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Tectonic implication of Jurassic adakite arc magmatism in the Korean Peninsula

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Sensitive high-resolution ion microprobe (SHRIMP) zircon U-Pb ages and whole-rock chemical compositions of Early to Middle Jurassic plutons from the central to southern Korean Peninsula are reported to investigate the effect of paleo-Pacific plate subduction preserved along the continental margin. Twenty-one plutonic rocks from the Yeongnam massif (i.e. Sunchang and Namwon plutons), the Okcheon belt (Jeongup, Boeun, and Mungyeong plutons), the northeast (Gangreung pluton), and the Gyeonggi massif (Gonam, Anheung, and Ganghwa plutons) have age ranges from ca. 189–186 Ma to 177 Ma, 177–166 Ma, and 177–173 Ma, respectively. Most plutonic rocks have chemistry equivalent to adakites, showing high SiO_2 (53.96–73.31 wt.%), low MgO (0.33–2.84 wt.%), high Na2O (2.65–4.83 wt.%), high Sr/Y and La/Yb, low Y and Yb, as well as low HFSEs (Nb and Ta), suggesting that the plutonic rocks resulted from partial melting of the basaltic portion of oceanic crust subducted beneath volcanic arcs. Spatial distributions of this adakite-equivalent plutonic belt, based on the present study, together with the previously reported geochronological results, indicate that magmatic pulses had gradually migrated toward the continent at the Korean Peninsula as a result of slab shallowing caused by periodic slab buckling. The petrogenesis and tectonic setting of the similar geochronological and geochemical characteristics of the plutonic belt among the Korean Peninsula, Japan, northeastern China, and Russia provide a possible link to an active subduction system that existed during the Early to Middle Jurassic ages, although the results of the plate subduction might differ in different locations along the East Asian continental margin.