

A review of active faults in Indochina region

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ABSTRACT

Major active faults in Indochina region are principally caused by progressive northward and north-eastward movement of the Indian plate and collision with the Eurasian plate since Paleogene. A present-day seismicity in Indochina region is, at least to an extent, related to active faults that located in the eastern part of plate boundary and zone of strike-slip deformation, between the Red River Fault and the Sagaing Fault. We compiled active fault, seismological, remote sensing data and field survey for updating the evidences of active faults in the region. Four active fault systems have been identified in Indochina region, and are as follows;

1) Transpressional fault system related to subduction and collision of the Indian plate beneath the Burma microplate, in the Indoburman range locates between the Sunda Megathrust and the Sagaing Fault. Major active faults in this zone trend mainly N-S and NW-SE, including Kabaw Fault, Laymyo Fault, Chunk Fault, West Bagoyama Fault, Pyay Fault, Thahtay Chung Fault, and Seidaung Fault; these faults cause both reverse (thrust) and strike-slip motions. The largest known earthquake with a Mw 7.3, occurred along the northern part of the Kabaw Fault in Homalin area on 6 August 1988.

2) Dextral Sagaing Fault system related to northward translation of the Indian plate, locates in Myanmar. Several major earthquakes ($M_w \geq 7.0$) and damages have been reported along the fault since 1930.

3) A complex active fault system related to an extrusion in the eastern syntaxis of the Himalaya, locates in the region between the Red River Fault and the Sagaing Fault, in Shan Plateau, northern Thailand and Laos, and Vietnam. There are mainly sinistral and dextral active faults, and normal faults. Sinistral active faults in this zone trend mainly NE-SW and ENE-WSW, including Nanting Fault, Wanding Fault, Jinghong Fault, Mengxing Fault, Nam Ma Fault, Mae Chan Fault, Thoen Fault, and Dien Bien Phu Fault. A large-scale earthquake reported in this zone with a Mw 6.8 on 24 March 2011 occurred on the southwestern segment of the Nam Ma Fault. Dextral active faults in this zone trend mainly NW-SE, including Wuliang Shan Fault, Lancang Fault, Mae Ping (or Moei) Fault, Three Pagoda Fault, and Srisawat Fault. The largest known earthquake, with a Mw 7.0, occurred along the northwestern part of the Lancang Fault near the border with Shan State, Myanmar on 6 November 1988. A normal fault trends mainly N-S, and is associated with Cenozoic basin formation. There are Pua and Petchabun Faults in Thailand. Based on seismicity, there were no reports of any damage from micro-earthquakes in the region.

4) Dextral Red River Fault system locates in southern China block and Vietnam. Strong earthquakes ($M_w \geq 6.0$) occurred on the Red River Fault during 1833-1962. However, at the present, a large earthquake has not occurred along the fault.

These four active fault systems have produced major earthquakes in the region since Holocene to present. In order to mitigate the impact of earthquakes, seismic hazard zonation is desired based on active fault data.

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