Understanding Vertical Land Motion in Eastern Indonesia and Its Implications to Regional Sea Level Rise

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SUMMARY

This study investigates the relationship between vertical land motion (VLM) and sea level rise (SLR) in eastern Indonesia, focusing on regions such as Sulawesi, North Maluku, Banda Sea, Nusa Tenggara, and Papua. The assessment of VLM has been undertaken using Global Navigation Satellite System (GNSS) data spanning up to 13 years that shows moderate rates of subsidence across these areas, largely driven by tectonic-induced motion. However, satellite altimetry and tide gauges observations reveal a significant SLR in eastern Indonesia, with rates exceeding global averages. The combination of land subsidence and acceleration of SLR poses serious risk to coastal communities, increasing vulnerability to flooding and shoreline erosion. This study emphasizes the necessity of incorporating VLM into disaster management strategies, highlighting the importance of continuous monitoring due to the region's active tectonic environment. The findings call for decision-making based on the inclusion of evidence from both land subsidence and SLR to ensure effective planning for future coastal resilience.