Abstracts: Deformation bands in porous sandstones can be widely developed in different structural systems and fault failure zones. In order to understand the development characteristics of deformation bands in porous sandstones of grabens, on the basis of previous studies (Qiao et al., 2012; Wang et al., 2018), typical deformation bands in porous sandstones in grabens are selected, and Cretaceous Honghuatao Formation in Yuan’an graben is developed. On the basis of field observation and measurement, the deformation band in stratum is taken as the research object, and the field data are interpreted artificially in the laboratory, and the occurrence state and development sequence of the deformation band in Honghuatao formation are analyzed carefully.

According to the basic form of deformation band development, the deformation band is divided into a single deformation band and clustered deformation bands (Fig. 1.). The single deformation band in the Honghuatao Formation is small in scale, and the direction is uncertain. When a single deformation band is dense to a certain extent, a clustered deformation bands is formed (Fossen et al., 2007), which shows that the clustered deformation bands is not formed by the increase of thickness by a single deformation band. With the extension of the clustered deformation bands, the width of the clustered deformation bands are usually fluctuating, and the clustered deformation bands with a single or smaller width are constantly dispersed on the plane.

There are various combinations of intersection and connection modes of deformation bands. Fossen et al. (1997), Chemenda et al. (2014), Ballas et al. (2015) and others have done some research on the combinational modes of deformation bands, but they have not done systematic research on the combinational modes. According to the combination relationship of deformation bands exposed in Cretaceous Honghuatao Formation in Yuan’an Basin, the most common combination model of deformation bands are classified, which are mainly divided into Hard-linked deformation bands, Parallel deformation bands, Conjugate deformation bands, Cross deformation bands, Dislocation deformation bands, Truncated deformation bands and Reticulated deformation bands seven types. Single deformation band mainly forms hard connection, conjugate and cross combination mode; cluster deformation bands were more likely to form dislocation and truncation deformation bands, and there are parallel and network deformation bands between them. Fig. 2I shows the cutting relationship of different strike deformation bands, and finally determines that the NE-trending deformation bands were formed first, and the NNW-trending and NNE-trending deformation bands were formed almost at the same time. Therefore, it is also important to systematically classify the combination modes of deformation bands. Therefore, it is of great significance to classify the combination patterns of deformation bands systematically.

The development scale of single and cluster deformation bands in different observation points of Yuan’an graben are different, but the development of deformation bands in plane has certain regularity. The types and scales of deformation bands are analyzed along the east-west direction of the graben. Because of the difference of deformation degree between Tongchenghe fault and Yuan’an fault, the deformation degree of cluster deformation bands is stronger than that of deformation bands. In the area with weaker shape, the deformation along Juhe River in graben is weak, which results in the dense development of single deformation band.
Key words: deformation bands, graben, porosity sandstones, combination model

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References


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