

# Using the Astro-Tidal-Triggering and the NCEP Temperature Information to Analyze the Three Earthquakes in Tibet

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Using the spatial-time fluctuations in the dynamics of temperature data of National Centers for Environmental Prediction of American (NCEP) and the additive tectonic stress caused by the astro-tidal-triggering (ATSA), the paper analyzes the three earthquakes which occurred in Tibet of China on July 12, 2004, August 10, 2004 and August 25, 2004. We introduce the new concept of the additive tectonic stress caused by the astro-tidal-triggering (ATSA), The ATSA means the ponderance that the astro-tidal-triggering acts on the seismic fault zone along the axes of the main stress  $P(Z_p)$  and tensile  $T(Z_t)$ . According to the  $Z_p, Z_t$  formula, we calculate the  $Z_p, Z_t$  since from July 2, 2004 to August 28, 2004, (fig.1). The figure shows the value change of the  $Z_p, Z_t$  in this period experienced four cycles. For each cycle, it increases fast from low valley to peak, remains relatively stable for 6-8 days, then drops rapidly and enters another similar process. There are three earthquakes occurred among the four cycles. The earthquakes occur at the time when change of the ATSA reaches relatively steady end of peak. It does not necessarily mean that every peak will shake, there is no earthquake from July 22 to July 28. NCEP data is the synthetically reanalyzing data, which utilizes all the observation data and assimilation model. It makes sure that data is analyzed much more correctly, and resolves the problem of cloud obstruction when using satellite infrared images to study earthquake. It is satisfied with monitoring the spatial-time evolution of temperature change. Infrared temperature anomaly increase before the impending earthquake usually reflected the seismotectonic tectonic activity. The NCEP temperature images analytic method by subtracting normal background image from a series of abnormal images is adopted in order to reduce the disturbance of other factors and extract availably the phenomenon of temperature abnormal increase caused by the earth's crust activities. According to the four cycle's change of the ATSA, we use the NCEP data extract the each cyclical temperature change under the same condition day by day so as to obtain a series of NCEP images of temperature abnormal increase (Fig.2-5). As is shown in Fig.2-5, successive temperature anomaly increase area has appeared along west-east Brahmaputra tectonic fault zone. The whole process of the three earthquakes went through the general spatial-time evolution: original temperature rise-fortified temperature rise-peak of temperature rise-attenuation, calmness-earthquake occurrence. But during the period of July 22 to July 28, there is no such phenomenon of the successive temperature anomaly

increase and no earthquake occurrence (Fig.3). From the above analysis, some primarily but worth while exploring conclusions can be drawn: 1. NCEP images is one of the most effective data to attain anomaly temperature and the dynamic spatial-time information in large area, especially in areas where it was covered by the cloud and the infrared can't penetrate the cloud leading to don't get the information of temperature abnormal increase. 2. NCEP temperature abnormal increase is the new way to inspect the movement of tectonic plate and the Seismotectonic activity. Seeing from the three earthquakes, the each process of the NCEP temperature abnormal increase goes through the general spatial-time evolution, original temperature rise-fortified temperature rise-peak of temperature rise-attenuation, calmness-earthquake occurrence. 3. The astro-tidal-triggering could trigger earthquake when the terra stress is in critical status (the NCEP temperature increase abnormal images of peak-attenuation period). The earthquake occurred at the end range of the ATSA peak value. It indicated that the ATSA didn't spring the earthquake in suddenly, but it is a successively acceleration process. 4. The astro-tidal-triggering is only an exterior factor rather than a decisive factor. The decisive factor is seismic tectonic activity. From July 22 to July 28, there is no temperature abnormal increase and no earthquake, it indicate that the tectonic stress is weak. The astro-tidal-triggering is extra-factor and the tectonic stress is inner-factor, the earthquake is the fruit of two factors.