



## **Anthropogenic Pb input into Bohai Bay, China: Evidence from stable Pb isotopic compositions in sediments**

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To investigate the source of Pb within Bohai Bay, Pb concentrations and Pb isotopic compositions ( $^{204}\text{Pb}$ ,  $^{206}\text{Pb}$ ,  $^{207}\text{Pb}$ , and  $^{208}\text{Pb}$ ) of surface sediments in this area were determined. The Pb concentration in this bay varied widely from 6.9 to 39.2  $\mu\text{g/g}$  (average:  $21.8 \pm 7.8 \mu\text{g/g}$ ), and the Pb isotopic compositions ranged from 0.8338 to 0.8864 (average:  $2.0997 \pm 0.0180$ ) for  $^{208}\text{Pb}/^{206}\text{Pb}$  and from 2.0797 to 2.1531 (average:  $0.8477 \pm 0.0135$ ) for  $^{207}\text{Pb}/^{206}\text{Pb}$ , presenting in three distinct clusters. The Pb isotopic ratios of sediments from the northeastern (NE zone) and northwestern (NW zone) coastal areas were significantly influenced by anthropogenic sources such as coal combustion and automobile emission. In sediments from the central and southern Bohai Bay (C–S zone); however, Pb mainly originated from the Yellow River catchment, as a result of lithogenic sediment (from rock weathering) accumulation. The Pb isotopic ratios further indicate that, apart from riverine inputs, the neighboring large-scale ports and aerosols significantly contributed to the anthropogenic Pb contained in these sediments. Pb contamination in the Haihe and Luanhe river mouths as well as in the regions near ports is also suggested from anthropogenic enrichment factors. As cities and ports continue to develop around Bohai Bay, a long-term extensive sewage monitoring program is highly recommended.