

Miocene to Pliocene osmium isotopic record of Mediterranean sediments: new insights into the Messinian Salinity Crisis

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In the late Miocene the Mediterranean Sea experienced a salinity crisis and formation of thick sequences of evaporites precipitated across the basin (Messinian salinity crisis). In this presentation we briefly review the Messinian salinity crisis, and report Os isotopic ratio from drilled cores in the Mediterranean to investigate hydrological evolution in the Mediterranean Sea. Pliocene sediments at all sites show Os isotopic ratios close to that of the coeval ocean water. This indicates that the Mediterranean was connected to the North Atlantic. Evaporitic sediments deposited during the late Miocene however, have lower isotopic ratios than coeval ocean water values. Os isotopic ratios of the pre-evaporite sediments in the western Mediterranean are almost identical to that of the coeval ocean water. In contrast, equivalent sediments from the Florence Rise have significantly lower isotopic values. The offset of Mediterranean evaporite Os isotopic ratios is attributed to limited exchange with the North Atlantic during the Messinian Salinity Crisis. The source of unradiogenic Os is likely to be weathering of ultramafic rocks (ophiolites) cropping out in the Mediterranean's drainage basins. Our Os isotopic record, that suggests limited exchange of seawater between the North Atlantic and Mediterranean Sea, is consistent with the previous Sr isotopic records. The offset in the Os ratio on the eastern Mediterranean Sea is attributed either to limited water exchange between eastern and western Mediterranean, or to local effects associated with exhumation of ophiolites around the eastern Mediterranean Sea. In the presentation, we also introduce a drilling project entitled 'Uncovering a salt giant', that is proposed by an international scientific community.

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