

# The 2012 MW 6.8 Thabeikkyin earthquake in central Myanmar: A widely felt strong event with unilateral rupture through the Singu basalt on the Sagaing fault

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## ABSTRACT

To understand the damage and physics processes of large earthquakes, it is important to integrate field surveys with modern geophysical analysis. Although Myanmar is seismically very active, such integration was never conducted in the past. Here we make the first report of its kind in Myanmar for the 2012 Mw 6.8 Thabeikkyin earthquake on the Sagaing fault in central Myanmar. Based on field surveys, interviews, press reports, and online sources, we estimated intensity of shaking at 99 sites, which shows a similar attenuation relation to that in western North America. Our post-earthquake field survey documented a  $\sim 45$  km long surface rupture with up to  $\sim 1.02$  m offset, extending from the epicenter southward along the fault. It is comparable with the  $\sim 50$  km long rupture model derived from geophysical inversion of GPS and seismic data. In this model, the largest asperity, with 1.8 m maximum slip, coincides with the Singu basalt, where the fault is constrained to be east-dipping. The model also shows a unilateral southward rupture with relatively fast rupture speed, which is likely responsible for substantial damage observed on the floodplains along the fault, including in cities like Sagaing, Mandalay and Wundwin, located as far as  $\sim 200$  km south of the epicenter.

**Keywords:** Thabeikkyin earthquake, Sagaing fault, felt intensity, rupture model, geophysical inversion