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Uplifting of the Jiamusi Block in the eastern Central Asian Orogenic Belt, NE China: evidence from basin provenance and geochronology

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The main part of Jiamusi Block, named as Huanan-Uplift, is located in the northeastern Heilongjiang, China. The Huanan-Uplift is surrounded by many relatively small Mesozoic-Cenozoic basins, e.g. Sanjiang Basin, Hulin Basin, Boli Basin, Jixi Basin, Shuangyashan Basin and Shuanghua Basin. However previous research works were mainly focused on stratigraphy and palaeontology of the basins, therefore, the coupling relation between the uplift and the surrounding basins have not been clear. Based on the field investigations, conglomerate provenance studies of the Houshigou Formation in Boli Basin, geochronology of the Huanan-Uplift basement, we have been studied the relationships between Huanan-Uplift and the surrounding basins.

The regional stratigraphic correlations indicates that the isolated basins in the area experienced the same evolution during the period of the Chengzihe and the Muling Formations (the Early Cretaceous). The paleogeography reconstructions suggest that the area had been a large-scale basin as a whole during the Early Cretaceous. The Huanan-Uplift did not exist.

The paleocurrent directions, sandstone and conglomerate provenance analyses show that the Huanan-Uplift started to be the source area of the surrounding basins during the period of Houshigou Formation (early Late Cretaceous), therefore, it suggests that the Jiamusi Block commenced uplift in the early Late Cretaceous.

The granitic gneisses in Huanan-Uplift give 494-415 Ma monazite U-Th-total Pb ages, 262-259 Ma biotite and 246-241 Ma K-feldspar 40Ar/39Ar ages. The cooling rates of 1-2 [U+2103]/Ma from 500-260 Ma and 10-11 [U+2103]/Ma from 260-240 Ma have been calculated based on the ages. This suggests that the Jiamusi Block had a rapid exhumation during late Permian, which should be related to the closure of the Paleo-Asian Ocean between the Siberian and North China continents.

It is concluded that during the late Paleozoic the Jiamusi Block was stable with a very slow uplifting. With the closure of the Paleo-Asian Ocean the Jiamusi Block underwent a very rapid exhumation in the late Permian. In the early Mesozoic the area went into a basin developing stage and formed a large basin as a whole during the Early Cretaceous. In the Late Cretaceous the Jiamusi Block started uplifting and the basin was broken into isolate small basins.

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