

Aseismic creeping of the Philippine fault in Leyte Island, Philippines, revealed by field observation and InSAR analysis

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The Philippine fault is a 1250-km-long, left-lateral strike-slip fault extending NNW parallel to the Philippine archipelago. This fault has been very active in the past 100 years with several destructive earthquakes accompanied by surface rupture in Luzon and Mindanao Islands. We identified evidence for aseismic creeping of the Philippine fault in Leyte Island located on the central portion of the fault. InSAR analyses of the satellite images taken between February 2007 and January 2011 also revealed a sharp contrast in the displacement fields across the fault trace that suggests aseismic creeping of the fault. In the field, we are able to identify left-lateral offsets of artificial features with known construction years in northern and central island, giving slip rates as much as 24mm/yr, which is comparable to the GPS-derived slip rate of the fault in Masbate Island. In order to precisely estimate the creep rates, we initiated alignment array measurements of the creeping section of the Philippine fault, similar to the one conducted along the Hayward fault in the San Francisco Bay area.

Keywords: Philippine fault, Leyte Island, creeping, InSAR analysis, alignment array measurement