



Structural anatomy and dynamics of evolution of the Huanghua Depression during the Indosinian-Yanshan movement: Implication for the destruction of North China Craton

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The North China Craton is a typical example of cratonic destruction. The process of cratonic destruction is a hot research topic that has been studied by domestic and foreign scholars in recent decades. Huanghua Depression is considered as the best example of the destruction of the North China Craton and is an ideal place to test the craton destruction. Since the Indosinian movement, Huanghua Depression experienced conversion from contraction to extension, the structural characteristics of the depression significantly changed. The detailed study of the structural characteristic and evolution process in different stages of Huanghua Depression can help us to understand the construction reversal and reveal the process of the destruction of the North China Craton. Based on the detailed interpretation of ~ 7600 km² 3D seismic data and Isotopic data from 59 samples, we aim to analyse the geometry and kinematic of main faults, spatial and temporal evolution process of the highs and sags in Huanghua Depression during Indosinian movement to Yanshan movement.

Here we consider five distinct stages of the structural anatomy and dynamics of evolution of Huanghua Depression during the Mesozoic: First, early-middle Triassic stable stage: cratonic basins. Second, late Triassic compressional thrust stage: influenced by Indosinian movement, some structures large-scale, paleo-anticline and thrust fault formed and the present stratigraphic characteristics show that Triassic and Paleozoic were almost completely denuded in north of Huanghua Depression. Meanwhile, large-scale synclinorium formed and Triassic was not denuded in south of Huanghua Depression. Third, early-middle Jurassic thrust stage: in early Yanshan movement, compressional structure distributes Wumaying area in South of Huanghua Depression and Chenghai area, central Huanghua Depression. Fourth, the late Jurassic and early Cretaceous extension rifting stage: up to the middle period of Yanshan movement, negative inversion structure formation wide developed and rift basin was thus formed and erupting with volcanic. the time span of lithospheric thinning is 150-75Ma, with a peak stage at 138Ma. Fifth, late Cretaceous compression lifting stage: up to late Yanshan movement, structure inversion occurred again with several compressional structure features, thrust triangular belt, thrust imbricate structure and extrusion anticline in South Huanghua Depression and the tectonic belt strike is NNE or nearly SN.

Many researchers consider that the formation of Huanghua Depression is related with the late of destruction of the NCC and that the subsequent faulted crust and surface collapse with cracking of the basement are the main reasons for development of Huanghua Depression. we emphasize two distinct tectonic events during the Mesozoic that contributed to the destruction of NCC. The deformation during the late Triassic, the early-middle Jurassic and the late Cretaceous in Huanghua Depression are mainly manifested as large scale thrust movement. The rifting formed during the late Jurassic and the early Cretaceous, occurring with the violent volcanic activity along with the extensional fault systems. Thus, we suggest that the destruction of NCC might have been influenced by multiple tectonic movement and the initial thrust and erosion weaken the strength of the crust during the late Triassic.