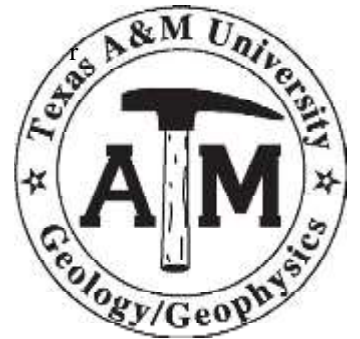


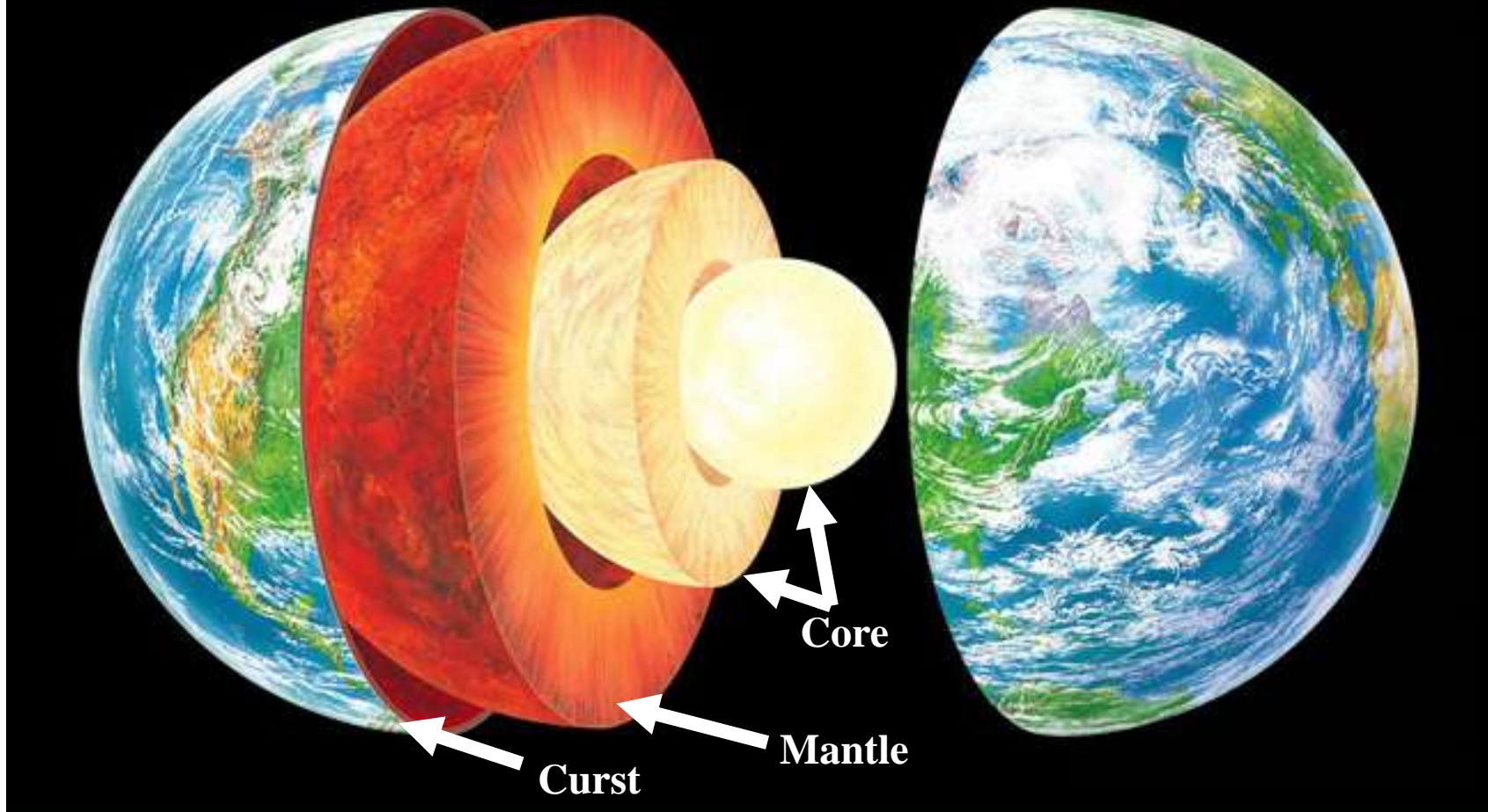
Parallel Finite Element Simulations of Dynamic Earthquake Rupture and Seismic Wave Propagation

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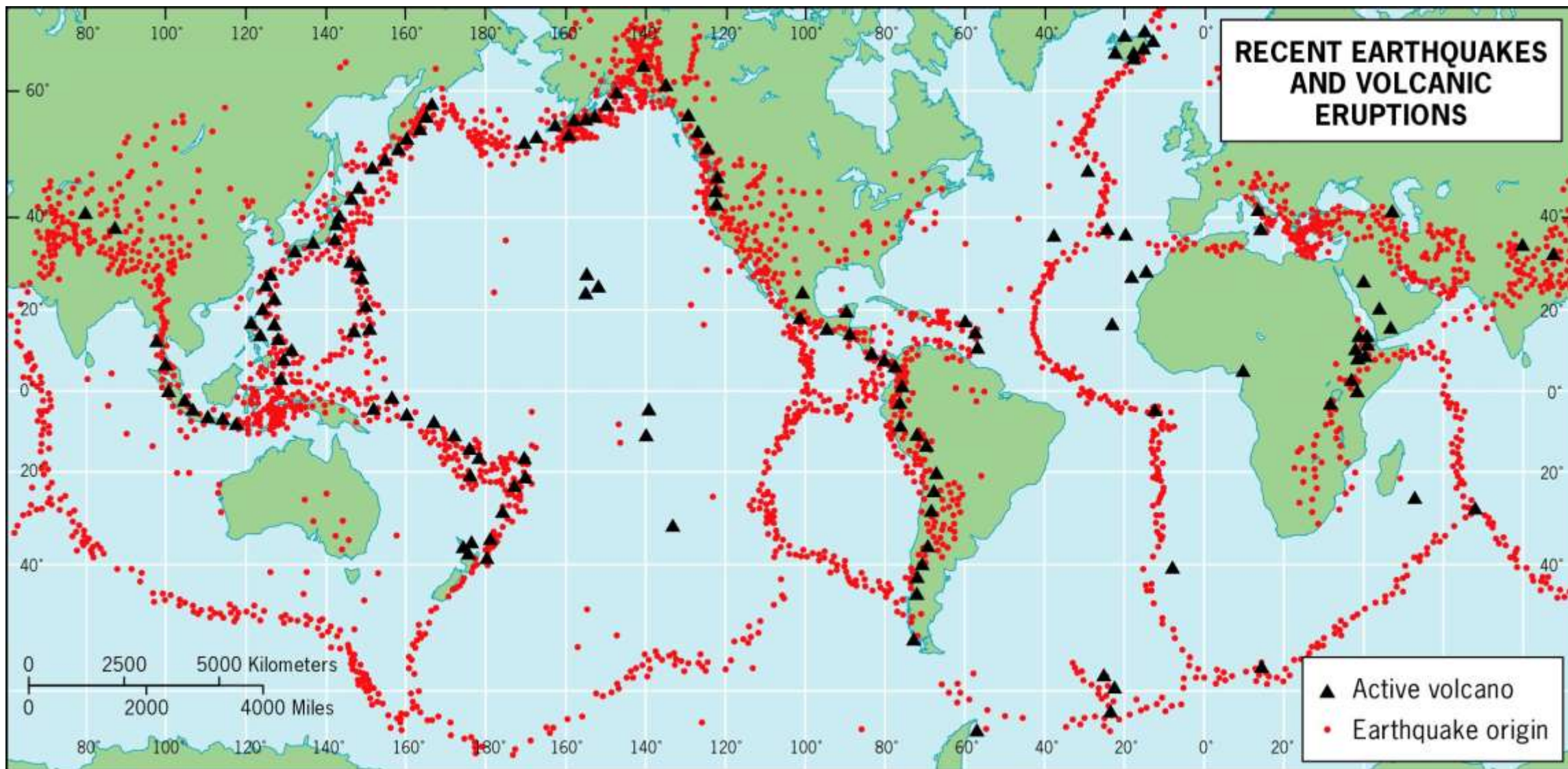
Earth



Why Do Earthquakes Happen?

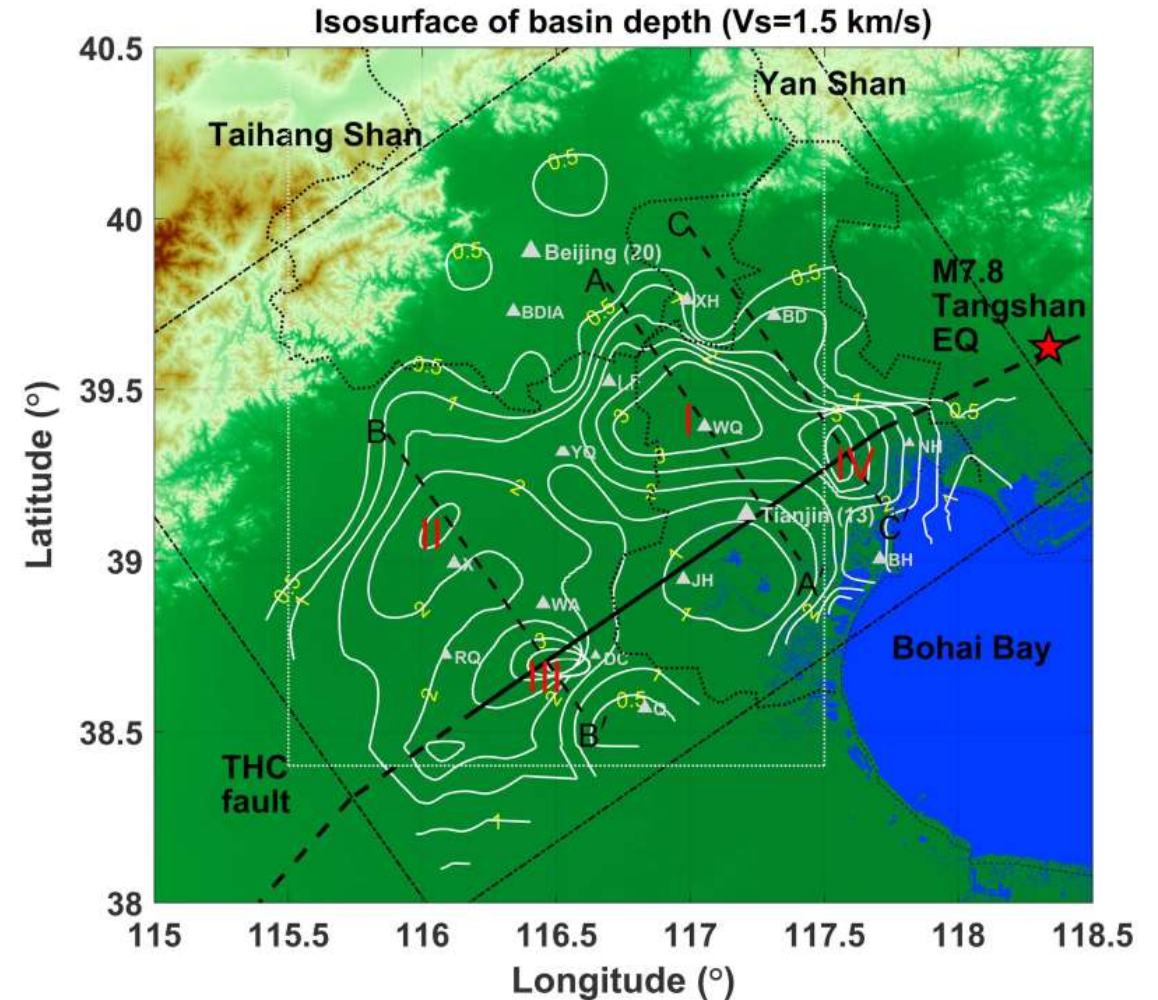
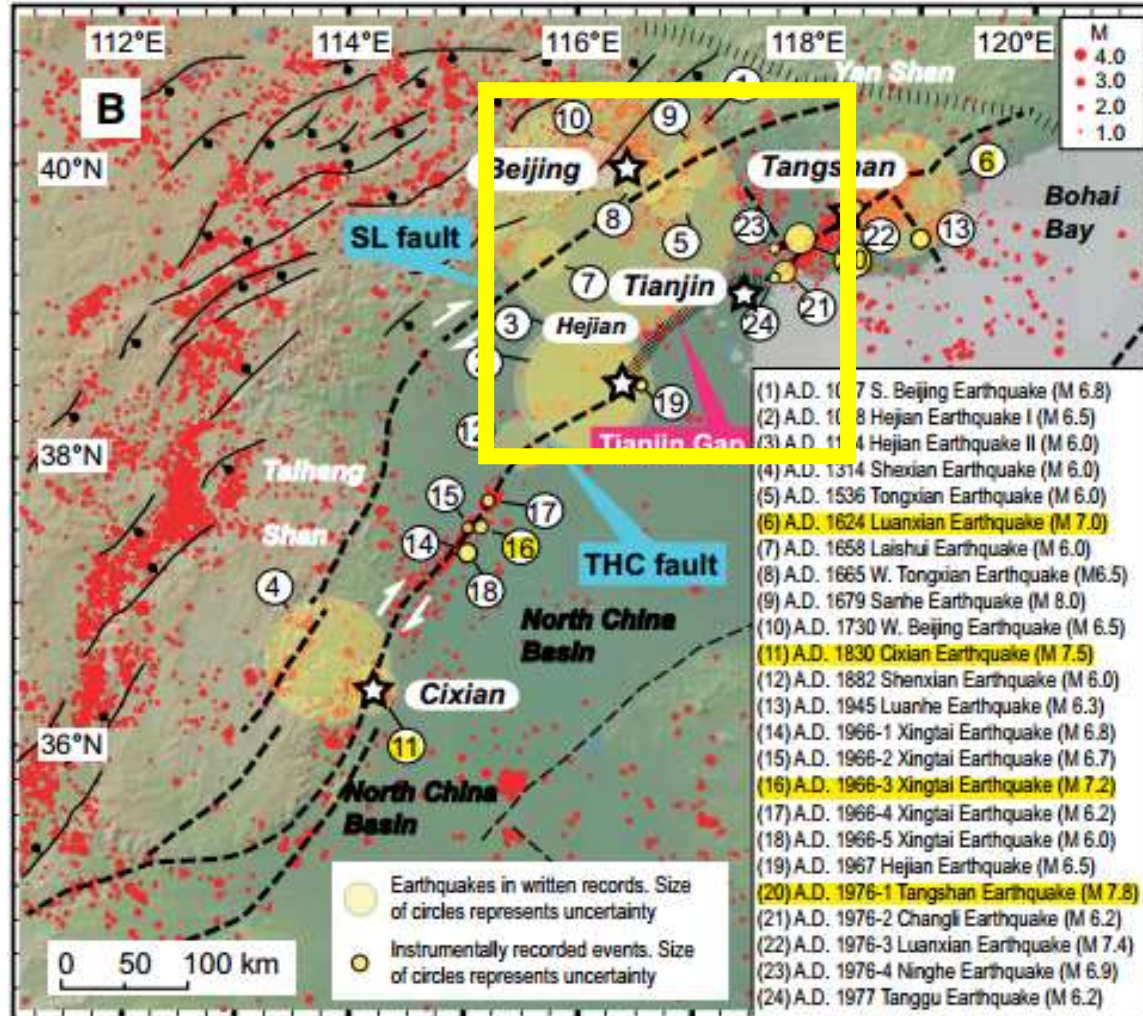
Lithosphere = Crust + Upper Mantle → Plates; Plate Tectonics

Earthquakes occur at Plate Boundaries



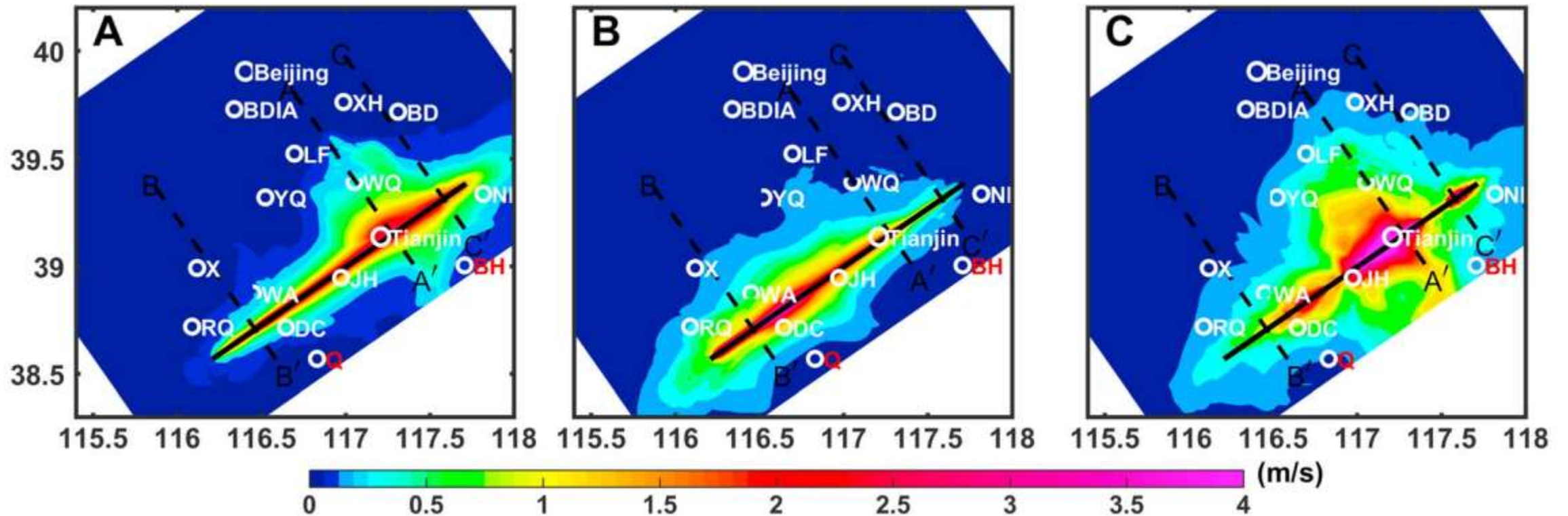
Potential Earthquake in North China

(Duan et al., 2017)



Topography (color) and sediment basin depth (contours) in North China.

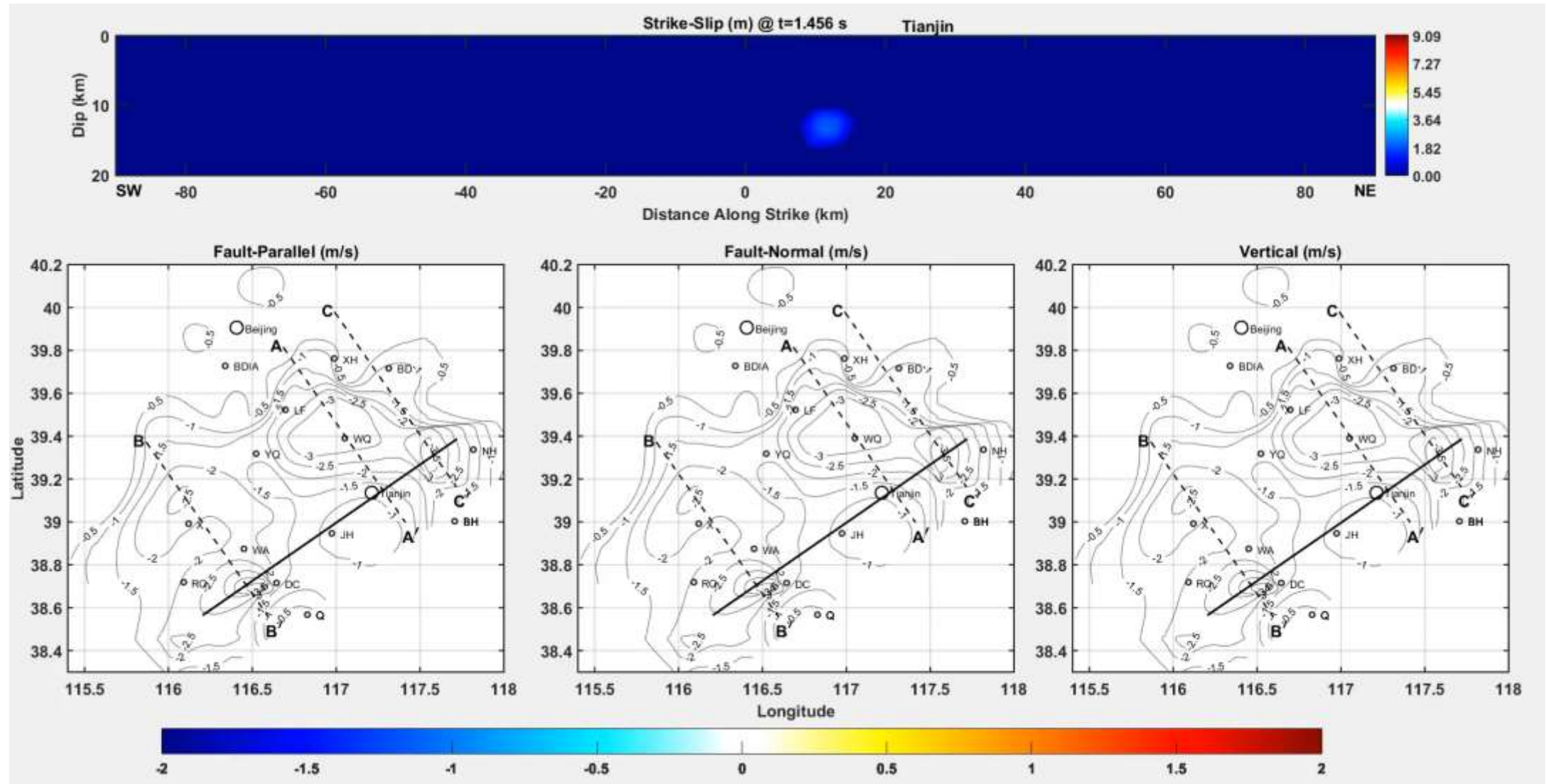
(Yin et al., 2014)



Peak Horizontal Ground Velocity from 3 Scenario Realizations (**Duan et al., 2017**).

Scenario earthquakes and corresponding ground motions from parallel finite element simulations of dynamic rupture and wave propagations. In each model, there are ~480 million elements. Each simulation takes ~22 hrs using 256 MPI processes: ~5000 BUs + 500 Gb Memory per Simulation.

Dynamic rupture on fault (Top) and seismic wave propagation along Earth's surface (Bottom)



(Duan et al., 2017)