

# **The 12 May, 2008, Mw 8.0 Wenchuan earthquake, Sichuan, China: Background, field investigations and tectonic implications**

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## **Abstract:**

The Mw8.0, Wenchuan earthquake, which devastated the mountainous, western rim of the Sichuan basin in central China on May 12th, 2008 produced a surface rupture at least 200 km-long, with oblique thrust/dextral slip and maximum scarp height of ~11m. It thus ranks as one of the world's largest continental mega-thrust events in the last 150 years. Field investigation shows clear surface breaks along two of the main branches of the NE-trending Longmen Shan thrust fault system. The principal rupture, on the NW-dipping Beichuan fault, displays near equal amounts of NW hanging-wall up – thrust and right-lateral slip. Basin-ward of this rupture, another continuous surface break is observed for over 70 km on the parallel, shallower-NW-dipping Pengguan fault. Slip on this latter fault was pure thrusting, with a maximum scarp height of ~ 3.5 m. This is one of the very few reported instances of co-seismic surface rupture on parallel thrusts. The long rupture, large-offsets, and distributed surface breaks that characterize this out-of-sequence event clearly attest to regional, EW-directed, present-day crustal shortening along the NE-SW trending, eastern margin of Tibet. It calls for a re-evaluation of tectonic models anticipating little or no active shortening of the upper crust along that edge of the plateau, and highlights the need for a re-assessment of seismic hazard along potentially under-rated active faults across the densely-populated western Sichuan basin and mountains.