

Paleogeographic evolution of the late Neoproterozoic and early Phanerozoic with new paleomagnetic constraints from West African Craton

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The paleogeographic evolution of the late Neoproterozoic and early Phanerozoic is dominated by the dispersion of Rodinia and the assembly of Gondwana. The timing of these two episodes is still highly debated, partly due to discordant paleomagnetic data which imply rapid polar wander between 600 and 550Ma in several continents. In order to better constrain the paleogeography for this epoch, we bring new paleomagnetic data on volcanic series from the West African Craton (WAC), which is a key block to understand the evolution of these two supercontinents. We conducted a paleomagnetic study on pyroclastic and lava flows dated by SHRIMP U-Pb method on zircon from the groups of Ouarzazate (upper Ediacaran) and Taroudannt (lower Cambrian) in the Anti-Atlas (Morocco). Three components of magnetization were thermally isolated, mainly carried by minerals of the titanohematite family, magnetite contributing sometimes to the magnetization. The group A, of shallow inclination and south-east declination is mainly observed in the Ouarzazate group. This direction is interpreted as a Permo-Carboniferous remagnetization. The B and C components are observed at two distinct stratigraphic levels : the former at the base of the Ouarzazate group (572-570Ma) and the latter at intermediate and top levels of the Ouarzazate group and in the Taroudannt group (565-530Ma). Both consist of dual-polarity directions supported by positive fold tests and may represent the characteristic magnetizations. The calculated poles are separated by around 100° which imply rapid polar wander between 615 and 565Ma in the apparent polar wander path (APWP) of WAC similar to what is observed in data from other continents. We will discuss this global feature and address the existence of True Polar Wander episodes or perturbations of the Earth magnetic field during the Ediacaran. The tectonic implications will be examined as well.