



## **Analysis the coseismic records of teleseismics at the groundwater level of Tangshan well in China and its mechanism exploration**

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The Tangshan well (118.18°, 39.62°) is located at Tangshan city of Hebei Province in China. Various data of the Tangshan well are observed starting in more than 30 years ago. In this paper's analysis the observation data is sampled per minute and starting in October 2001. In addition the broadband digital seismic records of station Douhe were used, which is about 20 km away from the Tangshan well. The especially phenomena, fluctuations of the groundwater level in Tangshan well were induced by 63 teleseismics ( $M \geq 7.0$ , NEIC catalogue) during 2001.10-2005.10, at the same time the deep groundwater temperatures were dropped sharply and then recovered to normal. The relationship among the fluctuations, seismic waves, and deep groundwater temperature changes were analyzed by nonlinear statistical methods such as Nonlinear Least Square, Butterworth filter, Fast Fourier Transform and spectral analysis.

The starting time of fluctuations was lagged behind the arriving time of seismic waves, but appeared before the drops of the deep groundwater temperatures. The amplitudes and durations of the seismically induced fluctuations and the value of corresponding drops, duration of the deep groundwater temperatures are in proportion with the magnitude of the teleseismics. But they also relate with the distances between the well and the epicenters of teleseismics. The seismic waves of the teleseismics contain the signal components whose frequencies are nearly same with that of the water level fluctuations. Finally, the possible mechanism of the coseismic transient fluctuations of the

groundwater level was discussed.

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