

Estimation of block boundaries around the Izu Peninsula based on GNSS data using hierarchical and non-hierarchical cluster analyses

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The purpose of this research is to estimate the block boundaries around the Izu Peninsula based on GNSS horizontal data, as an application of cluster analysis following recent studies (e.g., Simpson et al., 2012; Savage, 2018). Using F3 solution of the GNSS data by Geographical Survey Institute, we obtain displacement rates for 2 years, 3 years, and 5 years during 2005-2010. We perform cluster analyses of the displacement rate data into 3 divisions by the Ward method of a hierarchical method and the k-means method of a non-hierarchical method, and plot the results on maps. On the basis of the Delaunay triangulation algorithm, each observation point was connected. Then we mark lines of which endpoints are classified in a different cluster, and stack them to estimate the locations of the block boundaries. The block boundary goes north along the Suruga Trough and joins the Darumayama fault zone in the western part of the Izu Peninsula. It crosses the Izu peninsula eastward and separates Izu Oshima from the Izu peninsula. The block boundary also extends northward toward the Hakone volcano along the eastern Izu volcano group and Tanna fault.

Keywords: GNSS, Izu Peninsula, Block boundary