Draft scientific report of the Open-ended Scientific Group for effectiveness evaluation

Comments of Italy

Note: • The Open-ended Scientific Group (OESG), established pursuant to decision MC-4/11, has developed a scientific draft report for review and comments by Parties. Although the term of reference only refers to review by Parties and the Effectiveness Evaluation Group, review and comments from other stakeholders will also be appreciated.
The OESG, co-chaired by Mr. Dominique Bally Kpokro (Côte d'Ivoire) and Ms. Alexandra Steffen (Canada), who replaced Mr. Terry Keating (the United States of America), developed its plans for data collection analysis (UNEP/MC/COP.5/INF/24) and an overview of available monitoring, emission and release data (UNEP/MC/COP.6/INF/23).
The OESG worked to develop a draft scientific report in which it compiled and analysed available mercury monitoring, emission and release data. The draft report has been posted on the following web page:

- https://minamataconvention.org/en/intersessional-work-and-submissions-cop-7#sec3477

General comments	
The Italian competent authority would like to thank the Open-ended Scientific Group (OESG) for preparing this report pursuant to decision MC-4/11. The comments below refer to the Word version of the draft report available on the Minamata Convention website (OESG_Scientific_Report_260410_draft_word). During our review, we noted that several sections of the report refer to Annex 1 (e.g. lines 2002, 2071, 2427, 2630 and 3300). However, this annex does not appear to be available in the version provided to Parties. In addition, the text refers to figures and tables that are not included in the document (e.g. lines 774 and 1330). We would appreciate clarification as to whether these annexes, figures and tables will be made available during the review process. The references listed below are suggested for consideration and possible inclusion in the report. We also suggest reviewing and harmonizing the format of in-text citations throughout the document to ensure consistency.	
Specific comments	
Line	**Comment**
116	Please remove (The report is in https://gmd.copernicus.org/articles/18/2747/2025/gmd-18-2747-2025.html) and add (Dastoor et al., 2025)
690	Please link MIA with (https://minamataconvention.org/en/parties/minamata-initial-assessments)
690	Please link PRTRs with (https://prtr.unece.org)
691	Please link CLTRAP with (https://unece.org/sites/default/files/2021-05/1979%20CLRTAP.e.pdf)
691	Please link GMA with (https://www.unep.org/resources/publication/global-mercury-assessment-2018)
692	Please link EDGAR with (https://edgar.jrc.ec.europa.eu/methodology)
700	Please link UNFCCC with (https://unfccc.int/process-and-meetings/united-nations-framework-convention-on-climate-change)
702-703	Please link "EDGAR Global Mercury Emissions v8.1" with (https://edgar.jrc.ec.europa.eu/dataset_tox81) and modify the sentence The EDGAR

	Global Mercury Emissions v8.1, which provides mercury emissions across all countries for the period from 1970 to 2022, is available at https://edgar.jrc.ec.europa.eu/dataset_tox81. It includes total mercury …" with "The EDGAR Global Mercury Emissions v8.1, which provides mercury emissions across all countries for the period from 1970 to 2022, includes toral mercury …"
709	Please link "EMEP/EEA guidebook" with (https://www.eea.europa.eu/en/analysis/publications/emep-eea-guidebook-2023)
714	Please modify "are based on (Cui et al. 2025) for China and (EDGAR v8.1) (Dastoor et al. 2025) for all other countries"
931	Please Remove (see above) or specify the section or figure or table of reference
1067	Please remove (e.g. a commentary by Lesley Sloss here: https://www.sustainable-carbon.org/blogs/fly-ash-let-it-lie/) and add (Trajković, D.V., Janković, A.Z., Mijatović, N.N. et al. Heavy metals in fly ash: chemometric modelling of extraction parameters and environmental and health risk assessment. Environ Geochem Health 48, 20 (2026). https://doi.org/10.1007/s10653-025-02908-9) (Nayak D. K., Abhilash P.P., Singh R., Kumar R., Kumar V., Fly ash for sustainable construction: A review of fly ash concrete and its beneficial use case studies, Cleaner Materials, V. 6, 2022, https://doi.org/10.1016/j.clema.2022.100143)
1329	Please modify with "the LAI (Leaf Area Index),
1373	Please modify with "Certain environmental contaminants are usually first detected in the air"
1465	Please modify note 12 (Concentrations were determined using the sampling rate)
1512-1513	We suggest changing the sentence "The submitted data were averaged first to daily averages followed by averages for the whole period of data submitted" with *Average of the data calculated per day and for the whole period*
1682	We suggest changing the sentence "Data were averaged on a monthly basis and plotted for all the years" with *Average of the data calculated per month*
1897	Please modify the link reported in text (https://doi.org/https://doi.org/10.1016/j.envpol.2024.125104) with the following: https://doi.org/10.1016/j.envpol.2024.125104
1917	Please modify the link reported in the text with https://doi.org/10.1016/j.atmosenv.2011.01.033
1920	Please modify the link reported in the text with https://doi.org/10.1016/j.atmosenv.2013.04.009
1924-1926	We suggest removing this reference because it is reported in line 1927-1929
1929	Please modify the link reported in text with https://doi.org/10.1016/j.scitotenv.2022.155802
1937	Please modify the link reported in text with https://doi.org/10.5194/acp-18-5905-2018
1948	Please modify the link reported in the text with https://doi.org/10.1016/j.atmosenv.2009.05.028
2639	Please modify (see below) with (Figure 12)
3041	Please modify (Stringell et al.,2014) with (Stringell et al.,2015)
3457	Please delete the sentence in brackets. (see also section 0.1.4.5). Section 0.1.4.5 is not included in the document
3588	Please modify (Nuligak, 1996) with (I, Nuligak , ISBN: 9780671780906)
3588	Please modify (Alunik et al.,2003) with (Across Time and Tundra: The Inuvialuit of the Western Arctic; ISBN:1551926458, 9781551926452)
3612	Please remove (Noel et al., in press)
3674	Please change (Macleod et al 2019) with (Macleod & Coughanowr, 2019)

4317	Please delete the sentence "The data collected is described in Annex II", as Annex II is not included in the document. Alternatively, please include it as an annex among the documents available on the website.
4322	Please change (2018 by Basu et al.[1]) with (Basu et al.,2018[1]))
4362	Please delete "from publications listed in the Annex II". Annex II is not included in the document. Alternatively, please include it as an annex among the documents available on the website.
4363	Please modify (by Basu et al. (2018)) with (Basu et al.,2018)
4746	Please add (Katsonouri et al., 2023)
5347	We suggest to modify (decadally) with (every ten years)
5517	Please add (padj) after (Dunn's test with Benjamini-Hochberg correction)
5518	Please remove (padj)
5734	Please add in the brackets (CA:LA) after "catchment:lake"
7178	Regarding the data on "tree rings" from Italy we suggest adding the bibliographic reference as following (Fornasaro et al., 2023) https://doi.org/10.3390/min13050688
7526	Please modify line with "*comprehensive description of the multi-model experiment program was recently published (Dastoor et al. (2025)*"
8284	Figure 14 and its caption is reported two times. A copy of figure 14 and its caption is also present at line 8178. Please check if the report need it.
8437	Please remove the-reference "*Geyman et al. 2024, DOI: 10.1029/2023EF004231*" because this reference is reported at line 8434
8438	Please modify the sentence "*Similarly to this study, Geyman et al. find that*" with the following "*in the same article (Geyman et al. (2024)) it's find that*"

References

Cheng Y., Watari T., Seccatore J., Nakajima K., Nansai K., Takaoka M., A review of gold production, mercury consumption, and emission in artisanal and small-scale gold mining (ASGM), Resources Policy, V. 81, 2023, https://doi.org/10.1016/j.resourpol.2023.103370 .

Dastoor, A., Angot, H., Bieser, J., Brocza, F., Edwards, B., Feinberg, A., Feng, X., Geyman, B., Gournia, C., He, Y., Hedgecock, I. M., Ilyin, I., Kirk, J., Lin, C.-J., Lehnherr, I., Mason, R., McLagan, D., Muntean, M., Rafaj, P., Roy, E. M., Ryjkov, A., Selin, N. E., De Simone, F., Soerensen, A. L., Steenhuisen, F., Travnikov, O., Wang, S., Wang, X., Wilson, S., Wu, R., Wu, Q., Zhang, Y., Zhou, J., Zhu, W., and Zolkos, S.: The Multi-Compartment Hg Modeling and Analysis Project (MCHgMAP): mercury modeling to support international environmental policy, Geosci. Model Dev., 18, 2747–2860, https://doi.org/10.5194/gmd-18-2747-2025 , 2025.

Cui, Y., Wu, Q., Wang, S., Liu, K., Li, S., Shi, Z., Ouyang, D., Li, Z., Chen, Q., Lü, C., Xie, F., Tang, Y., Wang, Y., and Hao, J.: Integrating point sources to map anthropogenic atmospheric mercury emissions in China, 1978–2021, Earth Syst. Sci. Data, 17, 3315–3328, https://doi.org/10.5194/essd-17-3315-2025 , 2025.

Marilena Muntean, Greet Janssens-Maenhout, Shaojie Song, Amanda Giang, Noelle E. Selin, Hui Zhong, Yu Zhao, Jos G.J. Olivier, Diego Guizzardi, Monica Crippa, Edwin Schaaf, Frank Dentener, Evaluating EDGARv4.tox2 speciated mercury emissions ex-post scenarios and their impacts on modelled global and regional wet deposition patterns, Atmospheric Environment, Volume 184, 2018, Pages 56-68, ISSN 1352-2310, https://doi.org/10.1016/j.atmosenv.2018.04.017 .

Muntean M., Janssens-Maenhout G., Song S., Selin N.E., Olivier J., Guizzardi D., Maas R., Dentener F., Trend analysis from 1970 to 2008 and model evaluation of EDGARv4 global gridded anthropogenic mercury emissions, Science of The Total Environment, V. 494–495, 2014, P. 337-350, https://doi.org/10.1016/j.scitotenv.2014.06.014 .

Wen M., Wu Q., Li G., Wang S., Li Z., Tang Y., Xu L., Liu T, Impact of ultra-low emission technology retrofit on the mercury emissions and cross-media transfer in coal-fired power plants, Journal of Hazardous Materials, V. 396, 2020, https://doi.org/10.1016/j.jhazmat.2020.122729 .

Andreae, M. O.: Emission of trace gases and aerosols from biomass burning – an updated assessment, Atmos. Chem. Phys., 19, 8523–8546, https://doi.org/10.5194/acp-19-8523-2019 , 2019
Friedli H.R., Radke L.F., Lu J.Y., Banic C.M., Leaitch W.R., MacPherson J.I., Mercury emissions from burning of biomass from temperate North American forests: laboratory and airborne measurements, Atmospheric Environment, V. 37, I. 2, 2003, P. 253-267, https://doi.org/10.1016/S1352-2310(02)00819-1 .
McLagan, D. S., Stupple, G. W., Darlington, A., Hayden, K., & Steffen, A. (2021). Where there is smoke there is mercury: Assessing boreal forest fire mercury emissions using aircraft and highlighting uncertainties associated with upscaling emissions estimates. *Atmospheric Chemistry and Physics*, *21*(7), 5635-5653. https://doi.org/10.5194/acp-21-5635-2021
Howard, D., Nelson, P. F., Edwards, G. C., Morrison, A. L., Fisher, J. A., Ward, J., Harnwell, J., van der Schoot, M., Atkinson, B., Chambers, S. D., Griffiths, A. D., Werczynski, S., and Williams, A. G.: Atmospheric mercury in the Southern Hemisphere tropics: seasonal and diurnal variations and influence of inter-hemispheric transport, Atmos. Chem. Phys., 17, 11623–11636, https://doi.org/10.5194/acp-17-11623-2017 , 2017
Horowitz, H. M., Jacob, D. J., Zhang, Y., Dibble, T. S., Slemr, F., Amos, H. M., Schmidt, J. A., Corbitt, E. S., Marais, E. A., and Sunderland, E. M.: A new mechanism for atmospheric mercury redox chemistry: implications for the global mercury budget, Atmos. Chem. Phys., 17, 6353–6371, https://doi.org/10.5194/acp-17-6353-2017 , 2017
Agnan, Y., Le Dantec, T., Moore, C. W., Edwards, G. C., & Obrist, D. (2016). New constraints on terrestrial surface–atmosphere fluxes of gaseous elemental mercury using a global database. *Environmental science & technology*, *50*(2), 507-524. https://doi.org/10.1021/acs.est.5b04013
Le Croizier G., Lorrain A., Sonke J. E:, Hoyos-Padilla M.E:, Galván-Magaña F., Santana-Morales O., Aquino-Baleytó M., Becerril-García E.E., Muntaner-López G., Ketchum J., Block B., Carlisle A., Jorgensen S.J:, Besnard L., Jung A., Schaal G., Point D. The Twilight Zone as a Major Foraging Habitat and Mercury Source for the Great White Shark, *Environmental Science & Technology* **2020** *54* (24), 15872-15882 https://doi.org/10.1021/acs.est.0c05621
Ackerman, Joshua T., C. Alex Hartman, and Mark P. Herzog. "Mercury contamination in resident and migrant songbirds and potential effects on body condition." *Environmental Pollution* 246 (2019): 797-810. https://doi.org/10.1016/j.envpol.2018.11.060
Provencher J. F., Bond A.L., Hedd A., Montevecchi W. A., Muzaffar S.B., Courchesne S.J., Gilchrist H.G:, Jamieson S.E., Merkel F.R., Falk K., Durinck J., Mallory M.L., Prevalence of marine debris in marine birds from the North Atlantic, Marine Pollution Bulletin, V. 84, I. 1–2, 2014, P. 411-417, https://doi.org/10.1016/j.marpolbul.2014.04.044 .
Lange, T., Rumbold, D. G., Frederick, P. C., Cunningham, M., & Pollman, C. D. (2020). Temporal changes in mercury concentrations in Everglades biota. In *Mercury and the Everglades. A Synthesis and Model for Complex Ecosystem Restoration: Volume III–Temporal Trends of Mercury in the Everglades, Synthesis and Management Implications* (pp. 27-50). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-55635-8
Kesic, R., Elliott, J. E., Lee, S. L., & Elliott, K. H. (2024). Legacy and emergent contaminants in glaucous-winged gull eggs from Canada's Pacific coast: Spatial distribution, temporal trends, and risks for human consumers. *Environmental Pollution*, *363*, 125099. https://doi.org/10.1016/j.envpol.2024.125099
Devalloir, Q., Fritsch, C., Bangjord, G., Bårdsen, B. J., Bourgeon, S., Eulaers, I., & Bustnes, J. O. (2023). Long-term monitoring of exposure to toxic and essential metals and metalloids in the tawny owl (Strix aluco): Temporal trends and influence of spatial patterns. *Science of the total environment*, *876*, 162710. https://doi.org/10.1016/j.scitotenv.2023.162710
Hebert C.E., Chételat J., Beck R., Dolgova S., Fordy K., Kirby P., Martin P., Rabesca M,

Inter-annual variation of mercury in aquatic bird eggs and fish from a large subarctic lake under a warming climate, Science of The Total Environment, V. 766, 2021, https://doi.org/10.1016/j.scitotenv.2020.144614 .
Schoch, N., Yang, Y., Yanai, R.D. *et al.* Spatial patterns and temporal trends in mercury concentrations in common loons (*Gavia immer*) from 1998 to 2016 in New York's Adirondack Park: has this top predator benefitted from mercury emission controls?. *Ecotoxicology* **29**, 1774–1785 (2020). https://doi.org/10.1007/s10646-019-02119-w
Harwood, L. A., & Smith, T. G. (2002). Whales of the Inuvialuit settlement region in Canada's Western Arctic: An overview and outlook. *Arctic*, 77-93. https://pubs.aina.ucalgary.ca/Arctic/Arctic55-S-77.pdf
Nielsen, N. H., Víkingsson, G. A., Hansen, S. H., Ditlevsen, S., & Heide-Jørgensen, M. P. (2018). Two techniques of age estimation in cetaceans: GLGs in teeth and earplugs, and measuring the AAR rate in eye lens nucleus. *NAMMCO Scientific Publications*, *10*. https://doi.org/10.7557/3.4184
Ostertag, S. K., & Chan, H. M. (2018). Biomarkers of the cholinergic and dopaminergic signaling pathways in Arctic beluga whales (Delphinapterus leucas): Relationship to methylmercury and selenium. *Arctic Science*, *4*(3), 405-420. https://doi.org/10.1139/as-2017-0033
Choy ES, Giraldo C, Rosenberg B, Roth JD, Ehrman AD, Majewski A, Swanson H, Power M, Reist JD, Loseto LL (2020) Variation in the diet of beluga whales in response to changes in prey availability: insights on changes in the Beaufort Sea ecosystem. Mar Ecol Prog Ser 647:195-210 https://doi.org/10.3354/meps13413
E. Worden, Everything is changing so much": Community Perspectives on the Declining Beluga Whale Harvest in Aklavik, NT, 2018, Thesis at University of Manitoba, Winnipeg, Canada, https://mspace.lib.umanitoba.ca/server/api/core/bitstreams/4d61d69a-bcff-4e25-8578-6b2caa9d7586/content
B. Day, Renewable Resources of the Beaufort Sea for Our Children: Perspectives from an Inuvialuit Elder, ARCTIC, VOL. 55, SUPP. 1 (2002) P. 1 – 3, https://doi.org/10.14430/arctic730
Usher P.J. 2002. Inuvialuit use of the Beaufort Sea and its resources, 1960–2000. Arctic, **55**(Suppl. 1): 18–28. https://doi.org/10.14430/arctic732
ICC: Inuuvik Community Corporation Tuktuuyaqtuuq Community Corporation Akłarvik Community Corporation, Mackenzie Project Environmental Group Calgary, Alberta, INUVIALUIT SETTLEMENT REGION TRADITIONAL KNOWLEDGE REPORT, 2006, http://www.capekrusenstern.org/docs/icc_study_2006.pdf
W.L. Lockhart, G.A. Stern, R. Wagemann, R.V. Hunt, D.A. Metner, J. DeLaronde, B. Dunn, R.E.A. Stewart, C.K. Hyatt, L. Harwood, K. Mount, Concentrations of mercury in tissues of beluga whales (Delphinapterus leucas) from several communities in the Canadian Arctic from 1981 to 2002, Science of The Total Environment, V. 351–352, 2005, P. 391-412, https://doi.org/10.1016/j.scitotenv.2005.01.050 .
Jones, H. J., Swadling, K. M., Butler, E. C. V., & Macleod, C. K. (2014). Complex patterns in fish–sediment mercury concentrations in a contaminated estuary: The influence of selenium co-contamination?. *Estuarine, Coastal and Shelf Science*, *137*, 14-22. https://doi.org/10.1016/j.ecss.2013.11.024
Gerson J.R., Simon N., Vega C.M., Gardner J.R., Yang X., Fernandez L.E., Bernhardt E.S. and Pavelsky T.M., Artificial lake expansion amplifies mercury pollution from gold mining.*Sci. Adv.***6**, (2020) https://doi.org/10.1126/sciadv.abd4953
Cardo, M. A., and P. M. Vargas. "Proyecto: plan nacional de accion sobre mercurio en el sector de la mineria de oro artesanal y de pequena escala en el Peru." *Artisanal Gold Council) Tropical Conservation* (2017).
Basu N., Horvat M., Evers D.C., Zastenskaya I., Weihe P., Tempowski J. A State-of-the Science Review of Biomarkers in Human Populations Worldwide between 2000 and 2018. Environmental Health Perspectives 126 (10), 2018. doi: 10.1289/EHP3904

Fornasaro, S.; Ciani, F.; Nannoni, A.; Morelli, G.; Rimondi, V.; Lattanzi, P.; Cocozza, C.; Fioravanti, M.; Costagliola, P. Tree Rings Record of Long-Term Atmospheric Hg Pollution in the Monte Amiata Mining District (Central Italy): Lessons from the Past for a Better Future. Minerals 2023, 13, 688. https://doi.org/10.3390/min13050688
Katsonouri A., Gabriel C., López M.E., Namorado S., Halldorsson T.I., Tratnik J.S., Martin L.R., Karakoltzidis A., Chatzimpaloglou A., Giannadaki D., Anastasi E., Thoma A., Domínguez-Morueco N., Cañas Portilla A.I., Jacobsen E., Assunção R., Peres M., Santiago S., Nunes C., Pedraza-Diaz S., Iavicoli I., Leso V., Lacasaña M., González-Alzaga B., Horvat M., Sepai O., Castano A., Kolossa-Gehring M., Karakitsios S., Sarigiannis D., HBM4EU-MOM: Prenatal methylmercury-exposure control in five countries through suitable dietary advice for pregnancy – Study design and characteristics of participants, International Journal of Hygiene and Environmental Health, V. 252, 2023, https://doi.org/10.1016/j.ijheh.2023.114213
Bellanger M., Pichery C., Aerts D., Berglund M., Castaño A., Čejchanová M., Crettaz P., Davidson F., Esteban M., Fischer M. E., Gurzau A. E., Halzlova K. Katsonouri A., Knudsen L. E., Kolossa-Gehring M., Koppen G., Ligocka D., Miklavčič A., Reis M. F., Rudnai P., Tratnik J. S., Weihe P., Budtz-Jørgensen E. & Grandjean P. (2013), Economic benefits of methylmercury exposure control in Europe: Monetary value of neurotoxicity prevention, Environmental Health V. 12 https://doi.org/10.1186/1476-069X-12-3
Eckley, C. S., Gilmour, C. C., Janssen, S., Luxton, T. P., Randall, P. M., Whalin, L., & Austin, C. (2020). The assessment and remediation of mercury contaminated sites: A review of current approaches. *Science of the Total Environment*, *707*, 136031. https://doi.org/10.1016/j.scitotenv.2019.136031
Waldron, M. C., Colman, J. A., & Breault, R. F. (2000). Distribution, hydrologic transport, and cycling of total mercury and methyl mercury in a contaminated river-reservoir-wetland system (Sudbury River, eastern Massachusetts). *Canadian Journal of Fisheries and Aquatic Sciences*, *57*(5), 1080-1091. https://doi.org/10.1139/f00-041
Cardona-Marek, T., Schaefer, J., Ellickson, K., Barkay, T., & Reinfelder, J. R. (2007). Mercury speciation, reactivity, and bioavailability in a highly contaminated estuary, Berry's Creek, New Jersey Meadowlands. Environmental science & technology, 41(24), 8268-8274. https://doi.org/10.1021/es070945h
Turner, R. R., Mitchell, C. P. J., Kopec, A. D., & Bodaly, R. A. (2018). Tidal fluxes of mercury and methylmercury for Mendall Marsh, Penobscot River estuary, Maine. *Science of The Total Environment*, *637*, 145-154. https://doi.org/10.1016/j.scitotenv.2018.05.090
Rudd, J. W., Kelly, C. A., Sellers, P., Flett, R. J., & Townsend, B. E. (2021). Why the English–Wabigoon river system is still polluted by mercury 57 years after its contamination. *Facets*, *6*(1), 2002-2027. https://doi.org/10.1139/facets-2021-0093
Gilmour C., Bell T., Soren A., Riedel G., Riedel G., Kopec D., Bodaly D., Ghosh U., Activated carbon thin-layer placement as an in situ mercury remediation tool in a Penobscot River salt marsh, Science of The Total Environment, V. 621, 2018, P. 839-848, https://doi.org/10.1016/j.scitotenv.2017.11.050
Driscoll C.T., SCHOFIELD, C. L., MUNSON, R., & HOLSAPPLE, J. (1994). The mercury cycle and fish in the Adirondack lakes. *Environmental Science & Technology*, *28*(3), 136A-143A. https://doi.org/10.1021/es00052a721
Lescord, G. L., Johnston, T. A., Branfireun, B. A., & Gunn, J. M. (2018). Percentage of methylmercury in the muscle tissue of freshwater fish varies with body size and age and among species. *Environmental Toxicology and Chemistry*, *37*(10), 2682-2691. https://doi.org/10.1002/etc.4233

Jacob M. Ogorek, Ryan F. Lepak, Joel C. Hoffman, John F. DeWild, Tylor J. Rosera, Michael T. Tate, James P. Hurley, and David P. Krabbenhoft *Environmental Science & Technology* **2021** *55* (18), 12714-12723 https://doi.org/10.1021/acs.est.1c02319
Todorova, S. G., Driscoll Jr, C. T., Matthews, D. A., Effler, S. W., Hines, M. E., & Henry, E. A. (2009). Evidence for regulation of monomethyl mercury by nitrate in a seasonally stratified, eutrophic lake. *Environmental Science & Technology*, *43*(17), 6572-6578. https://doi.org/10.1021/es900887b
McCord, S. A., Beutel, M. W., Dent, S. R., & Schladow, S. G. (2016). Evaluation of mercury cycling and hypolimnetic oxygenation in mercury-impacted seasonally stratified reservoirs in the G uadalupe R iver watershed, C alifornia. *Water Resources Research*, *52*(10), 7726-7743. https://doi.org/10.1002/2016WR019061
Millard, G., Eckley, C. S., Luxton, T. P., Krabbenhoft, D., Goetz, J., McKernan, J., & DeWild, J. (2023). Evaluating the influence of seasonal stratification on mercury methylation rates in the water column and sediment in a contaminated section of a western USA reservoir. *Environmental Pollution*, *316*, 120485. https://doi.org/10.1016/j.envpol.2022.120485
Demers, J. D., Driscoll, C. T., & Shanley, J. B. (2010). Mercury mobilization and episodic stream acidification during snowmelt: Role of hydrologic flow paths, source areas, and supply of dissolved organic carbon. *Water Resources Research*, *46*(1). https://doi.org/10.1029/2008WR007021
Dittman, J. A., Shanley, J. B., Driscoll, C. T., Aiken, G. R., Chalmers, A. T., Towse, J. E., & Selvendiran, P. (2010). Mercury dynamics in relation to dissolved organic carbon concentration and quality during high flow events in three northeastern US streams. *Water Resources Research*, *46*(7). **https://doi.org/10.1029/2009WR008351**
Dittman, J. A., Shanley, J. B., Driscoll, C. T., Aiken, G. R., Chalmers, A. T., & Towse, J. E. (2009). Ultraviolet absorbance as a proxy for total dissolved mercury in streams. *Environmental Pollution*, *157*(6), 1953-1956. https://doi.org/10.1016/j.envpol.2009.01.031
Shanley, J. B., Taylor, V. F., Ryan, K. A., Chalmers, A. T., Perdrial, J., & Stubbins, A. (2022). Using dissolved organic matter fluorescence to predict total mercury and methylmercury in forested headwater streams, Sleepers River, Vermont USA. *Hydrological Processes*, *36*(5), e14572. https://doi.org/10.1002/hyp.14572
Riscassi, A. L., & Scanlon, T. M. (2011). Controls on stream water dissolved mercury in three mid-Appalachian forested headwater catchments. *Water Resources Research*, *47*(12). **https://doi.org/10.1029/2011WR010977**
Schelker, J., Burns, D. A., Weiler, M., & Laudon, H. (2011). Hydrological mobilization of mercury and dissolved organic carbon in a snow-dominated, forested watershed: Conceptualization and modeling. *Journal of Geophysical Research: Biogeosciences*, *116*(G1). https://doi.org/10.1029/2010JG001330
Vidon, P., Allan, C., Burns, D., Duval, T.P., Gurwick, N., Inamdar, S., Lowrance, R., Okay, J., Scott, D. and Sebestyen, S. (2010), Hot Spots and Hot Moments in Riparian Zones: Potential for Improved Water Quality Management1. JAWRA Journal of the American Water Resources Association, 46: 278-298. https://doi.org/10.1111/j.1752-1688.2010.00420.x
Watras, C. J., Teng, H. Y., Latzka, A. W., Meyer, M. W., & Zhang, Z. (2020). Near-decadal oscillation of water levels and mercury bioaccumulation in the Laurentian Great Lakes Region. *Environmental Science & Technology Letters*, *7*(2), 89-94. https://doi.org/10.1021/acs.estlett.9b00772
Åkerblom, S., Zdanowicz, C., Campeau, A., Soerensen, A. L., & Hewitt, J. (2022). Spatial and temporal variations in riverine mercury in the Mackenzie River Basin, Canada, from

community-based water quality monitoring data. *Science of the Total Environment*, *853*, 158674. https://doi.org/10.1016/j.scitotenv.2022.158674
Lavoie, R. A., Amyot, M., & Lapierre, J. F. (2019). Global meta-analysis on the relationship between mercury and dissolved organic carbon in freshwater environments. *Journal of Geophysical Research: Biogeosciences*, *124*(6), 1508-1523. https://doi.org/10.1029/2018JG004896
Capo E., Feng C., Bravo A.G., Bertilsson S., Soerensen A.L., Pinhassi J., Buck M, Karlsson C., Hawkes J., and Björn E., *Environmental Science & Technology* **2022** *56* (18), 13119-13130 DOI: 10.1021/acs.est.2c03784
Nascimento, M. L., Nascimento, M. M., Felix, C. S. A., Menezes, N. M., Cruz, I., da Rocha, G. O., & de Andrade, J. B. (2025). Marine polychaetes as biomonitoring tools for total mercury in BTS beach environments. *JOURNAL OF BIOENGINEERING, TECHNOLOGIES AND HEALTH*, *8*(6), 527-533. https://doi.org/10.34178/jbth.v8i6.547
Gosnell, K. J., Balcom, P. H., Tobias, C. R., Gilhooly III, W. P., & Mason, R. P. (2017). Spatial and temporal trophic transfer dynamics of mercury and methylmercury into zooplankton and phytoplankton of Long Island Sound. *Limnology and Oceanography*, *62*(3), 1122-1138. **https://doi.org/10.1002/lno.10490**
Gosnell, K. J., Heimbürger-Boavida, L. E., Beck, A. J., Ukotije-Ikwut, P. R., & Achterberg, E. P. (2023). World war munitions as a source of mercury in the southwest Baltic Sea. *Chemosphere*, *345*, 140522. https://doi.org/10.1016/j.chemosphere.2023.140522
Živković, I., Heimbürger-Boavida, L. E., Petrova, M. V., Dufour, A., Begu, E., & Horvat, M. (2025). Achieving measurement comparability in mercury speciation analysis in seawater: Key requirements and best practices. *Marine Chemistry*, *269*, 104498. 10.1016/j.marchem.2025.104498
Amos H. M., Jacob D. J., Kocman D., Horowitz H. M., Zhang Y., Dutkiewicz S., Horvat M., Corbitt E. S., Krabbenhoft D. P., Sunderland E. M. Global Biogeochemical Implications of Mercury Discharges from Rivers and Sediment Burial, 2014, Environmental Science & Technology doi: 10.1021/es502134t
Berg, W., Johnels, A., Sjöstrand, B., & Westermark, T. (1966). Mercury content in feathers of Swedish birds from the past 100 years. *Oikos*, 71-83. DOI: 10.2307/3564782
Westermark, T., Odsjö, T., & Johnels, A. G. (1975). Mercury content of bird feathers before and after Swedish ban on alkyl mercury in agriculture. *Ambio*, 87-92.
Berglund, F. (1971). Methyl mercury in fish: A toxicologic-epidemiologic evaluation of risks: Report from an expert group. *Nordisk Hygienisk Tidskrift*, *4*, 19-364.
Westöö, G. (1966). Mercury in eggs from. *Swedish hens, meat of Swedish hens, broilers, and chickens, and in Swedish chicken livers, Var Foeda*, *18*, 85.
Jensen, S., & Jernelöv, A. (1969). Biological methylation of mercury in aquatic organisms. *Nature*, *223*(5207), 753-754. https://doi.org/10.1038/223753a0
Lindqvist, O., Johansson, K., Bringmark, L. *et al.* Mercury in the Swedish environment — Recent research on causes, consequences and corrective methods. *Water Air Soil Pollut* **55**, xi–261 (1991). https://doi.org/10.1007/BF00542429
Médieu A., Point D., Sonke J.E., Angot H., Allain V., Bodin N., Adams D.H., Bignert A., Streets D.G., Buchanan P.B., Heimbürger-Boavida L., Pethybridge H., Gillikin D.P., Ménard F., Choy C.A., Itai T, Bustamante P., Dhurmeea Z., Ferriss B.E., Bourlès B., Habasque J., Verheyden A., Munaron J., Laffont L., Gauthier O., and Lorrain A. table Tuna Mercury Concentrations since 1971 Illustrate Marine Inertia and the Need for Strong Emission Reductions under the Minamata Convention *Environmental Science & Technology Letters* **2024** *11* (3), 250-258 DOI: 10.1021/acs.estlett.3c00949

Shah V., Jacob D.J., Thackray C.P., Wang X., Sunderland E.M., Dibble T.S., Saiz-Lopez A., Černušák I., Kellö V., Castro P.J., Wu R. and Wang C., Improved Mechanistic Model of the Atmospheric Redox Chemistry of Mercury *Environmental Science & Technology* **2021** *55* (21), 14445-14456 DOI: 10.1021/acs.est.1c03160
Zhang, H., Wang, W., Lin, C., Feng, X., Shi, J., Jiang, G., & Larssen, T. (2022). Decreasing mercury levels in consumer fish over the three decades of increasing mercury emissions in China. *Eco-Environment & Health*, *1*(1), 46-52. https://doi.org/10.1016/j.eehl.2022.04.002
Feinberg, A., Dlamini, T., Jiskra, M., Shah, V., & Selin, N. E. (2022). Evaluating atmospheric mercury (Hg) uptake by vegetation in a chemistry-transport model. *Environmental Science: Processes & Impacts*, *24*(9), 1303-1318. DOI: 10.1039/D2EM00032F
A. Feinberg,N.E. Selin,C.F. Braban,K. Chang,D. Custódio,D.A. Jaffe,K. Kyllönen,M.S. Landis,S.R. Leeson,W. Luke,K.M. Molepo,M. Murovec,M.G. Nerentorp Mastromonaco,K. Aspmo Pfaffhuber,J. Rüdiger,G. Sheu, & V.L. St. Louis, Unexpected anthropogenic emission decreases explain recent atmospheric mercury concentration declines, Proc. Natl. Acad. Sci. U.S.A. 121 (42) e2401950121, https://doi.org/10.1073/pnas.2401950121 (2024).
Angot H., Rutkowski E., Sargent M., Wofsy S. C., Hutyra L. R.; Howard D., Obrist D. and Selin Noelle E., Atmospheric mercury sources in a coastal-urban environment: a case study in Boston, Massachusetts, USA, Environ. Sci.: Processes Impacts, 2021, V.23, I 12, p. 1914-1929, DOI:10.1039/D1EM00253H
Denzler, B., Bogdal, C., Henne, S., Obrist, D., Steinbacher, M., & Hungerbühler, K. (2017). Inversion approach to validate mercury emissions based on background air monitoring at the high altitude research station Jungfraujoch (3580 m). *Environmental science & technology*, *51*(5), 2846-2853. https://doi.org/10.1021/acs.est.6b05630
Rigby M., Park S., Saito T., Western L. M., Redington A. L., Fang X., Henne S., Manning A. J., Prinn R. G., Dutton G. S., Fraser P. J., Ganesan A. L., Hall B. D., Harth C. M., Kim J., Kim K.-R., Krummel P. B., Lee T., Li S., Liang Q., Lunt M. F., Montzka S. A., Mühle J., O'Doherty S., Park M.-K., Reimann S., Salameh P. K., Simmonds P., Tunnicliffe R. L., Weiss R. F., Yokouchi Y., Young D., 2019, Nature, Increase in CFC-11 emissions from eastern China based on atmospheric observations https://doi.org/10.1038/s41586-019-1193-4
Bieser, J. (2024, June). AI and climate protection: Research gaps and needs to align machine learning with greenhouse gas reductions. In *2024 10th International Conference on ICT for Sustainability (ICT4S)* (pp. 1-9). IEEE. **DOI:** 10.1109/ICT4S64576.2024.00010
Rosati, B., Paul, A., Iversen, E. M., Massling, A., & Bilde, M. (2020). Reconciling atmospheric water uptake by hydrate forming salts. *Environmental Science: Processes & Impacts*, *22*(8), 1759-1767. **https://doi.org/10.1039/D0EM00179A**
Outridge, P. M., Mason, R. P., Wang, F., Guerrero, S., & Heimburger-Boavida, L. E. (2018). Updated global and oceanic mercury budgets for the United Nations Global Mercury Assessment 2018. *Environmental science & technology*, *52*(20), 11466-11477. https://doi.org/10.1021/acs.est.8b01246
Sonke, J. E., Angot, H., Zhang, Y., Poulain, A., Björn, E., & Schartup, A. (2023). Global change effects on biogeochemical mercury cycling. *Ambio*, *52*(5), 853-876. https://doi.org/10.1007/s13280-023-01855-y
Giang, A., Song, S., Muntean, M., Janssens-Maenhout, G., Harvey, A., Berg, E., & Selin, N. E. (2018). Understanding factors influencing the detection of mercury policies in modelled Laurentian Great Lakes wet deposition. *Environmental Science: Processes & Impacts*, *20*(10), 1373-1389. **https://doi.org/10.1039/C8EM00268A**

Lei, H., Liang, X. Z., Wuebbles, D. J., & Tao, Z. (2013). Model analyses of atmospheric mercury: present air quality and effects of transpacific transport on the United States. *Atmospheric Chemistry and Physics*, *13*(21), 10807-10825. https://doi.org/10.5194/acp-13-10807-2013
De Simone F., Artaxo P., Bencardino M., Cinnirella S., Carbone F., D'Amore F., Dommergue A. Feng X. B., Gencarelli C. N., Hedgecock I. M., Landis M. S., Sprovieri F., Suzuki N., Wängberg I. and Pirrone, N., Particulate-phase mercury emissions from biomass burning and impact on resulting deposition: a modelling assessment, Atmospheric Chemistry and Physics, V.17, **2017**, N. 3, P. 1881--1899, DOI :10.5194/acp-17-1881-2017
Feinberg L., Ziemer J., Ansdell M., Crooke J., Dressing C., Mennesson B., O'Meara J., Pepper J., Roberge A., The Habitable Worlds Observatory engineering view: status, plans, and opportunities, Proc. SPIE 13092, Space Telescopes and Instrumentation 2024: Optical, Infrared, and Millimeter Wave, 130921N (2024); https://doi.org/10.1117/12.3018328
De Simone, F.; D'Amore, F.; Marasco, F.; Carbone, F.; Bencardino, M.; Hedgecock, I.M.; Cinnirella, S.; Sprovieri, F.; Pirrone, N. A Chemical Transport Model Emulator for the Interactive Evaluation of Mercury Emission Reduction Scenarios. *Atmosphere* **2020**, *11*, 878. https://doi.org/10.3390/atmos11080878
Geyman, B. M., Streets, D. G., Thackray, C. P., Olson, C. L., Schaefer, K., & Sunderland, E. M. (2024). Projecting global mercury emissions and deposition under the shared socioeconomic pathways. Earth's Future, 12, e2023EF004231. **https://doi.org/10.1029/2023EF004231**