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The surprising Mw 6.5 Bantul Earthquake 2006

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The Bantul area located in the Sultanate of Yogyakarta, Central Java, was hit by a disastrous earthquake on May 26, 2006 (UTC). The hypocentre was detected close to the south coast of Central Java, Indonesia, in 10 km to 38 km depth. The quake damaged not only profane houses but also historical buildings like the Hindu temple of Prambanan (9th century) and the Sultan cemetery in Imogiri (17th century). No historical records exist about comparable destructive earthquake in the area of Yogyakarta. The catastrophic event killed around 6000 people, destroyed more than 130,000 houses, and left $>$0.5 Million people homeless. Seismological records show relatively low seismicity for the Yogyakarta district, in comparison to other regions along the Sunda Arc. This surprising shallow strike slip earthquake was not directly related to the thrust tectonics between the Indo-Australian Plate and the Eurasian Plate, but should be caused by the stress accumulation in the upper crust induced by the subduction process. Largest destructions were concentrated in a strip area elongated parallel to the Opak river fault between Parangtritis at the coast up to Klaten, east of Yogyakarta. Therefore, it was thought that Opak fault was activated during the quake. However, a significant surface rupture was not visible. On the first point of view destructions were related to unsafe constructions, and topographic effects in the Gunung Kidul region. A more detailed view makes obviously that strong ground acceleration amplification on unconsolidated alluvial sediments enhanced the shaking of the soil for up to two minutes as local people reported. Therefore, strong site effects are likely

to be responsible for the disastrous damages in the specific areas of Bantul. Three days after the event the Seismological Task Force of the GFZ Potsdam have started to install a temporary network of 12 seismic stations in cooperation with Bureau Meteorology and Geophysics, Jakarta, and students from the Gadjah Mada University, Yogyakarta. The instruments collected about 3000 aftershock events over 3 months. The alignment of the aftershock hypocentres shows surprisingly that the Opak fault was not activated during the quake, but, a hitherto unknown fault located 10 km more to the east was the likely rupture plane. The alignment of the aftershocks fits well with the derived fault plane solutions as provided by NEIC and Harvard.