Zircon U-Pb and Hf Isotope Constraints on the Mesozoic Tectonics and Crustal Evolution of Southern Tibet

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Zircon' Hf isotope ratios can be used in much the same way as whole-rock Nd isotopes. They, furthermore, often record "hidden" information that allows more detailed studies of the magma generation processes. The first *in situ* Hf and U-Pb isotope analyses of zircon separates from Mesozoic granites in southern Tibet identify a significant, but previously uncomprehended, stage of magmatism. 34 igneous zircons from a granite within the Gangdese batholith show a weighted mean $^{206}Pb/^{238}U$ age of 188.1 ± 1.4 Ma and $\varepsilon_{Hf}(T)$ values between +10.4 and +16.8, suggesting Early Jurassic intrusive activity dominated with a juvenile mantle contribution. 23 out of 40 inherited zircons from two Cretaceous S-type granites in the northern magmatic belt delineate a slightly older $^{206}Pb/^{238}U$ age cluster between 188 and 210 Ma. These zircons have $\varepsilon_{Hf}(T)$ values from –3.9 to –13.7, yielding "crustal" Hf model ages from ca. 1.4–2.1 Ga, which suggest a major episode of crustal growth in Proterozoic time and remelting of this crust in the Early Jurassic. Combining these with literature data, we interpret the "Jurassic Gangdese" magmatism as an early product of the Neo-Tethyan subduction that played a long-lasting role in the tectonic evolution of southern Tibet prior to the India-Asia collision.