

## Potential influence of ocean acidification on deep-sea Fe-Mn nodules: An assessment by using artificial seawater

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With the continuous rise in CO<sub>2</sub> emissions, the pH of seawater may decrease extensively in the coming centuries. Deep-sea environments are more vulnerable to decreasing pH since sediments in deep oceans below the carbonate compensation depth (CCD) are often completely devoid of carbonate particles. In order to assess the potential risk of metal release from deep-sea sediments, the mobility of elements from ferromanganese (Fe-Mn) nodules and pelagic clays was examined. We adjusted the pH of seawaters into predicted values by CO<sub>2</sub>-induced pH regulation system. Two geochemical reference samples (JMn-1 and JMS-2) were treated with these seawaters to investigate the possible metal releasing from deep-sea sediments in response to pH changes. We found that the solid phases in JMn-1 and JMS-2 affect the pH of the ASW through the reaction between the surface hydroxyl groups and the charged ions/complexes in the ASW. According to our result, the variation in the element concentrations in seawater were mainly affected by sorption-desorption processes, which are primarily determined by changes in the surface charge of the solid phase of deep-sea sediments and ion species in seawaters. The possible releasing of heavy metal such as Mn, Cu, Zn, Cd and toxic elements such as As and Ag should be taken into consideration when assessing the influence of pH changing on deep-sea Fe-Mn nodules and red clays.