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Abstract

By assessing U geochemistry as well as U isotopic composition in marine sediments of Toulon Bay, NW Mediterranean Sea, authigenic U accumulation was found to be tightly linked to that of Mo and V with slight differences in accumulation rate depending on sediment redox conditions. In sediments collected on a transect along a river plume, the authigenic accumulation of these redox-sensitive elements appears to be linked to sediment grain size which probably drives the redox status of the sediments. A typical U loss in re-oxidized sediments was observed in sediments that had been previously disturbed. However, the dissolved U profiles do not show a simple and typical depletion trend but rather a depletion in the top 10 cm followed by release in deeper pore waters that could be linked to a potential reoxidation/mobilization of authigenic U(IV). The released U could be further scavenged as a U-P precipitate.

The U isotopic data ($\delta^{238}\text{U}$), which are the first reported for the coastal hypoxic sediments of Toulon Bay, average $-0.12\pm 0.12\text{‰}$ in surface sediments. However, sediments situated in front of river mouths show higher values of $\delta^{238}\text{U}$ (up to $+0.75\text{‰}$); these high values are reported for the first time in sediments below an oxic water column.

Keywords

Uranium ; Coastal sediments ; Diagenesis ; Uranium isotope composition ; Redox-sensitive elements

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