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Is the Nubia plate rigid or divided into sub-plates? Insights from geodetic data and the seismotectonic map of Africa

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Numerous geodetic studies have been carried out in recent years to characterize the kinematics of the African plate. Previous geodynamic and tectonic studies first led to the separation of the Africa plate into 2 plates, namely the Nubia plate to the west of the East African rift and the Somalia plate to the east. The subsequent densification of GPS data around the rift and related eastern tectonic blocks made it possible to subdivide the Somalia plate into several sub-plates (Somalia, Victoria, Rovuma and Lwandle). Nowadays, the density and quality of GPS data on the Nubia plate allows us to question its rigidity. Indeed, the recent seismotectonic map of Africa (*Meghraoui et al., 2016) shows that major tectonic structures with and/or volcanic lines (e.g., Okavango, Cameroun) display significant seismicity and present-day active deformation. Can this seismicity be related to sub-plates boundaries within the Nubia plate? Using a GPS data synthesis and geodynamic analysis, we here question the possibility of defining 3 sub-blocks: i.e. the West Africa block, the Equatorial-central Africa block and the Southern Africa block. The African plate is characterized by geological shield structures made of basement rocks (Proterozoic and Palaeozoic) where the seismotectonic activity and active deformation (inferred from GPS velocities) promote the sub-division and dislocation of the presumably rigid Nubia.

* Meghraoui, M., P. Amponsah, A. Ayadi, A. Ayele, B. Ateba, A. Bensuleman, D. Delvaux; M. El Gabry, R.-M. Fernandes, V. Midzi, M. Roos, Y. Timoulali, 2016, The Seismotectonic Map of Africa, Episodes Vol. 39, no. 1, DOI:10.18814/epiiugs/2016/v39i1/89232