

Strain concentration zone in the San-in area analyzed by GNSS data

*Tsukasa MITOGAWA¹, Tetsuya KOGURE¹

1. Interdisciplinary Faculty of Science and Engineering, Shimane University

Micro-earthquakes are distributed along the coast of the Japan Sea in the San-in area located in the north of the Japan Median Tectonic Line. Large earthquakes such as the 2000 Tottori Western Earthquake (M7.3) and the 2016 Middle Tottori Earthquake (M6.6) occurred in this area. Both earthquakes occurred along unidentified faults. This suggests that the information about the distribution of active faults is not enough to predict the occurrence place of earthquakes.

GNSS Earth Observation Network System (GEONET) was launched by the Geospatial Information Authority of Japan (GSI) in 1994. GEONET revealed the pattern of the surface crustal movement. Sagiya et al. (2000) used the technique and found Niigata-Kobe Tectonic Zone (NKTZ) where strain rate was large. Actually, many earthquakes occur along this zone. Therefore, strain rate in San-in area is also expected to be large. The purpose of this study is to find strain concentration zones in the San-in area considering the distribution of strain rate in high resolution calculated from GNSS data.

We used the GNSS daily coordinates (so-called the GEONET F3 solution) provided by GSI (Nakagawa et al., 2009). We calculated only the trend component of displacement rate although GNSS data itself includes the effects of some parameters such as annual and semi-annual trend of deformation or step deformation due to earthquakes. The displacement rate at each observation point was aligned to lattice point with interval of 0.1 degree obtained by Nearest Neighbor method in Generic Mapping Tools (GMT). The maximum rate of shear strain was calculated by differentiating displacement rate with respect to the distance among each lattice point. Results show that the distribution pattern of the strain rate changes with time and observation period. The largest strain rate of about 200 nanostrain/yr is found in Middle Tottori and around Mt. Sambe, which is an active volcano in Middle Shimane.

Keywords: Strain rate, GNSS, San-in area