Abstract

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The characteristics and morphology of columnar dacite in Tawau, Sabah

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Abstract: The occurrence of columnar jointing is commonly associated with volcanic rocks and a rapid cooling environment. We recently discovered well-preserved columnar dacite on the road cutting slope in the eastern part of Tawau town, Sabah. This paper briefly describes the occurrences and morphology of columnar dacite in the study area. Columnar dacite exhibits entablature feature since it has thinner and chaotic columns. The hexagon side dominates the columnar joints with minor pentagons to heptagon sides. Columns for dacite are much smaller compared with columnar basalt Tawau. The formation of columnar joints was influenced mainly by external fluid where the water flow on top of the cooling lavas makes it cool rapidly.

Keywords: columnar dacite, entablature, Tawau, rapid cooling

Abstrak: Kejadian kekar turus biasanya berasosiasi dengan batuan volkanik dan persekitaran yang cepat menyejuk. Penemuan terbaru dasit turus yang terpelihara secara baik telah dijumpai pada cerun pemotongan jalan raya yang terletak di bahagian timur bandar Tawau, Sabah. Kajian ini menjelaskan serba sedikit berkaitan dengan kejadian dan morfologi dasit turus di kawasan kajian. Dasit turus menunjukkan ciri-ciri '*entablature*' memandangkan ianya mempunyai turus yang lebih nipis dan tidak teratur. Kekar turus lebih didominasi oleh sisi hexagon selain turut menunjukkan sisi pentagon ke heptagon. Turus untuk dasit adalah lebih kecil jika dibandingkan dengan turus basalt di kawasan Tawau. Formasi kekar turus lebih banyak dipengaruhi oleh cecair luaran memandangkan air yang mengalir pada bahagian atas lava yang sedang menyejuk boleh mengakibatkan penyejukkan cepat.

Kata kunci: dasit turus, entablature, Tawau, penyejukan cepat

INTRODUCTION

The occurrences of columnar basalt in Tawau, Sabah is considered as a fascinating and spectacular scenery that attracted many tourists to visit this area. Columnar jointing is not usual; however, it does occur around the world with different rock types. In East Malaysia, columnar basalt are exposed in few locations such as Tawau, Tatau and Kapit (Lim, 1988; Nur Iskandar, 2006; Sanudin *et al.*, 2010; Moul & Noweg, 2018). Unlike columnar basalt in Tawau, the exposure of columnar jointing in Sarawak is not vast. Around the world, only a few places report the exposures of columnar jointing that consists of felsic volcanic rocks such as St. Mary's Island, India (columnar rhyolite; Melluso *et al.*, 2009), Atsumi Japan (columnar dacite; Goto & Tsuchiya, 2004) and Papuk Geopark, Croatia (columnar rhyolite; Balen & Petrinec, 2014). Usually, columnar jointing is associated with igneous bodies, which can be divided into columns and a network of polygonal fractures (Hetényi *et al.*, 2012). The fractures are formed during the cooling-induced contraction of lava which leads to hydrothermal fluid circulation (Lamur *et al.*, 2018). Recently we discovered an outcrop of columnar dacite on the road cutting near the Tawau town area. The columnar dacite has different morphology compared to columnar basalt in Tawau. This paper will briefly describe the occurrences and morphology of columnar dacite.

GEOLOGICAL SETTING

Sabah is located in the northern part of Borneo and is considered part of the Eurasian Plate or Sundaland Block (McCaffrey, 1996; Simon *et al.*, 1999; Hall, 2012). Sabah basement rocks consists of the Mesozoic crystalline

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