Tibet and Beyond: Magmatic Records from CIA (Caucasus-Iran-Anatolia) and Southern Tibet with Implications for Asian Orogeny and Continental Growth

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This study, based on an ongoing joint research project "Tibet and Beyond", presents a synthesis of principal magmatic records from the CIA (Caucasus-Iran-Anatolia) and Tibet-Himalaya orogens resulting from the continental collisions of Arabia and India, respectively, with Eurasia. In both orogens, through this and other recent studies, the temporal and spatial variations in magmatism pre-, syn- and post-dating the collisions can now be much better defined, thus improving our understanding of collision zone magmatism that appears to have evolved with changes in the lithospheric structures over time and space by collisional processes. The two "collisional" Tethyan orogens were preceded by accretionary orogenic processes, which not only had produced a substantial amount of juvenile continental crust but also fulfill the "orogenic cycle" that evolved from an accretionary into a collisional system. Geochemical data reveal that in contrast to generating vast portions of juvenile crust in the early, accretionary stages of orogenic development, crustal recycling plays a more important role in the later, collisional stages. The latter, as exemplified in SE Turkey and southern Tibet, involves addition of older continental crust material back into the mantle, which subsequently melted and caused compositional transformation of the juvenile crust produced in the accretionary stages. Similar features are observed in young volcanic rocks from eastern Taiwan, the northern Luzon arc complex and part of the active subduction/accretion/collision system in Southeast Asia that may evolve one day to resemble the eastern Tethyan and central Asian orogenic belts by collision with the advancing Australian continent.