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Refined stratigraphy and its paleogeographic implication of the Mungyeong Group (Cambrian-Ordovician), Korea

Inhye Kim, Yoojin Kwon, and Yikyun Kwon
Department of Geoenvironmental Sciences, Kongju National University, Gongju, Republic of Korea

The Mungyeong Group is a typical lower Paleozoic carbonate-dominated succession regarded as a lithologic subunit of the Joseon Supergroup in the mid-eastern part of the Korean peninsula. This succession was strongly affected by a series of diagenetic processes and tectonic deformation, so it is not easy to realize its sedimentary fabric and structure on outcrops. In addition, due to rare occurrence of fossils, its biostratigraphic information has been restricted. As a result, this group has exposed a lot of debates on its stratigraphy and consequently has failed to establish stratigraphy until now. Through the detailed outcrop description and geologic mapping, this study recognized two lithologically-distinct basin fills (western Gaeun and eastern Hogye basins) suggesting a refined lithostratigraphic framework on the group. The Gaeun basin is filled by the mixed carbonate-siliciclastic succession (Gaeun Subgroup) of the Mungyeong Group, comprising six lithologic formations: Gurangri, Maseong, Hanaeri, Seokgyori, Jeongri and Dotan formation in ascending order. The basal Gurangri Formation is the siliciclastic-dominated unit, containing abundant lower Paleozoic trilobite fossils, conformably overlain by other carbonate-dominated successions characterized by repetitions of limestone and marlstone with intercalations of dolostone beds. On the other hand, the Hogye Subgroup occurs in the eastern basin, divided into five lithostatigraphic units: Gadori, Seonamri, Urori, Yugok and Byeolamri formations in ascending order. This subgroup consists mainly of severely deformed limestone and dolostone successions, intercalated with shale beds. In the Hogye Subgroup, the basal siliciclastic-dominated succession (like as the Gurangri Formation in the Gaeun Subgroup) is not present. This study reveals that the Gaeun and Hogye subgroups in the Mungyeong Group have a distinctive lithology and stratigraphy with each other and compared with the adjacent Yeongweol and Taebaek groups. Till now, it has been known that the Taebaek, Yeongweol, and Mungyeong groups were formed in a broad epeiric platform (eastern margin of the North China Platform), showing lateral variations in lithology and stratigraphy. However, the abrupt and considerable changes in lithology and stratigraphy among stratigraphic units suggest a possibility that the groups were accumulated in different platforms or separated sedimentary systems that were far away with each other. The possibility warrants a close and intensive research on the stratigraphy and paleogeography of the Taebaeksan Basin.