



Lower Devonian paleomagnetic dating of a large mafic sill along the western border of the Murzuq cratonic basin (Saharan metacraton, SE Algeria).

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The Murzuq basin located in central North Africa, in Algeria, Libya and Niger is a key area, delineating a relictual cratonic area within the Saharan metacraton (Liégeois et al., 2013). On its western border, we discovered a very large sill ("Arrikine" sill), with a thickness up to 250m and a minimum length of 35 km. It is made of mafic rocks and is interbedded within the Silurian sediments of the Tassilis series. In the vicinity, the only known post-Pan-African magmatism is the Cenozoic volcanism in the In Ezzane area. Further south in Niger, also along the SW border of the Murzuq basin, large Paleozoic dolerite (Carte géologique du Sahara central, 1962) are probably related to the "Arrikine" sill magmatism, as they are in the same stratigraphical position. Several hundred kilometers westward and southwestward of Arrikine, Paleozoic magmatic products are known: Carboniferous basic intrusives (346 Ma; Djellit et al., 2006) are located in the Tin Serririne basin and Devonian ring complexes (407 Ma; Moreau et al, 1994) in the Air Mountains. For the Arrikine sill, K/Ar data gave a rejuvenation age (326 Ma) related to a K-rich aplitic phase and the LA-ICP-MS U-Pb method on zircon showed that only inherited zircons are present (0.6 to 0.7, 2.0 and 2.7 Ga ages), pointing to ages from the underlying basement corresponding to the Murzuq craton covered by Pan-African sediments (Derder et al., 2016). By contrast, a well-defined paleomagnetic pole yielded an age of 410-400 Ma by comparison with the Gondwana Apparent Polar Wander Path (APWP). This age, similar to that reported for the Air complexes (Moreau et al., 1994), can be correlated with the deep phreatic eruption before Pragian time thought to be at the origin of sand injections, which gave circular structures observed on different borders of the Murzuq basin (Moreau et al., 2012). This Lower Devonian magmatism had therefore a regional extension and can be related to a "Caledonian" transtensive reactivation of the western metacratonic boundary of the Murzuq craton related to distant events along the northern Gondwana margin.

References

- Carte géologique du Sahara central, from "carte géologique du nord ouest de l'Afrique", Centre National de la Recherche Scientifique (CNRS) edition, 1/2.000.000, 1962.
- Derder M.E.M., Maouche S., Liégeois J.P., Henry B., Amenna M., Ouabadi A., Bellon H., Bruguier O., Bayou B., Bestandji R., Nouar O., Bouabdallah H., Ayache M., Beddiaf M., 2016. *Journal of African Earth Sciences* 115, 159-176
- Djellit, H., Bellon, H., Ouabadi, A., Derder, M.E.M., Henry, B., Bayou, B., Khaldi, A., Baziz, K., Merahi, M.K., 2006. *Comptes Rendus Geosciences*. 338, 624-631.
- Liégeois, J.P., Abdelsalam, M.G., Ennih, N., Ouabadi, A., 2013. *Gondwana Research*, 23, 220-237
- Moreau, C., Demaiffe, D., Bellion, Y. and Boullier, A.M., 1994. *Tectonophysics*, 234, 129-146.
- Moreau, J., Ghienne, J.F., Hurst, A., 2012. *Sedimentology*, 59: 1321-1344.