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

MRS. ANAÏS MÉDIEU[1], DAVID POINT[2], JEROEN E SONKE[3], PEARSE BUCHANAN[4], NATHALIE BODIN[5], DOUGLAS ADAMS[6], ANDERS BIGNERT[7], DAVID STREETS[8], ANGOT HÉLÈNE[9], FRÉDÉRIC MÉNARD[1], C. ANELA CHOY[10], VALÉRIE ALLAIN[11], TAKAAKI ITAI[12], PACO BUSTAMANTE[13], BRIDGET FERRISS[14], BERNARD BOURLÈS[1], JÉRÉMIE HABASQUE[15], OLIVIER GAUTHIER[15] AND ANNE LORRAIN[15]

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