RTL algorithm and its application to seismicity analysis

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Reliable precursors and testing forecast models are the key problems of the study on earthquake forecast. Among various precursors, seismicity changes play an important role in intermediate-term study and have been tested for a long period of time. As one of the seismicity analysis methods, the Region-Time-Length (RTL) method, which takes into account the information of magnitude, occurrence time and location of earthquakes, showed some positive examples in Russia, Japan, Italy, USA, and China.

After introducing briefly the RTL algorithm, I summarize some case studies of applying the RTL algorithm to revealing seismicity precursors, including the Ms8.0 Wenchuan earthquake occurred in China on May 12, 2008. These case studies indicated that there are some similar characteristics of seismicity pattern changes prior to strong earthquakes, e.g., a seismic quiescence anomaly quantified by the RTL parameters appears before a target mainshock, the spatial distribution of seismic quiescence anomaly quantified by the Q parameters (an average of the RTL values over some time window at a certain position in the investigated region) appears around the epicenter of the mainshock. Further study is performed to judge whether or not a detected precursor is reliable. This study can enhance the reliability of precursors and strengthen the earthquake predictability studies.