Title : Extensional Fracture Spatial Distribution of Koh Samui Granite Using CorrCount Software

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ABSTRACT

Fracture networks are crucial for understanding tectonics history and fluid flow characteristics. This study analyzed fracture distributions in granitic rock at five waterfalls including Na Muang2, Hin Lat, Mountain, Lat Wa Non, and Khun Sri waterfall in Koh Samui, Surat Thani province, using the Normalize Correlation Count (NCC) technique through systematic scanline survey and the CorrCount software. Three distinct spatial fracture patterns were identified: clustered (NCC > 1), anti-clustered (NCC < 1), and regularly spaced (NCC ≈ 1). Clustered patterns predominantly occurred near major NE-SW and NW-SE lineaments with faulting features, such as slickenline and pseudotachylyte, mainly observed at the Lat Wa Non and Khun Sri waterfalls. Anti-clustered and regularly spaced patterns appeared away from the major structures, particularly at the Mountain waterfall and central section of Lat Wa Non. Spatial correlation analysis revealed power-law decay relationships in clustered regions and periodic spacing in regularly spaced zones.

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These patterns reflect the complex tectonic evolution of Koh Samui, with clustered patterns indicating zones of concentrated deformation, which might have been influenced by the Khlong Marui and Ranong Fault systems. Regularly spaced patterns suggest areas that experienced uniform stress distribution, likely representing periods of tectonic quiescence or regions sufficiently distant from major fault systems to develop systematic joint set. This quantitative analysis offers new insights into the structural evolution of the Gulf of Thailand region and serves as a framework for future studies on fluid flow in crystalline rock.

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