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An approach to the geology and metallogeny of the Precambrian of Western Sahara

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Six main geological terranes limited by main regional faults can be distinguished in the Precambrian of Western Sahara: Mauritanides, Tasiast-Tijirit-Auserd, Layuad, Miyec-Ijlil, Sfariat, Bir Lehlou.

The Mauritanides domain is made up by metamorphic rocks of Precambrian age. In addition to BIF, they contain ophiolitic series with podiform chromite deposits with PGE and some saturated and undersaturated alkaline complexes and carbonatites with REE and Nb. They overthrust undeformed Paleozoic series.

The Tasiast-Tijirit-Auserd domain has Paleo and Mesoarchean rocks as migmatitic gneisses and BIF-bearing greenstone belts intruded by Mesoarchean calc-alkaline granites. The ensemble is crosscut by ultramafic dikes of Neoarchean age. Late Neoarchean deformation comprises folding and shearing NE-SW trending, followed by late emplacement of a LIP with a dense diabase network and Neoarchean alkaline subsaturated rocks at 2494 ± 15 Ma. These rocks are only slightly enriched in REE and Nb.

The Layuad domain has metamorphic rocks in granulite facies (Neoarchean?), crosscut by saturated and undersaturated alkaline rocks and carbonatites with REE-Nb mineralization (2494 ± 15 Ma).

The Miyec-Ijlil domain has a basement with ophiolitic and gneisses in granulite facies unconformably covered by a thick sequence of metasedimentary rocks of possible Paleoproterozoic age, containing thick BIF sequences and some IOCG deposits replacing carbonates.

The Sfariat domain has a basement with gneisses and greenstone belts affected by amphibolite facies metamorphism, in which the large stratiform ultramafic-mafic complex of Bir Malhat intruded. This complex carry stratiform deposits of chromite, PGE and Fe-Ti-V. The ensemble is unconformably covered by volcanic series of arch affinity affected by prehnite-pumpellyite facies metamorphism and intruded by late calcalkaline granitoids ($2064,9 \pm 13$ Ma). These materials are strongly affected by Proterozoic NW-SE trending shear zones, and crosscut by late N-S and NNW-SSE diabases.

The Bir Lehlou domain at the North is made up by Paleoproterozoic rocks of arch affinity, including quartzites, boninites, basalts and rhyolites affected by low-grade regional metamorphism and intruded by late calc-alkaline intrusives (2065 ± 13 Ma). Gold-bearing vein deposits of possible epithermal origin are associated with this episode. Late magmatism includes monzonitic rocks and finally undersaturated and saturated alkaline rocks, that can be enriched in REE, U, Th and Nb.

Orogenic gold deposits occur in the dense networks of Archean and Proterozoic regional shear zones cutting all these domains, in some cases in the listwänites produced by replacement of ultramafic rocks. Listwänites in the Zug complex are also enriched in PGE.

