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SHRIMP U-Pb in zircon geochronology of granitoids from Myanmar: temporal constraints on the tectonic evolution of Southeast Asia

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The Mesozoic to Tertiary tectonic evolution of Southeast Asia is the result of the convergence and collision of fragments of Gondwanaland with Eurasia culminating in the collision of India. A rapidly growing geochronological database is placing tight constraints on the timing and duration of magmatic episodes, metallogenic and tectonic events in the Himalayas, Tibet and eastern Indochina. However, there is little comparable geochronology for Myanmar. This SHRIMP U-Pb in zircon geochronology focuses on granitoids from the Mogok Metamorphic Belt (MMB, a belt of high grade metamorphic rocks at the edge of the Shan-Thai Terrane), the Myeik Archipelago (Shan-Thai Terrane) and the west Myanmar Terrane. Strongly deformed granitic orthogneisses in the MMB near Mandalay contain Jurassic (~170 Ma) zircons that have partly recrystallised during ~43 Ma high-grade metamorphism. A hornblende syenite from Mandalay also contains Jurassic zircons with evidence of Eocene metamorphism rimmed by thin zones of 30.9 ±0.7 Ma magmatic zircon. The relative abundance of Jurassic zircons in these rocks is consistent with suggestions that southern Eurasia had an Andean-type margin at that time. Mid-Cretaceous to earliest Eocene (120 to 50 Ma). I-type granitoids in the MMB, Myeik Archipelago and west Myanmar confirm that prior to the collision of India, an up to 200km wide magmatic belt extended along the Eurasian margin. The primitive I-type Khanza Chaung granodiorite in the Wuntho batholith in the west Myanmar terrane hosts porphyry-style mineralisation and has a magmatic age of 94 [U+F0B1] 1 Ma. Triassic (~240 Ma), Jurassic (~170 Ma) and Early Cretaceous xenocryst zircons in this granitoid correspond with peaks of granitoid magmatism in the Shan-Thai terrane and establish that west Myanmar was part of the margin of Eurasia during the Mesozoic. A suite of highly fractionated metaluminous to peraluminous I-type granitoids with associated Sn-W-Ta mineralisation emplaced in the Myeik Archipelago of southern Myanmar (Shan-Thai terrane) have magmatic ages of 82 [U+F0B1] 1.4 Ma (Kawthoung), 62 [U+F0B1] 1.2 Ma (Hermyngi) and 50 [U+F0B1] 0.5 Ma (Auk Bok). Xenocryst zircons in these granitoids are either Proterozoic or derived from older members of the suite. This suite which extends into adjacent peninsular Thailand and was emplaced into thickened continental crust well inboard of the subduction zone during rapid convergence and subduction of the India-Australia plate. The primitive I-type Shangalon granodiorite in the Wuntho Batholith of west Myanmar has a magmatic age of 38.5 [U+F0B1] 0.6 Ma indicating subduction continued until ~40 Ma. Metamorphic overgrowths to zircons in the MMB orthogneiss near Mandalay date a period of Eocene (~43 Ma) high-grade metamorphism possibly during crustal thickening related to the initial collision between India and Eurasia (65 to 55 Ma). This was followed by emplacement of syn-tectonic hornblende syenites and leucogranites between 35 and 23 Ma. Comparison of the geochronology of Myanmar granitoids with the Hymalayas, Tibet and other parts of Southeast Asia indicates that Myanmar played a key role linking the Hymalayan Orogen to the tectonic evolution of Southeast Asia.