

Cu, Zn and Pb contamination sources in Dadaepo port (Korea) sediments using stable metal isotopes ($\delta^{65}\text{Cu}$, $\delta^{66}\text{Zn}$, $^{207}\text{Pb}/^{206}\text{Pb}$)

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Metal contamination in sediments might give a harmful effect to overlying seawaters through remobilization as well as directly to benthic community. And hence the management plans including the dredging or capping of contaminated sediments would be often applied to coastal environments, especially, fishing port. Before the purification and restoration of contaminated sediments, it would be essential to identify the sources and transport pathways. Stable metal isotopes would be useful to identify the metal contamination sources and the transport pathways^[1] in coastal environment. In order to evaluate the sources of heavy metals in Dadaepo port (a national fishing port from 1971) sediments where some heavy metals were severely contaminated, temporal and spatial variation of metal concentration and metal isotopes ($\delta^{65}\text{Cu}$, $\delta^{66}\text{Zn}$, $^{207}\text{Pb}/^{206}\text{Pb}$) were acquired. Metal concentrations increased toward to inner port and to the recent from the past, and the highest metal concentrations were found in innermost surface sediments. In the mixing diagrams of $\delta^{65}\text{Cu}$ vs. Al/Cu (or Zn/Cu), $\delta^{66}\text{Zn}$ vs. Al/Zn (or Cu/Zn), and $^{207}\text{Pb}/^{206}\text{Pb}$ vs. Fe/Pb, the isotope ratios of the metals sources could be confined and dictated that there were sources with specific values. Three kinds of antifouling paints which have widespread been used in Korea, showed the similar isotope ratios ($\delta^{65}\text{Cu}$, $\delta^{66}\text{Zn}$, $^{207}\text{Pb}/^{206}\text{Pb}$) and metal ratios (Zn/Cu, Pb/Cu) with the estimated contamination sources. This study indicated that AFP contributed much metals^[2] to coastal sediments, especially, in old fishing ports.

[1] Weiss et al., 2008. Environ. Sci. Tech. 655: 664

[2] Shafer et al., 2005. SERDP Project CP-1158.