

Supplementary Material: Modeling carbon burial along the land to ocean aquatic continuum: current status, challenges, and perspectives

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S1. Global database of organic carbon burial (OCB) rates

Available in our Zenodo repository [doi:10.5281/zenodo.8425010](https://doi.org/10.5281/zenodo.8425010).

S2. Dataset description and comments

- **Column names:** column names are short for the following:

- [1] Name: site or ecosystem name.
- [2] System number: assigned number for an individual system.
- [3] Ecosystem type: type of ecosystem according the following classification: Lake, Reservoir, Private impoundment, Saltmarsh, Mangrove, Seagrass, Macroalgal, Floodplain, Riverine wetland, Depression wetland, Hillslope, Constructed wetland, and Swamp.
- [4] Country: name of the country where the system is located ("Several" is used when more than one country is considered).
- [5] Continent: name of the continent where the system is located: Africa, Asia, Europe, N. America, C. America, S. America, Oceania ("Several" is used when more than one continent is considered).
- [6] Latitude: latitude in Decimal Degrees (DD) format.
- [7] Longitude: longitude in Decimal Degrees (DD) format.

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- [8] LSR mmy.1: linear sedimentation rate in mm y^{-1} .
 - [9] DBD gcm.3: dry bulk density in g cm^{-3} .
 - [10] Cdensity kgCm.3: carbon density, reported by some coastal studies, as $\text{DBD} \times \text{OC}$ content.
 - [11] OC content: organic carbon content in %.
 - [12] OCBrate gCm.2y.1: organic carbon burial rate in $\text{g C m}^{-2} \text{y}^{-1}$.
 - [13] OC depo gCm.2y.1: organic carbon deposition rate in $\text{g C m}^{-2} \text{y}^{-1}$.
 - [14] OCBeff: organic carbon efficiency in %.
 - [15] Dating method: short description of the dating method used for sedimentation estimations. However, this article does not aim to compare methodologies. For more details go to the original reference.
 - [16] Reference: reference from where the data were taken (listed at the end of this document). Nevertheless, some references might not correspond to the original reference, specially when they were taken from other large compilations.
 - [17] Notes ID: this column has been created to offer dataset users additional information regarding calculations for specific cases. For example, when the source did not provide a particular parameter but supplied the necessary information for direct calculation. Refer to Section [S3](#) for more details.
- **System number:** more than one site can correspond to the same system. When the value contains a decimal (e.g., 214.1 and 214.2), it means that the system has been reported for more than one ecosystem type (e.g., lake and floodplain).
 - **Coordinates:** when the exact coordinates of the site were not given, we looked up for the name of the system, state, county, or basin in Google Earth and took the averaged coordinates. This is why, for instance, some of the coastal ecosystems are not located along the coastline. Also, when the coordinates were given as a range, we took the average value. And when the sites were only shown in a map, an approximated value was taken.
 - **OCB rate:** when several or a range of values were given for a certain site, we reported the average value. The original values are given in Section [S3](#).

S3. Dataset notes (Note ID)

These notes provide additional information about calculations for specific cases. The ID follows this structure: AYYYY_N, where A is the first letter of the first author's last name, YYYYY is the publication year, and N is the note number. If there is more than one note that applies for the same site, they will be separated by a comma (e.g., AYYYY_1,2).

Table 1: Notes ID, additional information regarding calculations for specific cases

Coastal ecosystems	
Note ID	Note
M2019_1	Original OCB_{rate} values in $mmolC\ m^{-2}\ y^{-1}$
M2019_2	$LSR=AVERAGE(0.24,4.2)$
M2019_3	$LSR=AVERAGE(0.037,0.134)$
M2019_4	$LSR=AVERAGE(0.06,0.13)$
Lakes and reservoirs	
Note ID	Note
A2007_1	OC_{depo} was calculated as $OCB_{rate} \times 100 / OCB_{eff}$
A2007_2	$OCB_{eff}=AVERAGE(1.8,2.3)$
A2007_3	$OCB_{eff}=AVERAGE(1.2,1.6)$
A2007_4	$OCB_{eff}=AVERAGE(4.5,6)$
A2007_5	$OCB_{eff}=AVERAGE(0.7,1.8)$
A2016_1	OCB_{eff} was calculated as $OCB_{rate} \times 100 / OC_{depo}$
B2013_1	OCB_{eff} was calculated as $OCB_{rate} \times 100 / OC_{depo}$
D2008_1	$OC_{content}$ is calculated as $LOI \times 100 / 2.13$ as indicated by the authors (LOI: sediment loss on ignition). LSR is calculated as deposited sediment volume divided by lake area.
F2014_1	OCB_{eff} was calculated as $OCB_{rate} \times 100 / OC_{depo}$
G2013_1	$OC_{content}$ calculated as $OCB_{rate} \times 100 / \text{mean mass accumulation rates}$
H2013_1	$OC_{content}$ calculated as $OCB_{rate} \times 100 / \text{sediment total (erosional+in-lake) mass accumulation rates}$
K2013_1	age was determined by radiocarbon dating, paleomagnetic dating or deglaciation/ isolation of the basin.
K2020_1	OCB_{eff} was calculated as $OCB_{rate} \times 100 / OC_{depo}$. Original OCB_{rate} values in $molC\ m^{-2}\ y^{-1}$.
M2004_1	$OCB_{rate}=AVERAGE(31, 137)$. $LSR=AVERAGE(0.32,1.23)$ - Irion (1984) calculated an average LSR of $0.16\ cm\ year^{-1}$ using ^{14}C dating. For calculating Sed_{depo} , OC_{depo} and OCB_{eff} , data was taken from Smith-Morrill (1987) .
M2004_2	$LSR=AVERAGE(0.4,1.34)$. $OC_{content}$ is calculated as the mean of the range of $OC_{content}$ in settling particles. Sed_{depo} and OC_{depo} are the mean of all stations. OCB_{eff} was calculated as $OCB_{rate} \times 100 / OC_{depo}$.
O2012_1	$LSR=AVERAGE(0.2,0.4)$. OCB_{rate} was calculated as the global OCB_{rate} divided by the lake surface area.
O2014_1	$OCB_{rate}=AVERAGE(12,62)$

Lakes and reservoirs (continue)

Note ID	Note
P2010_1	$OCB_{rate} = AVERAGE(12.2, 10.1)$. OCB_{eff} was calculated as $OCB_{rate} \times 100 / depo$.
P2010_2	$OCB_{rate} = AVERAGE(16.6, 17.8)$
P2010_3	$OCB_{rate} = AVERAGE(7.2, 3.4)$
P2010_4	$CB_{rate} = AVERAGE(12.8, 9)$
R2017_1	OCB_{rate} calculated as $OCB_{eff} \times depo / 100$
S2006_1	OCB whole-system rate divided by the system area to obtain OCB areal rate
S2009_1	OCB_{eff} was calculated as $OCB_{rate} \times 100 / depo$
S2011_1	$DBD = dry_density \times (1 - porosity)$
S2012_1	$OC_{content}$ mean extracted from Sobek2009. $depo$ was calculated as the $OCB_{rate} \times 100 / OCB_{eff}$.
S2014_1	OC_{depo} was calculated as the $OCB_{rate} \times 100 / OCB_{eff}$
X2013_1	$OC_{content}$ was calculated as $OCB_{rate} \times 100 / buried$ sediments
X2015_1	$LSR = AVERAGE(0.18, 0.21)$
X2015_2	$LSR = AVERAGE(0.15, 0.25)$
X2015_3	$LSR = AVERAGE(0.62, 0.91)$

Floodplains and other freshwater wetlands

Note ID	Note
C2018_1	$OC_{content} = AVERAGE(47, 4.5, 39)$
C2018_2	$OCB_{rate} = AVERAGE(6, 114)$
C2018_3	$OC_{content} = AVERAGE(72, 22)$
C2018_4	$OCB_{rate} = AVERAGE(55, 295)$
S2017_1	$LSR = AVERAGE(0.86, 1.09)$

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