Table S1. We compared the GEOVIDE data to historical databases and publications. The location, date, type of data (PRA: particulate radionuclide activity; HP: hydrological parameter), and database or publication were listed. The relationship between particulate activity ratio of 210Po/210Pb and AOU were explored in the four studies in the Arctic and high-latitude North Atlantic (bold font).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Location | | Date | Type of Data | Database/Publication |
| Arctic | **Arctic (ARK-XXII/2)** | Jul-Sep 07 | PRA | https://doi.pangaea.de/10.1594/PANGAEA.763937 |
| HP | <https://doi.pangaea.de/10.1594/PANGAEA.763451> |
| Chukchi Shelf | Jul-Sep 10 | PRA | (He et al., 2015) |
| CESAR ice station | Apr-May 83 | PRA | (Moore and Smith 1986) |
| North Atlantic | N. Atlantic (F.S. Meteor) | Nov-Dec, 73 | PRA | https://doi.pangaea.de/10.1594/PANGAEA.604014 |
| Labrador Sea (R/V Knorr) | Jun, 75 | PRA | (Bacon et al., 1980b) |
| **N. Atlantic (BOFS)** | May-Jun 89, 90 | PRA | https://doi.pangaea.de/10.1594/PANGAEA.859221 |
| HP | https://doi.pangaea.de/10.1594/PANGAEA.859221 |
| BATS | Oct, 96 | PRA | (Kim and Church 2001) |
| **N. Atlantic (GA03)** | Oct-Nov 10, Nov-Dec 11 | PRA | (Rigaud et al., 2015) |
| HP | [http://www.bco-dmo.org/dataset/3517, http://www.bco-dmo.org/dataset/3687](http://www.bco-dmo.org/dataset/3517) |
| **N. Atlantic (GA01)** | May-Jun 14 | PRA | This study |
| HP | http://www.obs-vlfr.fr/proof/php/geovide/x\_datalist\_1.php?xxop=geovide&xxcamp=geovide |
| South Atlantic | SE Atlantic | May-Jun 96 | PRA | (Sarin et al., 1999) |
| Pacific | Equa. Pacific | Aug-Sept 92 | PRA | (Murray et al., 2005) |
| Equa. and W. Pacific (FR05/92) | Jul, 92 | PRA | https://doi.org/10.1594/PANGAEA.104707 |
| Equa. and W. Pacific (FR07/97) | Aug, 97 | PRA | (Peck and Smith 2002) |
| Equa. and W. Pacific (FR08/93) | Nov, 93 | PRA | https://doi.org/10.1594/PANGAEA.808075 |
| N. Pacific, Aleutian Basin | Jul-Aug 08 | PRA | (Hu et al., 2014) |
| SE. Pacific (GP16) | Oct-Dec 13 | PRA | http://www.bco-dmo.org/dataset/675444 |
| Antarctic | Southern Ocean (ANT-X/6) | Oct-Nov 92 | PRA | https://doi.pangaea.de/10.1594/PANGAEA.52064 |
| Southern Ocean (ANT-XXIV/3) | Feb - Apr 08 | PRA | https://doi.pangaea.de/10.1594/PANGAEA.763970 |
| Bellingshausen Sea | Nov-Dec 92 | PRA | (Shimmield et al., 1995) |
| Margin Sea | South China Sea (SEATS) | Jan-Oct 07, May 08 | PRA | (Wei et al., 2014) |
| Western Taiwan (ORII-1432) | Apr, 07 | PRA | (Wei et al., 2012) |
| Yellow Sea | Feb, 93 | PRA | (Hong et al., 1999) |
| Mediterranean Sea | Mar-Jun 03 | PRA | (Stewart et al., 2007) |

Table S2. 210Po and 210Pb activities in the total (210Pot, 210Pbt), small-size (210Pos, 210Pbs), and large-size (210Pol, 210Pbl) fractions, the activity ratios of 210Pot/210Pbt, 210Pos/210Pbs, and 210Pol/210Pbl, and the concentrations of suspended particulate matter in the small size fraction (SPMs, µg L-1) and total particulate fractions (SPMp, µg L-1).

The table was attached as an Excel spreadsheet.

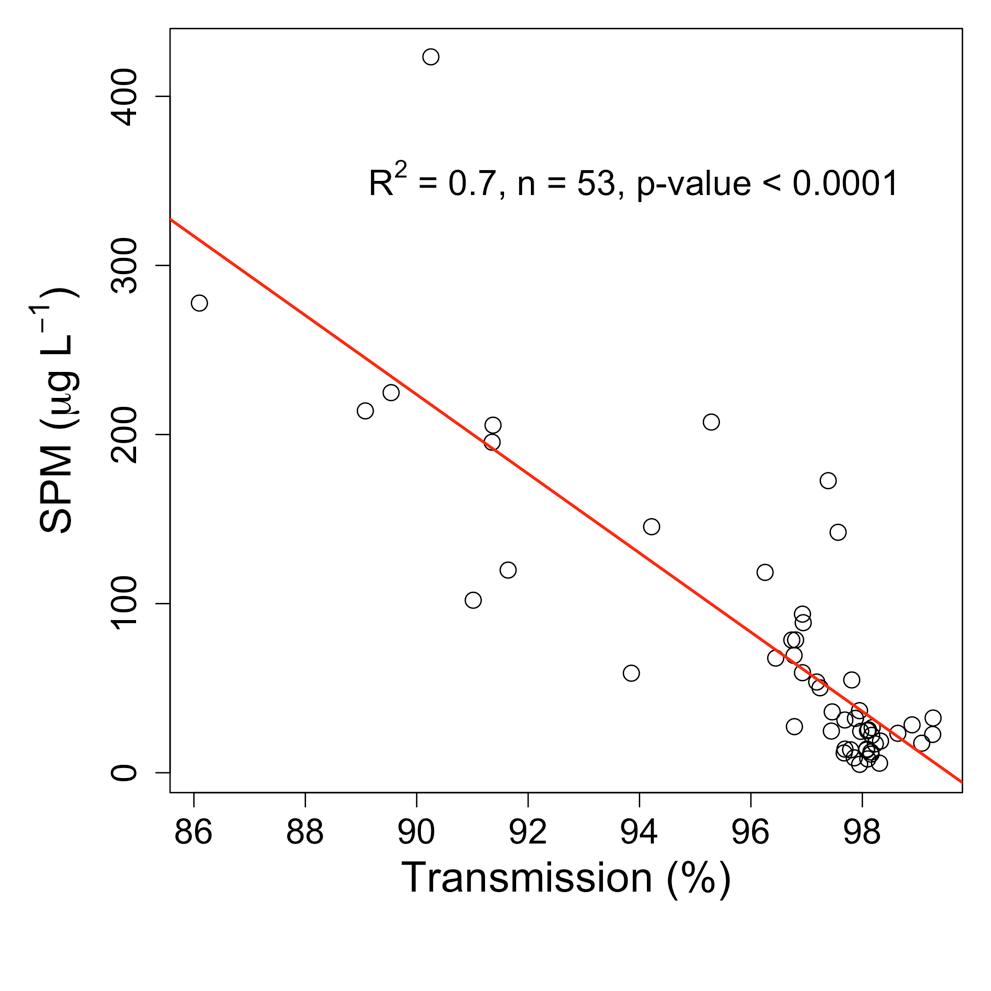


Fig. S1. Comparison of the suspended particulate matter (SPM, µg L-1) concentration vs. transmission (%). Note that high transmission indicates low particle concentration in the water column, and vice versa.