



Detrital zircon geochronology and Nd isotope geochemistry of an early Paleozoic succession in Korea:

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This study reports the results of an analysis of U-Pb ages of detrital zircons and Nd isotope compositions from the well-established lower Paleozoic platform succession developed on the Precambrian gneiss and metasedimentary rocks in South Korea. The three stratigraphic units in the basal part of the succession are the Jangsan, Myeonsan, and Myobong Formations. The unfossiliferous Jangsan (whitetopink quartz sandstone) and Myeonsan (dark-gray ilmenite-rich sandstone/shale) Formations are in fault contact and are generally considered to be coeval (Early Cambrian). Both formations are also generally considered to be conformably overlain by the dark gray, fossiliferous, fine-grained Myobong Formation (late Early-early Middle Cambrian). We here report U-Pb ages of detrital zircons and Nd isotopic data from the Jangsan, Myeonsan, and Myobong Formations. The Jangsan and Myeonsan Formations provide Archean-Paleoproterozoic U-Pb ages, but the former is characterized by Archean Sm-Nd model ages and the latter by late Paleoproterozoic Sm-Nd model ages, which is indicative of a significant change in provenance. This suggests that the Jangsan Formation predates the Myeonsan Formation. The Myobong Formation provides dominantly Meso- to Neoproterozoic U-Pb ages and Sm-Nd model ages that are slightly younger than those of the Myeonsan Formation. Contrary to the conventional wisdom, the combined evidence of unconformable contact and marked changes in zircon U-Pb ages and Nd isotopic compositions suggests that the Myobong Formation overlies the Jangsan and Myeonsan Formations unconformably. Considering the metamorphic age of the immediately underlying Precambrian basement metasediments (0.8 to 0.9 Ga), this stratigraphic relationship strongly suggests that the Jangsan Formation may be Neoproterozoic in age and that the Myeonsan Formation may be latest Neoproterozoic to Early Cambrian and calls for reevaluation of Precambrian-Paleozoic history of the Korean Peninsula. The results of this study also recommend application of this technique to unfossiliferous stratigraphic successions elsewhere.