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High-precision U-Pb zircon geochronology of the Oued Dar'a Caldera supereruptions (Ouarzazate Supergroup, Saghro Massif, Anti-Atlas, Morocco).

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The Oued Dar'a Caldera is a large rectangular-shaped volcanic structure that is filled with a uniform section of crystal-rich to very crystal-rich, quartz-rich, biotite-bearing, moderately to densely welded, ash-flow tuff of rhyolite composition (Walsh et al., 2012). The caldera is ~11 km wide and 18 km long, elongated in a northeast direction along the predominant structural trend of the region. It is bound on the northwest and southeast by major strike-slip faults. The Oued Dar'a caldera was developed in a pull-apart graben produced by a left step in a northeast-trending, left-lateral, strike-slip fault zone. Rhyolitic volcanic rocks in the Lower Ouarzazate Supergroup, including ash-flow tuffs of the Oued Dar'a Caldera, previously yielded SHRIMP U-Pb ages between 574 ± 7 Ma (caldera fill) and 571 ± 5 Ma (outflow facies; Walsh et al., 2012). We here provide the first high-precision ID-TIMS U-Pb zircon ages of volcanic rocks collected from the Oued Dar'a caldera volcanic succession. The obtained ages (563.69 ± 0.051 to 564 ± 0.045 Ma Ma) suggest that the Caldera fill is ~10 million years younger than the indicated by previous SHRIMP zircon ages. The miarolitic rhyolites that are stratigraphically located at the top of the volcanic pile of the Ouarzazate Supergroup are slightly younger than the caldera fill and could be contemporaneous with the emplacement of the Caldera. Our data further require that the age of an angular unconformity between the Lower and Upper Ouarzazate supergroup is older than 564 Ma. All these new ages can be correlated with the Central Iapetus Magmatic Province (CIMP) LIP record of the West African Craton.

References

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