abstract

EARTHQUAKE FAULT SUPERHIGHWAYS

Motivated by the observation that the rare earthquakes which propagated for significant distances at super-shear wave speeds (> ~3 km s^{-1}) occurred on very long straight segments of faults, we examine every known major active strike-slip fault system on land worldwide and identify those with long (>100 km) straight portions capable not only of sustained super-shear rupture speeds but having the potential to reach compressional wave speeds (~6 km s^{-1}) over significant distances, and call them 'fault superhighways'.

These superhighways include portions of the 1000 km long Red River fault in China and Vietnam passing through Hanoi, the 1050 km long San Andreas fault in California passing close to Los Angeles, Santa Barbara and San Francisco, the 1100 km long Chaman fault system in Pakistan north of Karachi, the 700 km long Sagaing fault connecting the first and second cities of Burma: Rangoon and Mandalay, the 1600 km Great Sumatra fault, and the 1000 km Dead Sea fault.

Of the 11 faults so classified, nine are in Asia and two in North America, with seven located near areas of very dense populations. Based on the current population distribution within 50 km of each fault superhighway, we find that more than 60 million people today have increased seismic hazards due to them.

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