

Early Cretaceous Paleomagnetism of South Korea: Implications for Tectonic Affinity between Korean Peninsula and North China

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Recent concern centers on whether South Korea may have undergone variable tectonic rotations from the Cretaceous to recent times. In an effort to contribute to the answer to this question, we have completed a paleomagnetic reconnaissance study of Early Cretaceous sedimentary and igneous rocks from the Kyongsang basin in southeast Korea. Stepwise thermal demagnetization isolated well-defined characteristic magnetization in all samples. The paleomagnetic directions reveal patterns of increasing amounts of clockwise (CW) rotation with increasing age for Aptian rock units. Paleomagnetic declinations indicate clockwise vertical-axis rotations of $R = 34.3^\circ \pm 6.9^\circ$ for the early Aptian rock unit, $R = 24.9^\circ \pm 10.6^\circ$ for the middle Aptian, and $R = -0.9^\circ \pm 11.8^\circ$ for the late Aptian relative to eastern Asia. The new Cretaceous paleomagnetic data from this study are consistent with the hypotheses that Korea and other major parts of eastern Asia occupied the same relative positions in terms of paleolatitudes in the Cretaceous. An analysis and comparison of previously reported paleomagnetic data corroborates this hypothesis and suggests that much of Korea may have been connected to the North China Block since the early Paleozoic. A plausible cause of the rotation is the westward subduction of the Kula plate underneath the Asian continent, which is inferred to have occurred during the Cretaceous according to several geologic and tectonic analyses.