Goldschmidt 2023 Abstract
https://doi.org/10.7185/gold2023.20541

The relevance of feeding strategy on the accumulation of Hg and MMHg

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The neurotoxin methylmercury (MMHg) can accumulate in marine biota to levels unsafe for human consumption. Due to the complexity of marine Hg speciation, the ecosystems, and the pathways of bioaccumulation, it is not always clear why certain organisms accumulate high amounts of mercury. In this modelling study we use a Hg cycling and bioaccumulation model which we drive using a 1D turbulence model in the North Sea and Northern Atlantic Ocean. We analyse the role of feeding strategy and life cycle of marine biota on the accumulation of both inorganic Hg and MMHg in different types of organisms. Here we show that the trophic position is a great indicator of the MMHg content of organisms but the inorganic Hg content is stronger influenced by a variety of other factors, such as age and feeding strategy. We show that sponges that can consume DOC can bioaccumulate higher total Hg than some fish species, despite their lower trophic levels, and that both benthic and pelagic predators have elevated MMHg levels. Our model unravels the processes governing patterns observed in previous observational studies. This increased understanding will provide us with better insights into what leads to Hg bioaccumulation and what causes the differences between observed levels of inorganic Hg and organic MMHg. Additionally, it can increase our understanding of Hg pollution in seafood and better predict which species are safe to consume in what quantities.