

# Monitoring of Local Deformations in North Borneo

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## SUMMARY

Large parts of SE Asia are located on the Sundaland block, a tectonic entity that appears to move independently from the Eurasian Plate. The island of Borneo is also considered to be part of the Sundaland block along its eastern margin. In North Borneo, the highest mountain in South-East Asia is situated: Mount Kinabalu with a height of ~4100 meters. As a result of past tectonic activity the mountain is considered to be still rising with a long term rate of about 0.5 mm/yr. However North Borneo also does seem to be still deforming in a different way. The North Borneo region appears to be actively deforming and might actually be separating from the rigid part of the Sundaland block. Deformation of western parts of North Borneo appears to be driven by gravity gliding due to frontal fold-and-thrust belts. However, north-west of North Borneo is exhibiting different deformation patterns and the driving forces behind it are still part of an already long-lived scientific debate. Global Navigation Satellite Systems (GNSS) are a great tool to study crustal motion and deformations in detail. Since 2007, the Department of Surveying and Mapping Malaysia (DSMM) have established additional continuous GNSS stations along the coastal area of North Borneo. The primary limits in previous researches were due to the lack of sufficient CGNSS station coverage in the area. Also in order to study the present (relatively small) deformation patterns, a sufficiently long time data span is needed. Therefore this region provides a great opportunity for an enhanced study of local deformation as already a three-year time span of GNSS data has now become available. Absolute and relative baseline positioning was used to analyze deformation in horizontal and vertical components. Our first strain rate analysis provides significant results in horizontal deformation. Surprisingly, analysis of the vertical GNSS displacements also appears to show some unexpected results.