2013   7   22   6. 6

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荣代潞，李亚荣

(730000)

：利用单健群分析方法研究了 2013 年 7 月 22 日岷县漳县 6.6 级地震前地震空间相关长度增长现象。结果表明，从 2011 年下半年开始主震周围区域地震空间相关长度明显增长。利用这种特征对可能的大震危险区进行网格式搜索，至少可以对未来强震发生的地点进行初步预测。

：岷县－漳县 **6.6** 级地震；地震空间相关长度；单键群方法（**SLC**）

Analysis of the Growth Phenomenon of Seismic Correlation Length Prior to Minxian－Zhangxian Earthquake

RONG Dai-lu, LI Ya-rong

(*Lanzhou Institute of Seismology, Chinese Earthquake Administration, Lanzhou, Gansu   730000, China*)

Abstract：The seismic correlation lengths prior to the Minxian－Zhangxian earthquake occurring on July 22, 2013, have been studied using the single-link cluster analysis (SLC) method. The catalogs used were downloaded from the China Earthquake Data Center (CEDC; http://data. earthquake. cn/data/). Earthquakes that occurred during the five years prior to the main shock until its origin time were located in an area centered on the main shock (34. 5N°, 104. 11°E) with a range of $32°\sim37°$, $102°\sim107°$. We selected 2. 5 (M_L) as the minimum magnitude and verified the completeness of the catalogs prior to the mainshock using the Gudengberg formula, which showed good results above magnitude $M_L=2.5$. The result shows that an increase in correlation length for moderate-sized earthquakes was observed nearly 1. 5 years before the main shock and can be fitted well by the power law. For the preparation and occurrence stage of the earthquake process characterized as a self-organized critical phenomenon, direct testing for the increase in spatial correlation lengths prior to large earthquakes is an independent approach used to detect critical point behavior in observed seismicity. The results of this study show that the self-organized critical point characteristic was been observed prior to the Minxian－Zhangxian M_S6. 6 earthquake. The results from the many earthquake examples indicate that the increase in seismic correlation length by the power law represents a physical process of critical-point characteristics in the source area in preparation of the main earthquake. In a future work, the grid search technique is

applied to systematically extract a region of increased correlation length from a dataset. Estimates for the epicenter of an expected mainshock may be then obtained from the results of the grid search.

Key words：Minxian－Zhangxian M_S6. 6 earthquake；seismic spatial correlation length；single-link cluster analysis (SLC)

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　　2013　7　22　　　　　　　　　　　　6. 6　　　　　。

　　　　　　　。　　　　　　　　　　　　[1]

6. 6　　　　　　　　　　　　　　。

　　　　　　　　:

(CEDC)　　　(http：//data. earthquake. cn/data/)。

　　　　　　:2009-01-01　　2013-07-22

　　　。

　　　　　　　:　　　　　(　　34. 5°,
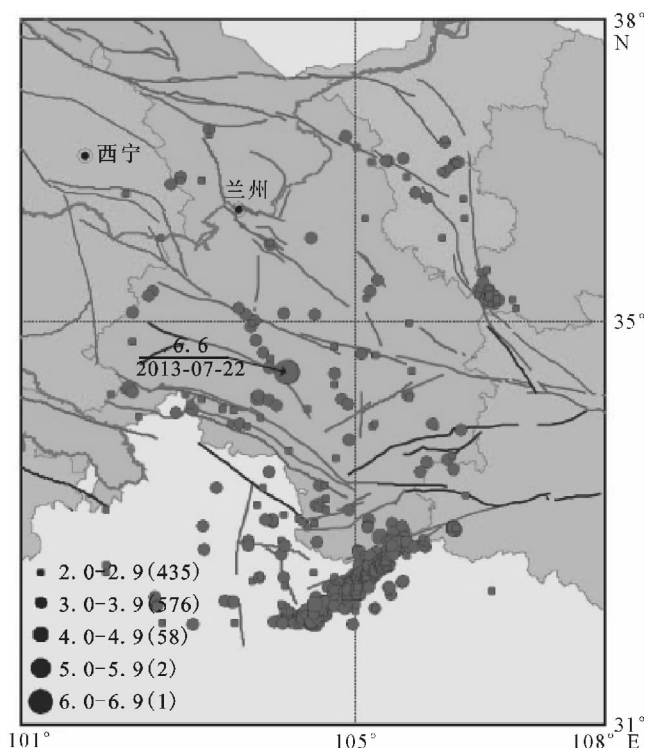
104. 18°),　　5°　　(　　32°～37°,　　102°

～107°)。

　　　　　　:M_L2. 5。

　　　　　　　　　1。

图 1　以主震震中为中心,5°×5°范围内地震分布

Fig. 1　Distribution of earthquakes in the area centered at the epicenter of main shock with 5°×5° range

　　　　　　　　　　　　6. 6

　　　[2],　　　　　Ⅷ　,

NW　　　　　　　.　　　　　　　,

　　,　　　一　　　　2,

2. 5(M_L)　　　　　　。
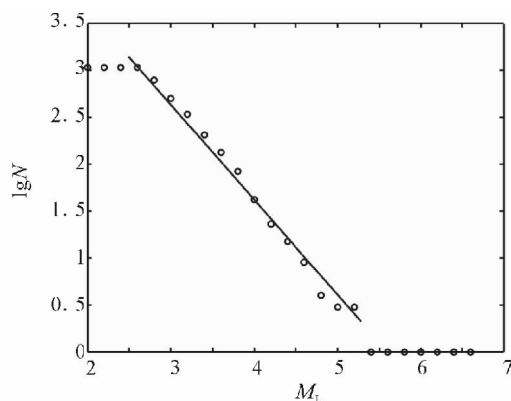
图 2　所用地震目录的震级－频度图

Fig. 2　The magnitude-frequency plots for the used catalog

　　　　　　　　3。

2

　　2009　　　　　　　　(3(a))

　　　　　　　,

,　2011

。　2011

3(b),

　　　　　　　　　　。

　　　　　　　[3]。

,　　　　　　32°～40°

1952　　　　9　M≥6. 5　[4]、　17

　　　　　6　　[5]、

9. 0　　(2011　3　11)[6]、　8. 0

(2008　5　12)[7]、2004

(　2004　12　26　M_W

9. 1　2012　4　11　M_S8. 6)[8]、　7. 0

(2013　4　20)[9]。

（a）2009年-2013年主震发生时

（b）2011年-2013年主震发生时
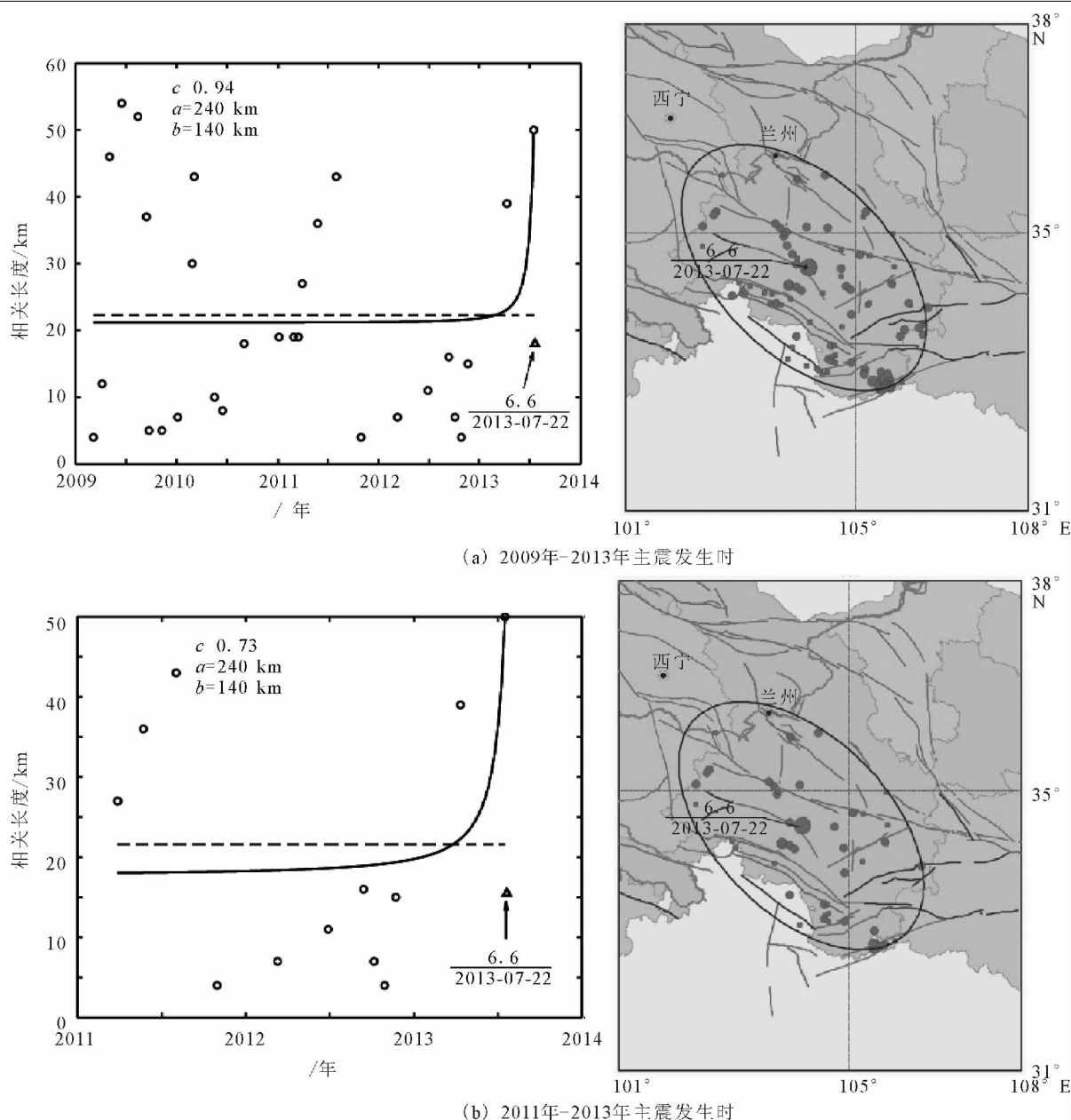
图 3   相关长度变化结果（左图为地震相关长度变化图（实线为幂指数拟合，虚线为常数拟合），
右图为对应的临界区域和地震分布）

Fig. 3   The result of correlation length changing

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