J232-002 **Room: 304** **Time: May 21 11:00-11:15**

Inversion of fault-slips of the Great Wenchuan earthquake based on ALOS/PALSAR information

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The May 12, 2008 Wenchuan earthquake, Mw7.9, occurred on the northeastern-striking Longmen Shan (LMS) faults beneath the steep eastern edge of the Tibetan plateau. The coseismic ruptures and crustal deformation occurred over a length of 285 km along LMS thrust belt. Over 87,392 people were dead or missing, 374216 injured. The potential strong earthquake zones were not supposedly including the LMS faults since the low-middle class of magnitudes and low frequency in the modern seismometer history. Even with abundant historical records of Dujiangyan irrigation infrastructure built in 256 BC, there were no extraordinary earthquakes events recorded. However, from the geological point of view, high topography and long-term uplift of the eastern plateau relative to the Sichuan foreland attracted much attention.

Just after the Wenchuan earthquake we reported the background and damage distribution on Wenchuan Earthquake Urgent Session. Three weeks later we investigated the fields of heavily damage-belts along the LMS faults (1,2). The challenges of fieldworks included the isolated at dark valleys due to blocked roads, unexpectedly political and military restrictions on access to portions of LMS faults, and inaccessible high-mountain areas accompanying risk of land-sliding. With the other two additional field investigations we discovered more detail facts that two of parallel coseismic thrust-fault belts, with a distance of 11-13km in between, ruptured along the Longmen Shan (LMS) faults. Over 10-segments locations were measured with distinguished displacement offsets. Of them the maximum vertical displacement reached ˜6 m on Yinxue-Beichuan fault, and ˜2 m on Guanxian-Anxian fault. Most of them companied with dextral-slip components. However, the left-slip fault at Xiaoyudong between of the two LMS faults, ruptured with the maximum displacements of 2.8m in horizontal, and 1.5m in vertical as well (2,3).

The field results showed coseismic ruptures in detail but our field knowledge is limited in the huge high-topographic area. With the advantages of PALSAR (Synthetic aperture radar sensor) data obtained from satellite ALOS, we could understand the whole fault-zones movements and crustal deformation in macro-scale. Combined the field information with interferometric information from the eight pairs of paths of InSAR interferogram, we derived the parallel fault-slip model. Furthermore, the fault-slip distribution was inversed based on the elastic half-space dislocation theory. The inversed fringes of the InSAR interferogram were well consistent with observed one. Also the inversed fault-slip displacements were consistent with the observed in general. The parallel-fault model is reasonable to interpret the coseismic surface ruptures and the crustal deformations (3).

Reference:

(1) Ken Xiansheng Hao, H. Si and H. Fujiwara, 2008, A preliminary investigation of the coseismic surface-ruptures for Wenchuan earthquake of 12 May 2008, Sichuan, China, Proc. of the 14th World conference on earthquake engineering, Beijing, S31-007.

(2) Ken Xiansheng Hao, H. Si, H. Fujiwara and T. Ozawa, 2008, How the coseismic faults are distributed over Longmen Shan faults during the 2008 Wenchuan earthquake, Sichuan, china, Proc. of the 7th ASC and SSJ 2008meeting, Tsukuba, A22-02.

(3) Ken Xiansheng Hao, H. Si, H. Fujiwara and T. Ozawa, 2008, Coseismic faults are crustal deformation accompanied the 2008 Wenchuan earthquake, china by field investigation and InSAR interferogram, the 2008 Fall meeting of the American Geophysical Union (CD-ROM), San Francisco, U23B-0056.