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Seismic induced large-scale dish structures in the early cretaceous of the Northern Ordos basin

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Abundant large-scale dish structures are developed in lower Cretaceous sandstones and sandy conglomerates in northern Ordos basin. In vertical section, these structures have a dish shape with concaved or flat central area and the tilted-up edges. Dish structures are developed in the yellow brown or gray white medium to thick massive sandstone, pebbly sandstone or conglomerates, with widths ranging from 1-3 m to 5-6 m or even 10 m with their height from 0.5 to 1.5m or even 2m. Both edges of the dish structures are tilted at angles from 0-45°, 45-75°to 75-90°, and some display rolled-up edges. Liquefied, sand filled pillars are located between dish structures, with different shapes, such as funnel-shaped, delta, vase, column, or shallow dish. Pillar widths range from several centimeters to 2-3 meters or much bigger. Different from the dishes, the pillars are composed of brown mudstone muddy siltstone, which grade into the yellow loosed silts due to the weathering process. Dish structures are most commonly formed in the yellowish or gray medium to thick fluvial pebbles or sand conglomerates, with the brown lacustrine mudstone or silt mudstone at the bottom. The mudstone and silt mudstone are massive and fragile due to fluidization and liquefaction. Dish structures commonly occur together with sand dikes, fluidized dikes, soft sediment deformation structures and soft deformed folds. Dish structures are formed due to mud diapirism and dewatering processes caused by earthquakes with magnitudes of more than 8-9, which are related to Mesozoic tectonic activity in north Ordos basin.

Figure 1: Photo of large-scale dish structures in the early cretaceous of the Northern Ordos basin

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