



## **Tension crack characteristics of surface ruptures of 2 strong earthquakes recently occurred along reverse faults in China**

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Field investigations show that there are some tension cracks in the surface ruptures of 2 strong earthquakes recently occurred along reverse faults with strike-slip component in China.

Yushu Ms7.1 earthquake occurred on April 14, 2010 in Qinghai, China produced a ~65 km long co-seismic surface rupture with a strike of  $310^\circ$ , which is distributed along Ganzi-Yushu fault that is a reverse fault with strike-slip component in the Qinghai—Tibetan Plateau. The surface rupture of Yushu Ms7.1 earthquake consists of shear, transtensional cracks, transpressional cracks, tension cracks and mole tracks. Some tension cracks occur on the top of small uplifts and the cracking course is from surface to underground for some tension cracks are shallow. The small uplifts are actually anticlines produced by a regional and deep compressional stress field, but there is a local tensional stress field on the top of the anticlines.

Lushan Ms7.0 earthquake on 20 April 20, 2013 in Sichuan, China occurred on the southern segment of the Longmenshan fault zone with a NE strike which is also a reverse fault zone with strike-slip component, but only a co-seismic surface rupture 80m long with a NW strike was found without any NE-striking surface rupture found. The surface rupture shows the form of tension cracks on a top of a small uplift. There are two sets of fresh striation on the surface rupture plane, the striation with larger plunge angles usually only remains above the range 10-20cm below the ground surface, which is covered by the striation with smaller plunging angles. The comprehensive analysis shows that the surface rupture during the Ms7.0 Lushan earthquake at first experienced thrusting, then sinistral strike-slip, and tension cracking at last.

In general, some tension cracks of the surface ruptures from Yushu Ms7.1 earthquake on April 14, 2010 and Lushan Ms7.0 earthquake on 20 April 2013 may be produced by the local tensional stress field, but they also reflect the regional and deep compressional stress environment.

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