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 $^{210}Po/^{210}Pb$ 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
	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)

	South China Sea (SEATS)	Jan-Oct 07, May 08	PRA	(Wei et al., 2014)
Margin Sea	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. ^{210}Po and ^{210}Pb activities in the total ($^{210}Po_t$, $^{210}Pb_t$), small-size ($^{210}Po_s$, $^{210}Pb_s$), and large-size ($^{210}Po_l$, $^{210}Pb_l$) fractions, the activity ratios of $^{210}Po_t/^{210}Pb_t$, $^{210}Po_s/^{210}Pb_s$, and $^{210}Po_l/^{210}Pb_l$, and the concentrations of suspended particulate matter in the small size fraction (SPM_s, μg L^{-1}) and total particulate fractions (SPMp, μg L^{-1}).

The table was attached as an Excel spreadsheet.

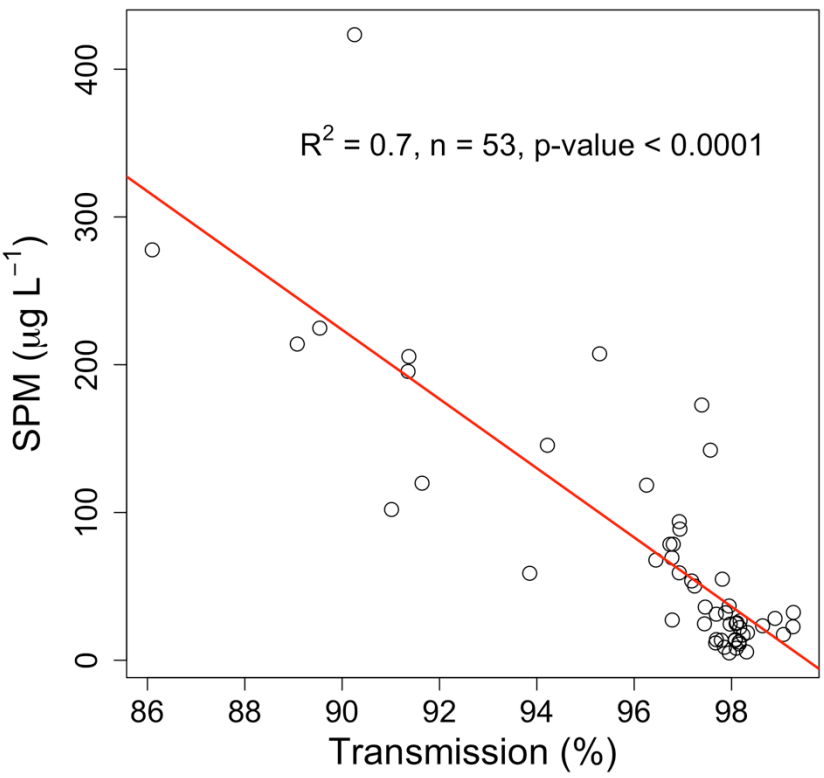

Fig. S1. Comparison of the suspended particulate matter (SPM, µg L^{-1}) concentration vs. transmission (%). Note that high transmission indicates low particle concentration in the water column, and vice versa.