Supplementary Information

**Mercury transport and human exposure from global marine fisheries**

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**Supplementary Table 1 | Results of segmented regressions with breakpoint year ± standard error (SE) and segmented line slopes with lower and upper 95% confidence intervals (CI) for fisheries catch time series of the entire ocean, the coastal ecosystem and the high seas presented in Fig. 1. The Davies test is testing for a non-zero difference-in-slope parameter.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Catch time series** | **Segmented regression** | | | | **Davies test** | **Overall test** | |
|  | **Breakpoint (year ± SE)** | **Line** | **Slope (kmol a-1)** | **95% CI** |  | **R2adj** | **P** |
| Entire ocean |  | 1 | 1.25 | 1.21–1.29 |  | 0.992 | <0.001 |
|  | 1991 ± 0.7 | 2 | 0.04 | -0.05–0.14 | <0.001 |  |  |
| Coastal |  | 1 | 1.11 | 1.07–1.15 |  | 0.987 | <0.001 |
|  | 1989 ± 0.6 | 2 | -0.19 | -0.28– -0.10 | <0.001 |  |  |
| High seas |  | 1 | 0.10 | 0.08–0.13 |  | 0.988 | <0.001 |
|  | 1975 ± 1.3 | 2 | 0.27 | 0.26–0.28 | <0.001 |  |  |
|  |  |  |  |  |  |  |  |

**Supplementary Table 2 | Trophic level (TL; mean ± SE) from FishBase1 for each ISSCAAP group.**

| **ISSCAAP group** | **TL** | | | **Rounded TL a** | **N** |
| --- | --- | --- | --- | --- | --- |
| Abalones, winkles, conchs | 2.1 | ± | 0.24 | 2 | 17 |
| Blue-whales, fin-whales | 3.8 | ± | 0.58 | 4 | 7 |
| Carps, barbels and other cyprinids | 2.8 | ± | 0.28 | 3 | 72 |
| Clams, cockles, arkshells | 2.1 | ± | 0.13 | 2 | 42 |
| Cods, hakes, haddocks | 3.9 | ± | 0.52 | 4 | 72 |
| Crabs, sea-spiders | 2.9 | ± | 0.38 | 3 | 25 |
| Eared seals, hair seals, walruses | 4.2 | ± | 0.59 | 4 | 18 |
| Flounders, halibuts, soles | 3.6 | ± | 0.42 | 4 | 59 |
| Freshwater crustaceans | 2.2 | ± | 0.36 | 2 | 19 |
| Freshwater molluscs | 2.1 | ± | 0.15 | 2 | 3 |
| Herrings, sardines, anchovies | 3.0 | ± | 0.27 | 3 | 55 |
| Horseshoe crabs and other arachnoids | 2.3 | ± | 0.61 | 2 | 1 |
| King crabs, squat-lobsters | 2.3 | ± | 0.24 | 2 | 14 |
| Krill, planktonic crustaceans | 3.1 | ± | 0.34 | 3 | 2 |
| Lobsters, spiny-rock lobsters | 2.7 | ± | 0.35 | 3 | 26 |
| Marine fishes not identified | 3.7 | ± | 0.46 | 4 | 1113 |
| Miscellaneous aquatic invertebrates | 2.7 | ± | 0.53 | 3 | 5 |
| Miscellaneous aquatic mammals | 2.8 | ± | 0.22 | 3 | 2 |
| Miscellaneous coastal fishes | 3.6 | ± | 0.43 | 4 | 420 |
| Miscellaneous demersal fishes | 3.8 | ± | 0.47 | 4 | 181 |
| Miscellaneous diadromous fishes | 3.8 | ± | 0.54 | 4 | 8 |
| Miscellaneous freshwater fishes | 3.4 | ± | 0.42 | 3 | 156 |
| Miscellaneous marine crustaceans | 2.6 | ± | 0.32 | 3 | 7 |
| Miscellaneous marine molluscs | 2.1 | ± | 0.13 | 2 | 1 |
| Miscellaneous pelagic fishes | 3.9 | ± | 0.48 | 4 | 124 |
| Mussels | 2.1 | ± | 0.22 | 2 | 13 |
| Oysters | 2.1 | ± | 0.13 | 2 | 15 |
| River eels | 3.7 | ± | 0.50 | 4 | 5 |
| Salmons, trouts, smelts | 3.5 | ± | 0.35 | 4 | 38 |
| Scallops, pectens | 2.1 | ± | 0.29 | 2 | 15 |
| Sea-squirts and other tunicates | 3.0 | ± | 0.30 | 3 | 4 |
| Sea-urchins and other echinoderms | 2.3 | ± | 0.61 | 2 | 10 |
| Shads | 3.3 | ± | 0.37 | 3 | 25 |
| Sharks, rays, chimaeras | 4.0 | ± | 0.49 | 4 | 155 |
| Shrimps, prawns | 2.6 | ± | 0.35 | 3 | 64 |
| Sperm-whales, pilot-whales | 4.4 | ± | 0.53 | 4 | 27 |
| Squids, cuttlefishes, octopuses | 3.7 | ± | 0.50 | 4 | 30 |
| Sturgeons, paddlefishes | 3.3 | ± | 0.39 | 3 | 11 |
| Tilapias and other cichlids | 2.8 | ± | 0.25 | 3 | 25 |
| Tunas, bonitos, billfishes | 4.3 | ± | 0.66 | 4 | 47 |
| Turtles | 2.6 | ± | 0.33 | 3 | 7 |

a Trophic level rounded to the nearest integer.

**Supplementary Table 3 | Total mercury (THg) and methylmercury (MeHg) mean concentrations (*μ*g g-1) ± standard deviation for each 41 ISSCAAP group weighted for samples sizes (Hgw ± SDw). These concentrations were paired with annual catch of marine fisheries of the same ISSCAAP groups to estimate Hg export.**

| **ISSCAAP group** | **Measured Hgw a** | | | **Whole THgw b** | | | **Whole MeHgw c** | ***N*** | **Reference d** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Abalones, winkles, conchs | 0.007 | ± | 0.007 | 0.007 | ± | 0.007 | 0.003 | 15 | 2 |
| Blue-whales, fin-whales | 0.243 | ± | 0.351 | 0.139 | ± | 0.199 | 0.026 | 262 | 3-8 |
| Carps, barbels and other cyprinids | 0.165 | ± | 0.093 | 0.105 | ± | 0.055 | 0.061 | 420 | 9 |
| Clams, cockles, arkshells | 0.024 | ± | 0.022 | 0.024 | ± | 0.022 | 0.011 | 816 | 9,10 |
| Cods, hakes, haddocks | 0.105 | ± | 0.076 | 0.068 | ± | 0.046 | 0.040 | 3062 | 9 |
| Crabs, sea-spiders | 0.102 | ± | 0.088 | 0.102 | ± | 0.088 | 0.047 | 1361 | 9 |
| Eared seals, hair seals, walruses | 13.1 | ± | 17.8 | 0.450 | ± | 0.601 | 0.086 | 1439 | 4,5,10-24 |
| Flounders, halibuts, soles | 0.190 | ± | 0.100 | 0.119 | ± | 0.060 | 0.069 | 6141 | 9 |
| Freshwater crustaceans | 0.210 |  |  | 0.210 |  |  | 0.097 | 1 | 9 |
| Freshwater molluscs | 0.020 | ± | 0.013 | 0.020 | ± | 0.013 | 0.009 | 95 | 25,26 |
| Herrings, sardines, anchovies | 0.069 | ± | 0.040 | 0.046 | ± | 0.025 | 0.027 | 2314 | 9 |
| Horseshoe crabs and other arachnoids | 0.077 | ± | 0.020 | 0.077 | ± | 0.020 | 0.036 | 214 | 27,28 |
| King crabs, squat-lobsters | 0.096 | ± | 0.085 | 0.096 | ± | 0.085 | 0.044 | 2102 | 2,5,9-11,29 |
| Krill, planktonic crustaceans | 0.013 | ± | 0.008 | 0.013 | ± | 0.008 | 0.006 | 61 | 2,5,10,11,29 |
| Lobsters, spiny-rock lobsters | 0.185 | ± | 0.071 | 0.185 | ± | 0.071 | 0.085 | 172 | 9 |
| Marine fishes not identified | 0.340 | ± | 0.454 | 0.202 | ± | 0.247 | 0.117 | 32480 | 9,30,31 |
| Miscellaneous aquatic invertebrates | 0.047 | ± | 0.061 | 0.047 | ± | 0.061 | 0.022 | 7530 | 2,5,9-11,25-29 |
| Miscellaneous aquatic mammals | 10.9 | ± | 37.0 | 1.74 | ± | 7.7 | 0.331 | 2346 | 3-8,10-24,32-41 |
| Miscellaneous coastal fishes | 0.264 | ± | 0.194 | 0.162 | ± | 0.113 | 0.094 | 5212 | 9 |
| Miscellaneous demersal fishes | 0.169 | ± | 0.140 | 0.106 | ± | 0.081 | 0.062 | 10126 | 9 |
| Miscellaneous diadromous fishes | 0.139 | ± | 0.125 | 0.088 | ± | 0.075 | 0.051 | 4586 | 9,30,31 |
| Miscellaneous freshwater fishes | 0.227 | ± | 0.146 | 0.141 | ± | 0.086 | 0.082 | 9840 | 9 |
| Miscellaneous marine crustaceans | 0.096 | ± | 0.085 | 0.096 | ± | 0.085 | 0.044 | 2102 | 2,5,9-11,29 |
| Miscellaneous marine molluscs | 0.020 | ± | 0.019 | 0.020 | ± | 0.019 | 0.009 | 4368 | 2,9,10 |
| Miscellaneous pelagic fishes | 0.587 | ± | 0.637 | 0.341 | ± | 0.341 | 0.198 | 12257 | 9 |
| Mussels | 0.026 | ± | 0.015 | 0.026 | ± | 0.015 | 0.012 | 589 | 9 |
| Oysters | 0.015 | ± | 0.014 | 0.015 | ± | 0.014 | 0.007 | 2815 | 9 |
| River eels | 0.220 | ± | 0.118 | 0.138 | ± | 0.068 | 0.080 | 535 | 9 |
| Salmons, trouts, smelts | 0.050 | ± | 0.015 | 0.034 | ± | 0.010 | 0.020 | 2204 | 9 |
| Scallops, pectens | 0.064 | ± | 0.027 | 0.064 | ± | 0.027 | 0.030 | 133 | 9 |
| Sea-squirts and other tunicates | 0.340 | ± | 0.454 | 0.202 | ± | 0.247 | 0.093 | 32480 | 9,30,31 |
| Sea-urchins and other echinoderms | 0.009 | ± | 0.011 | 0.009 | ± | 0.011 | 0.004 | 15 | 2,10 |
| Shads | 0.077 | ± | 0.029 | 0.051 | ± | 0.018 | 0.030 | 93 | 9 |
| Sharks, rays, chimaeras | 0.893 | ± | 0.487 | 0.515 | ± | 0.257 | 0.299 | 3021 | 9 |
| Shrimps, prawns | 0.058 | ± | 0.046 | 0.058 | ± | 0.046 | 0.027 | 508 | 2,5,9 |
| Sperm-whales, pilot-whales | 10.2 | ± | 65.0 | 5.27 | ± | 14.1 | 1.00 | 645 | 4,7,10,32-41 |
| Squids, cuttlefishes, octopuses | 0.061 | ± | 0.055 | 0.061 | ± | 0.055 | 0.028 | 735 | 9 |
| Sturgeons, paddlefishes | 0.139 | ± | 0.106 | 0.088 | ± | 0.064 | 0.051 | 157 | 30,31 |
| Tilapias and other cichlids | 0.196 | ± | 0.128 | 0.123 | ± | 0.075 | 0.071 | 2907 | 9 |
| Tunas, bonitos, billfishes | 0.665 | ± | 0.733 | 0.384 | ± | 0.385 | 0.223 | 6051 | 9 |
| Turtles | 0.028 | ± | 0.014 | 0.028 | ± | 0.014 | 0.011 | 28 | 42,43 |

a Measurements made on edible portion (fillet or whole for small fish)9. Hg measurements on edible portions are assumed to be representative of THg and MeHg9.

b THg concentration in fish muscle for each ISSCAAP group was transformed into whole body concentrations according to the equation (1) of main text44.

c We used percent of THg as MeHg of 58% for whole fish (n = 39), 46% for whole invertebrates (n = 462), and 39% for various tissues of turtles (n = 944). For marine mammals, we estimated the whole body burden of MeHg using published %MeHg resulting in an average of 19% of THg as MeHg (n = 206).

d The Hg Seafood Database9 can be found at the author’s website (<http://www.stonybrook.edu/commcms/gelfond/fish/database.html>).

**Supplementary Table 4 | Per capita methylmercury (MeHg) weekly intake (WI; μg of MeHg / kg of body mass (BM) / week) of marine fish and seafood between 1961 and 2011 for each country based on data of fish and seafood supply available for food consumption from the FAO.**

See spreadsheet “Lavoie et al\_Hg Fisheries\_Supplementary Table4.xlsx”.

**Supplementary Table 5 | Average mass (mean ± SD, in metric tonnes; t) of odontocetes, mysticetes and pinnipeds.**

| **Common name** | **Scientific name** | **Mass (mean ± SD; t)** | | | ***n*** | **Reference** |
| --- | --- | --- | --- | --- | --- | --- |
| **Odontocetes ("Sperm-whales, pilot-whales" group)** | |  |  |  |  |  |
| Commerson's Dolphin | *Cephalorhynchus commersonii* | 0.070 | ± | 0.009 | 11 | 45 |
| Heaviside's Dolphin | *Cephalorhynchus heavisidii* | 0.071 |  |  | 1 | 45 |
| Beluga Whale | *Delphinapterus leucas* | 0.38 | ± | 0.07 | 3 | 46 |
| Short-beaked Common Dolphin | *Delphinus delphis* | 0.088 | ± | 0.030 | 246 | 45 |
| Pygmy Killer Whale | *Feresa attenuata* | 0.11 | ± | 0.01 | 9 | 45 |
| Short-finned Pilot Whale | *Globicephala macrorhynchus* | 0.93 | ± | 0.44 | 9 | 45 |
| Long-finned Pilot Whale | *Globicephala melas* | 0.70 | ± | 0.49 | 19 | 45 |
| Risso's Dolphin | *Grampus griseus* | 0.28 | ± | 0.09 | 18 | 45 |
| Boto | *Inia geoffrensis* | 0.08 | ± | 0.03 | 4 | 45 |
| Pygmy Sperm Whale | *Kogia breviceps* | 0.35 | ± | 0.13 | 47 | 45 |
| Dwarf Sperm Whale | *Kogia sima* | 0.15 | ± | 0.05 | 20 | 45 |
| Fraser's Dolphin | *Lagenodelphis hosei* | 0.23 | ± | 0.13 | 2 | 45 |
| Atlantic White-sided Dolphin | *Lagenorhynchus acutus* | 0.15 | ± | 0.04 | 66 | 45 |
| White-beaked Dolphin | *Lagenorhynchus albirostris* | 0.22 | ± | 0.03 | 3 | 45 |
| Pacific White-sided Dolphin | *Lagenorhynchus obliquidens* | 0.11 | ± | 0.03 | 14 | 45 |
| Northern Right Whale Dolphin | *Lissodelphis borealis* | 0.077 | ± | 0.013 | 5 | 45 |
| Sowerby's Beaked Whale | *Mesoplodon bidens* | 0.65 |  |  | 1 | 45 |
| Hubbs' Beaked Whale | *Mesoplodon carlhubbsi* | 0.99 | ± | 0.62 | 2 | 45 |
| Blainville's Beaked Whale | *Mesoplodon densirostris* | 0.78 | ± | 0.23 | 6 | 45 |
| Gervais' Beaked Whale | *Mesoplodon europaeus* | 0.70 | ± | 0.15 | 13 | 45 |
| Ginkgo-toothed Beaked Whale | *Mesoplodon ginkgodens* | 1.0 | ± | 0.41 | 3 | 45 |
| Gray's Beaked Whale | *Mesoplodon grayi* | 1.0 |  |  | 1 | 45 |
| True's Beaked Whale | *Mesoplodon mirus* | 1.1 | ± | 0.23 | 3 | 45 |
| Pygmy Beaked Whale | *Mesoplodon peruvianus* | 0.28 |  |  | 1 | 45 |
| Indo-Pacific Finless Porpoise | *Neophocaena phocaenoides* | 0.033 |  |  | 1 | 45 |
| Irrawaddy Dolphin | *Orcaella brevirostris* | 0.084 | ± | 0.00 | 2 | 45 |
| Killer Whale | *Orcinus orca* | 1.8 | ± | 1.1 | 40 | 47 |
| Melon-headed Whale | *Peponocephala electra* | 0.17 | ± | 0.04 | 3 | 45 |
| Porpoise | *Phocaena phocaena* | 0.049 | ± | 0.015 | 96 | 45,46 |
| Vaquita | *Phocoena sinus* | 0.045 | ± | 0.006 | 4 | 45 |
| Dall's Porpoise | *Phocoenoides dalli* | 0.10 | ± | 0.03 | 35 | 45 |
| Dall's Porpoise | *Phocoenoides truei* | 0.10 | ± | 0.01 | 2 | 45 |
| Sperm Whale | *Physeter macrocephalus* | 31 | ± | 12 | 50 | 45,48 |
| Ganges River Dolphin | *Platanista gangetica* | 0.066 | ± | 0.013 | 7 | 45 |
| Franciscana | *Pontoporia blainvillei* | 0.031 | ± | 0.008 | 30 | 45 |
| False Killer Whale | *Pseudorca crassidens* | 0.54 | ± | 0.20 | 7 | 45 |
| Tucuxi | *Sotalia fluviatilis* | 0.030 |  |  | 1 | 45 |
| Pantropical Spotted Dolphin | *Stenella attenuata* | 0.061 | ± | 0.015 | 125 | 45 |
| Clymene Dolphin | *Stenella clymene* | 0.066 | ± | 0.028 | 2 | 45 |
| Striped Dolphin | *Stenella coeruleoalba* | 0.093 | ± | 0.036 | 164 | 45 |
| Atlantic Spotted Dolphin | *Stenella frontalis* | 0.10 | ± | 0.02 | 25 | 45 |
| Spinner Dolphin | *Stenella longirostris* | 0.062 | ± | 0.008 | 29 | 45 |
| Rough-toothed Dolphin | *Steno bredanensis* | 0.11 | ± | 0.02 | 25 | 45 |
| Shepherd's Beaked Whale | *Tasmacetus shepherdi* | 2.1 |  |  | 1 | 45 |
| Indo-Pacific Bottlenose Dolphin | *Tursiops aduncus* | 0.18 | ± | 0.02 | 4 | 45 |
| Common Bottlenose Dolphin | *Tursiops truncatus* | 0.21 | ± | 0.06 | 275 | 45 |
| Cuvier's Beaked Whale | *Ziphius cavirostris* | 1.6 | ± | 0.86 | 14 | 45 |
| Mean odontocetes |  | 1.3 | ± | 6.1 | 1449 |  |
| **Mysticetes ("Blue-whales, fin-whales" group)** | |  |  |  |  |  |
| Minke Whale | *Balaenoptera acutorostrata* | 5.8 | ± | 2.4 | 23 | 48 |
| Sei Whale | *Balaenoptera borealis* | 14 | ± | 6.7 | 20 | 48 |
| Bryde Whale | *Balaenoptera brydei* | 13 | ± | 2.1 | 27 | 48 |
| Blue Whale | *Balaenoptera musculus* | 88 | ± | 34 | 44 | 48 |
| Blue Whale | *Balaenoptera musculus* | 58 |  |  | 1 | 46 |
| Pigmy blue Whale | *Balaenoptera musculus brevicauda* | 47 | ± | 17 | 5 | 48 |
| Fin Whale | *Balaenoptera physalus* | 49 | ± | 9.3 | 42 | 48 |
| Gray Whale | *Eschrichtius robustus* | 17 | ± | 10 | 8.0 | 48 |
| Pacific right Whale | *Eubalaena glacialis sieboldii* | 58 | ± | 20 | 18 | 48 |
| Humpback Whale | *Megaptera novaeangliae* | 34 | ± | 6.0 | 7 | 48 |
| Mean mysticetes |  | 43 | ± | 35 | 195 |  |
| **Pinnipeds ("Eared seals, hair seals, walruses" group)** | |  |  |  |  |  |
| Guadalupe fur seal | *Arctocephalus townsendi* | 0.049 | ± | 0.0057 | 14 | 49 |
| Bearded seal | *Erignathus barbatus* | 0.20 | ± | 0.12 | 2 | 46 |
| Grey seal | *Halichoevus gvypus* | 0.26 | ± | 0.026 | 23 | 50 |
| Weddell seal | *Leptonychotes weddellii* | 0.35 | ± | 0.047 | 2 | 12 |
| Elephant seal | *Mirounga sp.* | 2.0 |  |  | 1 | 51 |
| Walrus | *Odobenus rosmaru* | 0.35 | ± | 0.33 | 4 | 46 |
| Ringed seal | *Phoca hispida* | 0.040 | ± | 0.0002 | 2 | 46 |
| Seal | *Phoca richardi geronimensis* | 0.11 |  |  | 1 | 46 |
| Mean pinnipeds |  | 0.23 | ± | 0.29 | 49 |  |

**Supplementary Table 6 | Methylmercury (MeHg) mean concentrations (*μ*g g-1) ± standard deviation for each taxonomic group weighted for samples sizes (Hgw ± SDw).**

| **Taxonomic group a** | **MeHgw b** | | | ***N*** | **Reference c** |
| --- | --- | --- | --- | --- | --- |
| Crustaceans | 0.096 | ± | 0.085 | 2102 | 2,5,9-11,29 |
| Cephalopods | 0.047 | ± | 0.061 | 7530 | 2,5,9-11,25-29 |
| Demersal fish | 0.169 | ± | 0.140 | 10126 | 9 |
| Molluscs, Other | 0.020 | ± | 0.019 | 4368 | 2,9,10 |
| Pelagic fish | 0.587 | ± | 0.637 | 12257 | 9 |
| Marine fish, Other | 0.340 | ± | 0.454 | 32480 | 9,30,31 |

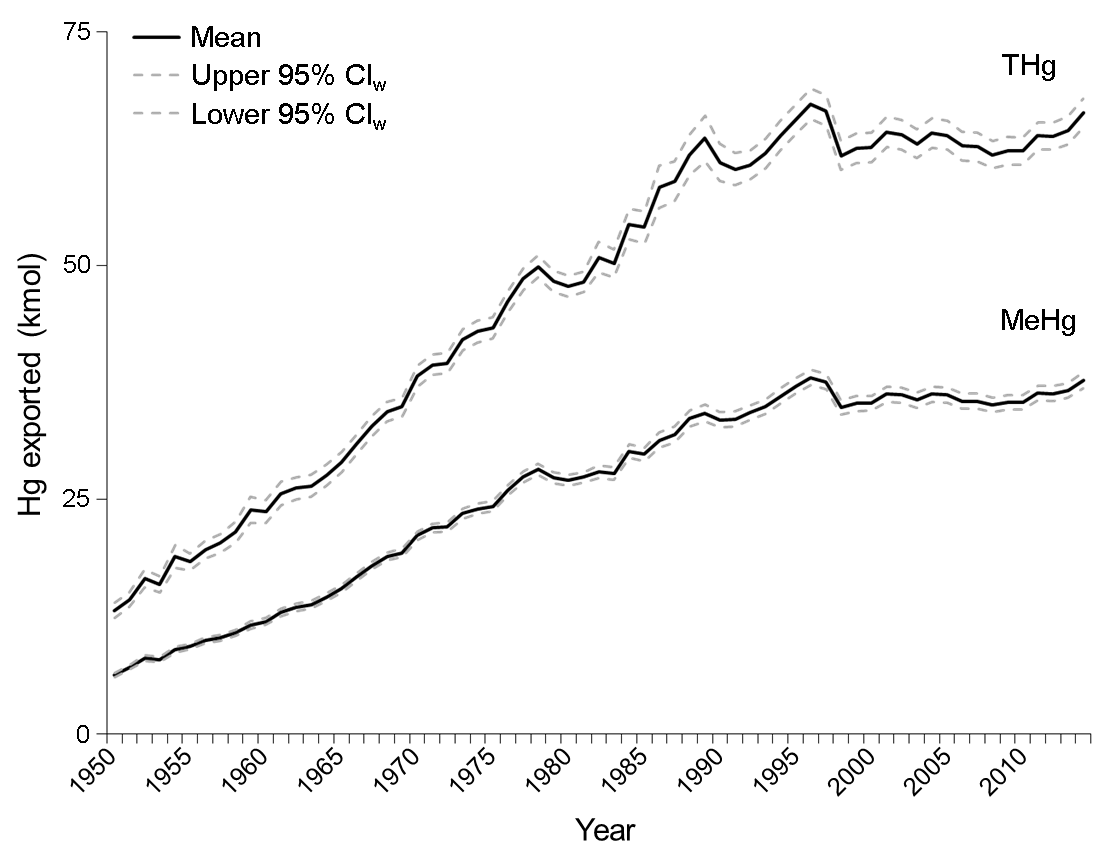
a Taxonomic groups for which available food supply data (kg capita-1 year-1) are accessible from the FAO52.

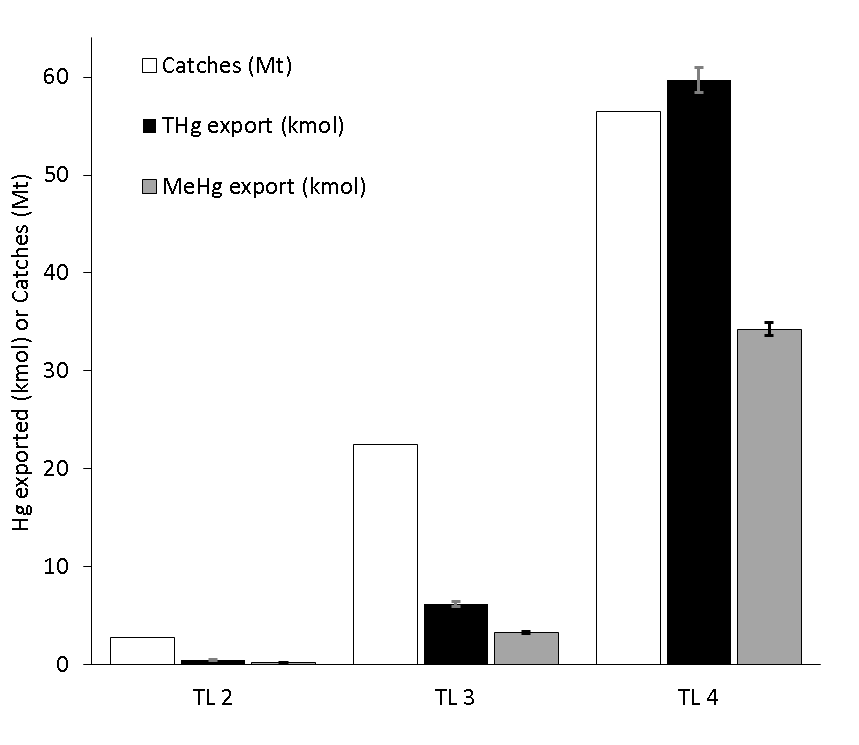
b Measurements made on edible portion (fillet or whole for small fish)9. Hg measurements on edible portions are assumed to be representative of THg and MeHg9.

c The Hg Seafood Database9 can be found at the author’s website (<http://www.stonybrook.edu/commcms/gelfond/fish/database.html>).

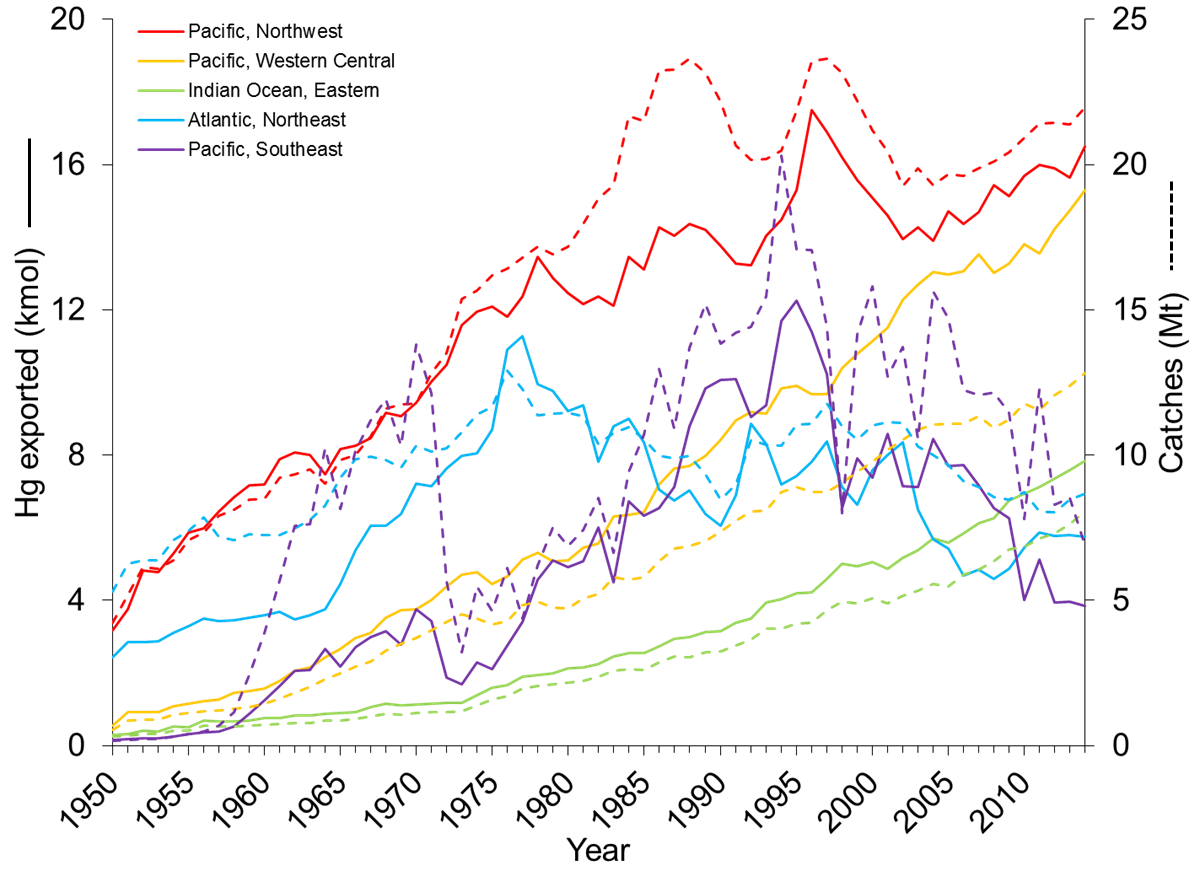
**Supplementary Table 7 | List of Major Fishing Areas (MFA) for statistical purposes**

|  |  |
| --- | --- |
| MFA name | MFA number |
| Arctic Sea | 18 |
| Atlantic, Northwest | 21 |
| Atlantic, Northeast | 27 |
| Atlantic, Western Central | 31 |
| Atlantic, Eastern Central | 34 |
| Mediterranean and Black Sea | 37 |
| Atlantic, Southwest | 41 |
| Atlantic, Southeast | 47 |
| Atlantic, Antarctic | 48 |
| Indian Ocean, Western | 51 |
| Indian Ocean, Eastern | 57 |
| Indian Ocean, Antarctic | 58 |
| Pacific, Northwest | 61 |
| Pacific, Northeast | 67 |
| Pacific, Western Central | 71 |
| Pacific, Eastern Central | 77 |
| Pacific, Southwest | 81 |
| Pacific, Southeast | 87 |
| Pacific, Antarctic | 88 |

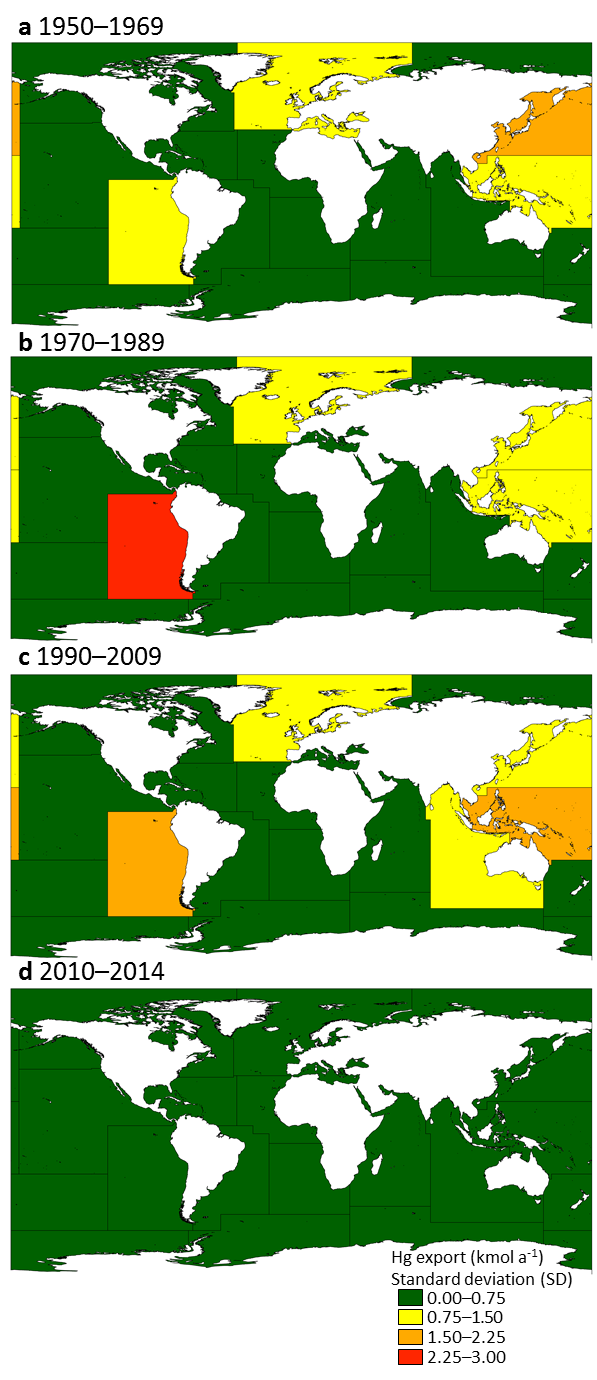
**Supplementary Figure 1 | Temporal trends (1950‒2014) of Hg exported from the entire ocean resulting from marine fisheries.** Average (full line) with lower and upper 95% confidence intervals weighted for sample size (CIw; dashed lines) are shown.



**Supplementary Figure 2 | Catches (white) and total mercury (THg; black) and methylmercury (MeHg; grey) exported from the entire ocean resulting from marine fisheries in 2014 by trophic level (TL).** Averages with lower and upper 95% confidence intervals weighted for sample size (CIw; error bars) are shown for Hg export.



**Supplementary Figure 3 | Temporal trends (1950‒2014) of catches (dashed lines) and Hg exported (full lines).** Northwest Pacific (#61; red), Western Central Pacific (#71; orange), Eastern Indian Ocean (#57; green), Northeast Atlantic (#27; blue), and Southeast Pacific (#87; purple).

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**Supplementary Figure 4 | Hg export from the ocean.** Standard deviations of meantotal Hg export data in **a**, 1950–1969, **b**, 1970–1989, **c**, 1990–2009, and **d**, 2010–2014 resulting from catches of fishes, molluscs, crustaceans, reptiles, and mammals for each Major Fishing Areas (MFA). MFA numbers are provided in panel **a** and corresponding MFA names are found in Supplementary Table 7. Means for each period are found in Fig. 2. Maps were created in ArcGIS version 10.3.1 (<http://desktop.arcgis.com/>).

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