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Session 14

Imaging and modeling 3D fault complexities in FAULT2SHA

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Defining the 3D geometries of faults and their structural and rheological complexities not only presents challenges for field geologists, but also for seismic hazard assessment (SHA). Roughness of the fault plane, friction, asperities and bends constitute primary controlling parameters in physicsbased earthquake rupture models. Advanced seismic-cycle and earthquake rupture simulations incorporating these variables in 3D models have shown the occurrence of complex earthquake ruptures. Meanwhile, structural and field geologists are analyzing data at micro- and macro-scales, revealing that microscale observables can influence earthquake ruptures, or that, for example, strain partitioning, propagation of earthquake rupture or the seismic/creeping behavior can be influenced by steps, bends, gaps and barriers within and between faults. Modeling the 3D geometry incorporating the variability of these fault parameters along-strike and down-dip is the new frontier that earthquake scientists are beginning to explore, and a key scientific target of the Fault2SHA community. Finally, as the assessment of seismic hazard is ultimately concerned with the expected ground motion, to what extent are empirical ground motion prediction equations and physics-based ground motion simulations capable of capturing these complexities?

This session welcomes contributions from: (i) earthquake geologists, seismologists and structural geologists exploring fault geometry and behavior, including detailed imaging of fault properties along-strike and down-dip; (ii) simulations of complex ruptures and earthquake recurrence through dynamic and multi-cycle simulations; (iii) incorporation of characteristic of 3D faultbased ruptures into SHA; (iv) and ground motion modelers (empirical and physics-based) investigating the influence of such complex micro- and macroscale 3D complexities.