

## Cyclic layering structures of dikes in Hirado Island, Nagasaki, Japan

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Many dikes in Hirado Island, Nagasaki, Japan have cyclic layering structures parallel to contact surfaces with country rocks. The aim of this study is to clarify what kinds of differences characterize the layering structures by quantitative analysis and field research.

We made thin sections which are perpendicular to contact surfaces and continuous, from one contact surface to another contact surface through the middle of a dike. We quantified mode and number density of groundmass crystals, phenocrysts, and vesicles as the function of the distance from contact surfaces.

Chilled margins were observed in contact surfaces, but not inside of dikes. Vesicle-rich layer and vesicle-poor layer parallel to contact surfaces are alternatively distributed. The variations of the mode and number density correspond to the layering structure. The sizes of vesicles and plagioclase groundmass become larger with the distance from contact surfaces. The spacing between neighboring vesicle layers also increases with the distance from contact surfaces.

This type of layering structures has been interpreted as the distribution of chilled margins which are formed by multiple injections on magmas into the dikes. However, in this study, it is found that the layering structure is determined by mode and number density of vesicles. Layering structures similar to structures in Hirado are also found in Ogi, Niigata (Toramaru et al. 1996). They consider that the layering structures are formed by coupling between heat and mass diffusions with non-linear reactions (crystallization or vesiculation). We consider that the layering structures in Hirado are formed by the same mechanism as in Ogi.