Goldschmidt 2022 Abstract
https://doi.org/10.46427/gold2022.12030

Stratigraphy, Geochronology, Geochemistry and Nd isotopes of the Late Ediacaran Ouarzazate group series from Eastern and Central Anti Atlas - (Morocco)

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In the Imiter mine area, the volcano-sedimentary series of the Ouarzazate Group consist mainly of rhyolitic to andesitic porphyritic lavas and their volcanoclastic equivalent. The Imiter Mine sequence (IMS), greater than 1600 m in thickness, is divided into four units. Unit 1 consists of a thick layer of massive conglomerates with well-rounded clasts of more than 50 cm in size and probably deposited in fluvial environment, generated by erosion and disintegration of the Saghro Group. Unit 2 is composed of variable proportions of tuffs and lapilli-rich mass flows deposited under predominantly lacustrine conditions, and thin feldspar-phyric andesite lavas. Unit 3 is dominantly composed of volcanic deposits containing a large number of volcanic blocks and bombs, deposited in a proximal environment. Andesite and dacite lava flows occur in several stratigraphic positions. Unit 4 corresponds to a new cycle of felsic and mafic effusive and explosive volcanism. The IMS is associated with a large mafic dyke swarm, sills and felsic intrusions. Laser ablation U–Pb zircon dating on three rhyolitic ignimbrites from the top of the unit 4, yielded an age of 570 ± 2 Ma, interpreted as the crystallization age, which represents the later volcanic activity in the IMS. In the Bou Azzer inlier in the central Anti-Atlas the coeval series yielded ages ranging from 555 ± 8 Ma, 590 ± 4. In the Imiter inlier, these volcanic rocks and the associated mafic dykes are metaluminous and display high-K calc-alkaline affinities. The related active-margin features reflect the characteristics of a magma source inherited from a previous subduction event, probably during the Panafrican events recorded in the Central Anti-Atlas. The volcanic rocks display negative εNd-565Ma (-0.18 to -4.91), whereas the associated mafic dykes display both positive and negative εNd-550Ma (-0.16 to +2.84). These values argue for a contribution of older crustal material in the genesis of the late Ediacaran magmatism of the Ouarzazate Group. This magmatism which covers the Anti-Atlas belt forms a silicic LIP developed during the postcollisional stage of the Panafrican event in the northwestern edge of the West African Craton.