## Magnetic and elastic properties of forearc basalt and boninite in the Ogasawara(Bonin) forearc recovered by IODP Expedition 352

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The Izu-Bonin-Mariana (IBM) arc, which is located to the southeast from Japan, is a typical intraoceanic arc system and is the type locality for subduction initiation. IBM project, which is a part of International Ocean Discovery Program (IODP) expeditions, is aimed to understand subduction initiation, arc evolution, and continental crust formation. Expedition 352 is one of the IBM projects and that has drilled four sites at the IBM fore-arc in the period from 30<sup>th</sup> of July to 29<sup>th</sup> of September, 2014. Expedition 352 has successfully recovered fore-arc basalts and boninites related to seafloor spreading during the subduction initiation as well as the earliest arc development. The fore-arc basalts were recovered from two sites (U1440 and U1441) at the deeper trench slope to the east, whereas the boninites were recovered from two sites (U1439 and U1442) at the shallower slope to the west. In this study, relationships between seismic velocity and density in comparison with magnetic susceptibility of these volcanic rocks were investigated in order to understand the large variation of seismic velocity in Layer 2 among seismic velocity structures. As a result, the densities are in a range between 2 g/cm<sup>3</sup> and 3 g/cm<sup>3</sup>. The porosities are in a range between 5 % and 40 %. The P-wave velocities are in a wide range from ~3 km/s to ~5.5 km/s and have a positive correlation to the densities. Variation of P-wave velocity along with bulk density show two trends depending on magnetic susceptibility values. Magnetic susceptibility shows bimodal distribution of 27 to 116 ( $\times 10^{-5}$  SI) and 794 to 5153 ( $\times 10^{-5}$  SI). Higher magnetic susceptibility samples consisting of volcanic rocks such as fore-arc basalt and high Mg andesite show that there is an inflection point in the trend where the P wave velocity and bulk density are 4.8 km/s and 2.8 g/cm<sup>3</sup>, respectively. Thermomagnetic curves and magnetic hysteresis suggest that these samples are composed of single-domain, puedo-single-domain and multi-domain titanomagnetite particles with little titanium content. Lower magnetic susceptibility samples consisting of boninite such as high Si boninite show a linear trend in the relationship between P-wave velocity and bulk density as well as linier thermomagnetic curves and low coercivity. They have not experienced high-temperature oxidation. It suggests that the two trends of the relationship between P-wave velocity and bulk density depend on magnetic susceptibility value resulting from the amount of titanomagnetites. In addition, these trends have also been found in the physical properties measured on board during Expedition 351.

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