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Dissolved Trace metal distributions and speciation in Yellow Sea, China

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Trace metals play an important role in marine biogeochemical cycling processes. However, owing to the lack of trace-metal clean sampling and analytical techniques, high quality data for dissolved trace metals in coastal seawaters of China are scarce. In this study, by employing stringent trace-metal clean sampling and analytical techniques, we investigated spatial distribution patterns of several dissolved trace metals (Cu, Ni, Co, Pb, Cd, Zn, and Ag) in Yellow Sea and Bohai Sea of China, and discussed their potential sources and sinks. In general, the dissolved metal concentrations decreased from Bohai Sea to Yellow Sea, and from nearshore to offshore. Despite the severe contamination status reported in coastal seawaters of China, the trace metal concentrations found in seawater are comparable to the concentrations found in pristine coastal seawaters of the US and the EU. In the meantime, the speciation of several metals (Cu, Pb, Zn, Cd) were also studied with the electrochemical (ASV and CLE-CSV) methods in the Yellow Sea. Natural organic ligands were found in seawaters that strongly complexed with dissolved metals. The concentrations and binding constants of the complexing ligands for each metal were reported and compared with the ones found in other coastal seawaters.