

DYNAMIC METAMORPHISM OF MARGINAL IGNEOUS COMPLEX OF THE MAIN RANGE GRANITE IN THE BELUM AREA, UPPER PERAK

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Two aspects of the geology of the area drained by the Halong, Bekek and Sara rivers in the Malaysian Nature Society's Belum Expedition area in Upper Perak are of special interest.

Marginal igneous complex

The area is located at the margin of the Main Range granite from published maps. Within the catchment area of the Sara, tourmaline-bearing plutonic rocks and gravels of tourmalinized biotite-cordierite-sillimanite schists occur.

In the rivers are exposed a suite of plutonic rocks ranging from hornblende quartz monzonite, biotite quartz monzonite, tonalite, granodiorite and adamellite forming an igneous complex at the margin of the Main Range granite. Tonalite and adamellite are predominant. Field relations of the tonalite and adamellite indicate that the two rocks are synplutonic. The relation between these two rocks with the others mentioned is at present not known. The quartz monzonites and granodiorite occur in close proximity in Halong and in Bekek granophyric adamellite and granophyric granodiorite occur in the same outcrop but the nature of the contact cannot be determined. The general impression is that all the rock types are coeval with the adamellite being the latest phase.

It is speculated here that this suite of rocks may be formed by an early emplacement of liquid magma at a high level which differentiated to develop the quartz monzonite, tonalite, granodiorite and possibly some adamellite, the bulk of which ascended slightly later immersing and invading the earlier formed

rocks before they have cooled down. The intrusion contact metamorphosed the adjacent Lower Palaeozoic low grade pelitic phyllites to the cordierite-sillimanite schist.

While this situation is similar to the occurrences of tonalitic margins of granitic plutons in the Eastern Belt where contact metamorphism is also well developed, we have as yet no knowledge that such type of margin has ever been mapped for the Main Range granite especially on the western side. We believe the absence of such margin is real for the areas already mapped and published. This may indicate that in the Belum area, the source rocks of the granite melt may have components different from those of the Main Range granite further south.

Dynamic metamorphism

The whole sector traversed occurs in a crush zone. Every piece of specimen (2b) collected from the outcrops shows evidence of dynamic deformation ranging from imperceptible to extreme pulverization producing ultracataclasite. At several places the ultracataclasite occurs as bands ranging from 2 cm to 50 cm, parallel to adjacent bands of less pulverized cataclasite and protocataclasite of a similar range of thickness. The major trend of the crushed rocks is 315° - 335° with a minor trend of 175° - 200° . The NW-flowing Bekek River, evidently oriented parallel to the strike of the major faulting, has several 50-70 m wide exposures of cataclasite with prominent quartz porphyroclasts. Here, the width of the cataclasite bands may well be several to tens of metres.

The NW-trending faults in the area appear to belong to a wider family of numerous NW-trending faults cutting the Main Range granite occurring between the Belum and the Sungai Nenggiri area to the south as shown in published maps. To the west of the Belum area is the post-granite NW-trending Bok Bak fault. The sector between Belum and Cameron Highlands and thence NW to central and west Kedah may be regarded as a zone of prominent NW-trending faults. These faults may have developed due to reactivation of the basement, which is suggested here to have prominent NW-trending structures, during post granite times. Coincidentally, the terrane of the Patani Metamorphics, which occurs in this zone, is also trending NW; another reflection of the trend of the basement structures.
