

## Crustal deformation around Kikaijima

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### 1. Introduction

Philippine Sea plate is subducting under Eurasian plate from the Ryukyu trench where is located at the east side of Ryukyu arc. On the other hand, there is back arc spreading at west side of Ryukyu arc. It was thought that the region of the back arc spreading is weak strength of crust, so, Interplate coupling is weak, too. However, I have experienced that the 2011 Tohoku-Oki Earthquake and the 2004 Sumatra-Andaman Earthquake, where are the same situation with the Ryukyu arc. It means to examine the possibility that the M9 class earthquake occurs in all subduction zones with a plate having similar tectonics background.

### 2. Collision with Amami plateau and high-speed uplift of Kikai-jima

Amami plateau, which is one of the world's largest scales, subducts under the Ryukyu arc from the Ryukyu trench, and Amami plateau make that Kikai-jima is high-speed uplift. Previous coastal terrace studies reveal that Kikai-jima is 2 mm/yr uplift. These evidences suggest strong interplate coupling and occurrence time of a large earthquake is about 1,000 years time scale. In addition, historical M8 class earthquake occurred around the Amami-Oshima in 1911, and seismic activity is high.

### 3. Tilt direction and uplift velocity at the Kikai-jima observed by leveling, and GNSS observation

A traverse line of Kikai-jima, Oshima, Amami-Oshima, Yokoate-jima can be established only more than 100km in the Ryukyu arc. A GNSS observation in Yokoate-jima (uninhabited island) was started in October 2013. Baseline change rate between Yokoate-jima and Amami-Oshima is about  $-3.8 \times 10^{-8}$  /yr, which is same level baseline change between Amami-Oshima and Kikai-jima ( $-2.5 \times 10^{-8}$  /yr). However, still have a short observation period (only 8 months). On the other hand, tilting in the Kikai-jima is observed by leveling. The direction and amount of tilt are forward to the trench axis and about  $10^{-7}$ /yr, which is in comparison with this leveling result (April, 2014) and the previous result (September, 1997). These results suggest strong plate coupling on the Ryukyu trench. However, strong plate coupling is difficult to explain both vertical and horizontal deformation components. It is may have an effect of collision of the Amami plateau.

Keywords: Leveling, Kikai Island, Interplate coupling, GNSS Observation