Structure and Tectonic Evolution of the Late Jurassic–Early Cretaceous Wandashan Accretionary Complex, NE China

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Abstract: The Late Jurassic–Early Cretaceous Wandashan accretionary complex (AC) in NE China is a key region for constraining the subduction and accretion of the Palaeo-Pacific Ocean; however, the protoliths and structure of the region remain poorly understood, resulting in debates regarding crustal growth mechanisms and subduction-related accretionary processes in Northeast China. In this contribution, we integrate detailed field observations, ocean plate stratigraphy (OPS) reconstruction, and associated geological data to determine the structure and tectonic evolution of the Wandashan AC. The Wandashan AC formed through the progressive incorporation of OPS units along an oceanic trench. The observed OPS comprises, in ascending order, Permian basalt and limestone, Middle Triassic–Early Jurassic chert, Middle Jurassic siliceous shale and mudstone, and Late Jurassic–Early Cretaceous turbidite. Numerous NNE–SSW-striking thrust faults have segmented the OPS into a series of bedding-parallel tectonic slices that were successively thrust over the Jiamusi massif along a basal thrust (the Yuejinshan Fault), producing a large-scale imbricate thrust system. The Wandashan AC underwent oceanward accretion via multiple deformational processes. The OPS units were detached and rearranged along or within a decollement through offscraping, underplating, thrusting, and duplexing. The units were then emplaced over the Jiamusi massif along the basal thrust. The timing of accretion and thrusting is constrained to the latest Middle Jurassic to earliest Early Cretaceous (ca. 167–131 Ma). Reconstructed accretion-related structural lines within the Wandashan AC trend dominantly NE–SW, close to the direction of Jurassic extension at the eastern Asian continental margin. Large-scale left-lateral strike-slip movement on the Dunhua-Mishan fault zone during the late Early Cretaceous resulted in the folding of structural lines within the Wandashan AC, producing their present-day westward-convex orientation.

Key words: accretionary complex, ocean plate stratigraphy, Mesozoic, thrust, Palaeo-Pacific, Wandashan

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