Paper Number: 856

Lithofacies and Sedimentary Micro-facies of Fine-grained Sedimentary Rocks in the Second Member of Kongdian Formation in Cangdong Sag

Deng Y., Chen S.Y., Yan J.H. and Chen J.

School of Geosciences, China University of Petroleum, Qingdao, China; yyjx111@hotmail.com.

Fine-grained sedimentary rocks are composed of complicated sediments that mainly less than 62.5 μm [1]. The huge amounts of fine-grained sedimentary rocks are widely distributed in lacustrine basins, whereas less attention has been paid to lithofacies and sedimentary micro-facies of fine-grained sedimentary rocks [2]. Previous studies on sedimentary micro-facies were mainly focused on coarse clastic skeleton sand bodies. Taking the fine-grained sedimentary rocks of the second member of Kongdian Formation (Ek_2) in Cangdong Sag as a research object, fine-grained sedimentary rocks are divided into 12 types of lithofacies in four main categories by means of “four components-three endmembers” classification scheme with integrated analysis of minerals, structures and organic carbon content by core observation, thin section identification, X-ray diffraction and organic carbon test.

The most developed five types of lithofacies include laminated fine-grained mixed rocks, laminated dolomite, laminated fine siltstone, massive dolomite and massive fine-grained mixed rocks. Under the control of skeletal sand bodies, the fine-grained lacustrine facies of Ek_2 is divided into six types of micro-facies based on fine-grained sedimentary rock types and lithofacies characteristics, combined with the control of factors such as paleoclimate features, paleo water depth, hydrodynamic conditions for fine-grained sediments development and palaeogeomorphologic features. These types include delta front circumference micro-facies, subaqueous fan circumference micro-facies, semi-deep lacustrine center limitation micro-facies, semi-deep lacustrine flat-broad micro-facies, semi-deep lacustrine edge undisturand micro-facies and semi-deep lacustrine submerged uplift micro-facies. The differences in mineral composition, lithology type, diagenesis, log response and depositional environment among different fine-grained micro-facies are analyzed. The study on sedimentary micro-facies of fine-grained deposits is of guidance value in unconventional oil and gas exploration.

References:

[1] Aplin A.C. and Macquaker, J.H.S. (2011) AAPG Bulletin 95(12):2031-2059

[2] Hickey J.J. and Henk B. (2007) AAPG Bulletin 91(4):437-443