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Space and Time: Tectonic Settings, Geochemistry and Petrogenesis

They appear to have acted locally as feeder dykes for the overlying lavas of the similar composition. In the light of the field and petrological characteristics, the Kožak pluton may be evaluated as the caldera type or subvolcanic pluton.

L10 : 1P/12 : PO

THE LATE PERMIAN - EARLY TRIASSIC OROGENY IN INDOCHINA: PRECISE U-Pb DATING RESULTS FROM VIETNAM

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Crystallization ages of intrusive rocks from the NW-striking Sông Ca and Sông Ma ductile fault zones in central and northern Vietnam, respectively, have been determined for the first time using U-Pb geochronology. Zircon grains separated from undeformed granites and diorites within the Sông Ca fault zone imply late Permian emplacement. Samples from three localities, spaced every 100 km along strike of the Sông Ca belt, yield the following results (SE to NW): (1) a lower intercept age of 250 ± 1 Ma (all ages are 2 o), (2) a concordant age of 251 ± 3 Ma, and (3) a concordant age of 251 ± 1 Ma. All three samples show evidence of a Precambrian hercynian component. For example, zircons from the granite at locality 1 give an upper intercept age of 1933 ± 11 Ma. These late Permian ages are significantly older than the Cambrian and Cenozoic thermal overprint ages identified within the Sông Ca fault zone by 40Ar/39Ar geochronology (Lepvrier et al., 1997). Zircons from an undeformed granite within the Sông Ma ductile deformation zone (sampled near Dien Bien Phu) yield a concordant age of 229 ± 1 Ma. This age is slightly younger than the 40Ar/39Ar plateau ages (~ 245 Ma) from shists and foliated granites of the Sông Ma metamorphic complex (Lepvrier et al., 1997) located ~ 80 km southeast of our sampling site within the Sông Ma belt. The emplacement of the granite from the Dien Bien Phu area clearly postdates the 245 Ma tectonometamorphic event. The late Permian - Early Triassic magmatism identified here suggests a magma-generating tectonic phase (subduction- or extension-related) in Indochina which is older than middle-upper Triassic unconformities generally interpreted to mark the initial phases of the Indosinian orogeny (e.g., Lacassin et al., in press). Regional variations in the timing of Indosinian deformation (e.g., ~ 200 Ma in Thailand; middle-Triassic in China) suggest a multi-phase history of deformation. Our results suggest that the Indosinian collisional deformation which marks the closing of the eastern Paleo-Tethys Sea (i.e., convergence between Gondwanaland and Eurasia) began earlier than previously inferred.


Lacassin R, Leloup PH, Phan TT, & Tapponnier P. Terra Nova, in press

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IMPORTANCE OF MAGMATIC INTERACTION PROCESSES IN THE EVOLUTION OF TERTIARY GRANITOID OF SERBOMACEDONIAN AND RHODOPE MASSIFS (NORTHERN GREECE)

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A lot of attention has been given the last few years to the study of microgranular Mafic Enclaves (MME) in granitoid plutons as important indicators of magmatic interaction processes. Their distribution is widely recognized in the Tertiary granitoid plutons emplaced in Serbomacedonian and Rhodope Massifs (Northern Greece). This work points to the study of such geologically complex areas for a better understanding of magmatic interaction processes as important petrogenetic engines not only on a local scale but considering also the regional spatial distribution of MME-bearing granitoid rocks. Granitoid rocks intruding Serbomacedonian and Rhodope Massifs can be roughly divided into two major groups: calc-alkaline and high-potassium - shoshonitic rocks. Whole-rock geochemical and isotopic data reveal that these groups cannot be related by simple processes such as fractional crystallization or assimilation plus fractional crystallization. More complex processes acting together have to be considered: mixing/mingling among at least two basic magma end-members with different potassium enrichment and an acid magma end-member has to be primarily invoked as the main differentiation process, possibly coupled with fractional crystallization. The main debate is on establishing the nature of magmas involved in these processes. Regarding some basic shoshonitic magmas, ideas considering them as anatectic crustal melts can be ruled out on the basis of geochemical and experimental petrology data. An alternative hypothesis, supported also by isotopic data of the considered MME, is, for both calc-alkaline and shoshonitic mafic magmas, a partial melting of a differently enriched upper mantle. Trace element data support the inference that melting occurred at different pressures. Variable intensities of interaction, possibly coupled with fractional crystallization, of such mafic melts with acid melts, produced by partial melting of a middle-lower crust of amphibolitic composition, can give the observed granitoid compositional spectrum. Plutons of Ouanoupoli, Jerissos, Stratoni and Vroudon have been considered in their more general features, whereas, as a particular and representative case of study, the Sithonia Plutonic Complex has been considered in detail to verify the above hypotheses.