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Gibson, R., Godin, L., Kellett, D.A., Cottle, J.M., and Archibald, D., 2016, Diachronous deformation along the base of the Himalayan metamorphic core, central-west Nepal: GSA Bulletin, doi:10.1130/B31328.1.

ADDITIONAL DATA REPOSITORY FILES:

GEOCHRONOLOGY

METHODS Monazite

Geochronology Methods

For the U-Th/Pb data, a primary reference material, **"**44096**"** (424 Ma Pb/U isotope dilution-thermal ionization mass spectrometry age; Aleinikoff et al., 2006) was employed to monitor and correct for mass bias as well as Pb/U and Pb/Th downhole fractionation. To monitor data accuracy, a secondary reference monazite "Manangotry" (552.9 Ma $^{206}Pb/^{238}U$, 554 Ma $^{207}Pb/^{206}Pb$ ID-TIMS dates; Horstwood et al., 2003) was analyzed concurrently (once every five unknowns) and mass bias- and fractionation-corrected based on measured isotopic ratios of the primary reference material. During the analytical period, repeat analyses of Manangotry gave a weighted mean $^{206}Pb/^{238}U$ date of 562 ± 3 Ma, mean square weighted deviation (MSWD) = 1.1, and a weighted mean $^{208}Pb/^{232}Th$ date of 525 ± 3 Ma, MSWD = 0.8 (2σ) (n = 21). Repeat analyses of FC-1 (55.7 Ma $^{206}Pb/^{238}U$ ID-TIMS age; Horstwood et al., 2003) gave a weighted mean $^{206}Pb/^{238}U$ date of 55.9 ± 0.1 Ma, mean square weighted deviation (MSWD) = 1.0, and a weighted mean $^{208}Pb/^{232}Th$ date of 54.9 ± 0.2 Ma, MSWD = 0.8 (2σ) (n = 32). All uncertainties are quoted at 2σ and include contributions from the external reproducibility of the primary reference material for the $^{207}Pb/^{206}Pb$, $^{206}Pb/^{238}U$, and $^{208}Pb/^{232}Th$ ratios.

Muscovite $^{40}Ar/^{39}Ar$ Geochronology Methods

Muscovite mineral separates were obtained by hand-crushing samples and hand-picking grains clear of inclusions and alteration under a binocular microscope. Muscovite separates were wrapped in aluminum foil, irradiated, and analyzed.

Five samples (SETK-05, MSY-03, MARK-07, MADK-12, MSY-08) from the Annapurna foothills were analyzed at the Geological Survey of Canada, Ottawa, Ontario using the procedure of Kellett and Joyce (2014). Mineral separates and Fish Canyon sanidine flux monitor ($^{40}Ar/^{39}Ar$ date of 28.305 ± 0.036 Ma; Renne et al., 2010) were irradiated with batch GSC Rad. #67 in an aluminum canister with fast neutrons in medium flux position 8B for 63.7 h at the McMaster Nuclear Reactor, Hamilton, Ontario. Multi-grain aliquots of muscovite grains were step-heated with a Photon Machines Inc. Fusion 10.6 55W CO_2 laser with homogenizer lens. Released gas was cleaned by getters for 4 min and analyzed over 10 min using a Nu Instruments Noblesse multicollector mass spectrometer. ^{40}Ar, ^{39}Ar, ^{38}Ar, ^{37}Ar and ^{36}Ar isotope values were extrapolated to zero time. Atmospheric $^{40}Ar/^{36}Ar$ analyses were conducted every 10 steps to monitor mass fractionation of Ar isotopes and the relative efficiency of the different detectors. Blank runs were conducted every 4 steps and values were subtracted from the proceeding sample gas values. Corrections were made for radioactive decay and neutron-induced isotopes. These corrections, along with age calculations and error propagation, were performed with Mass Spec 7.93 software (Deino, 2001). Plots and final age calculations were prepared using Isoplot 3.75 (Ludwig, 2012).

An additional three samples (CHB-16, BHE-01, CHB-05) from lower Dolpo were analyzed at Queen's University, Kingston, Ontario. Mineral separates with flux monitor MAC-83 biotite ($^{40}Ar/^{39}Ar$ date of 24.60 Ma referenced to Fish Canyon sanidine at 28.305 ± 0.036 Ma; Sandeman et al., 1999; Renne et al., 2010) were irradiated for 24 h with fast neutrons in medium flux position 8B at the McMaster Nuclear Reactor in Hamilton, Ontario. Samples were heated using a 30 W New Wave Research MIR 10–30 CO_2 laser with a faceted lens. Released gas was cleaned by getters for 5 min and analyzed over 10 min using a MAP 216 mass spectrometer. Atmospheric $^{40}Ar/^{36}Ar$ analyses were conducted to monitor mass fractionation of Ar isotopes. Blanks were run before every aliquot and values were subtracted from the sample gas values. Corrections were made for radioactive decay and for neutron-induced isotopes. Dates and errors were calculated using the method of Dalrymple et al. (1981) and constants of Min et al. (2000). Plots were prepared using Isoplot v. 3.75 (Ludwig, 2012).

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