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Rock magnetic parameters and climatic signals recorded in sediments from Red Sea and the Gulf of Aden

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Few studies have examined the magnetic and climatic signals of the Red Sea and the Indian Ocean. Herein, we present the results of three cores located on both sides of the Strait of Bab-el-Mandeb. They have been selected to study the climatic dependence of the rock magnetic parameters in the Red Sea (MD 92-1008) and the Gulf of Aden (Arabian Sea; MD 92-1002). Both of those cores present a continuous and very detailed oxygen isotope stratigraphies. The oxygen isotope stratigraphies of these two cores cover the last 20,000yrs and the last 60,000yrs for the Gulf of Aden and the Red Sea, respectively. In both cores, the Bølling-Allerød, the Younger Dryas and the LGM are very well defined. Both cores exhibit very large changes in magnetic susceptibility which can reach a factor of 20. Depth-age models show that the magnetic susceptibility peaks in the Gulf of Aden appeared in glacial periods, around the Heinrich event H1, in contrast to the one of the Red Sea, which is coeval with the Bølling-Allerød period. The magnetic mineralogy associated with the high-susceptibility intervals from the Gulf of Aden core is dominated by magnetite, whereas it is characterized by high-coercivity magnetic grains (hematite and a certain amount of goethite) in the Red Sea core. The origin of the peaks differs between the two basins as well as the climatic periods in which they are recorded. In the Red Sea core, a strong eolian input dominates the signal during the warm periods whereas in the Aden area, the flux of magnetic material displays changes of lower amplitude. It is striking that those changes in magnetic mineralogy and grain sizes cannot be correlated between both those cores. Interestingly also the high resolution susceptibility signal at site MD 92-1008 reflects high frequency $\delta 18O$ changes recorded in the GISP2 ice core. These changes are most likely due to different weathering conditions of the surrounding volcanic areas.