Progressive molybdenum drawdown during Mediterranean sapropel deposition

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Molybdenum (Mo) and its isotopes represent one of the most commonly used proxies for the reconstruction of marine redox conditions from sedimentary archives. As such, it has a major impact on our understanding of long-term trends in ocean deoxygenation and its relation to changes in global climate and biogeochemical cycles. Here, we present new high-resolution Mo-isotope data from several intervals of deoxygenation in the eastern Mediterranean, so called sapropels. These sediments provide a unique opportunity to study the Mo-isotope response to the repeated development of low-oxygen conditions in the same basin, with detailed constraints on time and local environments. As a result, the data presented here for sapropels S2–S9 have an impact on the application of the Mo-isotope proxy further back in time, but also provide better constraints on the highly varying redox conditions of different sapropels. Near-quantitative removal (δ^{98}Mo > 2 ‰) for sapropels S5 and S7 suggest strongly euxinic conditions with long deep-water renewal times and the drawdown of Mo from the dissolved pool. The lowest δ^{98}Mo values are generally found for S3 and S9 (-0.4 to +0.2 ‰) implying better ventilation of deep waters and only mildly euxinic conditions.