Geochemistry and geochronology of the Mudeungsan tuff from Korea

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Late Cretaceous Mudeungsan tuff within the Neungju basin, located on southwestern part of Korean Peninsula, covers an area of approximately 34km^2 of ignimbrites. The Mudeungsan tuff is welded crystal tuff with dacitic composition (SiO_2=63.1~69.1 wt%) and was generated from cogenetic calc-alkaline magma in the volcanic arc environment. SiO_2 compositions of northern part of Mudeungsan tuff are relatively higher than those of southern part of Mudeungsan tuff. The Mudeungsan tuff was intruded by the micrographic granite and quartz porphyry. SHRIMP zircon U-Pb ages of Mudeungsan tuff, micrographic granite, and quartz porphyry are 84.60±1.1~87.72±0.59 Ma, 82.99±0.67 Ma, and 85.66±0.90 Ma, respectively. The zircon U-Pb ages indicate that quartz porphyry and Mudeungsan tuff were formed about the same time, whereas micrographic granite intruded into Mudeungsan tuff about 1.6 Ma later. The micrographic granite with miarolitic cavities and mircrographic texture is highly felsic granite (SiO_2=75.72 wt%). Petrographic, geochemical, and geochronologic features with outcrop data of the micrographic granite and Mudeungsan tuff indicate that the micrographic granite were emplaced at the relatively shallow depth.