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Reactive iron in the seafloor of Cilician Basin, Eastern Mediterranean

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Reactive iron is a relatively more biogeochemically active part of solid phase iron pool in marine sediments. They can transport organic carbon, take part in microbial respiratory pathways and play a major role in controlling phosphate retention or release. The latter function is especially crucial in the oligotrophic Eastern Mediterranean (EM), where phosphate adsorption onto dust and river-derived reactive iron minerals might have yielded in oligotrophy. Here we describe for the first time reactive iron distributions and the geochemical context in the northern basin of the EM. We used the citrate-buffered dithionite extraction to quantify reactive iron in surface sediments from four transects. Cilician Basin has high reactive iron concentration, but each sub-region has own distribution driven by local input (i.e. river input in Goksu-Aydincik region). Average reactive iron (Fe_R) and total iron (Fe_T) concentrations are 55.9±16.4 and 523±152 μmol g^{-1}. Average reactive and total manganese concentrations are 2.39±4.09 and 11.4±9.1 μmol g^{-1}. The Fe_R/Fe_T molar ratio is in the range of 0.044-0.257 whereas Mn_R/Mn_T ratio is in the range of 0.057-0.401. Fe_R has significant correlation with organic carbon (R^2=0.81) in Aydıncık transect. In this transect organic carbon and % mud fraction has significant correlation (R^2=0.78). Highly coupled distributions of reactive iron, organic carbon and grain sizes show evidence for microbial Fe reduction in the 100 m - deep region. This evidence is also supported by the TOC/TN molar ratio decreasing below ≤10 in Cilican Basin transects towards 100-m deep stations, indicating microbal preference of marine-origin organic carbon near the 100 m-deep region.. The relative enrichment of reactive Mn in the basin is relatively higher than that of Fe. Reactive iron enrichment decreases with water depth whereas reactive Mn enrichment significantly increases with water depth. We conclude that among the reactive metal phases reactive manganese is more prone to mobilization across the sediment and transported laterally towards to open seafloor in the Cilican Basin.