



New Tertiary paleomagnetic poles from Mongolia and Siberia: Implications on rigid or non-rigid Eurasian plate

F. Hankard (1), J.-P. Cogné (1), V. Kravchinsky (2), L. Carporzen (1),

P. Lklagvadorj (3), A. Bayasgalan (3), G. Badarch (3); S. Rasskazov (4)

(1) Laboratoire de Paléomagnétisme, Institut de Physique du Globe de Paris & Université de Paris 7, France

(2) Physics Department, University of Alberta, Edmonton, AB, T6G2J1, Canada

(3) Mongolian University of Science and Technology, Ulaan Baatar, Mongolia

(4) East Siberian Branch of the Russian Academy of Science, Irkutsk, Russia

hankard@ipgp.jussieu.fr

The configuration of Central Asia has been drastically modified since the Tertiary India-Asia collision. Based on Cretaceous data, paleomagnetism has proven to be a powerful tool in depicting the relative movements between the continental blocks constituting the Asian Mosaic. It has been therefore possible to propose a paleogeographic reconstruction of this region prior to the collision. However, a problem arises with Tertiary data from Central Asia, for which the paleomagnetic inclinations are systematically lower than those predicted by the reference apparent polar wander path (APWP) of Eurasia. In order to better understand this problem, we carried out a paleomagnetic study on Tertiary basalts from Mongolia and Siberia, far from the India-Asia collision front. We present new paleomagnetic results obtained from 37 sampling sites (272 cores) from Tertiary basaltic and trachy-basaltic lava flows collected in 1999 and in 2004 in Taatsyn Gol (TG) region (Mongolia, 45.3°N, 101.1°E) and 14 sampling sites (115 cores) in the Ust Bokson area (Siberia, 52.1°N, 100.3°E).

Classical paleomagnetic methods allowed us to calculate three new Mongolian and Siberian Tertiary paleopoles. These poles lie at $\lambda=74.3^\circ\text{N}$, $\phi=161.0^\circ\text{E}$,

dp/dm=14.4/17.1 at 13 Ma, $\lambda=78.0^\circ\text{N}$, $\phi=194.6^\circ\text{E}$, dp/dm=9.7/11.7 at 20 Ma and, $\lambda=83.7^\circ\text{N}$, $\phi=271.3^\circ\text{E}$, dp/dm=3.7/5.0 at 30 Ma.

Whereas the poles at 13 and 20 Ma are fairly consistent with those of the reference APWP for Eurasia (Besse and Courtillot, 2002), the 30 Ma pole appears far-sided with respect to the corresponding reference pole. The discrepancy amounts to $9.8^\circ \pm 4.2^\circ$ in paleolatitude, which would imply a post Oligocene (30 Ma) convergence of more than 500 km between Mongolia and Siberia. This is unrealistic, as there is no deformed zone north of Mongolia that could have absorbed such motion. Another way to explain this discrepancy is to suppose that Siberia was not at the position predicted by the reference APWP. We therefore propose that Siberia was located about 1000 km south of the predicted position. As the APWP is valid and supported by a large set of data for Europe, a decoupling is needed between eastern and western parts of Eurasia. This decoupling could be achieved either in discrete zones (Urals, Tornquist. . .) or by diffuse deformation throughout the plate. In order to test for this hypothesis, we have performed a new sampling of 34 sites (282 cores) of 47 Ma volcanic rocks from the foothills of the Arts Bogd Range (Mongolia, 44.3°N , 102.2°E) in the summer of 2004; the first results from this new collection will be added to our Tertiary paleogeographic reconstruction of this region.