



## **Effect of 2008 and 2014 Yutian earthquake on earthquake probabilities to other faults**

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Static stress changes have been proposed to explain variations of seismicity rates, off-fault aftershocks and probability changes for the occurrence of impending earthquakes. Based on the rate-and-state dependent frictional law<sup>[1]</sup>, combined with the seismicity analysis before and after 2008 Yutian earthquake, we have quantitatively calculated the probability of earthquake occurrences nearby, and explained the probable causes of 2014 Yutian earthquake. The probabilities of occurrence a  $M7.0$  earthquake on the eastern segments of Kengxiwar fault, which is the Seismogenic fault of 2014 Yutian earthquake, increases from 3.3% in 2008 to 5.83% in 2014. The probabilities of occurrence a  $M6.5$  and a  $M6.0$  earthquake increase from 23.9% to 38.6% and from 42% to 62.3%, respectively. In addition, we have also computed the earthquake probabilities of southwest and central segments of Gonggacuo fault, and the central segments of Kengxiwar fault, where the Coulomb stress also changed after 2008 Yutian earthquake. The earthquake probabilities of central segments of Gonggacuo and Kengxiwar fault decreased after the 2008 Yutian earthquake, while the earthquake probabilities of southwest segments of Gonggacuo fault increased. After the 2014 Yutian earthquake, the earthquake probabilities of southwest and central segments of Gonggacuo fault increased, but the central segments of Kengxiwar fault decreased. This result indicates that slight variations in Coulomb stress changes can cause the seismic risk changes of the faults nearby. It needs about 500 years that the probabilities of occurrence a  $M7.0$  earthquake exceed to 95% of the three faults we mentioned above. The destructive earthquakes are likely to occur in the southwest segments of Gonggacuo fault, with 26 years and 0.8 years the probabilities of occurrence a  $M6.5$  and a  $M6.0$  earthquake exceed to 95%, respectively. While the seismicity of the central segments of Kengxiwar fault is low; it needs about 87 years and 54 years that the probabilities of occurrence a  $M6.5$  and a  $M6.0$  earthquake exceed to 95% respectively.