

## **The Ouarzazate Supergroup volcanic successions in the Anti-Atlas (Morocco): Evidence for three successive eruptive cycles.**

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The Ouarzazate supergroup covered a gigantic area of  $\sim 2 \times 10^6$  km<sup>2</sup>, with an estimated magma volume of  $\sim 1 \times 10^6$  km<sup>3</sup> and volcanic thicknesses more than 2000 m. The most-complete and best-preserved sequences of these volcanic successions of the Ouarzazate supergroup are in the Ouarzazate-Siroua-Bou Azzer regions. The Ouarzazate supergroup is subdivided into three successive eruptive cycles or tectonostratigraphic units separated by internal unconformities (i) The lower unit or first eruptive cycle (617–580 Ma; mainly ca. 580 Ma above an unconformity), up to 1500 m, is composed of synextensional calc-alkaline series (basalts, andesites, dacites, hybrid lavas, and rhyolitic ignimbrites) with volcanological characteristics typical of a continental stratovolcanofacies model, based on the volcanologic facies models of Cas and Wright (1988). Calderas with huge volumes of pyroclastic flow deposits (ignimbrites), and ash falls that cover large areas are common; (ii) The intermediate unit or second eruptive cycle (579–570 Ma), up to 500 m, occurs as a volcanic pile of tholeiitic basaltic flows and basaltic andesite lavas flows associated with continental (fluvial/lacustrine) detritic/stromatolitic deposits. Their volcanological characteristics are compatible with the facies model of continental basaltic successions (continental flood basalts) of Cas and Wright (1988); (iii) The upper unit or third eruptive cycle (555–542 Ma), up to 500 m, is represented by alkaline rhyolites, ignimbrites, lava flows, and domes. The volcanological characteristics are similar to continental silicic volcanoes according to the model facies of Cas and Wright (1988).