ID de Contribution: **125** Type: **Poster**

Detailed Three-dimensional Fault Model of the 2022 Mw 6.6 Luding Earthquake, Sichuan: Implications for Potential Seismic Risk in Southeastern Tibetan Plateau

jeudi 22 mai 2025 13:15 (15 minutes)

The detailed 3D fault model and further seismic rupture behavior analysis and fault mechanics simulation based on it are important and meaningful. A strong Mw 6.6 earthquake occurred in Luding, Sichuan, on 5 September 2022, the epicenter was located near the Moxi segment of the Xianshuihe Fault Zone (XSHF) in southeastern Tibetan Plateau. This earthquake is also situated at the Y-shaped junction of the XSHF, the Longmen Shan Fault Zone (LMSF), and the Anninghe Fault Zone (ANHF). Two seismic gaps, one in the southern LMSF and the other in the northern ANHF, are widely considered to have high seismic risk in this region. To date, a detailed 3D fault model has not been established for this earthquake, preventing a 3D Coulomb stress change (ΔCFS) calculation for further seismic potential analysis. Therefore, we build a detailed 3D fault model of the earthquake area and compute ΔCFS in the surrounding areas. Based on 3D modeling technology, we establish a 3D model of the main faults in the Luding earthquake area using previously published relocated earthquake catalog and focal mechanism solutions; including the Moxi segment (f1) of the XSHF, the Daduhe fault (f2) and two previously unknown faults (f3 and f4). We then calculate 3D ΔCFS, and find that the mainshock of the Luding earthquake significantly increased the Coulomb stress near the epicenter and triggered two M > 5 aftershocks. Moreover, it caused a remarkable increase in Coulomb stress and hence a notable enhancement in seismic hazard in the northern ANHF, where the fault has remained strongly coupled since 1480 CE and has been approaching the next strong earthquake recurrence.

Speaker information

other PhD students

Author: XU, Fang (State Key Laboratory of Earthquake Dynamics and Forecasting, Institute of Geology, China Earthquake Administration, Beijing, 100029, China / Universite Paris Cite, Institut Physique du Globe de Paris, CNRS, Paris, France)

Co-auteurs: ZHANG, Jinyu (State Key Laboratory of Earthquake Dynamics and Forecasting, Institute of Geology, China Earthquake Administration, Beijing, 100029, China); LU, Renqi (State Key Laboratory of Earthquake Dynamics and Forecasting, Institute of Geology, China Earthquake Administration, Beijing, 100029, China); KLINGER, Yann (Universite Paris Cite, Institut Physique du Globe de Paris, CNRS, Paris, France); LIU, Yiduo (Key Laboratory of Mountain Hazards and Surface Processes, Institute of Mountain Hazards and Environment, Chinese Academy of Sciences, Chengdu, China); YANG, Xuhang (State Key Laboratory of Earthquake Dynamics and Forecasting, Institute of Geology, China Earthquake Administration, Beijing, 100029, China); LIU, Guanshen (State Key Laboratory of Earthquake Dynamics and Forecasting, Institute of Geology, China Earthquake Administration, Beijing, 100029, China); GUO, Zhaowu (State Key Laboratory of Earthquake Dynamics and Forecasting, Institute of Geology, China Earthquake Administration, Beijing, 100029, China)

Orateur: XU, Fang (State Key Laboratory of Earthquake Dynamics and Forecasting, Institute of Geology, China Earthquake Administration, Beijing, 100029, China / Universite Paris Cite, Institut Physique du Globe de Paris, CNRS, Paris, France)

Classification de Session: Posters

Classification de thématique: Earth, Environment and Space Sciences: Geophysics