



Generation and evolution processes of Paleoproterozoic massive-type Sancheong anorthosite complex, Yeongnam massif, Korea

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The Paleoproterozoic (~1.87-1.79 Ga) Sancheong anorthosite complex in the Jirisan province of the Yeongnam massif, Korea, consists of massive-type and foliation-type Sancheong anorthosite (SA), Fe-Ti ore body (FTO), and mafic granulite (MG). We report their characteristics and interrelation on foliations, occurrences, lithofacies, composition minerals, suggesting the generation and evolution processes of the Sancheong anorthosite complex with the origin of their foliations. The main characteristics and interrelation are as follows: multilayer structures of FTO, straight-, anastomosing-, uneven-types FTO and MG veins derived from blocking associate with size reduction of SA, gradual or irregular boundaries of SA blocks, FTO and MG showing bulbous lobate margins and comb structures between SA blocks, flow foliations and linear arrangements of FTO and MG, discontinuous shear zone of SA, orientation of FTO and MG foliations parallel to the boundaries of SA blocks, predominance of FTO and MG foliations toward the boundaries of SA blocks, flow folding structures of FTO and MG foliation, lithofacies change of MG into FTO by the injection of MG into SA, and very similar assemblage of mafic minerals and chemical composition of ilmenite and almost equal occurrence and foliation features between FTO and MG. Such evidences indicate that the SA, FTO, MG foliations are magmatic foliations which were formed in a not fully congealed state of SA from the results of the fracturing of partly congealed SA, the injection and flow of FTO and MG melts into the fractured SA, the dynamic intercompaction between them. It also implies that the SA, FTO, MG were not formed from the intrusion and differentiation of magmas which were different from each other in genesis and age but from the multiple fractionation and polybaric crystallization of the coeval and cogenetic magma. Our new model suggests that the Sancheong anorthosite complex was generated and evolved as following sequence: the massive-type SA (a primary fractional crystallization of parental magmas under high pressure) → the foliation-type SA [a secondary fractional crystallization of the plagioclase-rich crystal mushes (anorthositic magmas) primarily differentiated from parental magmas under low pressure] → the FTO (an injection by filter pressing of the residual mafic magmas in the last differentiation stage of anorthositic magmas into the not fully congealed SA) → the MG (a solidification of the finally residual mafic magmas).