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Jurassic to Early Cretaceous history of the obducted Mirdita ophiolites in Albania: new insights based on a Late Jurassic – Early Cretaceous sedimentary succession above the from Mali I Shejtit

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Component analyses of Jurassic mélanges, predominantly the ophiolitic mélanges and various Late Jurassic to Early Cretaceous orogenic sedimentary rocks associated with the obducted Mirdita ophiolites in Albania play a crucial role in the detailed reconstruction of the Late Jurassic to Early Cretaceous geodynamic history of the Albanides. Whereas the Middle-Late Jurassic (Bajocian to Oxfordian) obduction history of the Mirdita ophiolites with the subsequent evolution of the Kimmeridgian-Tithonian is fairly well understood there are still uncertainties and open questions regarding the latest Jurassic to earliest Cretaceous tectonic evolution of the Mirdita zone. In fact several mélange types can be distinguished: 1) intraoceanic ophiolitic mélanges, B) ophiolitic mélanges formed in the frame of ophiolite obduction with scrapped off blocks from the overthrust continental domain and/or mélanges first deposited in trench-like basins and later incorporated into the nappe stack, also containing continental blocks (sedimentary mélanges), and C) ophiolitic mélanges related to subsequent tectonic transport, e.g. formed in the frame of mountain uplift and unroofing. These mélanges show fluvial transported material at the base of their overthrust. These 3 types of mélanges show all transitions between intense sheared rock bodies to units with well preserved primary sedimentary structures. These ones are termed as “flysch”. Another type are sedimentary sequences with similar component spectrum and sedimentary features, but contain younger blocks, i.e. reworked material from carbonate platforms formed on top of the obducted ophiolites in a period of relative tectonic quiescence in the time span between active (west-directed) obduction and further west-directed transport in the frame of mountain uplift and unroofing.

Crucial for the reconstruction of this history is the understanding of the so-called ophiolitic Simoni mélange overlain by the Fierza flysch in central north Albania, which is related to the evolution of various carbonate platform evolutions (Kimmeridgian-Tithonian, Valanginian, Aptian) above the obducted ophiolites. In fact both types are still mixed because there is no detailed analysis of the mélanges. One key area is the Mali I Shejtit, where various ophiolitic mélanges, orogenic sedimentary successions, and shallow-water carbonates are preserved.

Here we describe for the first time a latest Jurassic to Valanginian sedimentary succession deposited above the Mirdita ophiolites with a fining-upward trend throughout the Berriasian-Valanginian. The succession starts with fluvial conglomerates with various subrounded to rounded ophiolite and radiolarite pebbles, and rare angular limestone clasts of the Kimmeridgian-Tithonian platform (Kurbnesh Carbonate Platform). Upsection follow conglomerates with increasing content of carbonate clasts. The age of the predominantly shallow-water limestone clasts is proven by various shallow-water organisms, i.e. calcareous algae and foraminifera. Reefal organisms are common. Calpionellids in the matrix improve an earliest Cretaceous age. Upsection a Middle-Upper Berriasian marl succession with limestone beds follows, in its upper part with intercalated turbidites of a newly evolving shallow-water carbonate platform (Munella Carbonate Platform). These carbonate turbidites in the marly succession with in cases moderately preserved ammonoids contain various age diagnostic calcareous algae and foraminifera pointing to a Valanginian age. In fact these sedimentary rocks deposited in underfilled or in parts newly formed foreland basins.

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