

# AI-03056 Earthquake 20250930 Notes

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## Summary

On September 30, 2025, a **deadly magnitude 6.9 earthquake** struck the central Philippines archipelago at 10 PM local time [1]. The event was a shallow strike-slip earthquake located between the islands of Cebu and Leyte, originating about 15 kilometers east of Cebu [1].

## Impacts and Damage

The earthquake caused **very strong (intensity VII) shaking** in several cities, including Cebu City [2]. Initial reports indicate that at least **twenty people were killed** [2]. Significant damage was reported, including:

- Four collapsed buildings [2].
- Two partially collapsed churches [2].
- Six impassable bridges and one impassable road [2].

Reports of significant damage in San Remigio, southwest of Bogu City, were also noted [3]. As the earthquake occurred at night, the full extent of the damage was expected to become clearer in the following hours [2].

## The Unmapped Fault

The earthquake occurred on a fault that was apparently **unmapped** [4, 5]. As a strike-slip event, there were two potential orientations for the fault that ruptured [6]:

1. A **left-lateral** fault oriented northwest-southeast, similar to the nearby Philippine Fault [7].
2. A **right-lateral** fault oriented northeast-southwest, matching the orientation of faults that cut through Cebu island [7].

Based on the distribution of aftershocks recorded by the Philippine Institute of Volcanology and Seismology (PHIVOLCS), it is believed that the **second option is more likely** [3]. The data suggests the rupture likely began under the ocean and propagated southwest, cutting across the island of Cebu [3]. An earthquake of this magnitude would typically have a rupture length of 20-60 kilometers and an average displacement of 60-150 centimeters, which may be visible via satellite or field observation if it reached the surface [3, 6].

## Tectonic Context

The Philippines is a highly active tectonic region known as the **"Philippine Mobile Belt,"** an area of complex and distributed deformation situated between two subduction zones [5]. While many large earthquakes are associated with the major Philippine Fault, a significant number occur on smaller, often unmapped faults [5]. This is not the first time a large earthquake has occurred on a previously overlooked fault in the region; a M7.2 earthquake in 2013 on the nearby island of Bohol was caused by slip on a thrust fault that had not been previously identified [8]. The region's *transpressional* setting (a mix of convergence and lateral motion) results in various types of earthquakes, including strike-slip, thrust, and normal-faulting events [8, 9].

## Future Outlook

- **Aftershocks:** Aftershocks are expected to continue for months, and some could be strong enough to cause further shaking, particularly in northern Cebu [9].
- **Triggered Earthquakes:** The possibility of this event triggering a larger earthquake on the nearby Philippine Fault is considered **unlikely** [10]. This is because the rupture likely moved away from the major fault, and the adjacent sections of the Philippine Fault appear to be releasing stress through a combination of steady "creeping" and a previous M6.5 earthquake in 2017 [10, 11].

- **Foreshock Possibility:** There is a small, approximately 5% chance that this earthquake could be a foreshock to an even larger event [12].

The authors note that this assessment is preliminary and will be refined as more data from satellites and field surveys become available [12].