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Decoupling between Europe and Siberia since the Cretaceous: Evidence from paleomagnetism and geochronology of Meso-Cenozoic effusive formations from Siberia and Mongolia

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In order to better understand and unravel the complex tectonic evolution of Central Asia under the influence of the India-Asia collision, we held paleomagnetic and geochronologic studies of $\sim$2200 specimens from 311 sites from Amuria Block in Mongolia and in the vicinity of the Mongol-Okhotsk geosuture, and from Siberia Block. Samples were collected from Mesozoic to Late Cenozoic effusive formations. Rock magnetism experiments, stepwise thermal and alternating field (AF) demagnetizations, together with some new geochronological dating, allowed us to determine 4 Jurassic, 7 Cretaceous and 6 Tertiary new paleopoles. The analysis of these poles, together with coeval poles from Asia allows us to draw the following conclusions. Amuria Block, together with North China and South China Blocks were rigidly attached to Siberia since at least Late Jurassic-Early Cretaceous, after the closure of the Mongol-Okhotsk Ocean. This mosaic of continental blocks did not suffer any discernable relative latitudinal motion since at least the end of Paleocene. In contrast, our Tertiary poles and previously published coeval poles obtained on both sedimentary and effusive formations are systematically far-sided with respect to the poles from the reference apparent polar wander path (APWP) for Europe, from at least the late Eocene to the early Miocene. In the hypothesis of a dipolar magnetic field in the Tertiary, this

suggests a $\sim$1000-1500 km position of Siberia craton and Amuria block further south than expected at 40 and 30 Ma. This implies decoupling and relative rotations between western and eastern parts of Eurasia plate between the Late Eocene and Present. We finally show that, if Siberia was located more to the south, the $\sim 15^{\circ}$-20° paleolatitude anomaly generally observed in sedimentary formations from Central Asia reduces to a more reasonable average value of $\sim 7^{\circ}$, which could result from the superimposition of shallowing mechanisms due to sedimentary processes, and northward motion of Asian blocks under the effect of ongoing penetration of India into Eurasia in the Tertiary.