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## Metamorphism and geochronology of the exhumed Himalayan midcrust, Likhu Khola region, east-central Nepal: Recognition of a tectonometamorphic discontinuity

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### Geochronologic Methods

The monazite grains were dated using a split stream LA-MC-ICP-MS system at the University of Santa Barbara, California (UCSB) that collects U-Th-Pb ratios for geochronology and trace element data concurrently. The system consists of a Nu Plasma MC-ICP-MA (Nu Instruments, Wrexham, UK) and a 193nm ArF laser-ablation system equipped with a two-volume “HeEx” ablation cell that facilitates rapid transfer and washout of ablated material (Photon Machines, San Diego, USA). Analytical protocol is similar to that described by Cottle et al. (2009a, 2009b, 2011) with the modification that the collector arrangement on the Nu Plasma at UCSB allows for simultaneous determination of <sup>232</sup>Th and <sup>238</sup>U on highmass side Faraday cups equipped with 1011 ohm resistors and <sup>208</sup>Pb, <sup>207</sup>Pb, <sup>206</sup>Pb, and <sup>204</sup>Pb on four low-mass side ETP discrete dynode secondary electron multipliers. U-Th-Pb analyses were conducted for 30s each using spot diameters ranging from 7 to 20  $\mu$ m in diameter, a frequency of 3 Hz, and 0.75 J/cm<sup>2</sup> fluence (equating to crater depths of  $\sim$ 7–8  $\mu$ m). U-Th-Pb data from five samples were collected over four analytical sessions. A primary reference material, “Managotry” monazite (554 Ma Pb/U isotope dilution–thermal ionization mass spectrometry [ID-TIMS] age; Paquette et al., 1994), was employed to monitor and correct for mass bias, as well as Pb/U and Pb/Th down-hole fractionation. To monitor data accuracy, two secondary reference monazites “FC-1” (55.7 Ma Pb/U ID-TIMS age; Horstwood et al., 2003) and “44096” (424 Ma Pb/U ID-TIMS age; Aleinikoff et al., 2006) were analyzed concurrently (once every 3–5 unknowns) and mass bias– and fractionation-corrected based on measured isotopic ratios of the primary reference material. During the analytical period, repeat analyses of FC-1 gave a weighted mean <sup>206</sup>Pb/<sup>238</sup>U age of  $54.9 \pm 0.4$  Ma, mean square of weighted deviates (MSWD) = 0.9, and a weighted mean <sup>208</sup>Pb/<sup>232</sup>Th age of  $57.2 \pm 0.5$  Ma, MSWD = 1.4 (2 $\sigma$ ). Data reduction was performed with IgorPro and Iolite software at UCSB. All uncertainties are quoted at 2 $\sigma$  and include contributions from the external reproducibility of the primary reference material for the <sup>207</sup>Pb/<sup>206</sup>Pb, <sup>206</sup>Pb/<sup>238</sup>U, and <sup>208</sup>Pb/<sup>232</sup>Th ratios.