

The interactions between large events in southwestern Taiwan : 2010 Jiashian, 2010 Taoyuan and 2012 Wutai earthquakes

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Abstract

The 2010 Jiashian earthquake is the largest inland earthquake in the southwestern Taiwan since the 1964 M6.3 Paiho earthquake. Since 2010, three large events with $M \geq 5.5$ have occurred – referred to as the 2010 Jiashian, the 2010 Taoyuan, and the 2012 Wutai earthquakes. The occurrence of these three earthquakes could not be associated with the rupture of active faults. Therefore, a comprehensive study on seismic hazards in southern Taiwan is necessary. The Jiashian mainshock rupture area is surrounded by high seismicity between 1991 and 2007, suggesting that the Jiashian earthquake may be triggered by the high stress concentration in the vicinity. Following the 2010 Jiashian earthquake the seismicity rate in southern Taiwan was determined to be significantly higher than before the quake. According to the modified Omori formula of the Jiashian earthquake, the 2010 Taoyuan and 2012 Wutai earthquakes could be regarded as aftershocks of the 2010 Jiashian earthquake. And the Coulomb stress change imparted by the Jiashian earthquake showed that the 2010 Jiashian earthquake promoted failure on fault systems near the epicenters of the 2010 Taoyuan and 2012 Wutai earthquakes. Additionally, the rate-and-state friction model indicated that a high seismic rate will persist at least until the end of 2012. The occurrences of these three large events draw attention to the seismic hazard induced by blind faults in southwestern Taiwan.

References

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