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Subduction, accretion and closure of Proto-Tethyan Ocean: Early Paleozoic accretion/collision orogeny in the Altun-Qilian-North Qaidam orogenic system, northern Tibet of China.

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The Altun-Qilian-North Qaidam orogenic system, which is located in northern Tibet, was considered as the northernmost orogenic collage of the Proto-Tethyan domain. In contrast to the central Asia Orogen to the north characterized by long-lived accretionary processes, the architecture of the Tethyan orogenic collage was regarded as resulting from collisions between various continental terranes derived from the northern margin of Gondwana. However, in contrast to typical collisional orogens (e.g. Alps and Himalaya orogens), the Altun-Qilian-North Qaidam orogenic system includes abundant ophiolites, arc magmatic rocks and subduction-accretion complex, and thus some authors had regarded the orogenic system of the north Tibet as a typical accretionary orogen built by the development of an evolving arc-accretion complex growing southward along the margin of the Tarim and North China Craton during Paleozoic. However, this view is difficult to explain the common occurrence of continent-type UHP metamorphic rocks, broadly distributed Barrovian type metamorphism and associated granitic magmatism as well as deformation structure related to collisional orogenesis in the south Altun and North Qaidam Mountains. In this contribution, based on published data and our new data, we propose that two distinct orogenesises, i.e. accretion/collision orogenesises, developed in the Altun-Qilian-Qaidam during early Palaeozoic time. The diagnostic marks include HP/LT metamorphic belts, ophiolitic mélangé and arc magmatic rocks related to subduction-accretion, which mainly occur in the north Qilian Mountains and North Altun, and UHP metamorphism, Barrovian type metamorphism, associated granitic magmatism, extension collapse resulted from continental subduction and continent-continent collision along the South Altun-North Qaidam. We also build a tectonic model showing the tectonic evolution related to the subduction, accretion and closure of Proto-Tethyan Ocean.

