Evidence for a far traveled thrust sheet in the Greater Himalayan thrust system, and an alternative model to building the Himalaya

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New U-Pb zircon data from a Galchhi shear zone orthogneiss in central Nepal yield a 467.25 +2.5/-9.7 Ma crystallization age and metamorphic overgrowths of 26.2±1.7 Ma. To the northeast, the shear zone is crosscut by two undeformed pegmatite veins with U-Pb zircon crystallization ages of 24.7±0.6 Ma and 22.5±1.3 Ma, caused by motion on a thrust that initiated at ~26-22 Ma. This time is older than the 22-16 Ma Main Central thrust. Two micaceous quartzite samples from the hanging wall and footwall of the Galchhi shear zone yield youngest detrital zircon peak ages of ~584 and ~570 Ma, respectively. Toward the northern Himalaya, two quartzite samples from the hanging wall and footwall of the Langtang thrust, which has similar timing to the Galchhi shear zone, yield youngest detrital zircon peak ages of ~765 Ma and ~660 Ma, respectively. An augen orthogneiss from the hanging wall of the Langtang thrust yields a 474 +7/-3 Ma crystallization age. Rocks at Galchhi are younger than at Langtang suggesting that either the Langtang thrust cuts up section to the south or that the shear zone at Galchhi is another fault in the Greater Himalayan thrust system. Thus, the southward dipping Galchhi shear zone brought Greater Himalayan rocks from north of the Langtang thrust southward, and were subsequently passively folded into their present position by younger faults in the Lesser Himalayan duplex. We suggest a model with top-to-the-south shearing on the Langtang thrust or another intra-Greater Himalayan thrust to form the Galchhi shear zone.

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