

Preliminary study for Petrogeochemical Evolution of Volcanic Rocks in Hallasan Natural Reserve Area, Jeju Island, South Korea

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The geological researches on the volcanic field of Jeju Island in South Korea have been focused on volcanic rocks distributed on lowlands around the Mt. Halla, and the coastal area. Based on these studies, some models for the spatio-temporal evolution of Jeju Island's magmatic system have been suggested. However, due to limited accessibility, there have been restricted studies on volcanic rocks in the highlands of Mt. Halla, which is named Hallasan Natural Reserves Area. In this study, through geological survey and sampling in Hallasan Natural Reserves Area, petrographic studies of target samples, geochemical studies on major and trace elements in major minerals, and age dating to identify sequential volcanic activities are conducted. Based on bulk chemistry, analyzed samples are subdivided into basalt, trachybasalt, basaltic trachyandesite, trachyandesite, and trachyte on the TAS diagram. Based on normative mineralogy, basalt system with the names of rocks is classified as tholeiite, hypersthene basalt, olivine tholeiite, olivine basalt, and alkali basalt, according to the composition of normative hypersthene, quartz, olivine, and nepheline. These results are consistent with the detailed petrographic descriptions in this study. Also, most volcanic rocks have the characteristic of the low-Al-alkali suite. It provides critical information on the alkali magma source forming volcanic rock in this area. The purpose of this study is providing petrogeochemical evidence to elucidate processes of volcanisms and interpreting the changes in characteristics of volcanic rocks based on analyses of major and trace elements, and REEs in major minerals. Through integrating the results from previous researches and these geological analyses, evolutionary stages of Jeju Island's volcanic activity would be completed in more detail.