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Positioning the Southern Margin of Asia Prior to Its Collision with India: Paleomagnetic Constraints from Late Cretaceous Dykes in Gangdise Belt

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1 Abstract

The pre-collisional southern margin of Asia can be restored using paleomagnetic data from late Cretaceous rocks from the Lhasa terrane. However, the available data are based either on the red beds or on the intercalated thin layers of lava flows, both of which had been involved in strongly folding. Recent studies show clear evidence for the possibility of serious overprint hence the data could not be reliably used for tectonic interpretation. We report paleomagnetic data from diorite dykes and the grano-diorite country rock in the Gandise belt near the city of Lhasa. U–Pb isotopic dating indicates the intrusive rocks have an age of ~82–86 Ma. Fifteen sites yield acceptable ChRM directions which pass a reversal test. SEM and light microscope observations show primary

intergrowth relationship between magnetite and other minerals within the thin sections. AMS measurement defines a primary magma flow fabric for the intruded dykes and the country rocks. All the characteristics support that the ChRMs are primary. The paleomagnetic pole calculated from the remanence of the dykes and the country rocks yields a paleolatitude of ~14°N which provide a reliable constraint for the southern margin of Asia near Lhasa. Furthermore, the recorded declination shows significant counterclockwise rotation of ~20° for the sampling location relative to the north. In consideration of the strike and tectonic setting of the dykes, the strike of the southern margin of Asia is restored which is compatible with the hypothesis of a quasi-linear margin of Eurasia prior to its collision with India.

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