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Analysis on the Active Faults in '4.20' Lushan Earthquake Area Based on Remote Sensing

YE Chengming^{1,2}, CUI Peng² and BI Xiaojia³

1 Key Lab. of Earth Exploration and Information Techniques of Ministry of Education, Chengdu University of Technology, China, 610059

2 Institute of Mountain Hazards and Environment, Chinese Academy of Sciences, Chengdu, Sichuan P.R. China. 610041.

3 Chengdu Earthquake Mitigation Bureau, Chengdu, Sichuan P.R. China. 610042

Many scholars analyzed and discussed the study area about the process of fault surface rupture, geological structure, deep structure and dynamic evolution of the genetic mechanism of the earthquake. Due to the limitations of the data, some very important factors is not still be found. Why is the earthquake rupture of the Wenchuan earthquake occurred in 2008 a one-direct to north, and the southern section of the Longmenshan fault is very stable. But a Ms7.0 Earthquake occurred in the southern section of the Longmenshan fault five years later. In view of the above question, we extracted the fault distribution and structure using multi-source remote sensing data, earthquake monitoring stations data, GPS monitoring data about the southern section. After comprehensive analysis and Carefully measuring, we have come to the following understanding.

a). Because of the abdominal thrusts tectonic movement, the faults show a distribution of the NE and NW direction and they form an angle of nearly 90 degrees in the study area. The NE trends of the Longmenshan Mountain Back fault (Wenchuan-Maoxian fault, Jintang fault, Beimu Mountain fault) in east longitude 102.5 degrees to 103 degrees gradually become into the trend of nearly WE, and show a distribution of arcuate structure with less secondary faults. The trend of the longmenshan central fault zone - Beichuan-Yingxiu fault maintains NE good, but in the remote sensing image the structure trace is not continuous, shows line trace missing about 5Km distance in the 103.15 degrees area. The central fault and the mountain back fault gradually merged in the study area from north to south, and the average distance of the faults including secondary faults is not more than 5Km in 20Km range. The trends of the mountain front fault(Dujiangyan-

Hanwang fault) and the central fault always maintain consistent. Their distance is more than 20Km and their altitude difference is more than 3km, that shows the two fault zones are relative independence. The secondary faults number of the front fault gradually increases from north to south, and the The maximum is more than 10. The two faults shows a symmetrical distribution, average distance of not more than 3km, tectonic rift basin in Lushan County Regional. The southern fracture of the State Road 318 is the NW-trending fault, and the length, rupture width and size of the secondary fault is less than the NE trend fractures(Fig.1).

b). Based on the crust movement data, the study shows the movement direction of the area crust as a whole is roughly same, but its velocity is very uneven, is a typical Variable zone. The maximum velocity is more than 14.5 mm / year in the west of the mountain back fault, the minimum velocity is less than 5.5 mm / year in the north of Meishan City Danleng County. Because of the study area is a typical abdominal thrusts structure area, the crust activity zone should be a speed sharp decline area or a inflection point area of speed from large to small. The profile of crust movement shows the "5.12" Wenchuan earthquake and the Lushan "4.20" earthquake epicenter positions belong to the latter and the ebian falut is in the same situation. The fracture belong to the former situation are Longmenshan Mountain front mountain fault, the Dadu river fault, Beimushan fault etc. The fault slip direction can be inferred through the trends from the relation of the fault trends and crust movement. the northern section of Longmenshan central fault and the mountain back fault are right-lateral strike-slip faults and the trend of the mountain front fault is substantially perpendicular to the motion direction that presents it only is a Thrust fault(fig2 and fig3).

* Corresponding author. E-mail: rsgis@sina.com

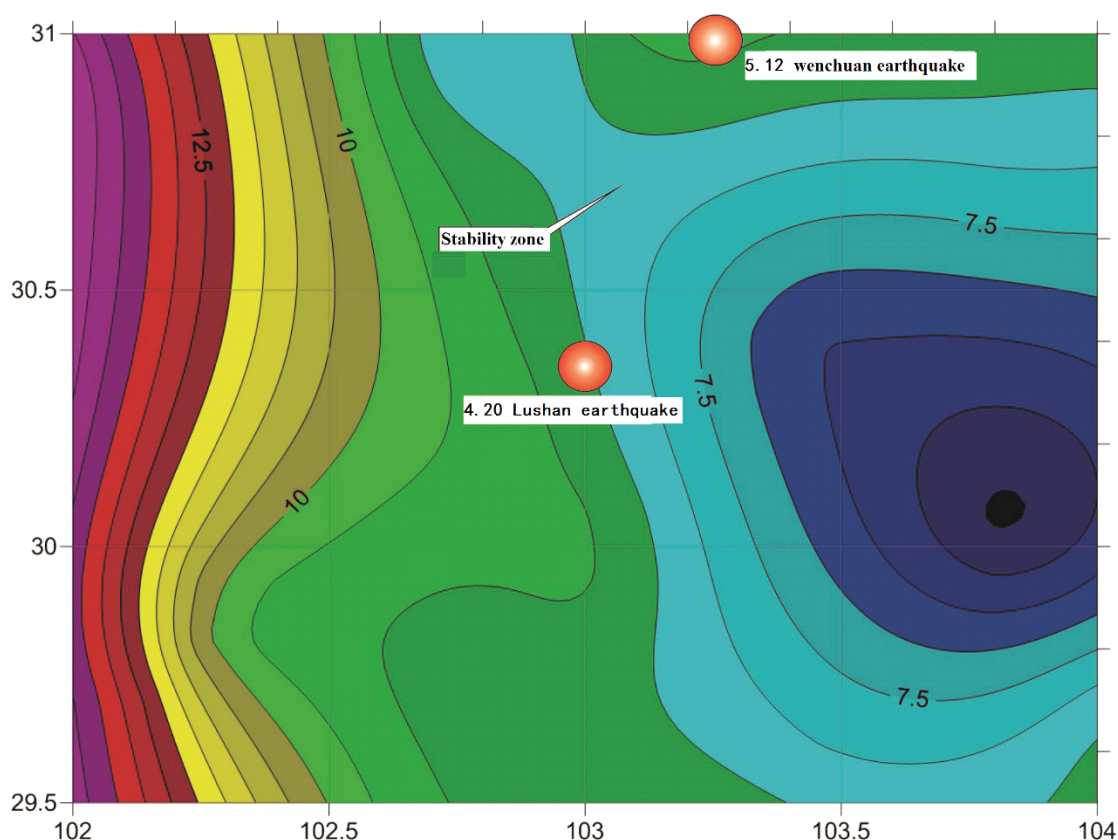


Fig1. The crust movement velocity contour map(mm/y)

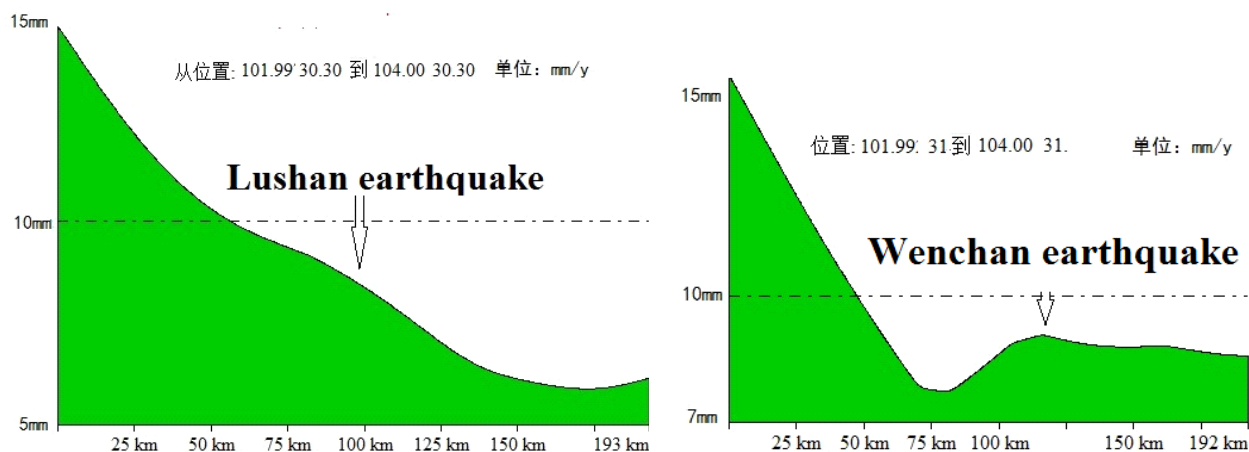


Fig2. The crust movement velocity profile(mm/y)

c).In recently 100 years, there are 9 times more than Ms5.0 independent earthquake occurred and 4 times more than Ms6.0. The time is June 12, 1941 and February 24, 1970 in addition to 5.12 Wenchuan earthquake and 4.20 Lushan earthquake. The spatial distribution of earthquake shows there is no one occurred in at latitude 30 degrees to 30 degrees 15 minutes region, and the region is located between the the Wenchuan epicenter and the Lushan epicenter. The comparison of velocity and epicenter positions presents a 20Km width, nearly constant velocity zone with a weaker

NW-trending and it extends to the mountain front fault. In a certain sense, This is a evidence of the point of view about the 4.20 lushan earthquake is not a aftershocks the 5.12 Wenchuan earthquake. The area located in 30 degrees should be the most tectonically active regions and that is a NW trending linear zone (on both sides of State Road 318) and a typical ductile shear zones(fig3).

Key words: 4.20 Lushan earthquake; Fault zones; Remote Sensing

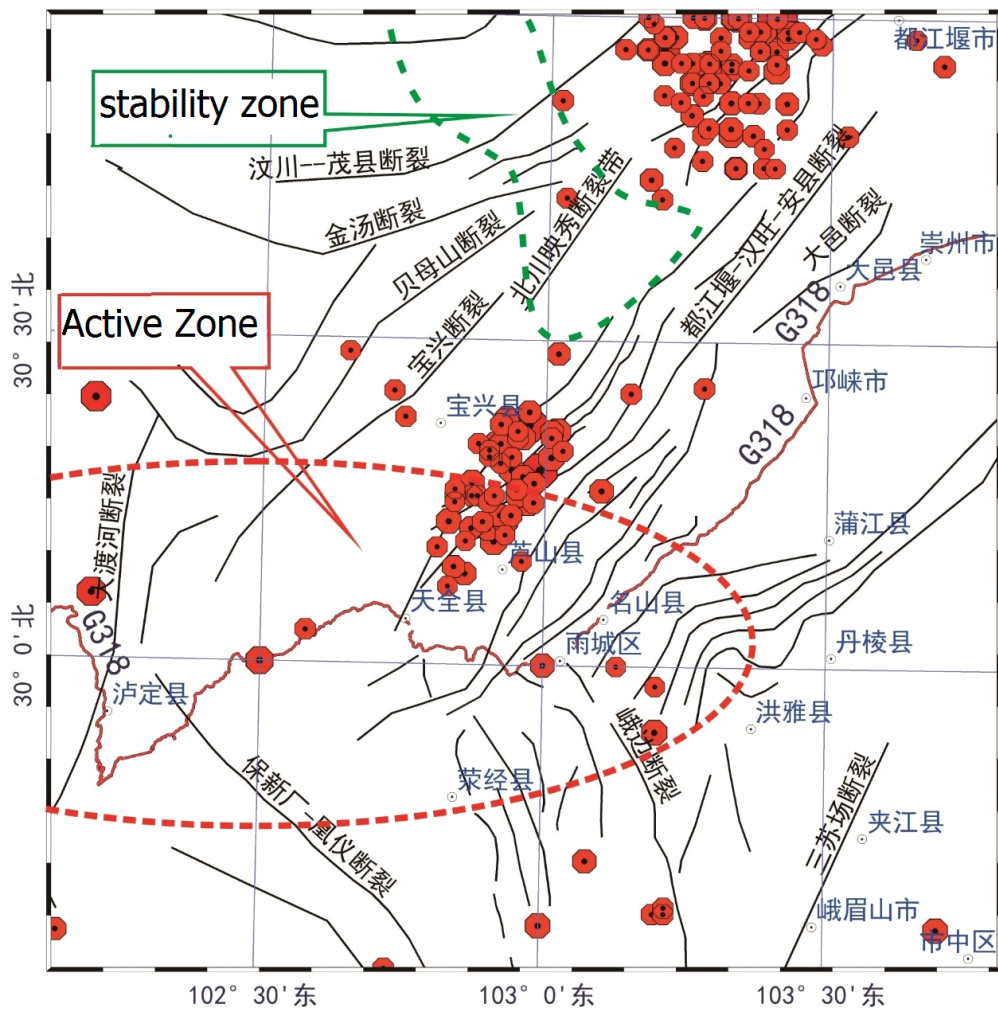


Fig3 Faults and Epicenters in Lushan earthquake area