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## Detection of seismically quiescent regions before the repeated interplate large earthquakes (II)

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Detection of seismic quiescence often depends on subjective judgments. To apply to earthquake prediction, automatic and objective methods are needed with knowledge about the detection capabilities of seismic observation network and information about the long-term seismicity. As the ways to visualize the spatial distribution of seismicity, ZMAP (Wiemer and Wyss, 1994) and Matsumura's method (Matsumura, 2007) have been often referred. In this study, however, we used the method developed by Aketagawa and Ito (2008). This method, different from the other methods, determines the seismicity level in each circular region centering on each epicenters which are declustered, and makes it possible to detect quiescence or activation even for low seismicity regions. We have been trying to apply the method to the repeated interplate earthquakes in the Pacific side of the northern and north-eastern Japan, which is the area with a high probability of precursory seismic quiescence (Yoshikawa, 2008). We report here the recent results on the other large earthquakes with the magnitude 7.0 and larger in Japan.

In general the seismic quiescence is more detected in inter-plate earthquakes than intra-plate earthquakes. The following is the examples:

- i) Seismic quiescence was confirmed prior to the large inter-plate earthquakes of the 1968 off Tokachi(M7.9), the 2003 off Tokachi(M8.0), the 2005 off the Miyagi Prefecture(M7.2), and the 2008 off the Ibaraki Prefecture(M7.0). However, the conditions for detection, that is, magnitude thresholds and duration of analysis, had to be searched with trials and errors for each case.
- ii) Though the 2004 off the coast of Kushiro(M7.1) is an inter-plate earthquake, no remarkable quiescence was detected, which may be caused by aftershock activity of the 2003 off Tokati earthquake and its peripheral activity.
- iii) No clear quiescence could be found prior to the 2003 off the coast of Miyagi Prefecture (M7.1) and the 2004 off the coast of Kii peninsula(M7.4), but it could be confirmed for the 1982 off Urakawa(M7.1), all of which are intra-plate earthquakes.

Keywords: Seismicity, quiescence, plate boundary, detection