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## **Structural characterization and its implication of deformation timing of the Daerbute strike slip fault**

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The Daerbute fault zone, located in the western Junggar orogenic belt of the Mid-Asian Tectonic Domain, is a regional strike slip fault with a length of 400km. The NE-SW trending Daerbute fault zone presents distinct linear distribution in plain view, cutting through the Zaire Mountain and Hala'alate Mountain. Because of the high level compression, the rocks within the fault zone experienced intense cataclasis, resulting in a topographic valley with width of 300-500m and depth of 50-100m after weathering and erosion. The well exposed outcrops present horizontal striations and lineations. Flower structures and horizontal dragging folds can also be observed in the outcrops. The distribution of horse-tailed primary fault zone and its strike-slip splay faults is in accordance with the Riedel model of simple shear proposed by Sylvester. Flower structures can be interpreted in both seismic and time-frequency electromagnetic (TFEM) sections, indicating the typical strike slip characteristics of the Daerbute fault. The Daerbute fault can be subdivided into two segments: the west segment presents multiple fault cores with width of 1-2m and damage zones, while the east segment only presents one fault core with width of 300m, in which the rocks experienced higher level of rock cataclasis, resulting in mylonite, schist and even serpentine. In the central overlapping portion, the sediments within the fault zone is primarily reddish sandstones, conglomerates and some mudstones, of which the paleontological tests suggest mid Permian as the depositing timing. Integrating timing of the splay fault development, there are at least two periods of activity for the Daerbute fault. It is speculated that the Daerbute fault was formed as a dextral fault in mid Permian, resulting in a small pull apart basin which allows the sedimentation of mid Permian. Under the impact of the Siberia plate, the Daerbute fault transferred to be sinistral in Triassic, leading to the tilting and erosion to present of the Mid-Permian sediments.

**Keywords:** Daerbute fault; Structural characterization; Deformation timing; western Junggar orogenic belt;

