

Brittle fault zone in granite, Pulau Pangkor

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On the western board of Pulau Pangkor, between the beaches of Pasir Ketapang and Pasir Bogak, is a coastal exposure of more than a kilometre wide of coarse-grained porphyritic biotite granite.

The coastal exposure is accessible during low-tide levels on calm-weather days. Its exposure is laced with linear subparallel fracture lines which we suspect are elements of a brittle fault zone.

In the literature very little emphasis have been given to brittle structures in granite as compared to that have been given to the ductile ones.

In the field, the exposure consists of thin fault/fracture planes which strike in the 290°-310° direction and inclined 65°-85° southwestwards. These planes, are separated between a few cm to several cm from one another. On the rock surface these fault planes appear as thin lines. Close observation of surficial rocks along these fault/fracture lines indicate that many of them do not show evidence that the rocks have translated along them. Granite protolith between these "fault-fractures" also do not show any deformational characteristics.

A sample chosen from one of the few thicker fault ("sheared") planes and another from an intrafault ("unfaulted") zone give ages of 70.2 ± 3.5 and 73.2 ± 4.6 Ma, respectively. As ages for Pangkor granite determined by Bignell are 207, 209 and 215 Ma, we believe the younger age indicate the age of the faulting during late Upper Cretaceous.

What intrigued us about the brittle fault zone is the lack of translational movements along most of the fault lines. The few that we could observe that movements had taken place were found to be left-lateral, and we infer that this is a left-lateral fault zone.

Under the microscope these fine fault planes are observed as thin microfracture zones of thickness from 0.1-0.2 mm to 0.1 mm (anastomised) thick. The translations along these fault/fracture zones also is an image of the megascopic scale. Most do not show that translation had taken place. A few show microscale 1/2 mm translations, both left lateral and right lateral movements were observed.

The microstructure of the protolith adjacent to fault/fracture zones is dominated by intra- and intergranular fractures. Some of the fractures in quartz are healed.

Volcanic breccia is exposed in one locality along the Jalan Silam at km 113 (Locality JS113) and km 129 (sample JS129). Most of the clasts in the volcanic breccia are of basalt fragments. The size of the clasts varies from a few cm up to 5 cm across. In thin section these rocks consist of clasts of mainly basaltic fragments showing vesicular texture.