

Geology and geochemistry of Bukit Nimong and Selanjan intrusives of West Sarawak, Malaysia - Implications for gold and porphyry copper mineralization

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Bukit Nimong and Bukit Selanjan areas located in the south central part of West Sarawak are underlain by the dioritic intrusives surrounded by metasandstone of the Silantek Formation. The intrusives are the result of the multi-phase magma intrusions into the Silantek Formation during Miocene, developed simultaneously with other nearby intrusives at Bukit Klambi and Bukit Tiong Laju. These areas were the target for mineral exploration as far back as in the 1700's when the Dutch geologists crossed over to Sarawak from Kalimantan, Indonesia, the former Dutch colony. However, more detailed and systematic geochemical survey was only carried out during 1980s by the Geological Survey Malaysia, mainly collecting stream sediments and panned concentrates at the confluence of 4th or the 3rd order stream (Tan, 1979, Alex Unya *et al.*, in press). The results from the analysis of the stream sediments showed some high anomalous values for gold, copper and other metallic minerals.

In more recent years, detailed geological mapping, geochemical and geophysical surveys were carried out in the vicinity of these two hills. Geological mapping results showed that the intrusives in the two areas are multi-phase intermediate to acid intrusive stocks which had thermally metamorphosed the surrounding country rocks belonging to the Silantek Formation. Rock geochemistry study shows that the intrusives in the two areas can be classified as calc-alkaline series in which the weight percentage of CaO = K₂O+Na₂O, and the weight percent of silica are between 56-61% (oversaturated).

The two intrusive stocks are associated with extensive hydrothermal alteration and are believed to have potential for gold and copper mineralization. In Bukit Selanjan area, there are potentials for the existence of gold mineralization zones controlled by two large breccia pipes in the intrusive rocks. The three major breccia zones outcropped in the central part of the southern intrusive body; the largest of one is about 2100 m² (70 m×30 m), and the other two breccia outcrops are 600m² (30 m×20 m) and 480 m² (24 m×20 m) respectively. Two types of breccia pipes that may be associated with gold mineralization can be recognized; high fluidize breccia and low fluidize breccia. The alteration is mainly silicification sericitization, chloritization and advanced argillization that may relate to possible gold mineralization.

Extensive stock-works and with sporadic disseminated copper mineralization associated with gold are confined within the intrusive outcrops in the Bukit Nimong area. Evidence of major alterations in Bukit Nimong area includes silicification, potassium metasomatic alteration, sericitization, chloritization and K feldspar development. These are indications of a possible porphyry copper system in the Bukit Nimong area.

Geochemistry results of soil samples from both the Selanjau and Bukit Nimong areas showed anomalous values for copper and gold. Geophysical Induced Polarization survey is planned to be carried out in the two areas with latest technology and high capacity equipment (10kw power supply VIP 10000 IP System) which can penetrate down to five hundred meters. The IP results will guide further exploration works including drilling in the two areas.