

## **Eocene – Oligocene Source Rock Organic Geochemistry, Micro-Facies, and Basin Connectivity in Paratethys**

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### **ABSTRACT**

Outcrops on the Belaya River, on the northern side of the Caucasus in south-west Russia, expose a Paleogene to early Neogene succession. This includes two organic rich units, the Kuma Formation (Eocene) and the Maykop Series (Oligocene – Early Miocene). It is the type locality for the latter. These units form potential and proven source rocks for regional hydrocarbon reserves and are excellent analogues for age-equivalent strata in the Black Sea. It is hypothesised that the preservation of organic matter in these units occurred due to the episodic restriction of the marginal sea in which they were deposited (Paratethys), as a result of the collision of Africa and Arabia with Eurasia. Detailed sedimentary logging and sampling (approximately every 50 cm) through 250 m of stratigraphy has been completed along the Belaya River. RockEval pyrolysis was conducted on the Eocene portion of these samples and combined with data previously obtained from the lower Oligocene part of the Maykop Series. The Kuma Formation is characterised by total organic carbon (TOC) values of 1-5.5% over approximately 43 m compared to values of between 1-3% in the Maykop Series throughout its lowermost 130 m. Detailed thin section analysis reveals a range of facies from calcareous laminated marls with abundant, well-preserved foraminifera (Kuma Formation), to dark heterogeneous mudstones with occasional lenses and sporadic very-fine to fine sand-sized quartz grains and fish remains (Maykop Series). Within the Kuma Formation, facies with dark fine-grained matrix interlaminated with concentrations of organic matter have higher TOC values than samples with a lighter matrix that lack organic-rich laminae. Strontium isotope analysis is ongoing to determine the connectivity of Paratethys during Early Cenozoic times. This will test the ‘restriction hypothesis’ for organic matter production in Paratethys. The characterisation of Black Sea organic-rich mudstones and the construction of a basin connectivity record will provide new insights, specifically, into the hydrocarbon prospectivity of the basin, as well as, more generally, into the processes and controls on source rock development in marginal marine settings in tectonically active regions.