Eocene subduction erosion and crustal relamination in the Gangdese belt, South Tibet

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Crustal relamination probably plays an important role in refinement of the continental crust, but it has not been well tested. The discrepancy of isotopic composition between the pre- and syn-collision magmatic rocks from the Gangdese belt in south Tibet provide an opportunity to test the crustal relamination model. The Confluence hornblende gabbros and Nyingchi granites from the eastern Gangdese belt formed at ca. 50 Ma after the India-Asian collision. The Nyingchi granites have high Sr/Y and $(Dy/Yb)_N$ ratios and enriched Sr-Nd-Pb-Hf isotopic compositions, which are different with those of the pre-collision granites. We propose that the Nyingchi granites were derived from partial melting of the relaminated crustal materials which were eroded from the upper Gangdese belt. The Confluence hornblende gabbros display arc-like trace element patterns. The Sr-Nd-Pb-Hf isotopic composition suggest that the Confluence gabbro sourced from enriched lithospheric mantle which was metasomatized by relaminated crustal materials from the upper Gangdese belt by suduction erosion and subducted Indian continent. The Eocene magmatism in the eastern Gangdese belt probably was related to the breakoff of the Neo-Tethyan oceanic slab after the India-Asian collision. Our results suggest that crustal materials can relaminate through subduction erosion and continental suduction during the continental collision.