3D Modeling of Earthquake Cycles of the Xianshuihe Fault, Southwestern China

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Abstract We perform 3D modeling of earthquake generation of the Xianshuihe fault, southwestern China, which is a highly active strike-slip fault with a length of about 350 km, in order to understand earthquake cycles and segmentations for a long-term forecasting and earthquake nucleation process for a short-term forecasting. Historical earthquake data over the last 300 years indicates repeated periods of seismic activity, and migration of large earthquake along the fault during active seismic periods. To develop the 3-D model of earthquake cycles along the Xianshuihe fault, we use a rate- and state-dependent friction law. After analyzing the result, we find that the earthquakes occur in the reoccurrence intervals of 400-500 years. Simulation result of slip velocity distribution along the fault at the depth of 10km during 2694 years along the Xianshuihe fault indicates that since the third earthquake cycle, the fault has been divided into 3 parts. Some earthquake ruptures

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