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Sedimentary Iron and Manganese biogeochemistry through the Arabian Sea Oxygen Minimum Zone

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The authigenic precipitates of iron (Fe) and manganese (Mn) are ubiquitous components of most marine sediments. Whilst displaying dramatic redox behavior and supporting the microbial degradation of organic matter, many Fe/Mn authigenic phases also play a critical role in influencing the distribution of other trace metals *via* scavenging reactions.

The behavior and influence of Fe and Mn authigenic precipitates is well constrained in truly oxic and anoxic environments. However, detailed biogeochemical information in organic rich, transitional suboxic conditions, such as those found in Oxygen Minimum Zone (OMZ) environments, is limited.

Here, we present a novel data set from the Pakistan margin of the Arabian Sea, from sites spanning the OMZ, which display a wide range of redox conditions. Included are results of *in-situ* benthic lander incubation studies, sediment elemental determinations, and porewater modelling. We shall address the distribution, mobilisation, precipitation, and kinetics of reactions involving Fe/Mn at points within, and along the lower margin of the OMZ. The impact of Fe/Mn cycling on trace metal (Cr, Co, Cd, Mo, Ni, & U) distribution within the OMZ sedimentary environment will also be discussed**.**

This study shows that under the suboxic conditions of OMZ environments, it is apparent that oxyhydroxides play a significant role in trace metal biogeochemistry at ocean margins.