Geochronology of leucogranites in Chomolungma area, Southern Tibet

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South Tibetan detachment system and leucogranites

The Rongbuk Valley on the north side of Chomolungma is a critical location to establish the timing and duration of movement along the ductile strand of the South Tibetan detachment system (STDS) [1, 2]. Leucogranites are present within the Qomolangma detachment zone in the footwall of the STDS at Rongbuk Valley [3]. Dating the timing of movement STDS relies on precise geochronology of leucogranite melts are either deformed by or cross-cut STDS-related fabrics [2].

Monazites from difference generations of leucogranites in Rongbuk Valley were dated by LA-ICPMS. The monazites from a deformed leucogranite sill yields Th-Pb age of 24.1±0.3 Ma. In contrast, the age of undeformed leucogranite dike is 16.1±0.2 Ma. We interpret the ~24- and 16-Ma ages to record two discrete periods of melt crystallization.

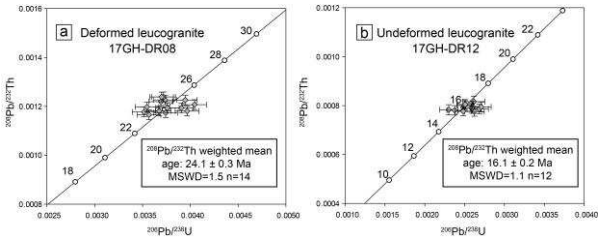

Figure 1 Monazite U-Th-Pb ages for the leucogranites

Discussion of Results

The earliest leucogranite sills in the Rongbuk Valley have been folded and deformed. The younger generation of undeformed granite dikes cuts across deformed granite sills and the shear zone foliation. On the basis of geologic relationships between variably deformed nature of the leucogranite sills and dikes and the Th-Pb ages, we conclude that the Qomolangma detachment was active before ~24 Ma. Along the top of the Greater Himalayan slab, ductile shearing lasted until 16.4 Ma [2], after which the last leucogranite dikes were intruded at 16.1-15.4 Ma [2, 3].

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[1] Murphy & Harrison (1999) *Geology* **27**, 831-834. [2] Cottle *et al.* (2015) *Lithos* **227,** 94-106. [3] Searle *et al.* (2003) *J. Geol. Soc. London* **160,** 345-366.