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## A global database of dissolved organic matter (DOM) measurements in coastal waters (CoastDOM v1)

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1 **A global database of dissolved organic matter (DOM) measurements in coastal**  
2 **waters (CoastDOM v1)**

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204 **Abstract**

205 The measurements of dissolved organic carbon (DOC), nitrogen (DON), and phosphorus  
206 (DOP) are used to characterize the dissolved organic matter (DOM) pool and are  
207 important components of biogeochemical cycling in the coastal ocean. Here, we present  
208 the first edition of a global database (CoastDOM v1; available at  
209 <https://figshare.com/s/512289eb43c4f8e8eaeef>) compiling previously published and  
210 unpublished measurements of DOC, DON, and DOP collected in coastal waters. These  
211 data are complemented by hydrographic data such as temperature and salinity and, to  
212 the extent possible, other biogeochemical variables (e.g., Chlorophyll-a, inorganic  
213 nutrients) and the inorganic carbon system (e.g., dissolved inorganic carbon and total  
214 alkalinity). Overall, CoastDOM v1 includes observations from all continents however,  
215 most data were collected in the Northern Hemisphere, with a clear gap in coastal water  
216 DOM measurements from the Southern Hemisphere. The data included were collected  
217 from 1978 to 2022 and consist of 62339 data points for DOC, 20360 for DON and 13440  
218 for DOP. The number of measurements decreases progressively in the sequence DOC  
219 > DON > DOP, reflecting both differences in the maturity of the analytical methods and  
220 the greater focus on carbon cycling by the aquatic science community. The global  
221 database shows that the average DOC concentration in coastal waters (average  
222 (standard deviation; SD): 182 (314)  $\mu\text{mol C L}^{-1}$ ; median: 103  $\mu\text{mol C L}^{-1}$ ), is 13-fold greater  
223 than the average coastal DON concentrations (average (SD): 13.6 (30.4)  $\mu\text{mol N L}^{-1}$ ;  
224 median: 8.0  $\mu\text{mol N L}^{-1}$ ), which was itself 39-fold greater than the average coastal DOP  
225 concentrations (average (SD): 0.34  $\pm$  1.11  $\mu\text{mol P L}^{-1}$ ; median: 0.18  $\mu\text{mol P L}^{-1}$ ). This  
226 dataset will be useful to identify global spatial and temporal patterns in DOM and to  
227 facilitate reuse of DOC, DON and DOP data in studies aimed at better characterising local  
228 biogeochemical processes, closing nutrient budgets, estimating carbon, nitrogen and



229 phosphorous pools, as well as identifying a baseline for modelling future changes in  
230 coastal waters.

231

232 **Keywords:** Dissolved organic matter, Dissolved organic carbon, Dissolved organic  
233 nitrogen, Dissolved organic phosphorus, Coastal waters, Global database.



## 234 **1. Introduction**

235 Coastal waters are the most biogeochemical dynamic areas of the ocean, exhibiting  
236 the highest standing stocks, process rates and transport fluxes of carbon (C), nitrogen  
237 (N), and phosphorus (P) per unit area (Bauer et al., 2013; Mackenzie et al., 2011). In  
238 these areas, organic matter plays a critical role in numerous biogeochemical processes,  
239 serving as both a C, N and P reservoir and substrate (Carreira et al., 2021).

240 Organic matter found in the marine environment is commonly distinguished by its size;  
241 material retained on a filter with a pore size typically between 0.2 and 0.7  $\mu\text{m}$  is classified  
242 as particulate organic matter (POM), whereas organic matter that passes through the filter  
243 is referred to as dissolved organic matter (DOM). This partitioning is operational but has  
244 implications for biogeochemical cycling: POM can be suspended in the water column or  
245 sink to the sediments controlled by its size, shape and density (Laurenceau-Cornec et al.,  
246 2015), whereas DOM is a solute that mostly remains in the water column. In most coastal  
247 waters, the DOM concentrations are greater than POM, with the POM fraction being less  
248 degraded and more bioavailable (Boudreau and Ruddick, 1991; Lønborg et al., 2018).

249 The DOM pool consists mainly of C (DOC), N (DON), and P (DOP) but it also includes  
250 other elements such as oxygen, sulphur and trace elements (Lønborg et al., 2020). In  
251 coastal waters, DOM originates from multiple sources. Internal, or autochthonous,  
252 sources include planktonic organisms (Lønborg et al., 2009; Carlson and Hansell, 2015),  
253 benthic microalgae, macrophytes, and sediment porewater (Burdige and Komada, 2014;  
254 Wada et al., 2008 ). On the other hand, DOM from external, or allochthonous, sources,  
255 has mainly terrestrial origins, including wetlands, river and surface runoff, groundwater  
256 discharges, and atmospheric deposition (Iavorivska et al., 2016; Raymond and Spencer,  
257 2015; Taniguchi et al., 2019; Santos et al., 2021). The main sinks for DOM from the water  
258 column in coastal waters are: 1) bubble coagulation and abiotic flocculation (Kerner et al.,  
259 2003) or sorption to particles (Chin et al., 1998); 2) sunlight mediated photodegradation



260 (Mopper et al., 2015); and 3) microbial degradation by mainly heterotrophic prokaryotes  
261 (Lønborg and Álvarez-Salgado, 2012).

262 Given the importance of DOM as a source of nutrients and for coastal biogeochemical  
263 cycling in general, numerous studies have measured the C, N and P content of the DOM  
264 pool over the last few decades (e.g., García-Martín et al., 2021; Cauwet, 2002; Osterholz  
265 et al., 2021). Most data, however, are often unavailable or stored in an inaccessible  
266 manner, making it difficult to e.g., analyse global spatial and temporal patterns effectively.  
267 A global open ocean DOM data compilation already exists, but it contains few coastal  
268 samples (< 200m) (Hansell et al., 2021). Hence, there is a clear need for a comprehensive  
269 global and integrated database of DOC, DON and DOP measurements for coastal waters.  
270 To address this need, we have prepared the first edition of a coastal DOM database  
271 (named CoastDOM v1), by compiling both previously reported as well as unpublished  
272 data. These data have been obtained from authors of the original studies or extracted  
273 directly from the original studies. In order to allow the DOM measurements to be  
274 interpreted across larger scales, and to better understand their relationship with local  
275 environmental conditions, we have included concurrently collected ancillary data (such  
276 as physical and/or chemical seawater properties) whenever available. The objective of  
277 this database is multifaceted. Firstly, we aimed to compile all available coastal DOM data  
278 into a single repository. Secondly, our intention was to make these data easily accessible  
279 to the research community and thirdly, we sought to achieve long-term consistency of the  
280 measurements, to enable data intercomparison, and establish a robust baseline for  
281 assessing, for example, the impacts of climate change and land use changes.

282

## 283 **2. Methods**

### 284 **2.1. Data compilation**



285 The measurements included in CoastDOM v1 were obtained either directly from  
286 authors of previously published studies, online databases, or scientific papers. An  
287 extensive search of published reports, Ph.D. theses, and peer-reviewed literature was  
288 performed to identify studies dealing with DOM in coastal waters. First, a formal search  
289 was performed using Google Scholar in January 2022 using the search terms “dissolved  
290 organic carbon”, “dissolved organic nitrogen”, and “dissolved organic phosphorus” in  
291 connection with “marine” or “ocean”, which yielded a total of 897 articles (after filtering  
292 the query by searching content in the title and abstract and excluding non-coastal  
293 articles). When data could not be obtained directly from the corresponding authors,  
294 relevant data were extracted. Further searches for relevant datasets were conducted  
295 using the reference lists of the identified scientific papers as well as databases and  
296 repositories to capture as many datasets as possible. Additionally, research groups that  
297 were invited to participate in this effort were also encouraged to submit unpublished data  
298 to CoastDOM v1.

299

## 300 **2.2. Dissolved organic matter analysis**

301 The DOC concentrations included in CoastDOM v1 were commonly measured using a  
302 total organic carbon (TOC) high temperature catalytic oxidation (HTCO) analyser (81%  
303 of samples). Some were measured by a combined wet chemical oxidation (WCO) step  
304 and/or UV digestion, after which the carbon dioxide generated was quantified (19% of  
305 samples). Similarly, concentrations of total dissolved nitrogen (TDN) were determined  
306 using either a nitric oxide chemiluminescence detector connected in series with the HTCO  
307 analyser used for DOC analyses (31% of the samples), or by employing a UV and/or  
308 chemical oxidation step (69%). In the latter approach, both organic and inorganic N  
309 compounds were oxidised to nitrate, which was subsequently quantified through a  
310 colorimetric method to determine the concentration of inorganic N (Valderrama, 1981;



311 Álvarez-Salgado et al., 2023; Halewood et al., 2022; Foreman et al., 2019). The reported  
312 DON concentrations were calculated as the difference between TDN and dissolved  
313 inorganic nitrogen (DIN; sum of ammonium ( $\text{NH}_4^+$ ) and nitrate/nitrite ( $\text{NO}_3^- + \text{NO}_2^-$ );  $\text{DON}$   
314 =  $\text{TDN} - \text{DIN}$ ) (Álvarez-Salgado et al., 2023). Analyses of total dissolved phosphorus  
315 (TDP) were determined by UV (4%) or wet chemical oxidation (66%), or a combination of  
316 these (30%), and subsequently were analysed for inorganic phosphorus by a colorimetric  
317 method (Álvarez-Salgado et al., 2023). The DOP concentrations were calculated as the  
318 difference between TDP and soluble reactive phosphorus (SRP:  $\text{HPO}_4^{2-}$ ) ( $\text{DOP} = \text{TDP} -$   
319 SRP) (Álvarez-Salgado et al., 2023).

320

### 321 **3. Description of the dataset**

322 The data compiled in CoastDOM v1 were collected, analysed and processed by different  
323 laboratories, however, all data included have undergone quality control measures, either  
324 by using reference samples or internal quality assurance procedures. While many of the  
325 included DOC and TDN data have been systematically compared against consensus  
326 reference material (CRM) mainly provided by the University of Miami's CRM program  
327 (Hansell, 2005), there is a limitation in CoastDOM v1 regarding the intercalibration across  
328 different measurement systems used for both DOP and DON determination. While the  
329 CRM could be used for DOC, DON and DOP measurements, this has not yet been  
330 attempted for DOP and measurement uncertainties increase in the sequence  $\text{DOC} >$   
331  $\text{DON} > \text{DOP}$ . Although some of the reported measurements have quantified the DOP  
332 recovery based on commercially available DOP compounds such as Adenosine  
333 triphosphate (ATP), it is not known if these were conducted systematically in all cases.  
334 Therefore, we strongly recommend undertaking further intercalibrations across  
335 laboratories for future measurements of TDP, as has been done for DOC and TDN



336 measurements (e.g., Sharp et al., 2002). Since additional quality control is not possible  
337 in retrospect, we assessed the quality of CoastDOM v1 based on its internal consistency.

338 In CoastDOM v1, we defined “coastal water” as encompassing estuaries (salinity >  
339 0.1) to the continental shelf break (water depth < 200 m). However, some locations, such  
340 as deep fjords which are close to the coast cannot be classed as coastal due to  
341 bathymetry (deeper than > 200 m). Therefore, we evaluated the inclusion of some  
342 datasets on a case-by-case basis. For inclusion in the database, each DOM  
343 measurement needed at a minimum to contain the following information (if reported in the  
344 original publication or otherwise available):

- 345 - Country where samples were collected
- 346 - Latitude of measurement (in decimal units)
- 347 - Longitude of measurement (in decimal units)
- 348 - Year of sampling
- 349 - Month of sampling
- 350 - Sampling day (when available)
- 351 - Depth (m) at which the discrete sample were collected
- 352 - Temperature (°C) of the sample
- 353 - Salinity of the sample
- 354 - Dissolved organic carbon (DOC) concentration ( $\mu\text{mol L}^{-1}$ )
- 355 - Method used to measure DOC concentration
- 356 - DOC - QA flag: Quality flag for DOC measurement
- 357 - Dissolved organic nitrogen (DON) concentration ( $\mu\text{mol L}^{-1}$ )
- 358 - Total dissolved nitrogen (TDN) concentration ( $\mu\text{mol L}^{-1}$ )
- 359 - Method used to measure TDN concentration
- 360 - TDN - QA flag: Quality flag for TDN measurement
- 361 - Dissolved organic phosphorus (DOP) concentration ( $\mu\text{mol L}^{-1}$ )



- 362 - Total dissolved phosphorus (TDP) concentration ( $\mu\text{mol L}^{-1}$ )
- 363 - Method used to measure TDP concentration
- 364 - TDP - QA flag: Quality flag for TDP measurement
- 365 - Responsible person
- 366 - Originator institution
- 367 - Contact of data originator
- 368 It should be noted that in all entries, at least DOC, DON or DOP should have been
- 369 measured. In addition, we also included other relevant data, when available, in the
- 370 CoastDOM v1 dataset:
- 371 - Depth at the station where the sample was collected (Bottom depth, m).
- 372 - Total suspended solids (TSS) concentration ( $\text{mg L}^{-1}$ )
- 373 - Chlorophyll-*a* (Chl *a*) concentration ( $\mu\text{g L}^{-1}$ )
- 374 - Chl *a* - QA flag: Quality flag for chlorophyll-*a* measurement
- 375 - Sum of nitrate and nitrite ( $\text{NO}_3^- + \text{NO}_2^-$ ) concentration ( $\mu\text{mol L}^{-1}$ )
- 376 -  $\text{NO}_3^- + \text{NO}_2^-$  - QA flag: Quality flag for  $\text{NO}_3^- + \text{NO}_2^-$  measurement
- 377 - Ammonium ( $\text{NH}_4^+$ ) concentration ( $\mu\text{mol L}^{-1}$ )
- 378 -  $\text{NH}_4^+$  - QA flag: Quality flag for  $\text{NH}_4^+$  measurement
- 379 - Soluble reactive phosphorus ( $\text{HPO}_4^{2-}$ ) concentration ( $\mu\text{mol L}^{-1}$ )
- 380 -  $\text{HPO}_4^{2-}$  - QA flag: Quality flag for  $\text{HPO}_4^{2-}$  measurement
- 381 - Particulate organic carbon (POC) concentration ( $\mu\text{mol L}^{-1}$ )
- 382 - Method used to measure POC concentration
- 383 - POC - QA flag: Quality flag for POC measurement
- 384 - Particulate nitrogen (PN) concentration ( $\mu\text{mol L}^{-1}$ )
- 385 - Method used to measure PN concentration
- 386 - PN - QA flag: Quality flag for PN measurement
- 387 - Particulate phosphorus (PP) concentration ( $\mu\text{mol L}^{-1}$ )





- 388 - Method used to measure PP concentration
- 389 - PP - QA flag: Quality flag for PP measurement
- 390 - Dissolved inorganic carbon (DIC) concentration ( $\mu\text{mol kg}^{-1}$ )
- 391 - DIC - QA flag: Quality flag for DIC measurement
- 392 - Total alkalinity (TA) concentration ( $\mu\text{mol kg}^{-1}$ )
- 393 - TA - QA flag: Quality flag for TA measurement

394

395 Quality control of large datasets is crucial to ensure their reliability and usefulness.  
396 Thus, we have not included data that were deemed compromised, such as records that  
397 had not gone through quality control by the data originators. We also accepted a certain  
398 degree of measurement error since multiple groups have been involved in the collection,  
399 analysis, and/or compilation of the information. Some of these errors were corrected (e.g.,  
400 when a value was placed in a wrong column, or clearly inaccurate locations were  
401 reallocated for consistency with the place of study), while others could not be rectified  
402 (e.g., values showing clear signs of contamination) and were consequently excluded from  
403 CoastDOM v1. It should also be noted that differences in analytical capabilities between  
404 laboratories and individual measurement campaigns likely caused additional uncertainty.  
405 Outliers, arising for example from contamination, were removed from the dataset. The  
406 data were moreover screened for zero values (i.e., concentrations below the detection  
407 limit or absence of data). In cases where concentrations were below the detection limit,  
408 the zero values were replaced with half the value of the limit-of-detection. To ensure the  
409 inclusion of only high-quality data, we only accepted entries with specific World Ocean  
410 Circulation Experiment (WOCE) quality codes: “2- Acceptable measurement” and “6-  
411 Mean of replicate measurements”. In our quality control assessments, we carefully  
412 avoided overly strict criteria, known as “data grooming”, which could potentially overlook  
413 genuine patterns and changes in the dataset that may be significant over longer temporal



414 and/or wider spatial scales. Coastal waters are known to exhibit a wide range of  
415 environmental concentrations, influenced by factors such as seasonality and local  
416 anthropogenic activities. Consequently, these data points may encompass a wide  
417 concentration range.

418

### 419 **3.1 Summary of dissolved organic carbon (DOC) observations**

420 Measurements of DOC concentrations were conducted between 1978 to 2022, with a  
421 total of 62339 individual data points (Table 1). The DOC concentrations ranged from 17  
422 to 30327  $\mu\text{mol C L}^{-1}$  (average (Standard Deviation; SD): 182 (314)  $\mu\text{mol C L}^{-1}$ ; median:  
423 103  $\mu\text{mol C L}^{-1}$ ; Table 1). The majority (53%) of the concentrations fell within the range of  
424 60 to 120  $\mu\text{mol C L}^{-1}$  (Fig. 1). A large number of DOC observations (17%) ranged between  
425 300 and 600  $\mu\text{mol C L}^{-1}$ , which were predominantly collected in eutrophic and river-  
426 influenced coastal waters of the Northern Hemisphere, such as the Baltic Sea (Fig. 1). It  
427 was observed that 75% of the DOC concentrations were higher than 77  $\mu\text{mol C L}^{-1}$ , while  
428 25% of the measurements surpassed 228  $\mu\text{mol C L}^{-1}$  (Table 1).

429 Coastal environments that experience minimal continental runoff, such as Palmer  
430 Station in Antarctica, typically exhibit low DOC concentrations. On the other hand, coastal  
431 waters heavily influenced by humic-rich terrigenous inputs, such as the Sarawak region  
432 in Malaysia, tended to have high DOC concentrations. In addition some extreme high  
433 DOC concentrations were measured in the Derwent River in Australia which is impacted  
434 by paper mill effluents. There has been a large increase in the number of DOC  
435 observations after 1992 (Fig. 2), and those measurements were from a wide range of  
436 locations. However, these observations were not evenly distributed, with the Southern  
437 Hemisphere being relatively under-sampled, especially in the African, South American  
438 and Antarctic continents (Fig. 2, 3).

439



### 440 **3.2. Summary of dissolved organic nitrogen (DON) observations**

441 The DON measurements were collected between 1990 and 2021, with a total of 20357  
442 data points (Table 1). Concentrations of DON ranged from  $< 0.1$  to  $2095.3 \mu\text{mol N L}^{-1}$   
443 (average (SD):  $13.6 (30.4) \mu\text{mol N L}^{-1}$ ; median:  $8.0 \mu\text{mol N L}^{-1}$ ; Table 1), with the most  
444 common range (42%) for DON concentrations between  $4$  to  $8 \mu\text{mol N L}^{-1}$  (Fig. 1). Overall  
445 75% of DON concentrations were above  $5.5 \mu\text{mol N L}^{-1}$ , while 25% were above  $15.8 \mu\text{mol}$   
446  $\text{N L}^{-1}$  (Table 1).

447 The lowest DON concentrations were recorded in Young Sound, Greenland, which  
448 receives direct run-off from the Greenland Ice Sheet, whereas the highest concentrations  
449 were detected during a flood event in the Richmond River Estuary, Australia. Since 1995,  
450 there has been a large increase in the number of DON measurements conducted in  
451 coastal waters globally (Fig. 2); however, the majority of those measurements have been  
452 in the Northern Hemisphere, mostly in Europe and the United States (Fig. 2, 3).

453

### 454 **3.3. Summary of dissolved organic phosphorus (DOP) observations**

455 CoastDOM v1 includes a total of 13534 DOP measurements, collected between 1990  
456 and 2021 (Table 1). Overall, DOP concentrations ranged from  $< 0.10$  to  $84.27 \mu\text{mol P L}^{-1}$   
457 <sup>1</sup> (average (SD):  $0.34 (1.11) \mu\text{mol P L}^{-1}$ ; median:  $0.18 \mu\text{mol P L}^{-1}$ ; Table 2). The majority  
458 (74%) of DOP concentrations were below  $0.30 \mu\text{mol P L}^{-1}$  (Fig. 1). Analysis of the DOP  
459 dataset revealed that 75% of the concentrations were above  $0.11 \mu\text{mol P L}^{-1}$ , while 25%  
460 were above  $0.30 \mu\text{mol P L}^{-1}$  (Table 1).

461 The lowest DOP concentrations were measured off the Kimberley Coast in Australia,  
462 while the highest concentrations were found in the Vasse-Wonnerup Estuary in the South  
463 west region of Australia. Similarly to DOC and DON, most of the DOP measurements  
464 have been conducted from the 1990s onwards, with a predominant focus in the Northern  
465 Hemisphere, particularly in Europe and the United States (Fig. 2, 3).



466

#### 467 **3.4. Summary of dissolved organic matter (DOM) observations**

468 In CoastDOM v1 the number of measurements decreases progressively in the  
469 sequence DOC > DON > DOP, reflecting both differences in the maturity of the analytical  
470 methods and the greater focus on carbon cycling by the aquatic science community. In  
471 addition the average DOC concentration in coastal waters (182 (314)  $\mu\text{mol C L}^{-1}$ ), was  
472 13-fold greater than the average coastal DON concentrations 13.6 (30.4)  $\mu\text{mol N L}^{-1}$ ,  
473 which was itself 39-fold greater than the average coastal DOP concentrations (0.34 (1.11)  
474  $\mu\text{mol P L}^{-1}$ ) (Table 1). Interestingly the coefficient of variation (C.V.) increased from DOC  
475 (173%) to DON (224%) and DOP (326%), which is related to that the % contribution of  
476 refractory organic material decreases in the same sequence (Table 1).

477

#### 478 **3.5. Potential use of the dataset**

479 The use of the CoastDOM v1 dataset should be accompanied by the citation of this  
480 paper and the inclusion of the correct doi-reference. CoastDOM v1 will be available in full  
481 open access on the PANGEA homepage after acceptance of the manuscript, where it will  
482 be available as a \*.csv file. The dataset includes a brief description of the metadata and  
483 methods employed, with emphasis on measurement techniques and data units. We  
484 chose the terminology most familiar to the ocean science community. It is important to  
485 note that all data included in CoastDOM v1, as well as this manuscript, are considered  
486 public domain; as such, a subset of this global dataset may also be present in previous  
487 data compilations (e.g., Hansell et al., 2021). The list of citations and links referenced in  
488 CoastDOM v1 also provide users with information as to how these data has been  
489 previously used in publications or databases.

490

#### 491 **3.6. Recommendations and conclusions**



492 In CoastDOM v1, we have compiled available coastal DOM data in a single repository,  
493 making it freely available to the research community. This compilation has established a  
494 consistent global dataset, serving as a valuable information source to investigate a variety  
495 of environmental questions and to explore spatial and temporal trends. We suggest a set  
496 of recommendations for the future expansion of this global dataset. Firstly, our analysis  
497 highlights a spatial bias, with a concentration of sampling efforts and/or data availability  
498 predominantly concentrated in the Northern Hemisphere. The data gap in coastal DOM  
499 measurements in the Southern Hemisphere needs to be addressed to provide a more  
500 representative global understanding of the role of DOM in coastal water biogeochemistry.  
501 Additionally, increased sampling efforts especially in the African and South American  
502 continents are warranted due to the vulnerability of many coastal areas to climate change  
503 and intensifying human activities, which will undoubtedly impact DOM biogeochemistry.  
504 Further it is also worth noting that there is comparatively few data from coastal waters  
505 affected by river discharge into the tropics, e.g., Amazon, Indian and Indonesian rivers  
506 that together dominate freshwater inputs to the coastal ocean. Secondly, there is a need  
507 for more comprehensive temporal and spatial datasets to capture the variability of DOM  
508 levels in highly dynamic and productive coastal systems. Focused efforts should be made  
509 to resolve these temporal and spatial changes. Thirdly, it is also important to collect and  
510 report ancillary data, such as temperature, salinity, nutrient measurements, and  
511 particulate components, to provide context and better understand the underlying  
512 processes driving the observed DOM levels. Lastly, we strongly recommend that the  
513 DOM research community conducts regular inter-calibration exercises to establish  
514 standardised and interoperable methods, particularly for DON and DOP measurements.  
515 This will ensure the comparability and reliability of data across different studies and  
516 enhance our understanding of DON and DOP dynamics in coastal waters.



517 In light of ongoing global environmental changes, the mobilisation and open sharing of  
518 existing data of important biogeochemical variables, such as the DOM pool, are crucial  
519 for establishing baselines and determining global trends and changes in coastal waters.  
520 The aim is to publish an updated version of the database periodically to determine global  
521 trends of DOM levels in coastal waters, and we therefore encourage researchers to  
522 submit new data to the corresponding author. The CoastDOM v1 dataset was developed  
523 according to the FAIR principles regarding Findability, Accessibility, Interoperability and  
524 Reusability of data. Thus, CoastDOM v1 will serve as a reliable open-source information  
525 resource, enabling in-depth analyses and providing quality-controlled input data for large  
526 scale ecosystem models.

527

#### 528 **4. Data availability**

529 The dataset is available for the review process at Figshare  
530 <https://figshare.com/s/512289eb43c4f8e8eaeef>). The dataset is furthermore submitted to  
531 the PANGEA database and is currently waiting to be assigned a Doi number (Lønborg et  
532 al., 2023). The file will be available as a \*.csv merged file and will be available in full open  
533 access in the PANGEA database after acceptance of the manuscript.

534

#### 535 **Competing interests**

536 The authors declare no competing interests.

#### 537 **Author Contribution**

538 C.L., C.C., and X.A.A-S started the initiative and finalised the data compilation. All co-  
539 authors contributed data. C.L. wrote the manuscript with input from all co-authors.

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561

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685 **Figure legends**

686 **Figure 1.** Histograms showing the distribution of observations for **a)** dissolved organic  
687 carbon (DOC), **b)** nitrogen (DON) and **c)** phosphorus (DOP), within defined  
688 concentration ranges in the coastal ocean. Note that the concentration ranges are not  
689 uniform in all cases due to the large difference in concentration levels.

690 **Figure 2. a)** Cumulative number of observations for dissolved organic carbon (DOC),  
691 nitrogen (DON), and phosphorus (DOP). Number of observations shown as a function  
692 of **b)** latitude, and **c)** longitude, grouped into bins of 10° latitude or longitude.

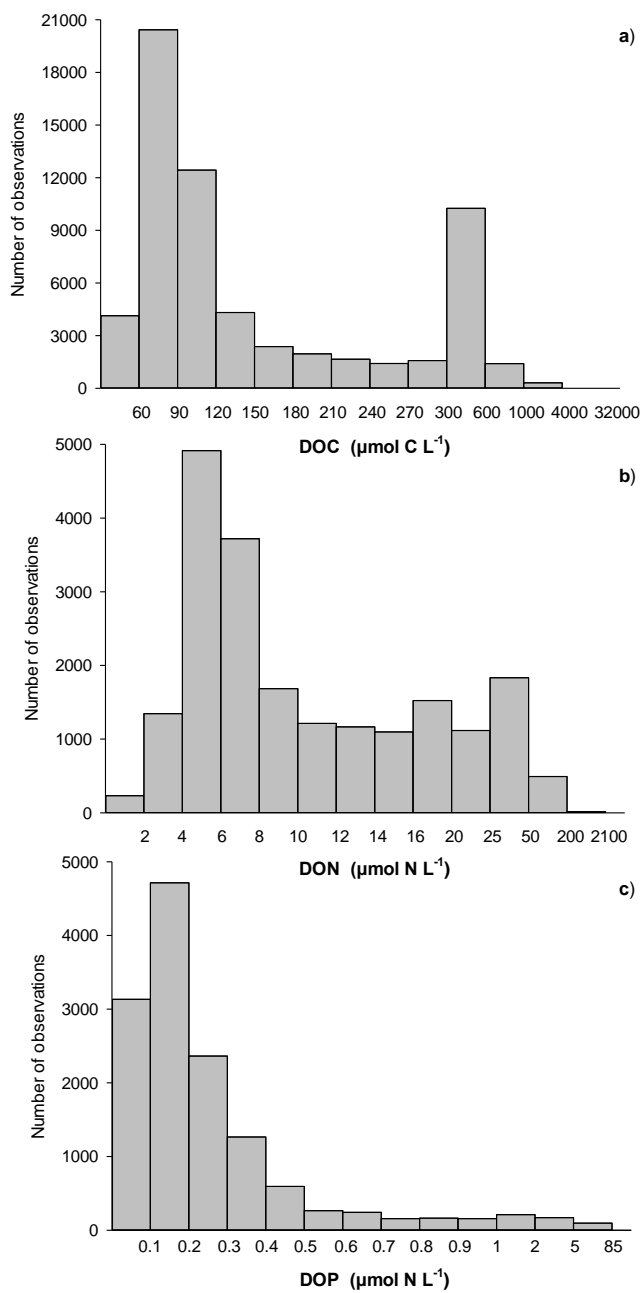
693 **Figure 3.** Global distribution of observations included in CoastDOM v1 for **a)** dissolved  
694 organic carbon (DOC), **b)** nitrogen (DON), and **c)** phosphorus (DOP). The black dots  
695 on the map represent the reported data that are included in the CoastDOM v1  
696 database. Histograms show the distribution of observations for DOC, DON and DOP  
697 within defined concentration ranges in the continents where measurements are  
698 available. Maps were created using the GIS shape file obtained from Laurelle et al.  
699 (2013)



700 **Table 1.** Descriptive statistics for the dissolved organic carbon (DOC), dissolved organic  
701 nitrogen (DON), and dissolved organic phosphorus (DOP) measurements included in the  
702 CoastDOM v1 dataset. The minimum (Min), maximum (Max), average values (Avg.) and  
703 standard deviation (SD), coefficient of variation (CV %), median, 25th and 75th  
704 percentiles (perc.) and number of samples (N) for each variable are shown.

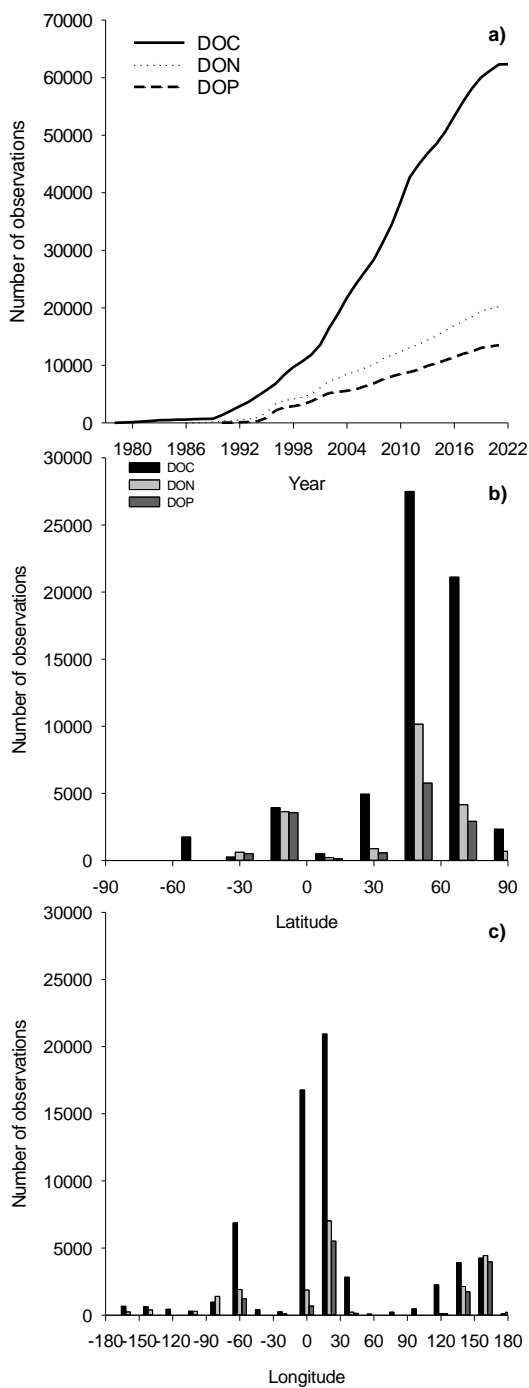
|            | DOC<br>$\mu\text{mol C L}^{-1}$ | DON<br>$\mu\text{mol N L}^{-1}$ | DOP<br>$\mu\text{mol P L}^{-1}$ |
|------------|---------------------------------|---------------------------------|---------------------------------|
| Min        | 17                              | < 0.1                           | < 0.01                          |
| Max        | 30327                           | 2095.3                          | 84.27                           |
| Avg. (SD)  | 182 (314)                       | 13.6 (30.4)                     | 0.34 (1.11)                     |
| Median     | 103                             | 8.0                             | 0.18                            |
| CV %       | 173                             | 224                             | 326                             |
| 25th perc. | 77                              | 5.5                             | 0.11                            |
| 75th perc. | 228                             | 15.8                            | 0.30                            |
| N          | 62339                           | 20357                           | 13534                           |

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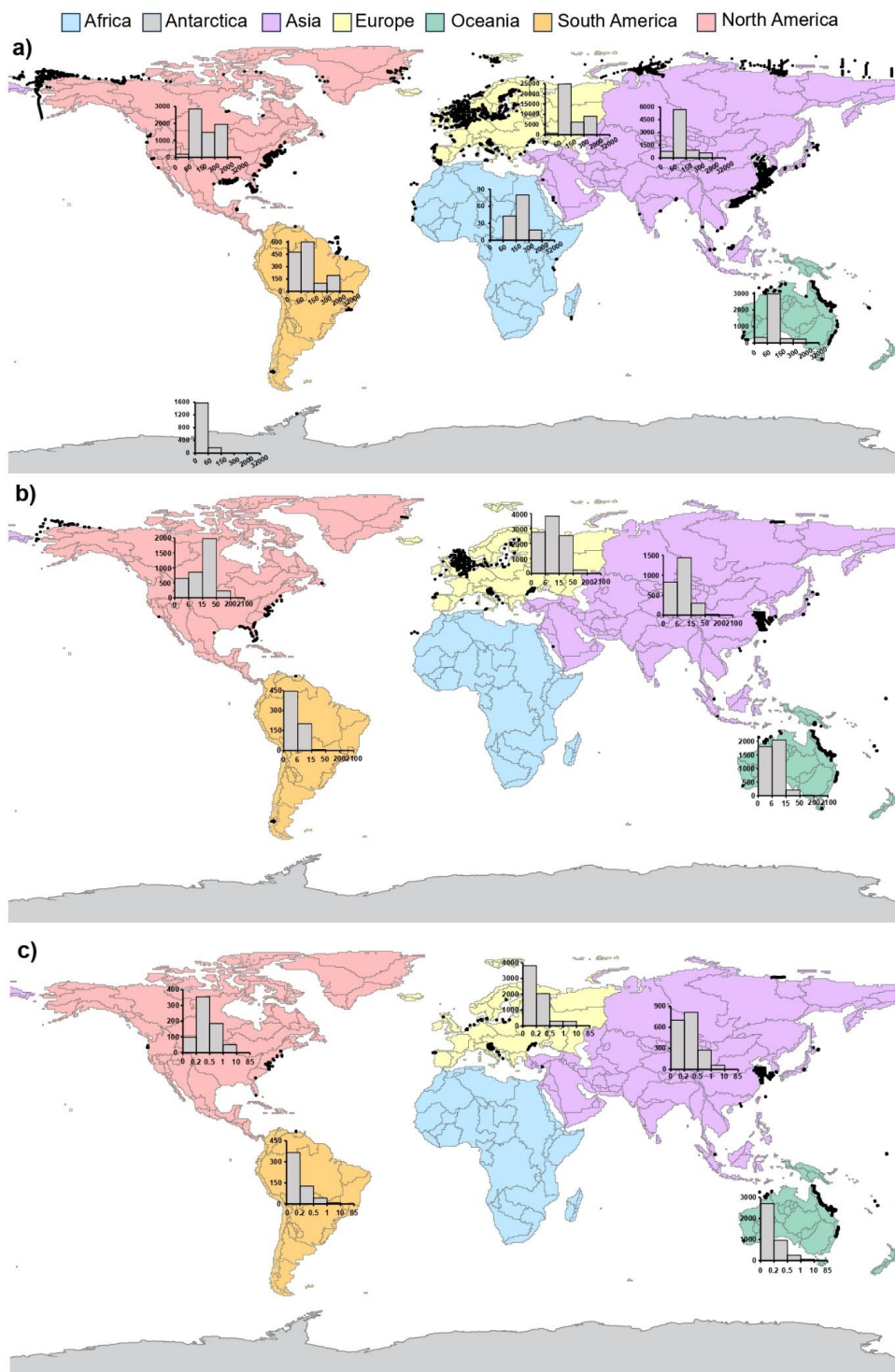
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707 **Figure 1.**



708

709 **Figure 2.**



710  
711

Figure 3.