

A seismic quiescence in the Tamba region after careful thinking a magnitude shift

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Katao (2005) reported that the seismic activity in the Tamba region had decreased since 2003. The occurrence rate of microearthquakes has been lower than that before 2003. Such a quiescence was recognized during two years before the 1995 Hyogo-ken Nanbu Earthquake (Mjma7.3). Therefore, this quiescence has been discussed whether the major earthquake follows the quiescence or not (e.g. Umeda, 2005).

Magnitudes of earthquake in the Tamba region had been determined by using stations of Abuyama seismic station network, Disaster Prevention Research Institute, Kyoto University until 2001. Extensive regional stations have been included in 2002 and Hi-net stations have been added from April 2002 to determine magnitudes. In the Tamba region, magnitudes have been estimated by automatic processing from 2002. Such a variation in a seismic station network leads to a magnitude shift, causing misinterpretation of regional seismicity for a long time.

In this study, we reestimate magnitudes using stations of Abuyama seismic station network to remove the magnitude shift. We find that magnitudes are 0.1-0.5 larger than that before. We investigate a cumulative number of declustered earthquakes (Reasenberg, 1985 ; RFACT=5) from 1990 to October 2004. The number shows that the seismic activity decreases from later 2000 and from 2003. This trend is the same for larger cutoff magnitudes. In later 2000, a slow slip event has started in the Tokai region. Kobayashi and Hashimoto (2005) reported that the strain rates decreased in and around the Tamba region, and especially, the areal strain rate kept decreasing from 2000.

This consistency (of seismicity in the Tamba region with the slow slip event in the Tokai region and a resulting change in strain rate) suggests that the quiescence is caused by the stress change due to the slow slip event in the Tokai region, implying the quiescence is not a precursor of a large earthquake observed before the 1995 Hyogo-ken Nanbu earthquake.