

HDS029-05

Room:302

Time:May 24 11:45-12:00

## Relationship between landslides caused by 1556 M8.5 Huaxian earthquake and active faults in eastern Weihe Basin, China

Gang Rao<sup>1\*</sup>, Aiming Lin<sup>1</sup>

<sup>1</sup>Grad. Sch. Sci. Tech., Shizuoka Univ.

Earthquake-induced landslides have been reported in association with many moderate to large earthquakes, causing many casualties and large economic losses, which have been paid great attention to and widely investigated around the world (e.g., Harp and Jibson, 1996; Ren and Lin, 2010). Most earthquake-induced landslides are concentrated in the areas around the epicenter of large earthquakes over a distance of tens of kilometers. Recent studies reveal that there is close relation between the distribution and topographic features of earthquake-induced landslides along the co-seismic surface rupture zone, which is effected by the pre-existing active faults, e.g., the earthquake-induced landslides caused by the 2008  $M_w$  7.9 Wenchuan earthquake (Ren and Lin, 2010).

The locations of landslides can be identified by interpretations of Remote Sensing images and structural analysis of digital elevation model (DEM) data, which are controlled by the tectonic topography developed along the pre-existing active fault.

In this paper, we present case study of the earthquake-induced landslides caused by the 1556 M 8.5 Huaxian earthquake occurred in the Weihe Basin, central China. The Great Huaxian earthquake occurred on 23 January 1556 in the eastern Weihe Basin, central China, resulting more than 820,000 fatalities and widespread damage in the densely-populated region around the Xi'an city, an old capital of China.

We use high-resolution IKONOS and WorldView remote sensing images to identify the locations of landslides along the south margin of eastern Weihe Basin. Topographic analysis is conducted with 30-m resolution Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) Global Digital Elevation Model (GDEM). The results have been confirmed by the field investigations.

The landslides caused by the 1556 great Huaxian earthquake mostly occurred in the south margin of the eastern Weihe Basin where many active normal faults are developed. The landslides are mainly developed upon steep slopes ( $30-60^\circ$ ) along the active normal fault zones within the margin zone between the Weihe Basin and Huashan Mountains. A cluster of landslides including the greatest landslide of  $> 6 \text{ km}^2$  are developed along the Huashan Piedmont faults near the Huaxian city where is inferred as the epicentral area of 1556 M 8.5 earthquake. Based on the distribution of landslide and deformation features of active faults and disaster distributions recorded in the historical documents, it is inferred that the landslides are concentrated in the epicentral area of 1556 great earthquake.

Keywords: Landslides, Active faults, 1556 M 8.5 Huaxian earthquake, Eastern Weihe Basin, Central China