

Space Technology in the Royal Belum: Bridging the Tranquility for Future Geo-Sustainability

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Abstract

Today's advance space technology has revolutionized modern mapping techniques in the tropics. Global Navigation Satellite System (GNSS) delivers accurate positioning and remote sensing disseminates high resolution spatial information over a wide area. In this research, we utilized these two space technology in the Royal Belum Forest 3rd Expedition carried out in September 2014. Belum Forest reserve in Northern Perak covers an area of about 290,000 hectares across the lower and upper section of Belum-Temenggor. Belum impenetrable forest stretches into the Malaysian-Thai borders has never been properly mapped and much element of research beneath its canopy still remain elusive. Encroachment of boarders and illegal poaching activities has been a matter of concern that disrupts the tranquil biodiversity of Belum. Thus, correct mapping is urgently needed to address this problem. Establishing the first ever GNSS reference stations in Royal Belum State Park is a step forward to develop a comprehensive intelligent GNSS in the Belum-Temenggor Forest Complex (BTFC). Despite many studies have utilized handheld GPS as a mean to locate their study area and finding, however, this GNSS setup delivers mm-level accuracy for other researchers to use within the confinement of BTFC. Forest mapping and carbon estimation research with local and international counterparts was carried out utilizing the 2nd expedition setup GNSS stations to 30 selectively chosen forest plots to evaluate dense and low-dense forest in a reserved tropical forest region. The relative vertical and horizontal accuracy of these hourly observations were within ± 10 mm level. Georectification of the WorldView-2 very high resolution panchromatic multispectral remotely sense image can be used to map the wide inaccessible forest areas. Deliverables from

long hours of GNSS observations across the 50 km² virgin forest can indirectly provide weather information. In the 3rd expedition, 3 GNSS stations were setup relatively 20, 30 and 40 km away to calculate the integrated water column of Royal Belum that is essential for understanding the tropical climate of Malaysia. Hence, GNSS coupled with high resolution spatial imagery from WorldView-2, the efforts toward geospatializing the terrestrial ecosystem for assessing geo-security issues and understanding climate change will be possible for a geo-sustainable future of Royal Belum.

Keywords: GNSS, remotely sensed imageries, geospatial, geo-security, forestry.