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Mercury cycling in deep sea sediments underneath highly productive upwelling systems

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Mercury (Hg) belongs to the best studied trace metals given its harmfulness to humans and the environment. Previous studies showed that in sea water Hg has nutrient-like, scavenged, or hybrid-type characteristics depending on external sources of Hg to the surface ocean and scavenging by organic and inorganic particles. Further, internal recycling processes prior to final burial complicates the interpretation of the accumulation processes of Hg, with consequences also for the interpretation of Hg in geological records[1].

Here, we present chemical data for total Hg along with Al, organic and inorganic carbon as well as trace metals (e.g. Ag, Ba, Cd, Re, U) for several continental margin sediments below the highly productive Humboldt and Benguela current systems. Next to Hg contents we assess the host phases of Hg using thermal desorption profiles. The focus is on a variety of short cores from bathyal and abyssal water depths (1-4 km) from Namibia, Peru as well as Northern and Southern Chile. These are deep sea regions with less detailed Hg information than other deep sea regions, e.g. from the Northern hemisphere[2]. The obtained data are compared with those published for e.g. the highly productive Arabian Sea.

Preliminary results show that (i) Hg is enriched over its lithogenic background in all sediments, (ii) Hg enrichment increases upcore in most cases suggesting anthropogenic contributions (iii), Hg seems to be preserved over both, organic carbon and Ag, a robust export indicator, and (iv) Hg enrichment is related to another host phase other than organic carbon in carbonate-rich sediments. The results of this study support previous indications of a widespread export and accumulation of Hg in abyssal to hadal ocean sediments.

References:

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[2]Liu et al. (2021), *Proceedings of the National Academy of Sciences* 118, e2102629118