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A Study on correlation between strain rate from GPS data and occurrence of inland Earthquakes

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The Headquarters for Earthquake Research Promotion has published "National Seismic Hazard Maps for Japan " since 2005 for preparation for seismic hazards. This map is expected to be used in various social fields and have attracted attention to a degree of seismic hazard.
Recently, however, a series of inland earthquakes occurred where the hazard map shows relatively low occurrence probability or have no specified active fault, such as Niigata-ken Chuetsu Earthquake (October 23, 2004, M6.8), the Noto Hanto Earthquake (March 25, 2007, M6.9), Iwate -Miyagi Nairiku Earthquake (June 14, 2008, M7.2). The method of probabilistic seismic hazard analysis for inland earthquakes, especially a seismic activity model for earthquakes without specified source faults should be improved. In this report, we consider the possibility of a space-time prediction model for earthquake occurrence using GPS data from GEONET.
Firstly, the strain rate of inland crust is calculated from GPS data of GEONET ("coordinates of the daily F3"). The average velocity vector of each GPS station by the regression model of each displacement data. Then, by separating the island triangular elements, we can require the velocity of the strain rate of each element from the average velocity vectors.
Secondly, the frequency of occurrence of crustal earthquakes is calculated from the JMA earthquake catalog (1923-2007). The a value and b value of the Gutenberg-Richter law are evaluated for 24 tectonic divisions proposed for Kakimi (2003).
The a value and b value of the Gutenberg-Richter law have some relation to the average strain rate of the crust obtained from the GPS data. It is expected a new evaluating method of seismic hazard analysis for earthquakes without specified faults can be proposed based on the strain rate of the crust from GPS data in future.

Keywords: inland earthquakes, earthquakes without specified source faults, GPS, tectonic division, strain rate, b value