Deformation process of the Neoproterozoic and Cambrian paragenesis system in the southern and eastern Sichuan Basin

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The Neoproterozoic and Cambrian carbonate & evaporite paragenesis system in the southern and eastern Sichuan Basin is easily resulted in the complex deformation and a variety of salt related structures under the compressive stress from NW-SE direction. In order to improve the reliability of structural traps, the physical modeling and the forward numerical simulation are applied to study the deformation process of geological structures in this paper. Firstly, the stratigraphic filling structure and the stratigraphic model are established so as to provide a scaled geological model. Secondly, a template for the material selection of physical modeling is founded according to the relationship between extrusion strain rate and thickness of the stata from the physical modeling for each material. Next, it is inferred that the deformation process and the key period of formation of salt-related structures by using seismic interpretation and balanced section of structural evolution.Finally, the physical simulation and the forward numerical simulation for the scaled geological model are carried out respectively and the process of structural deformation is analyzed so as to establish possible structural styles.The results are as follows: 1) The halite layers play an important role during the process of deformation, which cause discordant tectonic deformation of its upper and lower strata; 2) The structural deformation is characterized by longitudinal stratification and plane zonation, which fault-related folds are developed above the halite layers, but the broad anticlines and imbricated-fault folds are developed below the halite layers, and the structural deformation is divided into the extrusion thrust zone, adjustment zone and structural frontal zone along the extrusion pressure direction;3)The movement of the salt body is controlled by the basement fault, structural slope and the catastrophe zone of halite layers, which is prone to the accumulation and thickening the halite layers at the core of anticlinal fold.