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A Toarcian Oceanic Anoxic Event record from an open-ocean setting in the northern margin of eastern Tethys: Implications for redox and weathering conditions

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The Toarcian Oceanic Anoxic Event (T-OAE, ~ 183 Ma), also known as Jenkyns Event, was one of the most important hyperthermal events of the Mesozoic, marked by a prominent negative carbon-isotope excursion (CIE) in both terrestrial and marine material. Although the T-OAE has been widely studied in the western Tethyan and Boreal regions, only relatively few investigations about the T-OAE have been conducted in other sites. Here we present new carbon-isotope, element geochemical and sedimentological data from a lower Toarcian open-marine section in the northern margin of eastern Tethys (Qiangtang Basin). This study section shows a negative CIE, which accords with other well-preserved sedimentary successions, and thus our data provide the evidence of the T-OAE from an open-marine setting in the northern margin of eastern Tethys. Elemental, mineralogical and sedimentological data indicate that mainly oxic bottom water conditions prevailed during the T-OAE interval in the section. Therefore, anoxia is not a significant feature of the T-OAE in the study area. Combined with previous studies, redox conditions in the bottom water show a clearly spatially variable and mainly depend on local conditions (e.g., water depth and basin hydrography). Sedimentological and geochemical analyses reveal an intensified chemical weathering and an increased coarse-grained detrital flux during the T-OAE, which is a regional response to global warming occurring in this interval.