Stable mercury concentrations in tunas from the global ocean arise question about monitoring the effectiveness of the Minamata Convention

MRS. ANAÏS MÉDIEU1, DAVID POINT2, JEROEN E SONKE3, PEARSE BUCHANAN4, NATHALIE BODIN5, DOUGLAS ADAMS6, ANDERS BIGNERT7, DAVID STREET8, ANGOT HÉLÈNE9, FRÉDÉRIC MÉNARD1, C. ANELA CHOI10, VALÉRIE ALLAIN11, TAKAAKI ITAI12, PACO BUSTAMANTE13, BRIDGET FERRIS14, BERNARD BOURLÉS1, JÉRÉMIE HABASQUE15, OLIVIER GAUTHIER15 AND ANNE LORRAIN15

1IRD
2Géosciences Environnement Toulouse, CNRS/IRD/Université Paul Sabatier Toulouse III
3CNRS/Université de Toulouse
4Carnegie Science
5Sustainable Ocean Seychelles (SOS)
6Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute
7Department of Environmental Research and Monitoring, Swedish Museum of Natural History
8Harvard John A. Paulson School of Engineering and Applied Sciences
9CNRS
10Scripps Institution of Oceanography, University of California San Diego
11Pacific Community
12Department of Earth and Planetary Science, The University of Tokyo
13LIENSs - CNRS-La Rochelle Université
14National Oceanic and Atmospheric Administration
15IRD, Univ Brest, CNRS, Ifremer, LEMAR, F-29280 Plouzané, France

Presenting Author: anais.medieu@ird.fr

Humans are exposed to toxic methylmercury mainly by consuming marine fish. While reducing mercury emissions aim to protect human health, it is unclear how this affects methylmercury concentrations in seawater and marine biota. We compiled existing and newly acquired mercury concentrations in tropical tunas over 50 years in the global ocean to explore the multidecadal variability of mercury content in pelagic top predators. We show strong inter-annual variability of tuna mercury concentrations at the global scale, once accounting for bioaccumulation. We find increasing mercury concentrations in skipjack in the late 1990s in the northwestern Pacific, likely resulting from concomitant increasing Asian mercury emissions. Elsewhere in the global ocean, stable long-term trends of tuna mercury concentrations contrast with an overall decline in mercury emissions and deposition since the 1970s, and with specific regional trends. We suggest the slow or absent response in tuna mercury to global mercury release likely reflects the inertia of the surface ocean, which is supplied by legacy mercury accumulated in the subsurface ocean over centuries. This highlights that the actions implemented by the Minamata Convention are currently insufficient to assure a reduction in mercury concentrations in highly consumed pelagic fishes, and calls for long and continuous mercury time series in marine biota.