T25B-06 Kinematic Evolution of the Tangra Yumco Rift, South-Central Tibet

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16:43 - 16:53

S102ab (South, Level 1, McCormick Place)

Abstract

We interpret the kinematics of the Tangra Yumco (TYC) rift by evaluating spatiotemporal trends in fault displacement, extension onset, and exhumation rates. We present new geologic mapping, U-Pb geochronology, zircon (U-Th)/He (ZHe) thermochronology, and HeFTy thermal modeling results that are critical to testing dynamic models of extension in Tibet. The TYC rift is bounded by two NNE striking (~N10°E-N35°E) high angle (~45-70°) active normal faults that alternate dominance along strike. Footwall granodiorites show foliation, slip lineation, and fault plane striation measurements indicative of northeast directed oblique sinistral-normal slip. In North and South TYC, hanging wall deposits are cut by a series of active high-angle normal faults which likely sole into a master fault at depth, while in central TYC, hanging wall deposits display synthetic graben structures potentially indicative of low-angle faulting. Analysis of ~50 samples collected across key structural relationships in and around TYC yield 14 mean U-Pb dates between ~59-49 Ma and ~190 single-grain ZHe dates between ~60-4 Ma with spatial trends in ZHe data correlating strongly with latitude. Samples from Gangdese latitudes show a concentration of ~28-15 Ma ages, while those north of ~29.8° latitude yield both younger (~9-4 Ma) and older (~59-45 Ma) ages. We interpret (1) Gangdese Range samples reflect exhumation during contraction and uplift along the GCT peaking at ~21-20 Ma, (2) ~9-4 Ma ages reveal extension timing along fault segments experiencing significant rift-related exhumation, and (3) ~59-45 Ma ages represent un-reset or partially-reset samples from fault segments that have experienced lesser magnitudes of rift exhumation. HeFTy thermal models indicate a two-stage cooling history with initial slow cooling followed by accelerated cooling rates in Late Miocene-Pliocene time (~13-4 Ma) consistent with prior results from TYC and other Tibetan rifts. Our data are consistent with a segment linkage fault evolution model for the TYC rift, with underthrusting of Indian lithosphere likely related to the northward acceleration of rifting. Future work will utilize advanced HeFTy modeling including U-

Pb and apatite fission track data to further constrain the exhumation history of TYC and test dynamic models of extension for southern Tibet.

First Author

R

Aislin Reynolds
Montana State University

Author

L

Andrew K Laskowski
Montana State University

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