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Assessing redox sensitive elements concentrations as deoxygenation proxies in sapropel layers: influence of bioturbation and sediment mixing

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The influence of bottom-water oxygenation on sapropel deposition has been thoroughly studied since sapropels represent exceptional examples of deoxygenation events linked to past climate changes. Most of the studies have used the concentration of redox sensitive trace metals (RSTMs) to assess the evolution and dynamics of past large-scale deoxygenations. Sapropel deposition is interrupted when reventilation oxygenates bottom-waters preventing the accumulation/preservation of organic matter (OM) and allowing macro and micro burrowing-organisms to repopulate and bioturbate the seafloor. Bioturbation is an important aspect to be considered when assessing RSTMs concentrations obtained from bulk sediment samples. Bioturbated sediments should be avoided during sampling for geochemical analyses, this is easy for big and visible traces, however it is difficult for small traces, as is the case of *Chondrites*. *Chondrites*-producers have an opportunistic behavior, being one of the first organisms to colonize the seafloor after an anoxic event, therefore they are very abundant in organic-rich sediments. Because of this behavior, *Chondrites*-producers can introduce great volumes of oxic sediments into anoxic sediments (enriched in OM and RSTMs). Consequently, the derived signal from bulk sediment geochemical analyses will have a mixed signature between *Chondrites* infill and host sediments. As a case study, this work assesses the influence of *Chondrites* on RSTMs enriched in sapropel S7 deposited ~195ka at Eratosthenes Seamount (Levantine Basin, Easter Mediterranean). ICP-OES, ICP-MS and Pyrolysis-Rockeval were used to obtain major and trace elements concentration and TOC content. Moreover, thin sections from resin embedded sediments were prepared for LA-ICP-MS analyses in order to compare the RSTMs concentration in the host sediments and *Chondrites*infills. After statistical analyses of the geochemical data and quantification of bioturbation using image treatments, the data supports that in most samples, the RSTMs are impoverished in *Chondrites* infill with respect to the host sediments. In some cases, *Chondrites* can determine a bioturbated area over 35% that can dilute between 10-20% the original concentration of a RSTM (e.g., Mo, U and V). Therefore, the assessment of the effects of *Chondrites* in the original concentration of RSTMs in organic-rich sediments that represent past deoxygenation events is of great relevance for paleoenvironmental/paleoceanographic studies.