



Structural evolution of the Yeongwol thrust system, northeastern Okcheon fold-thrust belt, Korea: Insights from structural interpretations and SHRIMP U-Pb and K-Ar geochronology

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The NE-trending Okcheon Belt is a prominent fold-thrust belt preserved in the Korean Peninsula. In the Yeongwol area, the northeastern Okcheon Belt, the Cambrian-Ordovician (possibly to Silurian) Joseon Supergroup overlies the Carboniferous-Permian (possibly to early Triassic) Pyeongan Supergroup and/or Jurassic Bansong Group by N-S trending thrust faults, having highly connected traces in map view. To understand the structural geometry of these thrust faults and their evolution history, we have conducted structural analyses, together with SHRIMP U-Pb zircon and K-Ar illite age datings. The results show that (1) the thrusts in the Yeongwol area, carrying the lower Paleozoic strata over the upper Paleozoic or Mesozoic strata, are defined as the Yeongwol thrust system. The closed-loops map patterns of this system can further be interpreted by alternative duplex models in terms of a hinterland dipping duplex vs. a combination of major thrusts and connecting splays; (2) newly obtained SHRIMP U-Pb zircon ages from a dike and synorogenic sediments and K-Ar illite ages from fault gouges, together with previously reported evidences from the Yeongwol area, suggest multiple events after Permo-Triassic to early Neogene. The SHRIMP U-Pb detrital zircon ages from the lower Paleozoic rocks of the Yeongwol area can provide tectono-stratigraphic information of this area before the Permian. These further indicate the broader implications in that how detailed structural interpretations supported by the geochronological data can help to understand the tectonic evolution of the Okcheon Belt as well as the fold-thrust belts in general.