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# New insights into the provenance of Palaeocene to Miocene sediments in the Lenghu Structural Belt, Qaidam Basin: Response to the Tibetan Plateau Uplifting

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The Qaidam Basin is the largest intermontane basin on the north-eastern edge of the Tibetan Plateau. Along the basin's northern margin is developed the Lenghu structural belt formed as a consequence of Tibetan plateau tectonics during the Cenozoic Indo-Asian collision [1]. The basin stratigraphy within Lenghu has been thought to contain a sedimentary record of uplift in the neighbouring Qilian Mountains, but systematic provenance studies of sandstones have yet to be conducted. Following previous studies elsewhere in the basin [2], an integrated provenance analysis approach was adopted, looking at clast compositions, heavy mineral assemblages, palaeocurrent directions, sedimentary facies and seismic reflection characteristics.

Our results show that the bulk of the sediment originated from the north-east. From the Lenghu No.4 to No.7 Oilfield, that is, in a NE-SW direction, the sandstone percent content decreases gradually, while the stratum thickness of each formation increases. Progradational reflection configuration patterns deduced from the seismic section are consistent with previously published palaeocurrent research, indicating the same direction towards the south-west [3,4]. Petrographic and heavy mineral analysis of sediments in the Lenghu tectonic zone reveals the presence of three compositional areas. More specifically, Area A, shows a relatively high proportion of feldspars and metamorphic clasts, and a magnetite-garnet-zircon-epidote heavy mineral suite, interpreted as being derived from lithologies similar to those exposed around the Xiaosaishiteng Mountains. While the Area B, influenced by the north-western Saishiteng Mountains, has a typical magmatic parent rock provenance, low in lithic fragments (< 20%) and a zircon-magnetite-garnet-leucosphenite heavy mineral assemblage. Area C possesses detrital characteristics of both Area A and B, but with a leucosphenite-zircon-magnetite heavy mineral population that could be derived from the south-eastern Saishiteng Mountains.

In addition, based on a sandstone content contour map, drill core observations and microfacies analysis, we conclude that from Palaeocene to Oligocene, the provenance supply capacity progressively

weakened, but strengthened abruptly in Miocene. This change matches well with the timing of Tibetan plateau uplift, suggesting that the movement of the Tibetan plateau had an important influence on the provenance supply system in the Qaidam Basin.

*References:*

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