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An osmium isotope record of continental weathering from the northern Tethys

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Silicate weathering acts as a negative feedback on carbon emissions (C removal) and oxidative weathering can release carbon from C-rich rocks weathering on land (C emission). Therefore, quantifying the magnitude of the weathering process through time, as well as separating and constraining these two weathering effects on the C-cycle, is an important goal for understanding the drivers of the geological carbon cycle. The flux of osmium (Os) into the oceans is strongly affected by the weathering of organic-rich sedimentary rocks, and thus this proxy may be a useful tool to assess oxidative weathering processes.

We present new radiogenic osmium (Os) and stable rhenium (Re) isotope datasets from the Sogno core, Lombardy Basin, N. Italy. This locality samples a deep pelagic sedimentary succession from the north-western Tethys, which includes the global carbon isotope excursion that defines the ‘Toarcian Oceanic Anoxic Event’ or the ‘Jenkyns Event’.

We use the new data to identify how the Os isotopic composition of the ocean evolved across the T-OAE in response to continental weathering fluxes, focusing specifically on the onset of the negative carbon isotope excursion interval which has been interpreted variably in terms of oxidative weathering pulses and silicate weathering.

We will show results across the onset and duration of the Early Toarcian Oceanic Anoxic Event and discuss how these data have potential to constrain oxidative carbon weathering at this time.