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Paleolatitude and age of the Indo-Asia collision

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Tibetan plateau uplift is thought to have major repercussions on Asian paleoenvironments as well as global climate. However, its timing remain elusive due to ongoing controversies on the kinematics of the Indo-Asia collision. This can be solved by paleomagnetically-determined paleolatitudes of terranes bounding the Indo-Asia suture zone. We show here, based on new paleomagnetic data from the Linzizong volcanic rocks (54-47 Ma) near the city of Lhasa, that the latitude of the southern margin of Asia was 19.5 +/- 5.0 N when these rocks were deposited. This implies, when compared to a review of regional paleomagnetic datasets, that the onset of collision occurred ca. 48 Ma (95% confidence interval between 57 Ma and 40 Ma), thus excluding the possibility of a younger ($\sim$35 Ma) collision. These results are consistent with tomographic anomalies locating the collision at 15-25 N, and with independent 56-46 Ma collision age estimates inferred from the timing of slowing down of India, high pressure metamorphism, the end of marine sedimentation and the first occurrence of Asian detritus on the Indian margin. Our results imply 3300 +/- 600 km subsequent latitudinal convergence between India and Asia divided into 1500 +/- 600 km within Asia and 1800 +/- 700 km within India.