

## Natural enrichment of Hg and Pb in Hupo basin sediments through coastal upwelling identified by stable Pb and Hg isotopes, Korea

MANSIK CHOI<sup>1\*</sup>, DONGJIN JOE<sup>1</sup>, CHULIN SUN<sup>2</sup>

<sup>1</sup>Chungnam National University, Daejeon 34153, Korea

(\*correspondence: [mschoi@cnu.ac.kr](mailto:mschoi@cnu.ac.kr), [djjoie@naver.com](mailto:djjoie@naver.com))

<sup>2</sup>Korea Marine Environment Management Corporation,  
Busan 48940, Korea ([steelsun@korea.or.kr](mailto:steelsun@korea.or.kr),

Metal contamination in sediments might give a harmful effect to benthic community and to overlying seawaters. In order to setup the management plans for sediment contamination, 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<sup>1</sup> in coastal environment.

Hupo basin is located between the western coast of East Sea, Korea, and Hupo submerged sand bank. Since this coastal area is exposed to the East Sea and has shallow water depth, it might be difficult to expect the metal enrichment in sediments. However, some surface samples showed higher concentrations than KSQG (Korean sediment quality guideline) in Pb and Hg, and historical enrichments were also found in core sediments. Organic carbon concentrations in this coastal basin sediments were 1.5 times higher than those in other coastal area at the same grain size, and correlated well with Pb and Hg concentrations. Historically, POC concentrations were nearly constant but steady increase of Pb and Hg concentrations were found from 1930s. The possibility of metal transport from the Youngil bay was refused through spatial distribution of enrichment factors for Pb and Hg in surface sediments, and of metal accumulation rates in core sediments, and stable Pb ( $^{207}\text{Pb}/^{206}\text{Pb}$  and  $^{208}\text{Pb}/^{206}\text{Pb}$ ) and Hg ( $\delta^{202}\text{Hg}$  and  $\Delta^{202}\text{Hg}$ ) isotopes. Thus, the enrichment of Hg and Pb might be related with the enrichment of organic matter in this coastal area, which was resulted from coastal upwelling process that provided multilayer organic matter coating to sediment grains<sup>2</sup>. In addition, historical enrichment of Pb and Hg was caused from atmospheric deposition, which was also confirmed from stable isotopes, and their fluxes increased steadily from 1930s to present.

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

[2] Hedges and Keil, 1995. Mar. Chem. 49: 81-115