

## Spatiotemporal distribution of shallow seismic activity around Onikobe area, northeastern Honshu, Japan

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In order to elucidate the process of inland earthquake occurrence, it is necessary to consider the influence of the heterogeneous structure of the upper crust. In particular, examining the relationship between seismic activity and existing weak planes such as geological faults and caldera walls will be very important for the above understanding. In order to investigate the relationship between geologically heterogeneous structure and seismic activity, the best region will be where reliable geological data are available and the seismicity is high. In this study, we investigate the relation between the heterogeneous geological structure and the seismic activity in the Onikobe region located in the northernmost part of Miyagi prefecture because the region satisfies the above conditions.

This area is located in the backbone range, where many calderas exist. In this region, Umino et al. (1998) discussed the relationship between the caldera structure and large-scale earthquakes that occurred in the Onikobe region in 1996. After that, however, the earthquake activity in this area appears to change considerably after the 2008 Iwate-Miyagi Nairiku earthquake and the 2011 Tohoku-Oki earthquake. We investigate the temporal change in the seismic activity for about 20 years (1996-2015) in detail, and discuss the relation between the spatiotemporal change in the seismic activity and the caldera structure. In order to elucidate the relation, we carried out 1) estimation of temporal change in the seismic activity, 2) hypocenter relocation, 3) fault type determination, and 4) stress field estimation. The results indicate that the earthquake fault-type distribution as well as the seismic activity and hypocenter distribution is affected by nearby large earthquakes. It is also suggested that the change in the hypocenter and fault-type distributions are controlled by the caldera wall distribution.

According to Terakawa and Matsu'ura (2010), this area is located in a reverse fault type stress field of east-west compression, but many strike-slip-fault type earthquakes have occurred and at least some of them appear to occur along steep caldera walls. We will discuss in detail the relation among the seismic activity which changed due to the stress disturbance caused by large earthquakes, the shape of the existing weak planes, and the background stress field.

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