

Reevaluation of the Thoen fault activity along the southeastern margin of the Lampang basin, northern Thailand

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The collision between Indian and Eurasian plates since the early Tertiary causes the NW-SE and NE-SW strike-slip faults and the N-S dip-slip faults in the Indochina region, predominantly. The Lampang Cenozoic basin, northern Thailand, is bordered on its southeastern side by the NE-SW-trending Thoen fault. In order to clarify tectonic activity of this region, we selected the Thoen fault as a target (fault) for paleoseismological study.

Morphotectonic landforms formed by normal faulting in the Lampang basin are fault scarps, triangular facets, wine glass canyons and linear mountain front. Geomorphic index data, including stream length gradient index (SL), ratio of valley floor width to valley height (Vf) and mountain front sinuosity (Smf) suggest that the Lampang basin is a slightly active tectonic area.

Geomorphological features and geomorphic index data of the study area envisage active normal faulting with slight lateral movement. However, stratigraphic units of trenches indicate no evidence of fault movement within the recent 3,000 years. AMS radiocarbon ages suggest that the last movement of the Thoen fault at Ban Don Fai (Ban Don Fai segment) might have occurred more than 940 years ago. Based on the age of the stratigraphic units extrapolated from the relationship between AMS radiocarbon and TL ages, the Thoen fault at Ban Thung (Sop Prap segment) might have ruptured more than 3,600 years ago.

In the northern Thailand, there are six major faults that have been regarded as an active fault: Mae Chan, Mae Tha, Pua, Thoen, Mae Hon Son and Mae Ping faults. This study proved that the Thoen fault might be not so active at least during the last several thousand years. More researches on the other active faults are necessary to evaluate the fault activity and very recent tectonics in northern Thailand.

Keywords: Thoen fault, Morphotectonic landforms, Geomorphic index, Lampang basin, Northern Thailand