

## **The use of Redox Sensitive Elements in revealing sedimentary history of spreading hypoxia off the Changjiang Estuary: applicability and possible limitations**

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Over the last few decades, substantial increasing of both extent and severity of coastal bottom water hypoxia have been documented, which heavily stroke the ecosystem health and related economic output. Hypoxia off the Changjiang Estuary is among the world's biggest seasonal coastal hypoxia areas. Redox sensitive elements (RSE) have been proved to be an effective tool to recovery the hypoxia history in its historical central area. Since modern observations have revealed it to be undergoing a waving spreading, it is necessary to re-evaluate the application of RSE in some atypical hypoxia area.

In March 2012, four sediment gravity cores E1-E4 were collected, make up a profile right pass through the historical central area of the hypoxic zone. RSE records were analyzed and compared with grain size composition, organic elements content, as well as observation data, to explore its applicability and possible limitations in rebuilding sedimentary history of the spreading Changjiang hypoxia area. Results show that:

(1) Affected by the terrestrial input, it's hard to recognize the expected relative enrichment of RSE in cores closer to the central hypoxia area. However, V and Mo show better correlation in E3 and E4, while Fe and Mn are more correlate in E1 and E2, which might offer a clue to the effect of different redox conditions.

(2) Among all four cores, only in E3 shows a significant upcore increase of excess RSE, which likely indicating the undergoing descending of DO at the central area of hypoxia. The lack of obvious trend in other cores could be occasioned by limitation of RSE proxies in reflecting less depleted oxygen condition.

(3) Relationships between RSE and TOC also show interesting phenomenon to be more correlated in E3. It could be resulted by either better preservation of organic matters under low-oxygen condition or promoted RSE enrichment by rich organic compounds.

Overall, the application of RSE in the Changjiang hypoxia zone might still be limited, other proxies should be combined to depict a more complete story.