

**Supplementary Material for:**

**Tide as steering factor in structuring archaeal and bacterial ammonia-oxidizing communities in mangrove forest soils dominated by *Avicennia germinans* and *Rhizophora mangle***

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**Table S1** Relative abundance (%) of bacterial genera in mangrove soils. Only genera above 1% are presented. Genera that mostly contributed to differences between mangrove species as determined by SIMPER analysis were highlighted in boldface

| Phylum           | Genus                                   | Location and sample # |     |     |      |      |       |     |     |     |       |     |     |     |       |     |      |       |     |     |  |  |
|------------------|-----------------------------------------|-----------------------|-----|-----|------|------|-------|-----|-----|-----|-------|-----|-----|-----|-------|-----|------|-------|-----|-----|--|--|
|                  |                                         | PI-A                  |     |     | PI-R |      | SHI-A |     |     |     | SHI-R |     |     |     | NHI-A |     |      | NHI-R |     |     |  |  |
|                  |                                         | 2                     | 3   | 4   | 3    | 4    | 1     | 2   | 3   | 4   | 1     | 2   | 3   | 4   | 1     | 3   | 4    | 1     | 2   | 4   |  |  |
| Actinobacteria   | Unclassified OM1 clade                  | 3.3                   | 2.6 | 2.0 | 1.1  | 1.0  | 1.2   | 1.8 | 1.5 | 2.2 | 4.2   | 2.5 | 3.8 | 2.7 | 1.8   | 3.1 | 3.3  | 2.4   | 1.4 | 1.5 |  |  |
|                  | <i>Mycobacterium</i>                    | 0.9                   | 0.7 | 0.7 | 0.6  | 0.2  | 1.1   | 0.6 | 0.8 | 0.5 | 1.1   | 2.4 | 1.3 | 0.8 | 0.2   | 0.7 | 0.4  | 0.3   | 0.1 | 0.0 |  |  |
|                  | <i>Demequina</i>                        | 0.0                   | 0.0 | 0.0 | 0.0  | 0.0  | 1.4   | 0.6 | 0.0 | 0.3 | 0.0   | 0.0 | 0.0 | 0.0 | 0.0   | 0.0 | 0.7  | 0.4   | 0.0 | 0.0 |  |  |
|                  | Uncultured Elev-16S-1332                | 1.0                   | 1.7 | 0.9 | 1.1  | 0.3  | 1.1   | 1.6 | 0.8 | 2.2 | 0.3   | 0.6 | 0.8 | 0.5 | 0.5   | 1.3 | 3.4  | 0.6   | 0.0 | 0.0 |  |  |
| Bacteroidetes    | <i>Gracilimonas</i>                     | 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   | 1.6 | 0.0  | 0.0   | 0.0 | 0.0 |  |  |
|                  | Uncultured Bacteroidetes VC2.1 Bac22    | 2.9                   | 1.6 | 3.8 | 0.0  | 0.2  | 0.0   | 0.1 | 0.0 | 0.8 | 0.2   | 0.5 | 0.1 | 0.6 | 1.2   | 0.0 | 0.0  | 5.4   | 1.8 | 0.7 |  |  |
|                  | <i>Marinifilum</i>                      | 0.1                   | 0.0 | 0.1 | 0.4  | 0.4  | 0.0   | 0.0 | 0.0 | 0.2 | 0.3   | 0.3 | 8.8 | 2.7 | 0.1   | 0.0 | 0.0  | 0.5   | 0.2 | 0.6 |  |  |
|                  | Uncultured Marinilabiaceae              | 0.5                   | 0.2 | 0.3 | 1.8  | 1.4  | 0.0   | 0.0 | 0.0 | 0.1 | 0.4   | 0.1 | 0.0 | 0.1 | 0.9   | 0.5 | 0.0  | 0.5   | 0.0 | 0.5 |  |  |
|                  | <i>Lutibacter</i>                       | 0.0                   | 0.0 | 0.0 | 0.0  | 0.0  | 0.0   | 0.0 | 1.3 | 2.2 | 0.1   | 0.2 | 0.3 | 0.0 | 0.1   | 0.0 | 0.0  | 2.0   | 0.1 | 0.0 |  |  |
|                  | <i>Tenacibaculum</i>                    | 0.0                   | 0.0 | 0.0 | 0.0  | 0.0  | 16.9  | 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 |  |  |
| Chloroflexi      | Uncultured Anaerolineaceae              | 1.3                   | 2.9 | 3.0 | 4.6  | 10.7 | 1.0   | 1.2 | 1.0 | 1.5 | 2.6   | 0.4 | 1.3 | 5.5 | 5.3   | 2.8 | 15.6 | 2.2   | 0.9 | 0.5 |  |  |
|                  | Uncultured Ardenticatenia               | 0.1                   | 0.1 | 0.0 | 0.2  | 0.3  | 0.0   | 0.1 | 0.0 | 0.0 | 0.0   | 0.0 | 0.0 | 0.0 | 0.3   | 0.1 | 4.0  | 0.2   | 0.1 | 0.2 |  |  |
| Firmicutes       | <i>Aeribacillus</i>                     | 0.0                   | 0.0 | 0.0 | 0.0  | 0.0  | 0.0   | 0.0 | 0.0 | 0.0 | 0.0   | 0.1 | 0.0 | 0.0 | 0.0   | 0.9 | 0.0  | 0.0   | 0.1 | 3.3 |  |  |
|                  | <i>Halobacillus</i>                     | 0.1                   | 0.0 | 0.0 | 0.0  | 0.0  | 0.0   | 0.1 | 0.0 | 0.1 | 0.1   | 0.1 | 0.1 | 0.1 | 0.3   | 0.3 | 1.1  | 0.4   | 0.1 | 0.5 |  |  |
|                  | <i>Sedimentibacter</i>                  | 0.0                   | 0.0 | 0.0 | 0.0  | 0.0  | 0.0   | 0.2 | 0.0 | 0.1 | 0.0   | 0.0 | 1.2 | 0.0 | 0.0   | 0.0 | 0.0  | 0.0   | 0.0 | 0.0 |  |  |
|                  | <i>Fusibacter</i>                       | 0.0                   | 2.1 | 0.4 | 0.0  | 0.2  | 0.1   | 2.2 | 0.2 | 3.2 | 0.6   | 0.5 | 0.2 | 0.4 | 8.7   | 7.1 | 0.0  | 0.9   | 0.2 | 2.1 |  |  |
|                  | Uncultured Gracilibacteraceae           | 0.0                   | 0.0 | 0.0 | 0.0  | 0.0  | 0.0   | 0.0 | 0.0 | 0.0 | 0.1   | 0.2 | 2.0 | 0.7 | 0.0   | 0.0 | 0.0  | 0.0   | 0.0 | 0.0 |  |  |
| Gemmatimonadetes | Uncultured BD2-11 terrestrial group     | 1.3                   | 3.2 | 1.5 | 0.9  | 1.1  | 0.9   | 1.7 | 1.1 | 0.6 | 0.8   | 0.5 | 0.9 | 0.9 | 1.1   | 1.1 | 1.7  | 1.0   | 0.6 | 1.2 |  |  |
|                  | Uncultured PAUC43f marine benthic group | 0.2                   | 0.5 | 0.2 | 0.0  | 0.0  | 0.5   | 1.5 | 0.2 | 0.2 | 0.5   | 0.3 | 0.3 | 0.3 | 0.2   | 0.2 | 0.3  | 0.2   | 0.1 | 0.1 |  |  |
| Nitrospirae      | Uncultured Nitrospiraceae               | 0.0                   | 0.1 | 0.1 | 1.7  | 1.8  | 0.0   | 0.1 | 0.0 | 0.0 | 0.3   | 0.1 | 0.3 | 0.3 | 0.3   | 0.1 | 0.2  | 0.1   | 0.0 | 0.3 |  |  |
| Parcubacteria    | Uncultured Parcubacteria                | 0.0                   | 0.0 | 0.0 | 0.0  | 0.1  | 0.0   | 0.0 | 0.0 | 0.0 | 0.0   | 0.0 | 0.0 | 0.0 | 2.3   | 0.0 | 0.0  | 0.0   | 0.0 | 0.0 |  |  |
| Planctomycetes   | Pir4 lineage                            | 0.8                   | 0.3 | 0.9 | 0.7  | 0.4  | 1.1   | 1.4 | 1.9 | 2.0 | 0.9   | 0.5 | 0.6 | 1.0 | 1.6   | 1.5 | 1.0  | 1.9   | 0.0 | 0.2 |  |  |

|                |                                         |     |     |     |     |     |            |            |            |            |            |            |            |            |     |     |     |     |     |     |
|----------------|-----------------------------------------|-----|-----|-----|-----|-----|------------|------------|------------|------------|------------|------------|------------|------------|-----|-----|-----|-----|-----|-----|
|                | <i>Planctomyces</i>                     | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 0.7        | 0.9        | 0.8        | 1.0        | 0.5        | 0.5        | 0.3        | 0.6        | 1.1 | 0.7 | 0.6 | 1.2 | 0.1 | 0.8 |
|                | Uncultured Planctomycetaceae            | 0.3 | 0.1 | 0.5 | 0.5 | 0.3 | 0.7        | 1.4        | 0.7        | 0.8        | 0.5        | 0.1        | 0.2        | 0.6        | 0.9 | 0.9 | 0.6 | 0.9 | 0.0 | 0.4 |
| Proteobacteria | <i>Filomicrobium</i>                    | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.4        | 0.2        | 0.4        | 0.3        | 1.5        | 1.1        | 1.0        | 1.0        | 0.2 | 0.4 | 0.4 | 1.2 | 0.5 | 0.8 |
| Proteobacteria | Uncultured JG34-KF-361                  | 1.3 | 1.3 | 0.9 | 0.7 | 0.6 | 1.0        | 1.2        | 0.8        | 1.1        | 0.1        | 0.0        | 0.4        | 0.2        | 0.5 | 0.2 | 0.4 | 0.4 | 0.2 | 0.1 |
|                | <i>Hoeflea</i>                          | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.3        | 0.3        | 0.3        | 0.2        | 0.5        | 0.5        | 0.3        | 0.3        | 0.7 | 1.5 | 0.3 | 0.4 | 0.8 | 0.5 |
|                | Unclassified Phyllobacteriaceae         | 0.3 | 0.2 | 0.2 | 0.2 | 0.3 | 1.8        | 0.6        | 0.6        | 0.5        | 0.5        | 0.3        | 0.3        | 0.3        | 0.2 | 0.3 | 0.3 | 0.8 | 0.9 | 0.3 |
|                | <i>Rhizobium</i>                        | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0        | 0.2        | 0.0        | 0.1        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 |
|                | <i>Bauldia</i>                          | 0.4 | 0.4 | 0.3 | 0.5 | 0.5 | 0.8        | 1.1        | 0.5        | 0.6        | 0.1        | 0.1        | 0.1        | 0.1        | 0.1 | 0.3 | 0.2 | 0.3 | 0.3 | 0.2 |
|                | Unclassified Rhizobiales Incertae Sedis | 0.6 | 1.1 | 0.5 | 0.5 | 0.6 | 0.7        | 1.6        | 0.3        | 0.5        | 0.1        | 0.0        | 0.2        | 0.2        | 0.2 | 0.1 | 0.3 | 0.1 | 0.0 | 0.1 |
|                | <i>Parvibaculum</i>                     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.8        | 0.0        | 0.0        | 0.1        | 0.0        | 0.1        | 0.0        | 0.0        | 0.0 | 0.0 | 0.4 | 0.1 | 0.1 | 0.0 |
|                | Uncultured Rhodobiaceae                 | 0.5 | 0.4 | 0.2 | 0.1 | 0.1 | 0.7        | 1.0        | 0.9        | 1.0        | 0.3        | 0.1        | 0.6        | 0.6        | 0.2 | 0.3 | 0.3 | 0.8 | 0.5 | 0.3 |
|                | Unclassified Rhodobiaceae               | 1.1 | 0.9 | 0.7 | 0.9 | 0.6 | 2.0        | 2.1        | 2.1        | 2.0        | 2.4        | 1.7        | 1.5        | 1.8        | 0.8 | 0.9 | 1.8 | 2.5 | 0.8 | 1.5 |
|                | <b><i>Pseudolabrys</i></b>              | 0.9 | 0.8 | 0.6 | 0.5 | 0.7 | <b>3.0</b> | <b>5.1</b> | <b>2.5</b> | <b>3.0</b> | <b>0.3</b> | <b>0.6</b> | <b>0.7</b> | <b>0.6</b> | 0.3 | 0.5 | 0.6 | 1.4 | 0.6 | 0.3 |
|                | <i>Variibacter</i>                      | 0.2 | 0.4 | 0.3 | 0.8 | 1.2 | 1.7        | 0.9        | 0.8        | 0.7        | 0.3        | 0.3        | 0.4        | 0.1        | 0.0 | 0.0 | 0.1 | 0.7 | 0.1 | 0.1 |
|                | Unclassified Rhodobacteraceae           | 0.3 | 0.2 | 0.3 | 0.3 | 0.4 | 0.2        | 0.6        | 0.3        | 0.3        | 1.0        | 0.5        | 0.6        | 0.7        | 0.2 | 0.5 | 2.7 | 0.6 | 0.4 | 0.7 |
|                | Uncultured MSB-1E8                      | 0.1 | 0.4 | 0.1 | 0.2 | 0.1 | 0.0        | 0.1        | 0.1        | 0.2        | 0.5        | 0.1        | 0.2        | 0.4        | 0.7 | 1.5 | 1.0 | 0.6 | 0.1 | 0.4 |
|                | <i>Thalassospira</i>                    | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0 | 0.7 | 1.6 | 0.6 | 0.0 | 0.0 |
|                | Uncultured Rhodospirillaceae            | 1.6 | 2.4 | 1.6 | 2.1 | 2.3 | 1.5        | 2.6        | 2.0        | 2.2        | 1.9        | 1.3        | 1.7        | 1.6        | 1.9 | 2.1 | 1.2 | 2.6 | 1.2 | 2.5 |
|                | Uncultured Nitrosomonadaceae            | 0.0 | 0.0 | 0.0 | 1.6 | 2.5 | 0.1        | 0.2        | 0.0        | 0.1        | 0.1        | 0.0        | 0.1        | 0.1        | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.2 |
|                | <i>Candidatus Accumulibacter</i>        | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0        | 0.0        | 0.0        | 0.8        | 0.0        | 0.0        | 2.9        | 0.0        | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|                | Uncultured Bacteriovoracaceae           | 0.2 | 0.6 | 0.3 | 1.0 | 1.2 | 0.1        | 0.1        | 0.0        | 0.1        | 0.2        | 0.2        | 0.7        | 0.3        | 0.2 | 0.0 | 0.3 | 0.2 | 0.0 | 0.0 |
|                | <i>Desulfobacterium</i>                 | 0.0 | 0.5 | 1.4 | 0.8 | 0.1 | 0.0        | 0.0        | 0.0        | 0.1        | 0.4        | 0.1        | 1.1        | 0.7        | 1.0 | 0.1 | 0.0 | 2.0 | 0.9 | 0.6 |
|                | <i>Desulfotignum</i>                    | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0        | 0.0        | 0.0        | 0.0        | 0.2        | 0.2        | 0.0        | 0.3        | 1.4 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 |
|                | SEEP-SRB1                               | 0.4 | 1.1 | 0.6 | 0.3 | 0.6 | 0.7        | 1.0        | 0.9        | 0.6        | 1.3        | 0.5        | 0.7        | 0.8        | 0.3 | 0.5 | 0.5 | 0.7 | 0.5 | 0.7 |
|                | Sva0081 sediment group                  | 0.7 | 1.8 | 0.8 | 0.7 | 0.7 | 0.5        | 1.0        | 0.8        | 0.4        | 1.5        | 0.9        | 0.8        | 0.9        | 1.6 | 1.5 | 0.9 | 1.1 | 0.5 | 1.3 |
|                | <i>Desulfobulbus</i>                    | 0.0 | 0.0 | 0.1 | 0.6 | 1.4 | 0.1        | 0.0        | 0.1        | 0.1        | 1.1        | 0.3        | 0.4        | 0.5        | 0.1 | 1.5 | 0.1 | 0.8 | 0.2 | 0.6 |
|                | H16                                     | 0.1 | 0.1 | 0.1 | 1.4 | 1.4 | 0.3        | 0.5        | 0.3        | 0.7        | 0.2        | 0.0        | 0.2        | 0.2        | 0.1 | 0.1 | 0.0 | 0.3 | 0.1 | 0.3 |
|                | <i>Desulfuromusa</i>                    | 0.2 | 0.1 | 0.2 | 0.4 | 0.2 | 0.4        | 0.0        | 0.0        | 1.4        | 0.1        | 0.1        | 0.6        | 0.3        | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
|                | Uncultured Sandaracinaceae              | 0.3 | 0.5 | 0.5 | 0.6 | 0.5 | 0.5        | 1.0        | 0.7        | 0.5        | 1.3        | 0.9        | 0.8        | 0.7        | 1.1 | 1.0 | 0.6 | 0.9 | 0.5 | 1.2 |
|                | Uncultured NB1-j                        | 1.0 | 2.5 | 1.4 | 1.5 | 1.6 | 0.9        | 2.0        | 1.6        | 1.3        | 1.5        | 0.7        | 1.6        | 1.0        | 0.8 | 1.8 | 1.4 | 1.3 | 0.4 | 2.1 |
|                | Uncultured Syntrophobacteraceae         | 0.5 | 1.1 | 1.2 | 0.7 | 1.1 | 0.4        | 1.4        | 0.8        | 0.8        | 1.9        | 0.6        | 1.3        | 1.4        | 0.4 | 0.8 | 0.6 | 0.6 | 0.2 | 0.7 |

|                |                                               |             |             |             |            |            |            |            |             |             |            |             |             |             |     |     |     |     |      |     |
|----------------|-----------------------------------------------|-------------|-------------|-------------|------------|------------|------------|------------|-------------|-------------|------------|-------------|-------------|-------------|-----|-----|-----|-----|------|-----|
| Proteobacteria | <i>Arcobacter</i>                             | 0.4         | 1.2         | 0.1         | 0.2        | 0.1        | <b>0.2</b> | <b>0.7</b> | <b>29.3</b> | <b>1.1</b>  | <b>0.0</b> | <b>0.1</b>  | <b>0.1</b>  | <b>0.3</b>  | 0.0 | 0.0 | 0.0 | 1.0 | 0.0  | 0.4 |
|                | <i>Sulfurimonas</i>                           | 2.9         | 1.3         | 1.7         | 3.3        | 0.1        | <b>0.0</b> | <b>0.0</b> | <b>0.0</b>  | <b>4.8</b>  | <b>0.3</b> | <b>0.5</b>  | <b>1.2</b>  | <b>0.9</b>  | 3.1 | 2.0 | 0.0 | 0.4 | 0.6  | 1.5 |
|                | <i>Sulfurovum</i>                             | <b>43.8</b> | <b>20.1</b> | <b>38.2</b> | <b>1.6</b> | <b>0.1</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b>  | <b>16.1</b> | <b>0.1</b> | <b>0.1</b>  | <b>0.0</b>  | <b>0.1</b>  | 9.7 | 0.2 | 0.0 | 0.2 | 43.8 | 8.1 |
|                | <i>Marinobacter</i>                           | 0.0         | 0.0         | 0.3         | 0.0        | 0.0        | 0.0        | 0.1        | 0.1         | 0.1         | 0.2        | 0.0         | 0.0         | 0.0         | 0.2 | 3.7 | 2.5 | 0.1 | 0.2  | 0.6 |
|                | <i>Idiomarina</i>                             | 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 | 0.1 | 1.6 | 0.0 | 0.0  | 0.0 |
|                | Uncultured BD7-8 marine group                 | 0.7         | 0.3         | 1.4         | 0.1        | 0.1        | 0.1        | 0.3        | 0.4         | 0.3         | 0.6        | 1.0         | 0.3         | 0.5         | 1.0 | 0.6 | 0.1 | 1.3 | 0.3  | 0.1 |
|                | <i>Thioalkalispira</i>                        | <b>0.3</b>  | <b>0.1</b>  | <b>1.5</b>  | <b>6.4</b> | <b>4.1</b> | <b>0.1</b> | <b>0.1</b> | <b>0.1</b>  | <b>0.3</b>  | <b>1.4</b> | <b>3.1</b>  | <b>10.4</b> | <b>4.2</b>  | 2.5 | 0.2 | 0.2 | 3.0 | 0.3  | 6.4 |
|                | <i>Thiogranum</i>                             | 0.1         | 0.0         | 0.1         | 0.1        | 0.1        | 0.3        | 0.2        | 0.1         | 0.2         | 0.7        | 0.5         | 0.3         | 0.4         | 0.1 | 1.0 | 0.1 | 0.5 | 1.2  | 1.2 |
|                | <i>Sedimenticola</i>                          | 0.0         | 0.0         | 0.0         | 0.0        | 0.0        | <b>0.0</b> | <b>0.0</b> | <b>0.0</b>  | <b>0.0</b>  | <b>2.5</b> | <b>33.4</b> | <b>1.2</b>  | <b>12.6</b> | 0.0 | 0.0 | 0.0 | 0.7 | 0.1  | 0.0 |
|                | Uncultured Gammaproteobacteria Incertae Sedis | 0.2         | 0.2         | 0.3         | 0.3        | 0.4        | 0.5        | 0.6        | 0.3         | 0.3         | 1.0        | 0.9         | 0.5         | 0.5         | 0.3 | 0.9 | 0.2 | 0.8 | 0.6  | 1.3 |
|                | <i>Halomonas</i>                              | 0.0         | 0.4         | 0.0         | 0.0        | 0.0        | 0.9        | 0.0        | 0.0         | 0.0         | 0.0        | 0.0         | 0.0         | 0.0         | 0.1 | 0.4 | 2.8 | 0.1 | 0.4  | 1.7 |
|                | <i>Amphritea</i>                              | 0.4         | 1.2         | 0.3         | 0.7        | 0.3        | 0.0        | 0.0        | 0.0         | 0.0         | 0.0        | 0.1         | 0.0         | 0.1         | 0.0 | 0.1 | 0.0 | 1.1 | 1.4  | 1.5 |
|                | Uncultured Piscirickettsiaceae                | 0.0         | 0.0         | 0.0         | 0.0        | 0.1        | 0.0        | 0.0        | 0.0         | 0.0         | 0.0        | 0.0         | 0.0         | 0.0         | 0.0 | 0.0 | 0.0 | 0.0 | 1.1  | 0.0 |
|                | Uncultured Thiotrichaceae                     | 0.1         | 0.2         | 0.0         | 0.6        | 0.2        | 3.6        | 0.1        | 0.0         | 0.0         | 0.8        | 0.3         | 0.4         | 0.5         | 0.1 | 0.9 | 0.0 | 0.2 | 0.5  | 1.2 |
|                | <i>Vibrio</i>                                 | 0.0         | 0.2         | 0.1         | 1.0        | 0.0        | 0.0        | 0.1        | 5.2         | 0.1         | 0.1        | 0.0         | 0.2         | 0.1         | 0.1 | 0.0 | 0.0 | 0.1 | 0.2  | 0.4 |
|                | Uncultured JTB255 marine benthic group        | 0.5         | 0.7         | 0.6         | 0.7        | 0.2        | 0.1        | 0.2        | 0.1         | 0.1         | 1.2        | 1.3         | 0.7         | 0.6         | 0.8 | 1.9 | 0.6 | 0.5 | 0.3  | 1.1 |
|                | Unclassified JTB255 marine benthic group      | 1.4         | 2.6         | 1.7         | 0.9        | 1.3        | 1.3        | 2.9        | 1.6         | 2.1         | 4.1        | 2.3         | 2.4         | 1.9         | 0.4 | 1.4 | 0.2 | 1.7 | 1.1  | 2.2 |
|                | Unclassified Xanthomonadales                  | 0.7         | 0.8         | 0.8         | 1.4        | 1.6        | 0.7        | 1.5        | 1.4         | 1.1         | 2.1        | 1.3         | 1.1         | 0.8         | 0.3 | 0.7 | 0.3 | 0.7 | 0.1  | 0.1 |
|                | <i>Luteibacter</i>                            | 0.0         | 0.0         | 0.0         | 0.0        | 0.0        | 1.9        | 0.0        | 0.0         | 0.0         | 0.0        | 0.0         | 0.0         | 0.0         | 0.0 | 0.0 | 4.2 | 0.0 | 0.0  | 0.0 |
|                | Unclassified Xanthomonadaceae                 | 0.0         | 0.0         | 0.0         | 0.0        | 0.0        | 4.7        | 0.4        | 0.0         | 0.0         | 0.0        | 0.0         | 0.0         | 0.0         | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 |
|                | Uncultured Gammaproteobacteria                | 0.1         | 0.1         | 0.1         | 3.2        | 1.4        | 0.5        | 0.5        | 0.3         | 0.7         | 1.7        | 0.7         | 1.1         | 1.0         | 0.2 | 1.1 | 0.5 | 1.2 | 1.1  | 2.2 |
| Spirochaetae   | <i>Spirochaeta 2</i>                          | 0.6         | 1.2         | 0.9         | 1.0        | 1.9        | 0.4        | 0.5        | 0.4         | 0.4         | 2.5        | 1.0         | 1.1         | 2.5         | 0.6 | 0.2 | 0.8 | 0.8 | 0.2  | 0.9 |

**Table S2** Relative abundance (%) of archaeal genera in mangrove soils. Only genera above 1% are presented. Genera that mostly contributed to differences between mangrove species as determined by SIMPER analysis were highlighted in boldface

| Phylum          | Genus                                           | Location and sample # |             |             |             |             |             |             |             |             |             |             |             |             |       |      |      |       |      |      |  |
|-----------------|-------------------------------------------------|-----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------|------|------|-------|------|------|--|
|                 |                                                 | PI-A                  |             |             | PI-R        |             | SHI-A       |             |             |             | SHI-R       |             |             |             | NHI-A |      |      | NHI-R |      |      |  |
|                 |                                                 | 2                     | 3           | 4           | 3           | 4           | 1           | 2           | 3           | 4           | 1           | 2           | 3           | 4           | 1     | 3    | 4    | 1     | 2    | 4    |  |
| Aenigmarchaeota | <i>Candidatus Aenigmarchaeum</i>                | 0.4                   | 0.0         | 0.0         | 0.0         | 0.0         | 3.9         | 2.8         | 3.6         | 0.9         | 0.0         | 0.0         | 0.0         | 1.8         | 1.4   | 0.0  | 0.0  | 0.6   | 0.0  | 0.0  |  |
| AK8             | Uncultured AK8                                  | 0.4                   | 0.0         | 0.0         | 0.0         | 0.1         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 1.0         | 0.9         | 0.0   | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  |  |
| Altiarchaeales  | Uncultured Altiarchaeales                       | 0.0                   | 0.0         | 0.0         | 1.5         | 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  |  |
| Bathyarchaeota  | <b>Uncultured Bathyarchaeota</b>                | <b>77.3</b>           | <b>53.1</b> | <b>57.5</b> | <b>33.7</b> | <b>32.2</b> | <b>68.8</b> | <b>80.2</b> | <b>44.8</b> | <b>45.0</b> | <b>19.5</b> | <b>30.0</b> | <b>50.0</b> | <b>33.3</b> | 42.9  | 20.3 | 40.9 | 21.3  | 26.7 | 20.0 |  |
| Euryarchaeota   | <i>Haladaptatus</i>                             | 0.0                   | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.5         | 2.9   | 1.6  | 8.8  | 0.9   | 0.0  | 0.0  |  |
|                 | <i>Halogeometricum</i>                          | 0.4                   | 0.0         | 0.0         | 0.0         | 0.0         | 6.5         | 0.5         | 0.0         | 1.3         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0   | 0.0  | 5.6  | 0.0   | 0.0  | 0.0  |  |
|                 | <i>Halohasta</i>                                | 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   | 6.7  | 0.0  |  |
|                 | <i>Halolamina</i>                               | 0.0                   | 0.0         | 0.0         | 0.0         | 0.0         | 1.3         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0   | 0.0  | 3.2  | 0.0   | 0.0  | 0.0  |  |
|                 | <i>Halomarina</i>                               | 0.0                   | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.5         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 1.4   | 0.0  | 5.1  | 0.3   | 0.0  | 0.0  |  |
|                 | <i>Halorussus</i>                               | 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  | 3.2  | 0.3   | 0.0  | 0.0  |  |
|                 | <i>Natronomonas</i>                             | 0.0                   | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 1.3         | 0.0         | 0.0         | 0.3         | 0.0         | 0.0   | 0.0  | 0.3  | 0.0   | 0.0  | 0.0  |  |
|                 | Uncultured Halobacteriaceae                     | 0.4                   | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.4         | 0.0         | 5.0         | 0.3         | 0.0         | 0.0   | 0.0  | 2.3  | 0.0   | 0.0  | 3.3  |  |
|                 | Unclassified Halobacteriaceae                   | 1.2                   | 1.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.5         | 0.6         | 0.9         | 2.4         | 0.0         | 0.0         | 0.9         | 0.0   | 1.6  | 5.6  | 0.0   | 0.0  | 0.0  |  |
|                 | <i>Methanobacterium</i>                         | 0.0                   | 0.0         | 0.0         | 1.0         | 1.4         | 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  |  |
|                 | Uncultured Methanomicrobiaceae                  | 0.0                   | 0.0         | 0.0         | 2.9         | 0.8         | 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  |  |
|                 | <i>Methanolinea</i>                             | 0.0                   | 0.0         | 0.0         | 1.5         | 1.5         | 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  |  |
|                 | <i>Methanosaeta</i>                             | 0.0                   | 0.0         | 0.0         | 2.9         | 2.5         | 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  |  |
|                 | <b><i>Methanococcoides</i></b>                  | 0.0                   | 0.0         | 0.0         | 0.0         | 0.0         | <b>0.0</b>  | <b>0.0</b>  | <b>0.0</b>  | <b>0.0</b>  | <b>0.0</b>  | <b>0.0</b>  | <b>22.6</b> | <b>0.9</b>  | 1.4   | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  |  |
|                 | <i>Methanolobus</i>                             | 0.0                   | 1.0         | 0.0         | 0.5         | 0.1         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0   | 0.0  | 0.1  | 0.0   | 6.7  | 10.0 |  |
|                 | <i>Methanosarcina</i>                           | 0.0                   | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 3.8         | 0.0         | 0.0   | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  |  |
|                 | Uncultured 20c-4                                | 0.0                   | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.3         | 1.4         | 0.0   | 0.0  | 0.1  | 0.0   | 0.0  | 0.0  |  |
|                 | <b>Uncult. Marine Benthic Group D - DHVEG-1</b> | 0.0                   | 7.3         | 13.1        | 0.0         | 0.3         | <b>0.0</b>  | <b>0.0</b>  | <b>0.6</b>  | <b>0.0</b>  | <b>29.3</b> | <b>10.0</b> | <b>3.8</b>  | <b>21.9</b> | 4.3   | 0.0  | 3.1  | 0.0   | 0.0  | 0.0  |  |

|                   |                                                 |            |             |             |             |             |            |            |            |            |            |             |            |            |     |      |      |     |      |      |
|-------------------|-------------------------------------------------|------------|-------------|-------------|-------------|-------------|------------|------------|------------|------------|------------|-------------|------------|------------|-----|------|------|-----|------|------|
|                   | <b>Unclas. Marine Benthic Group D - DHVEG-1</b> | 0.4        | 1.0         | 5.6         | 1.0         | 0.0         | <b>0.0</b> | <b>0.0</b> | <b>0.6</b> | <b>0.0</b> | <b>7.3</b> | <b>10.0</b> | <b>1.7</b> | <b>7.8</b> | 1.4 | 0.0  | 1.8  | 0.0 | 0.0  | 0.0  |
| Lokiarchaeota     | <b>Uncultured Lokiarchaeota</b>                 | <b>7.4</b> | <b>14.6</b> | <b>11.3</b> | <b>0.0</b>  | <b>1.7</b>  | 6.5        | 3.3        | 1.8        | 3.1        | 2.4        | 0.0         | 2.8        | 9.1        | 4.3 | 0.0  | 13.0 | 1.8 | 10.0 | 3.3  |
| MHVG <sup>1</sup> | Uncultured MHVG                                 | 0.0        | 0.0         | 0.6         | 0.0         | 0.0         | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0         | 1.7        | 0.0        | 0.0 | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  |
| MEG <sup>2</sup>  | Uncultured MEG                                  | 0.0        | 0.0         | 0.0         | 1.0         | 0.1         | 0.0        | 0.0        | 1.2        | 0.0        | 0.0        | 0.0         | 0.3        | 0.9        | 0.0 | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  |
| Thaumarchaeota    | <b>Uncultured Marine Group I</b>                | <b>0.4</b> | <b>0.0</b>  | <b>0.0</b>  | <b>34.6</b> | <b>31.3</b> | <b>0.0</b> | <b>0.0</b> | <b>1.2</b> | <b>0.0</b> | <b>4.9</b> | <b>0.0</b>  | <b>0.7</b> | <b>0.5</b> | 5.7 | 10.9 | 0.0  | 8.4 | 0.0  | 10.0 |
|                   | <b>Unclassified Marine Group I</b>              | <b>0.0</b> | <b>0.0</b>  | <b>0.0</b>  | <b>3.4</b>  | <b>10.3</b> | 0.0        | 0.5        | 0.6        | 0.9        | 0.0        | 0.0         | 0.0        | 0.0        | 0.0 | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  |
|                   | Uncultured Soil Crenarchaeotic Group (SCG)      | 0.0        | 0.0         | 0.0         | 0.0         | 0.2         | 0.0        | 0.0        | 0.6        | 0.4        | 0.0        | 0.0         | 0.7        | 0.0        | 0.0 | 1.6  | 0.1  | 3.9 | 3.3  | 0.0  |
| Uncultured        | Uncultured Archaea                              | 0.8        | 3.1         | 2.5         | 2.4         | 1.8         | 0.0        | 1.4        | 0.6        | 1.3        | 12.2       | 10.0        | 0.7        | 1.8        | 0.0 | 1.6  | 0.6  | 0.3 | 3.3  | 0.0  |
| Woesearchaeota    | Uncultured Woesearchaeota                       | 0.8        | 4.2         | 1.9         | 0.5         | 2.1         | 0.0        | 0.0        | 1.2        | 15.3       | 0.0        | 0.0         | 2.1        | 4.1        | 8.6 | 0.0  | 0.3  | 0.0 | 0.0  | 0.0  |

<sup>1</sup>MHVG, Marine Hydrothermal Vent Group

<sup>2</sup>MEG, Miscellaneous Euryarchaeotic Group

**Table S3** Physico-chemical properties of soil samples. Presented are the values of combined soil samples per sampling location

| Soil properties                      | Sample          |                 |                 |                 |                 |                 | Reference  |
|--------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------|
|                                      | PI-A            | PI-R            | SHI-A           | SHI-R           | NHI-A           | NHI-R           |            |
| Particle size (DV50) <sup>1</sup>    | 84              | 87              | 92              | 116             | 157             | 292             | [1]        |
| TOC (%)                              | 26              | 22              | 26              | 13              | 3.5             | 6.1             | [1]        |
| pH                                   | 7.7             | 7.4             | 5.7             | 7.4             | 7.5             | 6.7             | [1]        |
| Salinity (g L <sup>-1</sup> )        | 69              | 39              | 41              | 37              | 95              | 57              | [1]        |
| Nitrate (g kg <sup>-1</sup> )        | nd <sup>2</sup> | nd <sup>2</sup> | nd <sup>2</sup> | nd <sup>2</sup> | nd <sup>2</sup> | nd <sup>2</sup> | [1]        |
| Nitrite (g kg <sup>-1</sup> )        | nd <sup>2</sup> | nd <sup>2</sup> | nd <sup>2</sup> | nd <sup>2</sup> | nd <sup>2</sup> | nd <sup>2</sup> | [1]        |
| Sulfate (g kg <sup>-1</sup> )        | 15.3            | 10.7            | 9.6             | 2.7             | 3.4             | 2.2             | This study |
| Sulfur (g kg <sup>-1</sup> )         | 431             | 12              | 406             | 233             | 2.9             | 1.7             | This study |
| Aluminum [Al] (mg kg <sup>-1</sup> ) | 9,480           | 40,000          | 25,500          | 19,700          | 9,330           | 8,380           | This study |
| Arsenic [As] (mg kg <sup>-1</sup> )  | < 5             | < 5             | < 5             | < 8.9           | < 5             | < 5             | This study |
| Cadmium [Cd] (mg kg <sup>-1</sup> )  | 0.2             | < 0.1           | < 0.1           | < 0.2           | < 0.1           | < 0.1           | This study |
| Calcium [Ca] (mg kg <sup>-1</sup> )  | 17,400          | 12,100          | 7,780           | 5,910           | 17,700          | 2,330           | This study |
| Chromium [Cr] (mg kg <sup>-1</sup> ) | 29              | 110             | 42              | 30              | 8.7             | 7.7             | This study |

|                                       |        |        |        |        |        |        |            |
|---------------------------------------|--------|--------|--------|--------|--------|--------|------------|
| Cobalt [Co] (mg kg <sup>-1</sup> )    | 1.6    | 6.3    | 4.1    | 3      | 0.99   | 1.3    | This study |
| Phosphorus [P] (mg kg <sup>-1</sup> ) | 1,090  | 1,140  | 827    | 556    | 756    | 168    | This study |
| Iron [Fe] (mg kg <sup>-1</sup> )      | 3,540  | 12,200 | 8,190  | 8,290  | 2,630  | 3,880  | This study |
| Potassium [K] (mg kg <sup>-1</sup> )  | 5,600  | 5,800  | 6,500  | 6,600  | 5,000  | 4,000  | This study |
| Copper [Cu] (mg kg <sup>-1</sup> )    | 3.9    | 8.9    | 24     | 11     | 1.8    | 2.8    | This study |
| Mercury [Hg] (mg kg <sup>-1</sup> )   | < 0.1  | < 0.1  | < 0.1  | < 0.1  | < 0.1  | < 0.11 | This study |
| Lead [Pb] (mg kg <sup>-1</sup> )      | 1.9    | 11     | 12     | 11     | 14     | 3.5    | This study |
| Magnesium [Mg] (mg kg <sup>-1</sup> ) | 15,000 | 14,000 | 11,000 | 6,400  | 2,700  | 2,200  | This study |
| Manganese [Mn] (mg kg <sup>-1</sup> ) | 16     | 64     | 38     | 37     | 34     | 40     | This study |
| Sodium [Na] (mg kg <sup>-1</sup> )    | 74,000 | 61,000 | 52,000 | 27,000 | 16,000 | 12,000 | This study |
| Nickel [Ni] (mg kg <sup>-1</sup> )    | 14     | 28     | 16     | 8      | 3.6    | 3.2    | This study |
| Zinc [Zn] (mg kg <sup>-1</sup> )      | 39     | 53     | 47     | 33     | 8.8    | 12     | This study |

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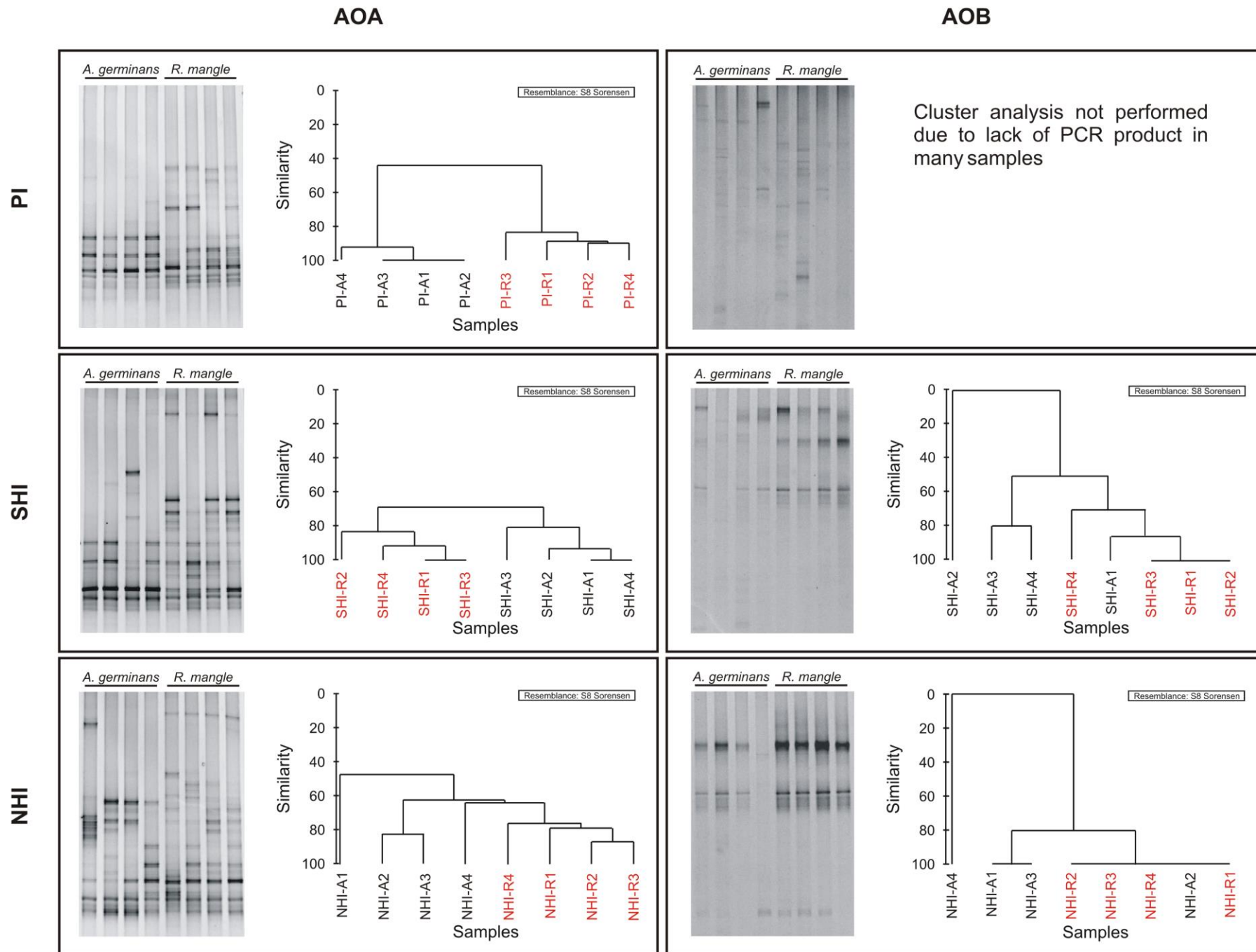
<sup>1</sup>As volume based mean diameter

<sup>2</sup>Not detectable (< 0.5 mg per kg dry soil)

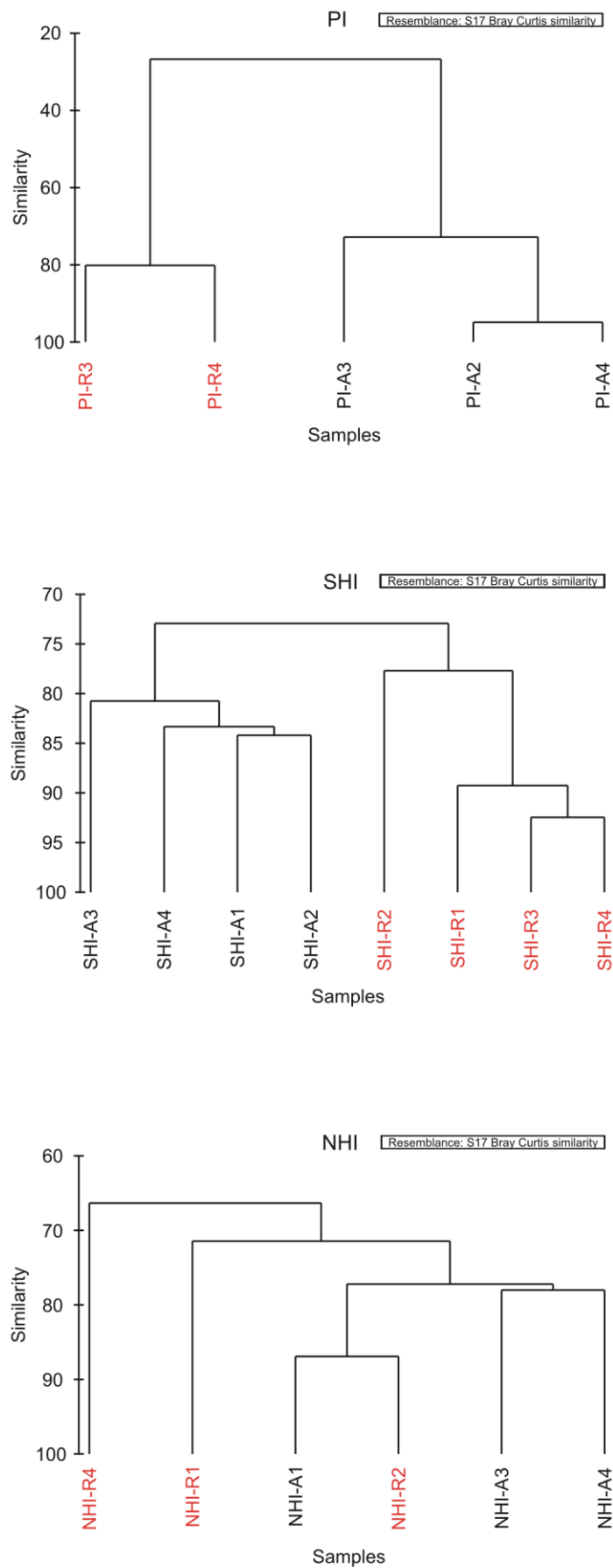
## Reference

1. Balk M, Laverman AM, Keuskamp JA, Laanbroek HJ (2015) Nitrate ammonification in mangrove soils: A hidden source of nitrite? Front Microbiol. doi: 10.3389/fmicb.2015.00166

**Fig. S1** Effect of mangrove tree species (*Avicennia germinans* vs. *Rhizophora mangle*) on the community composition of AOA and AOB, based on PCR-DGGE of *amoA* genes



**Fig. S2** Cluster analysis of soil samples covered by *Avicennia germinans* and *Rhizophora mangle* based on the relative abundance of OTUs classified as Nitrosomonadaceae



**Fig. S3** Principal component analysis of the physico-chemical properties of mangrove soil samples. Vectors in blue represent physico-chemical properties of the soils

