Paper Number: 1474

Ordovician dioritic magmatism of the Donken area, SE Laos: Implications for Gondwana evolution in SE Asia

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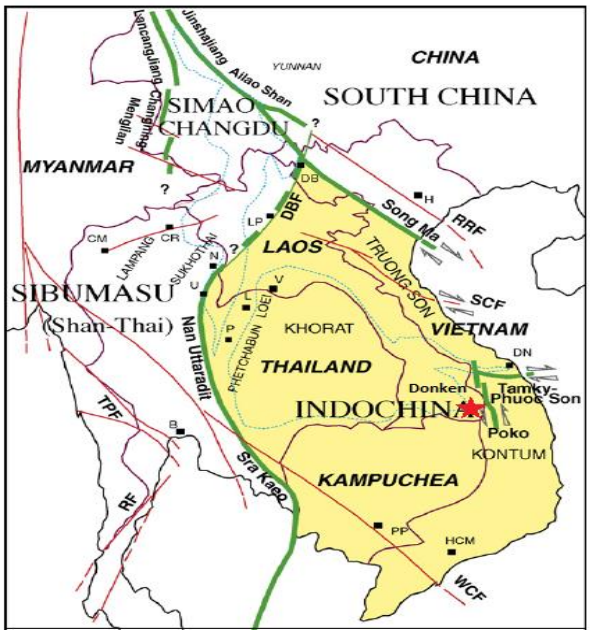
The Truong Son Fold Belt is characterised by Late Carboniferous to Late Triassic metamorphic, volcanic and plutonic rocks, the product of accretion of the Indochina Terrane onto the South China Terrane and the subduction, collision and extension events that took place [1]. This study reports geochronological and geochemical data from a dioritic intrusion and rhyolitic tuff obtained from the Donken area, part of the supposedly Permian Antoum Granodiorites [6] (Fig. 1).



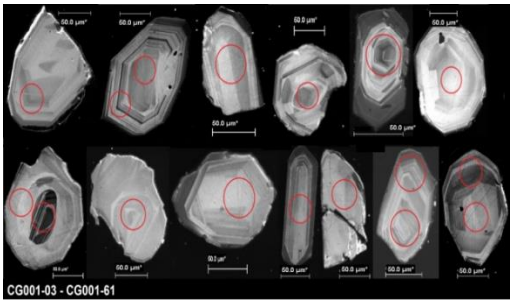


Figure 1: Map of SE Asia showing the extent of the Indochina Terrane. Donken, indicated by a red star, is situated adjacent to the Kontum Massif, with the Truong Son Fold Belt and Kontum Massif separated by the Tamky Phuoc Son and Po Ko shear zones (modified after original [2] and subsequently after [3])

Figure 2: Cathodoluminescence (CL) images of zircon grains from the Donken diorite intrusive with the location of LA–ICP–MS ablation spots indicated by red circles.

Zircon U-Pb LA-ICP-MS dating (Fig. 2) in this study suggests a ca. 470 Ma age for the dioritic intrusion and an age of ca. 476 Ma for the rhyolitic tuff. The whole-rock geochemical signature for both units suggests a subduction-related island arc environment, with the diorite of calc-alkaline affinity and the tuff of tholeiitic affinity. In addition, the dioritic intrusion exhibits an adakitic signature (high Sr, low Y and HREE contents). These observations imply that Ordovician magmatism occurred within the Indochina Terrane, and is linked with a poorly-understood subduction event on the Gondwana continent. It is likely that this event is part of a wider Ordovician subduction-magmatic event documented to the northeast [4, 5], which is associated with the Tam Ky-Phuoc Son Suture Zone. This Ordovician subduction-magmatic event has recently been speculated as representing the northward-dipping subduction of the Tam Ky–Phuoc Son ocean basin under the Kontum Massif [5].

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