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Geospatializing The Klang Gate Quartz Ridge in Malaysia: A Technological Perspective

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Establishment of inventories on geological heritage, or geoheritage resources is a step forward for a comprehensive geoheritage management leading to a better conservation at national and global levels. Compiling and updating inventory of geoheritage is a tedious process and even so in a tropical environment. Malaysia has a tremendous list of geodiversity and generating its national database is a multi-institutional effort and worthwhile investment. However, producing accurate and reliable characteristics of such landform and spectacular geological features remained elusive. The advanced and modern mapping techniques have revolutionized the mapping, monitoring and modelling of the earth surface processes and landforms. Yet the methods for quantification of geodiversity physical features are not fully utilized in Malaysia for a better understanding its processes and activity.

This study provides a better insight into the use of advanced active remote sensing technology for characterizing the forested Quartz Ridge in Malaysia. We have developed the novel method and tested in the Klang Gates Quartz Ridge, Selangor. The granitic country rock made up by quartz mineral is known as the longest quartz ridge in Malaysia and characterized by rugged topography, steep slopes, densely vegetated terrain and also rich-biodiversity area. This study presents an integrated field methodological framework and processing scheme by taking into account the climatic, topographic, geologic, and anthropogenic challenges in an equatorial region. Advanced terrestrial laser scanning system was used to accurately capture, map and model the ridge carried out within a relatively stringent time period. The high frequency Global Navigation Satellite System and modern Total Station coupled with the optical satellite and radar imageries and also advanced spatial analysis were fully utilized in the field campaign and data assessment performed during the recent monsoon season.

As a result, the mapping and characterization of Quartz Ridge has shown promising results and advancing some hypothesis. The modern topographic laser scanning system proved suitable for such complex environment. The Quartz Ridge in Genting Klang, Selangor, believed to be the longest ridge in the world are now preserved in a digital form and can be quantitatively analysed. Many primary and secondary data can be generated and contributed to other studies, e.g. the determination of instability slope zone and rock-fall assessment along the ridge. Remarkably, this study is a first scientific exploration on the use of advanced geo-information tool, notably laser-based mapping to record, identify, and characterize the Quartz Ridge in Genting Klang, Selangor. The recent and modern geospatial data of tropical quartz in an urban forested environment provides technical and scientific spatial data of the longest quartz ridge. The geodatabase of Klang Gate Quartz Ridge allows the integration of multi-sensor-scales of remotely sensed data with other flora and fauna data in the area. As a conclusion, this study provides an accurate physical characteristic of prominent geological structures in Selangor, and its geospatial data is leading to a better compilation of comprehensive digital record of Quartz Ridge for conserving national geoheritage, promoting geotourism, and supporting its listing effort to the UNESCO's World Heritage Site in the near future.