



## **Paleobiological implications of dinosaur egg-bearing deposits in the Cretaceous Gyeongsang Supergroup of Korea**

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Dinosaur egg-bearing deposits in the Cretaceous Gyeongsang Basin in Korea is described in taphonomic aspect, their paleoenvironments are interpreted, and geobiological implications of dinosaur egg-bearing deposits in the world and Korea are analyzed in geographic occurrences, geological ages, paleoenvironments, and lithology. Dinosaur eggs with spheroolithids, faveoolithid, and elongatoolithid structural types occur in several stratigraphic formations of the Cretaceous Gyeongsang Basin in South Korea, and most of the egg-bearing formations are the Late Cretaceous. The dinosaur eggs usually occur as clutches in purple sandy mudstone of floodplain deposits preserved as calcic paleosol with association of vertic paleosol features in places. Most of the eggs are top-broken and filled with surrounding sediments. The general depositional environment of dinosaur egg deposits in the Gyeongsang Supergroup are interpreted as a dried floodplain where volcanic activity occurred intermittently in the vicinity of the nesting sites. Their depositional settings on which floodplains developed are diverse from fluvial plain with meandering rivers to alluvial plain with episodic sheet flooding. The nesting areas in the Gyeongsang Basin are deemed to have been under semi-arid climate, which resulted in formation of calcic soils facilitating preservation of the dinosaur eggs. The geochronologic occurrences of dinosaur egg-bearing deposits are mostly restricted to the Late Cretaceous in the world as well as in Korea. If it has not been resulted from biased discoveries and reports of dinosaur eggs, biological rather than physical and chemical conditions for preservation of dinosaur eggs might be related with the restricted occurrences in the Late Cretaceous. Two hypotheses are suggested for probable biological causes to the geochronologically restricted occurrences of dinosaur egg-bearing deposits. One is related with the appearance of angiosperms in the Late Jurassic and the spreading of angiosperm trees in ecological range through swamps and floodplains during the Late Cretaceous and subsequent change of herbivorous dinosaurs' dietary habit and the increase of volcanic activity in the Cretaceous. The other is related with the nesting behaviour in the Cretaceous. By contrast to the geochronologically restricted occurrence of dinosaur eggs, paleoenvironments of nesting areas of dinosaurs are varying from inland areas (alluvial fan, fluvial plain, desert, lake, etc.) to coastal areas (coastal plain, beach, lagoon), suggesting that dinosaurs avoided competition in sharing nesting areas. Little change in lithology from nested deposits to subsequent burying sediments indicates that dinosaurs preferred stable environment in terms of sedimentation as nesting sites.

**Key words:** Dinosaur eggs, Cretaceous, Paleobiological occurrence, Korea