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Tectonic evolution of the central Higher Himalayan Crystallines in the Kharta area, southern Tibet: New constraints from petrologic and geochronological data

Y. Liu 1, W. Siebel 2, H.-J. Massonne 3, X. Xiao 1

(1) Institute of Geology, Chinese Academy of Geological Sciences, Beijing, 10037, China (yanliu0315@yahoo.com.cn / Fax: 0086-10-68997803 / Phone: 0086-10-68999711), (2) Department of Geosciences, 72074 Tübingen, Germany, (3) Institut für Mineralogie und Kristallchemie, Universität Stuttgart, Azenbergstr. 18, D-70174 Stuttgart, Germany

Within the Kharta area, east of Mt. Qomolangma (Everest), garnet sillimanite gneisses and granites including overprinted eclogite lenses were displaced beneath the North Col Formation by a ductile normal fault (STD1) and above the upper Lesser Himalayan Crystallines by a ductile thrust (MCT1). Zircons from the overprinted eclogite lenses which are interpreted as former dikes were dated by the TIMS method. All samples plot close to a discordia line with Neoproterozoic upper intercept ages of about 970 Ma, suggesting a late Proterozoic age for emplacement of the dikes. Zircon SHRIMP analyses show that the garnet sillimanite gneisses and granites were derived from Pan-African acidic rocks produced by partial melting of Neoproterozoic sediments. Monazites from two granite bodies beneath the STD1 give very similar crystallization ages between 12-13 Ma, whereas monazites from a sample of highly sheared sillimanite gneisses beneath the MCT1 give a lower-intercept age of 13.4$\pm$1 Ma, suggesting that the MCT1 and the STD1 were active contemporaneously. Our data show that the Pan-African acidic rocks with Neoproterozoic mafic inclusions were subducted to form eclogite and HP metapelitic rocks first, and then experienced high-T and intermediate-P metamorphism to be converted into garnet sillimanite gneisses and overprinted eclogite lenses at about 33 Ma below south Tibet. At around 13 Ma, these rocks were exhumed southwards to shallow depth probably by ductile channel flow between the MCT1 and the STD1. Finally, they underwent N-S trending folding after 13 Ma.