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Constraining timing of Late Cretaceous-Early Cenozoic deformation of the Qiangtang terrane (Eastern Tibet) by magnetostratigraphy of the Gonjo Basin

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The poorly dated Gonjo (or Gongjue) Basin, located on the intensely deformed Qiangtang terrane of Tibet where it curves around the Eastern Himalaya Syntaxis, preserves a >3000 m thick terrestrial sedimentary sequence that formed during regional crustal shortening. Here, we present a high-resolution magnetostratigraphy, revealing a 69-41.5 Ma age range, providing robust timing of Late Cretaceous to Eocene shortening in central Tibet. Paleomagnetic declinations moreover show that the Gonjo Basin experienced ∼30° clockwise rotation since 52 Ma, consistent with models predicting bending of the Qiangtang terrane associated with shearing along the stable South China Block during Tibetan shortening. Our new age results reveal that the Gonjo Basin correlate with the Hoh Xil Basin in that it underwent a major increase in sedimentation rate, first at 69 Ma, then at 52 Ma, likely indicating enhanced shortening rates during these times. Interestingly, these time periods coincide with the rapid acceleration and deceleration of India-Asia convergence, respectively. We tentatively ascribe the 69 Ma event to increased friction driven by rapid Indian plate subduction resulting from a push force in the Indian ocean. The increase of sedimentation rate at 52 Ma coincides with the dramatically slowdown of India, suggesting that the deceleration corresponds to enhanced friction at the India-Asia plate contact, causing Tibetan shortening. We will discuss subduction scenarios that may explain the delay between ∼52 Ma Tibetan shortening and recent India-Asia collision estimates of ∼58 Ma.