

## Tsunami Source of the 2018 Sulawesi Earthquake Estimated from Tsunami and InSAR Data

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An unexpected destructive tsunami struck Palu Bay after the Mw 7.5 strike-slip faulting earthquake in Sulawesi, Indonesia, on 28 September 2018. This tsunami impacted Palu city with 5 m to 10 m runup. The combined effects of the earthquake and tsunami caused a few thousand casualties. The tsunami waves were observed by two tide gauges in Sulawesi. One tide gauge at Pantoloan port in the bay recorded tsunami waves starting at about 5 minutes after the earthquake with amplitudes of up to 2 m. The other tide gauge at Mamuju port recorded tsunami waves after about 20 minutes with peaks of about 10 cm. To understand the mechanism of this unusual tsunami, we jointly utilized the tsunami records and InSAR data to analyze the source of this earthquake. The InSAR data observed by Sentinel-1 well resolved the offset of horizontal ground movement in the direction of the orbit azimuth along the fault strike. The data show a strike of about  $358^\circ$  in the north of the bay and about  $352^\circ$  in the south of the bay. The magnitude of the offsets varied from about 1 m in the north to up to 5 m in the south. Our simple modeling result suggests a slip of about 5 m at the north and a slip up to 8 m at the south to reproduce the observed tsunami waveform at Pantoloan. The southern asperity extended about 40 km from the bay with a width of about 16 km. Tsunami travel time analysis showed that the main tsunami arrived at the Mamuju station after about 45 minutes which means the first tsunami wave at this station was triggered by another source.

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