Table S1 Spatial extent of ecosystems and urban areas with reference (R) and comments (C). In contrast to Table S2, Table S1 includes overlaps. For instance, ‘ocean’ comprises the shelves and the all other submerged coastal ecosystems, and soil includes peat soils and all non-submerged coastal ecosystems.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Ecosystem | Area | | | | | | |
|  |  | from | | | to | | | mean |
|  |  | [1012 m2] | *R* | *C* | [1012 m2] | *R* | *C* | [1012 m2] |
| 1 | Salt marshes | 0.02 | 1 |  | 0.06 | 2,3 |  | 0.04 |
| 2 | Mangroves | 0.08 | 4 |  | 0.15 | 5 |  | 0.12 |
| 3 | Seagrass | 0.21 | 6 |  | 0.60 | 7 |  | 0.41 |
| 4 | Macroalgae | 1.40 | 8 |  | 6.80 | 9 |  | 4.10 |
| 5 | Tidal flats | 0.12 | 10 |  | 0.13 | 10 |  | 0.13 |
| 6 | Coral reefs (warm water) | 0.25 | 11 |  | 0.85 | 12 | [[1]](#footnote-1) | 0.55 |
| 7 | Coral reefs (cold water) | 0.28 | 13 |  | 0.28 | 13 |  | 0.28 |
| 8 | Estuaries | 1.05 | 14 |  | 3.72 | 15 |  | 2.39 |
| 9 | Shelves | 26.39 | 16 |  | 32.24 | 17 |  | 29.31 |
| 10 | Ocean | 361.88 | 17 |  | 361.88 | 17 |  | 361.88 |
| 11 | Peat (high latitudes) | 3.10 | 18 |  | 3.32 | 19 |  | 3.21 |
| 12 | Peat (tropics) | 0.60 | 18 |  | 0.84 | 19 |  | 0.72 |
| 13 | Soils | 125.80 | 20 |  | 125.80 | 20 |  | 125.80 |
| 14 | Inland waters | 2.79 | 21 |  | 4.09 | 22 |  | 3.44 |
| 15 | Reservoirs | 0.25 | 21 |  | 0.50 | 22 |  | 0.38 |
| 16 | Ice cover (land) | 17.93 | 23 |  | 18.68 | 24 |  | 18.31 |
| 17 | Urban areas | 0.31 | 25 |  | 0.73 | 25 |  | 0.52 |

Table S2 Spatial extent of ecosystems and urban areas with reference (R, S1 = see Table S1), comments (C) and without overlaps.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Ecosystem | Area | | | | | | |
|  |  | from | | | to | | | mean |
|  |  | [1012 m2] | *R* | *C* | [1012 m2] | *R* | *C* | [1012 m2] |
| 1 | Salt marshes | 0.02 | S1 |  | 0.06 | S1 |  | 0.04 |
| 2 | Mangroves | 0.08 | S1 |  | 0.15 | S1 |  | 0.12 |
| 3 | Seagrass | 0.21 | S1 |  | 0.60 | S1 |  | 0.41 |
| 4 | Macroalgae | 1.40 | S1 |  | 6.80 | S1 |  | 4.10 |
| 5 | Tidal flats | 0.12 | S1 |  | 0.13 | S1 |  | 0.13 |
| 6 | Coral reefs (warm water) | 0.25 | S1 |  | 0.85 | S1 |  | 0.55 |
| 7 | Coral reefs (cold water) | 0.28 | S1 |  | 0.28 | S1 |  | 0.28 |
| 8 | Estuaries | 1.05 | S1 |  | 3.72 | S1 |  | 2.39 |
| 9 | Open shelves[[2]](#footnote-2) | 20.13 |  |  | 23.33 |  |  | 21.73 |
| 10 | Open ocean[[3]](#footnote-3) | 329.64 |  |  | 335.50 |  |  | 332.65 |
| 11 | Peat (high latitudes) | 3.10 | S1 |  | 3.32 | S1 |  | 3.21 |
| 12 | Peat (tropics) | 0.60 | S1 |  | 0.84 | S1 |  | 0.72 |
| 13 | Inland mineral soils[[4]](#footnote-4) | 121.30 |  |  | 121.88 |  |  | 121.59 |
| 14 | Inland waters | 2.79 | S1 |  | 4.09 | S1 |  | 3.44 |
| 15 | Ice cover (land) | 17.93 | S1 |  | 18.68 | S1 |  | 18.31 |
| 16 | Urban areas | 0.31 | S1 |  | 0.73 | S1 |  | 0.52 |
|  |  |  |  |  |  |  |  |  |
| 17 | Marine coastal ecosystems[[5]](#footnote-5) | 23.27 |  |  | 35.64 |  |  | 29.46 |
| 18 | Open ocean[[6]](#footnote-6) | 329.64 |  |  | 335.50 |  |  | 332.57 |
| 19 | Land[[7]](#footnote-7) | 146.02 |  |  | 149.54 |  |  | 147.78 |
|  | Total[[8]](#footnote-8) | 499.93 |  |  | 520.68 |  |  | 509.81 |

Table S3 POC burial rates with reference (R) and comments (C). In case no data have been found POC burial was set to zero.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Ecosystem | POC burial | | | | | | | | |
|  |  | from | | | to | | | mean | mean[[9]](#footnote-9) | ± range[[10]](#footnote-10) |
|  |  | [g C m-2 yr-1] | *R* | *C* | [g C m-2 yr-1] | *R* | *C* | [g C m-2 yr-1] | Tg C yr-1 | |
| 1 | Salt marshes | 73.15 | 1 |  | 440.00 | 26 |  | 256.57 | 12.82 | 11.36 |
| 2 | Mangroves | 39.94 | 1 |  | 229.00 | 26 |  | 134.47 | 19.08 | 15.81 |
| 3 | Seagrass | 62.65 | 1 |  | 176.00 | 27 |  | 119.32 | 59.49 | 46.11 |
| 4 | Macroalgae | 0.36 | 1 |  | 3.24 | 1 |  | 1.80 | 11.25 | 10.75 |
| 5 | Tidal flats | 99.90 | 28 |  | 159.70 | 28 |  | 129.80 | 16.73 | 4.32 |
| 6 | Coral reefs (warm water) | 0.11 | 29 | [[11]](#footnote-11) | 1.28 | 29 |  | 0.70 | 0.56 | 0.53 |
| 7 | Coral reefs (cold water) | < 0.01 | 30 | [[12]](#footnote-12) | 0.05 | 30 |  | 0.03 | 0.01 | 0.01 |
| 8 | Estuaries | 13.44 | 31 |  | 47.62 | 31 |  | 30.53 | 50.0 | 0.00 |
| 9 | Open shelves | 4.47 | 32 |  | 8.57 | 31 |  | 6.52 | 145.00 | 55.00 |
| 10 | Open ocean | 0.05 | 33 |  | 0.12 | 34 |  | 0.09 | 28.55 | 11.45 |
| 11 | Peat (high latitudes) | 18.64 | 35 |  | 24.00 | 36 |  | 21.32 | 68.72 | 10.96 |
| 12 | Peat (tropics) | 12.80 | 36 |  | 100.00 | 37 |  | 56.40 | 46.01 | 38.35 |
| 13 | Inland mineral soils | 0.41 | 38 |  | 0.41 | 38 |  | 0.41 | 50.00 | 0.00 |
| 14 | Inland waters | 14.35 | 38 |  | 14.65 | 39 |  | 14.50 | 50.00 | 10.00 |
| 15 | Ice cover (land) | 0.00 |  |  | 0.00 |  |  | 0.00 | 0.00 | 0.00 |
| 16 | Urban areas | 0.00 |  |  | 0.00 |  |  | 0.00 | 0.00 | 0.00 |

Table S4 PIC burial rates with reference (R) and comments (C). In case no data have been found POC burial was set to zero.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Ecosystem | PIC burial | | | | | | | | |
|  |  | From | | | to | | | mean | mean | ± range |
|  |  | [g C m-2 yr-1] | *R* | *C* | [g C m-2 yr-1] | *R* | *C* | [g C m-2 yr-1] | Tg C yr-1 | |
| 1 | Salt marshes | 26.00 | 40 |  | 54.00 | 40 |  | 40.00 | 1.74 | 1.22 |
| 2 | Mangroves | 0.00 | 40 | [[13]](#footnote-13) | 240.00 | 40 |  | 120.00 | 18.28 | 18.28 |
| 3 | Seagrass | 95.29 | 41 |  | 157.31 | 41 |  | 126.30 | 57.36 | 37.02 |
| 4 | Macroalgae | 0.00 |  |  | 0.00 |  |  | 0.00 | 0.00 | 0.00 |
| 5 | Tidal flats | 0.00 |  |  | 0.00 |  |  | 0.00 | 0.00 | 0.00 |
| 6 | Coral reefs (warm water) | 65.75 | 42 |  | 140.00 | 43 |  | 102.88 | 67.69 | 51.27 |
| 7 | Coral reefs (cold water) | 0.66 | 30 | [[14]](#footnote-14) | 5.60 | 30 |  | 3.13 | 0.89 | 0.70 |
| 8 | Estuaries | 0.00 | 31 |  | 0.00 | 31 |  | 0.00 | 0.00 | 0.00 |
| 9 | Open shelves | 7.45 | 31 |  | 11.32 | 44 |  | 9.38 | 207 | 57.00 |
| 10 | Open ocean | 0.40 | 44,45 |  | 0.86 | 46 |  | 0.63 | 210.18 | 78.07 |
| 11 | Peat (high latitudes) | 0.00 |  |  | 0.00 |  |  | 0.00 | 0.00 | 0.00 |
| 12 | Peat (tropics) | 0.00 |  |  | 0.00 |  |  | 0.00 | 0.00 | 0.00 |
| 13 | Inland mineral soils | 0.00 |  |  | 0.00 |  |  | 0.00 | 0.00 | 0.00 |
| 14 | Inland waters | 0.00 |  |  | 0.00 |  |  | 0.00 | 0.00 | 0.00 |
| 15 | Ice cover (land) | 0.00 |  |  | 0.00 |  |  | 0.00 | 0.00 | 0.00 |
| 16 | Urban areas[[15]](#footnote-15) | 0.00 |  |  | 0.00 |  |  | 0.00 | 0.00 | 0.00 |

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1. with an addition of 0.6 1012 m2 of sandy lagoons [↑](#footnote-ref-1)
2. Open shelves = Shelves (see Table S1) - Seagrass – Macroalgae - Coral reefs (warm water) – (Coral reefs (cold water)/2) - Estuaries [↑](#footnote-ref-2)
3. Open ocean = Ocean (see Table S1) –Shelves (see Table S1); including half of the cold water reefs [↑](#footnote-ref-3)
4. Inland mineral soils = Soils (see Table S1) - Salt marshes – Mangroves - Tidal flats - Peat (high latitudes) - Peat (tropics) [↑](#footnote-ref-4)
5. Marine coastal ecosystems = Salt marshes + Mangroves + Seagrass + Macroalgae + Tidal flats + Coral reefs (warm water) + Estuaries + Open shelves [↑](#footnote-ref-5)
6. Open ocean = Open ocean (10), including half of the cold water reefs [↑](#footnote-ref-6)
7. Land = Peat (high latitudes) + Peat (tropics) + Inland mineral soils + Inland waters + Ice cover (land) + Urban areas [↑](#footnote-ref-7)
8. Total = Marine coastal ecosystems + Open ocean + Land; It represents the total surface area of the Earth which considering an Earth radius of 6371 km amounts to 510.06 1012 m2 [↑](#footnote-ref-8)
9. ((Area-min. (see Tab. S2) \* POC burial-min) + (Area-max (see Tab. S2) \* POC burial-max))/2 [↑](#footnote-ref-9)
10. ((Area-max. (see Tab. S2) \* POC burial-max) - (Area-min (see Tab. S2) \* POC burial-min))/2 [↑](#footnote-ref-10)
11. based on PIC burial rates and the organic carbon content of reef carbonates of 0.02 – 0.11 % [↑](#footnote-ref-11)
12. this estimate assumes that cold-water reef carbon burial rates are equal to 4%– 12% of those from tropical reefs. [↑](#footnote-ref-12)
13. extrapolated to global scale [↑](#footnote-ref-13)
14. this estimate assumes that cold-water reef carbon burial rates are equal 4%– 12% of those from tropical reefs. [↑](#footnote-ref-14)
15. the burial of concrete and concrete derived carbonates have been excluded. [↑](#footnote-ref-15)