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Uplift ages and Differential Uplift Features of Helan Mountain in Mesozoic and Cenozoic

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Helan Mountain located in the northwest margin of Ordos basin and few works have been done on the uplift ages and features of the mountain which has great influence in the sedimentary framework of the surrounding basins such as Bayanhaote Basin, Yinchuan Graben and also Ordos Basin. Confined by the present geological features of deposits, structures and magmatic and hot fluid activities, it is researched systematically the uplift time and features in different parts, the sedimentary records in Helan Mountain by the way of apatite and zircon fission track analysis.

It is concluded by many fission tracks dating data that Helan Mountain experienced five stages of uplift which are Late Jurassic, late of Early Cretaceous, Late Cretaceous to Paleocene, Eocene and since Miocene with different features in different part. The uplift age in the south part is earlier than the north, but with weaker heat event than the north in Mesozoic. Since Cenozoic the north part uplifted rapidly in large scale which induced the tremendous subsidence and sedimentation, while the uplift scale and speed in the south part is smaller than those in the north. The age distribution trends and modeling of the thermal history in the east-west profile in the north part of Helan Mountain shows that it uplifted in the Late Jurassic and then went through a tectonic heat event in Middle and Late of Early Cretaceous, with the temperature in the west higher than the east. A gradually cooling course was followed in both part of the profile. The east evolved three

main uplift ages of Late Jurassic(170-145Ma)、Late Cretaceous to Paleocene(78-52Ma) and the period since Late Miocene(8Ma), while the east with three uplift ages of Late Jurassic(165-145Ma)、late of Early Cretaceous to Late Cretaceous (117-77Ma) and Eocene to Miocene (42-7Ma) . The uplift rate in the east is larger than the west since Cenozoic.

The uplift of Helan Mountain in Late Jurassic caused the tectonic subsidence and deposits of the coarse clastic rock of Fenfang River Formation in both the eastern Bayanhaote Basin and the western margin of Ordos Basin. The uplift in Late of Early Cretaceous is corresponding to the conglomerate with the near source in east and west side. The uplift since Cenozoic is related to the large-scale subsidence and huge Cenozoic deposits and the strength of uplift rate is accelerated with the rapid increase of the sedimentary rate in Yinchuan Graben. The uplift in Late Mesozoic is combined by the compression caused by the blocks collision between the Tethyan tectonic domain, Siberia plate and the Chinese blocks from the south and north, respectively. The collision of Indian block and Euro-Asian Block and the far field effect of the gradual uplift of Tibet Plateau greatly influenced the Cenozoic uplift of Helan Mountain.

Key words: fission track, uplift stage, differential uplift, Meso-Cenozoic, sedimentary record

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