

Dike intrusion process of 2000 Miyakejima - Kozujima event estimated from near-field GPS measurements

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We discuss detail model which explain 2000 Miyakejima – Kozujima dike intrusion event from near-field GPS data, and we also estimate spatio – temporal variation of dike intrusion.

Large ground deformations more than 70 cm are observed by continuous GPS measurements at Kozujima – Nijima Island area between 26 June 2000 and end of August.

From this ground deformations, some dike intrusion models are discussed. Nishimura et al.(2002) discuss dike with aseismic creep fault model, and Yamaoka et al.(submitted) introduce dike with deep spherical deflation source. Because only one dike model can not explain observed deformation, especially it can not explain deformation at Shikinejima Island.

We introduce three dikes complex model. We show that minimum value of weighted residuals of three dikes complex model is as same as theirs. And also, slip of creep which estimate 7m seem to be not realistic at dike with aseismic creep model. Dike with deep spherical deflation source which assumed to explain issue of magma supply can not explain magma budget. So their result suggests that other source supply magma from deeper part where we can not detect. Hypocenter distribution obtained by Sakai et al.(2003) supports three dike complex model.

We also estimate spatio – temporal variation of three dikes complex model.

This result shows that Miyakejima side dike has huge opening at first stage of the event, and deeper part of dike has large opening after the first stage. Our result supports process of dike intrusion which Furuya et al.(2003) discuss, and We can discuss detail process of dike intrusion by our result. It suggests that magma come from under Miyakejima Island at the beginning. Magma is also supplied under the dike among almost all stages. Hagiwara et al.(2003) discuss spatio-temporal change of High Q area which is calculated by seismic wave tomography technique. Their result also supports our result of spatio – temporal variation. However, our estimated volume of dikes which are 2.0 km³ is larger than other model. So we think next important issue is to discuss three dikes complex model by far-field GPS data.