

## **Chemical speciation of Phosphorus in Surface Sediments from the China Coast, Yellow Sea: Controlling factor and Bio-availability**

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The coastal zones are important ecosystems where mass and energy exchange actively. Phosphorus (P) is a limiting macronutrient whose availability affects primary productivities and biogeochemical cycles in the coasts. The Jiangsu Coast (JSC), located in the southwestern Yellow Sea, is an important component of the Chinese Coastal Zone. This area is significantly affected by the Yellow and Yangtze Rivers. As a rapidly developing area of East China, the Jiangsu Coastal Zone was facing similar environmental problems in recent years. The coastal seas of China including the Jiangsu Coast have been considered to be phosphorus-limiting areas.

In this study, 61 surface sediment samples were collected from the Jiangsu Coast, East China, to investigate P speciation using a sequential extraction method. The results showed that authigenic and detrital P fractions are the main species, averagely comprising 28.53% and 44.04% of the total P, respectively. Exchangeable, Fe-bound and organic P fractions form the bioavailable pools, and their total average reaches 5.94 mol/g. The three P species were controlled by grain sizes, organic matter and carbonates. The pH only affected the authigenic and detrital P fractions. The Fe-bound and exchangeable P fractions were transformed with one another. The two P fractions and organic P were probably transformed into authigenic P. The organic carbon/phosphorus ratios are  $> 106$  for most samples. Organic matter was mainly of terrestrial origin and underwent differential degradation. P in the JSC sediments initially originated from the Yellow River and was not greatly altered in the marine environment. Compared to other coastal regions of China, the JSC differs in sedimentary P, depending on material sources and environmental factors. These findings are expected to be beneficial for a deeper understanding of the P cycle and eutrophication in coastal zones.