acroporidae *Acropora vaughani* Wells, 1954 B3-R2-M1

Acroporidae *Anacropora forbesi* Ridley, 1884 B3

Acroporidae *Anacropora matthai* Pillai, 1973 B3-R2

Acroporidae *Anacropora puertogalerae* Nemenzo, 1964 R2

Acroporidae *Isopora palifera* (Lamarck, 1816) R2-M1

Acroporidae *Montipora aequituberculata* Bernard, 1897 R2

Acroporidae *Montipora angulata* (Lamarck, 1816) M1

Acroporidae *Montipora cactus* Bernard, 1897 B3-M1

Acroporidae *Montipora digitata* (Dana, 1846) B3-R2-M1

Acroporidae *Montipora efflorescens* Bernard, 1897 R2

Acroporidae *Montipora hispida* (Dana, 1846) B3-R2-M1

Acroporidae *Montipora mollis* Bernard, 1897 R2

Acroporidae *Montipora cf. nodosa* (Dana, 1846) R2

Acroporidae *Montipora stellata* Bernard, 1897 B3-R2-M1

**CORALS (Scleractinians)**  *(continue Table S1)*

**Clade Complex**

**Family Genus Species Site**

Agariciidae *Pavona cactus* (Forskål, 1775) B3-R2-M1

Agariciidae *Pavona clavus* Dana, 1846 R2

Agariciidae *Pavona decussata* (Dana, 1846) B3-R2-M1

Caryophylliidae *Polycyathus fulvus* Wijsman-Best, 1970 B3

Dendrophylliidae *Turbinaria mesenterina* (Lamarck, 1816) B3

Dendrophylliidae *Turbinaria stellulata* (Lamarck, 1816) R2

Dendrophylliidae Turbinaria reniformis (Bernard, 1896) M1

Dendrophylliidae *Tubastraea coccinea* Lesson, 1830 B3

Dendrophylliidae *Tubastraea micranthus* (Ehrenberg, 1834) B3

Euphylliidae *Galaxea fascicularis* (Linnaeus, 1767) B3-R2-M1

Incertae sedis *Pachyseris rugosa* Lamarck, 1801 B3-R2-M1

Incertae sedis *Pachyseris speciosa* Dana, 1846 B3-R2-M1

Poritidae *Goniopora cf. minor* Crossland, 1952 B3

Poritidae *Porites* sp. B3-M1

Poritidae *Porites cf. annae* Crossland, 1952 B3-M1

Poritidae *Porites lutea* Edwards & Haime, 1851 B3-R2-M1

Poritidae *Porites lobata* Dana, 1846 B3-R2-M1

Poritidae *Porites cylindrica* Dana, 1846 B3-R2-M1

Poritidae *Porites rus* (Forskål, 1775) R2

Siderastreidae *Pseudosiderastrea tayamai* Yabe & Sugiyama, 1935 B3

**CORALS (Scleractinians)**

**Clade Robust**

**Family Genus Species Site**

Fungiidae *Heliofungia actiniformis* (Quoy & Gaimard, 1833) B3

Fungiidae *Halomitra pileus* (Linnaeus, 1758) B3

Fungiidae *Fungia fungites* (Linnaeus, 1758) B3

Fungiidae *Ctenactis echinata* (Pallas, 1766) B3-M1

Fungiidae *Cantharellus noumeae* Hoeksema & Best, 1984 B3

Fungiidae *Sandalolitha dentata* Quelch, 1884 B3

Leptastreidae *Leptastrea purpurea* (Dana, 1846) B3-M1

Lobophylliidae *Echinophyllia aspera* (Ellis & Solander, 1786) B3

Lobophylliidae *Lobophyllia cf. hemprichi* (Ehrenberg, 1834) B3-M1

Lobophylliidae *Lobophyllia corymbosa* (Forskål, 1775) R2

Merulinidae *Coelastrea aspera* (Verrill, 1866) B3-R2

Merulinidae *Cyphastrea serailia* (Forskål, 1775) R2-M1

Merulinidae *Cyphastrea* sp. B3-M1

Merulinidae *Dipsastrea pallida* (Dana, 1846) B3-M1

Merulinidae *Dipsastrea cf. lizardensis* (Veron, Pichon, & B3

Wijsman-Best, 1977)

Merulinidae *Echinopora lamellosa* (Esper, 1795) B3-R2-M1

Merulinidae *Echinopora horrida* Dana, 1846 R2

Merulinidae *Favites abdita* (Ellis & Solander, 1786) B3-M1

Merulinidae *Favites melicerum* (Ehrenberg, 1834) B3-M1

Merulinidae *Goniastrea favulus* (Dana, 1846) B3-R2

Merulinidae *Goniastrea pectinata* (Ehrenberg, 1834) R2

Merulinidae *Hydnophora rigida* (Dana, 1846) B3

Merulinidae *Merulina scabricula* Dana, 1846 B3-M1

**CORALS (Scleractinians)** *(continue Table S1)*

**Clade Robust**

**Family Genus Species Site**

Merulinidae *Merulina ampliata* (Ellis & Solander, 1786) B3-M1

Merulinidae *Pectinia lactuca* (Pallas, 1766) R2-M1

Merulinidae *Pectinia paeonia* (Dana, 1846) B3-R2

Merulinidae *Platygyra sinensis* (Milne Edwards & B3-M1

Haime, 1849)

Merulinidae *Platygyra daedalea* (Ellis & Solander, 1786) B3-M1

Merulinidae *Trachyphyllia geoffroyi* (Audouin, 1826) B3

Pocilloporidae *Pocillopora damicornis* (Linnaeus, 1758) B3-R2-M1

Pocilloporidae *Pocillopora verrucosa* (Ellis & Solander, 1786) R2

Pocilloporidae *Stylophora pistillata* (Esper, 1797) R2

Psammocoridae *Psammocora contigua* (Esper, 1794) B3-R2-M1

**CORALS (non-scleractinians)**

**Family Genus Species Site**

Alcyioniidae *Sinularia*  sp. B3

**Table S2|** Summary of cover percentages of each category (CCA, Turf and suspension feeders) per site (B3, R2 and M1) for top (**A**) and bottom side (**B**). Data are mean ± SE (n=15, 20 and 19 for B3, R2 and M1, respectively).

**A)**

*Top sides, T2*  B3 R2 M1

Mean 46.94 ± 5.71 65.80 ± 5.30 70.89 ± 4.16

CCA Max 85.33 95.99 89.67

Min 20.55 21.89 32.32

Mean 19.64 ± 1.80 8.84 ± 1.57 10.11 ± 1.97

Turf Max 31.57 24.52 35.31

Min 8.50 1.03 0.20

*Top sides, T24/26*

Mean 9.73 ± 1.27 50.23 ± 2.95 2.88 ± 1.00

CCA Max 17.85 77.53 18.97

Min 3.49 27.74 0.00

Mean 49.49 ± 6.97 20.37 ± 1.66 88.39 ± 2.40

Turf Max 92.80 32.73 97.17

Min 0.82 8.42 51.56

**B)**

*Bottom sides, T24/26*

Mean 19.81 ± 3.45 23.99 ± 3.52 12.41 ± 3.25

CCA Max 49.54 77.46 49.39

Min 0.00 4.06 0.00

**B)**

*Bottom sides, T24/26 (continue Table S2)*

Mean 35.44 ± 4.48 67.00 ± 4.21 64.75 ± 4.65

Turf Max 65.82 94.42 91.69

Min 10.95 18.18 24.78

Susp. Mean 4.17 ± 1.05 0.45 ± 0.37 15.35 ± 4.77

feeders Max 12.09 7.32 70.75

Min 0.51 0.00 0.00

**Table S3|** Statistical data for each category of organisms settled on tile bottom sides after two years of tile deployment (TF). Non-parametric Kruskal-Wallis tests, followed by Dunn’s multiple comparisons, were run between stations for each category of organisms settled A), for coral recruits between stations settled on the whole tiles (all sides pooled) B) and between sides per station C) (B refers to Bottom-sides ; L refers to Lateral-sides ; T refers to Top-sides).

**A)**

*Bottom sides, T24/26 between stations df K-W p Dunn’s multiple comparison*

CCA (2, 54) 7.530 **0.020** M1 < R2 = B3 (***p* < 0.010**)

Turf (2, 54) 18.135 **<0.001** B3 < M1 = R2 (***p* < 0.001**)

Susp. feeders (2, 54) 21.066 **<0.001** B3 = M1 > R2 (***p* < 0.001**)

Empty (2, 54) 27.090 **<0.001** B3 > M1 = R2 (***p* < 0.001**)

**B)**

*Recruits, T24/26 between stations*

Recruits 2 17.521 **<0.001** B3 > R2 = M1 (***p* < 0.001**)

**C)**

*Recruits, T24/26 between sides*

B3 2 23.676 **<0.001** B > L > T (***p* < 0.020**)

R2 2 30.161 **<0.001** B > L = T (***p* < 0.001**)

M1 2 26.729 **<0.001** B > L = T (***p* < 0.001**)

**Table S4|** Non-parametric Kruskal-Wallis test between the three stations on Shannon Index Diversity (i.e., H= 4.17, 4.02, and 3.97 for stations B3, R2 and M1, respectively.

*Species diversity between stations df K-W p*

Shannon Index Diversity 2 2 0.368