



## **Geological, mineralogical and geochemical characteristics of the Cretaceous hydrothermal clay alteration areas of South Korea**

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Hydrothermally altered areas formed pyrophyllite-kaolin-sericite-alunite deposits are spatially distributed in Kyongsang and Chonnam areas, Cretaceous ancient volcanic field of the Yuchon Group. The Chonnam alteration area is located within depression zone which is composed of volcanic and granitic rocks of late Cretaceous age. The clay deposits of this area show the genetic relationship with silicic domes. The Kyongsang alteration area is mainly distributed within Kyongsang Basin comprising volcanic, sedimentary and granitic rocks of Cretaceous and Tertiary age. Most of the clay deposits of this area are closely related to calderas. Some clay deposits of this area are located in the contact zone between Precambrian Hongjesa granite gneiss and Paleozoic Jangsan quartzite of Choson Supergroup. Cretaceous igneous rocks of the both alteration areas belong to high K calc-alkaline series formed in the volcanic arc of continental margin by subduction-related magmatism. Chonnam igneous rocks show the more enrichment of crustal components such as K, La, Ce, Sm, Nd, Ba, higher (La/Yb)<sub>cn</sub> ratio, and higher initial  $^{87}\text{Sr}/^{86}\text{Sr}$  ratio (0.708 to 0.712) than those of Kyongsang igneous rocks. This might be due to the difference of the degrees of crustal contamination during Cretaceous magmatism. The most characteristic alteration minerals of Chonnam clay deposits are alunite, kaolin, quartz, pyrophyllite and diasporite which were formed by acidic solution. The those of Kyongsang clay deposits are sericite, quartz and pyrophyllite which were formed by weak acid and neutral solution. The formation ages of the clay deposits of both alteration areas range from 71.8 to 81.4 Ma and 39.7 to 336 Ma, respectively. This data indicate three hydrothermal activities of Tertiary (middle to late Eocene), late Cretaceous (Santonian to Maastichtian) and Paleozoic Carboniferous Period in South Korea. The both areas show

distinct geological and geochemical differences for igneous rocks and clay deposits.