# Integrated earthquake forecast: combination of b-value monitoring and ionospheric precursors

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In recent years, there are many electromagnetic phenomenon preceding large earthquakes. Anomaly of the total electron content (TEC) is one of the most promising anomalies for the short-term earthquake forecast. On the other hand, it is reported that the b-value around the epicenter region decreases prior to the large earthquake. The b-value can compute using the Gutenberg Richter law. The lead time is around few or tens years. In this study, we investigate the effectiveness of the integrated analyses on the b-value for the middle-term forecast and TEC analysis for the short-term forecast. We select the Tokachi region as a test site. We will report the results of the b-value changes in space and time for the stress field change and GIM-TEC and/or GPS-TEC changes. In this report, we will focus on the two Tokachi-oki earthquakes in 2003 and 2008. They occurred on September 11, 2003 (M8.0) and September 26, 2009 (M7.1). In addition, we will show the results for other regions, if possible.

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