A temporal variation in the crustal heterogeneity and a seismic quiescence

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Coda Q or Qcˆ-1 is a good indicator of the stress condition (Aki, 1985, Hiramatsu et al., 2000) and correlates with the tectonic activity. It's noted that Qcˆ-1 changes with time. We monitor the crustal heterogeneity using coda waves and try to understand a basis of forecasting the occurrence of the major earthquake.

Katao (2005) reported that the seismic activity in the Tamba region started to decrease in 2003. An occurrence rate of microearthquakes has been lower than that before 2003. Such the quiescence was recognized at the period 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).

Hiramatsu et al. (2000) reported that the temporal variation in Qcˆ-1 at 3.0Hz and 4.0Hz showed a negative correlation with the b value by the static stress change due to the 1995 Hyogo-ken Nanbu earthquake from 1987 to 1996 in the Tamba region. They concluded that there is a characteristic scale controlling the crustal activity in the region because the characteristic scale estimated by the b value is consistent with those by Qcˆ-1. Sugaya et al. (2005) reported that Qcˆ-1 at 3.0Hz and 4.0Hz increasing after the Hyogo-ken Nanbu earthquake decreased for two years.

In this study, we investigate a relation between the temporal variation in Qcˆ-1 and seismicity from 2001 to 2004 in the Tamba region and discuss the quiescence from 2003. An analysis method follows that of Hiramatsu et al. (2000). We recognize no temporal change for both b value and Qcˆ-1 at 3.0Hz and 4.0Hz after 1997. The number of earthquakes around M3 corresponds to the characteristic scale in the region tends to be larger than those in the quiescence before the Hyogo-ken Nanbu earthquake. And log Qcˆ-1 at 3.0Hz and 4.0Hz (3.0Hz:-2.09 ; 4.0Hz:-2.23) are 0.05 or 0.06 larger than that of the quiescence. So, the crustal condition from 2001 to 2004 differs from that in the quiescence before the 1995 Hyogo-ken Nanbu Earthquake. Furthermore, Sugaya et al. (this meeting) reports that the recent decrease in seismic activity in the Tamba region seems to associate with the slow slip event in the Tokai region. Therefore, we consider that this ongoing quiescence differs from that before the 1995 Hyogo-ken Nanbu Earthquake and may be a reduction stage of seismicity affected by the perturbation of the stress field caused in the surrounding region.