

Trace metals in Jurassic sedimentary rocks from northern Bulgaria: depositional conditions, links to global events and oil-source correlations

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A gradual marine transgression over the Moesian Platform from the Early to Middle Jurassic resulted in deposition of inner shelf sediments at relatively shallow water depths [1]. Preliminary trace metal results for these sediments suggest a generally well-oxygenated depositional environment with evidence for periodically dysoxic or anoxic water column conditions [2]. A short-lived oxygen depletion event also characterizes the local expression of the early Toarcian ocean anoxic event (T-OAE), recorded in the Boukorovtsi Member of the Ozirovo Formation [3]. Periodic depletion of dissolved oxygen in the water column is also consistent with the presence of organic-rich (generally 1-2 wt% total organic carbon) Middle Jurassic shales of the Etropole Formation (Stefanets Member), which are the most likely source rocks for small but numerous oil and gas fields onshore in northern Bulgaria [e.g., 4].

Here, we build on our previous work [2] by presenting new major and trace element content data for selected Jurassic rocks from northern Bulgaria. Together with a summary of previously published geochemical data, we discuss these results in order to: 1) reconstruct the depositional conditions (water depth and water restriction, paleoredox and paleoproductivity, feeding province, etc.); 2) compare the chemical record of globally recognizable events in the Early and Middle Jurassic (e.g., T-OAE) in Bulgaria with similar records in coeval sediments elsewhere; and 3) evaluate the genetic relationships between the studied rocks and Bulgarian crude oils using preliminary metal content data for the oils.

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[3] Metodiev, L.S., Savov, I.P., Gröcke, D.R., Wignall, P.B., Newton, R.J., Andreeva, P.V. and Koleva-Rekalova, E.K., 2014. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 409, 98-113.

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