

Current understanding on geologic setting of Yogyakarta earthquakes 2006 (central Java, Indonesia) based on integrating collaborative research outputs in the field of geology, geophysics and remote sensing.

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The active fault system responsible for the 27 May 2006 earthquakes in Yogyakarta region (central Java, Indonesia) is still poorly known. Due to its huge damages on human casualties and materials, the active fault system must be well characterized for prevention of future seismic hazards. In order to achieve this goal, an international research group consisting of Indonesian and Japanese geoscientists have been collaborating in conducting geologic, geophysics, and remote sensing on the damage areas.

Interpretation of subsurface structure using gravity data suggests that geologic setting of active fault system is located on the eastern margin of a volcanic-tectonic depression named as the Yogyakarta basin. The basin is NE-SW oriented depression measuring 16-22 km wide and at least 45 km long. During Cenozoic the basin was a place of multiple intrusions of volcanic centers, some are not exposed at the ground surface. Due to these volcanic intrusions, the Yogyakarta basin is current divided into several zones of sub-basin “highs” (Godean and Piyungan) and “lows” (Bantul and Prambanan). Interestingly, our aftershock seismic observation suggests that currently active region is not located along the so-called Opak fault that is considered by many researchers as the moving fault on 27 May 2006. Rather, our observation suggests that active fault is located further east, located within the Tertiary volcanic domains.

As the location of suspected active fault is quite remote from the spatial distribution of casualties intensity, we consider that besides the active fault itself, there are several geotechnical aspects that have also controlled the damage. These include the thickness of Quaternary filling on sub-basin “lows”, different soil compositions, and engineering aspect of housing and other constructions.