Mekanisme Deformasi pada Kompleks Granitoid Sibolga di Kecamatan Sitahuis, Kabupaten Tapanuli Tengah, Provinsi Sumatra Utara = Deformation Mechanisms of the Sibolga Granitoid Complex in Sitahuis Subdistrict, Central Tapanuli Regency, North Sumatra Province

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Abstrak

Pulau Sumatra berada di zona subduksi antara Lempeng Indo-Australia dan Lempeng Eurasia, menghasilkan tubuh-tubuh granit di sepanjang pesisir barat pulau. Kompleks Granit Sibolga diketahui mengandung UTJ, khususnya jenis LREE, yang penyebarannya dikontrol oleh tipe batuan, evolusi magma, hingga proses deformasi tektonik. Untuk memahami mekanisme deformasi yang bekerja pada daerah penelitian, dilakukan analisis data struktural di lapangan, mikrostruktur batuan melalui metode petrografi, serta analisis fabrik mineral magnetik menggunakan metode Anisotropy of Magnetic Susceptibility (AMS). Mikrostruktur mineral menyimpan rekaman deformasi yang terjadi sejak tahap magmatik hingga solid-state, sedangkan fabrik magnetik dari analisis AMS merepresentasikan orientasi strain yang bekerja. Penelitian ini bertujuan untuk mengungkap mekanisme deformasi yang berkembang pada Kompleks Granit Sibolga. Hasilnya ditemukan fabrik primer yang terekam pada lineasi magnetik, dan fabrik sekunder pada foliasi makroskopis dan foliasi magnetik. Deformasi pada KGS terjadi pada fase syn-emplacement dengan mekanisme piecemeal subsidence, menyebabkan intrusi terjadi secara bertahap. Sementara pada fase post-emplacement terjadi pada kondisi brittle pasca pengangkatan batuan, membentuk struktur berupa sesar, boudinage, kekar, microfracture, dan veinlet.

.....The island of Sumatra lies within a subduction zone between the Indo-Australian Plate and the Eurasian Plate, resulting in the formation of granitic bodies along the island’s western margin. The Sibolga Granite Complex is known to contain REEs, particularly Light Rare Earth Elements (LREEs), whose distribution is controlled by rock type, magmatic evolution, and tectonic deformation processes. To understand the deformation mechanisms operating in the study area, this research employs structural data analysis in the field, petrographic analysis of rock microstructures, and magnetic mineral fabric analysis using the Anisotropy of Magnetic Susceptibility (AMS) method. Mineral microstructures preserve records of deformation spanning from the magmatic to the solid-state stages, while magnetic fabrics derived from AMS analysis represent the orientation of the strain experienced. This study aims to reveal the deformation mechanisms that developed within the Sibolga Granite Complex. The results indicate the presence of primary fabric recorded in magnetic lineation and secondary fabric observed in macroscopic and magnetic foliation. Deformation within the complex occurred during the syn-emplacement phase through a piecemeal subsidence mechanism, resulting in a gradual intrusion process. Meanwhile, the post-emplacement phase was characterized by brittle deformation following rock uplift, leading to the formation of structures such as faults, boudinage, joints, microfractures, and veinlets.