Structural Characteristics and Evolution Process of the Western Slope of Xihu Sag

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The western slope is the most promising area for hydrocarbon accumulation in Xihu Sag. Since Cenozoic, the western slope has undergone multiple stages of evolutions, which resulted in the complex structure of the slope and complicated the hydrocarbon exploration in the study area. Based on the fine seismic interpretation, fault activation rate calculation and balanced cross section restoration, this paper analyzes the structural characteristics and evolution process of the western slope, in order to provide supports to the hydrocarbon exploration. The results show that the western slope is controlled by NNE-striking and NW-striking faults. Separated by NW-striking faults, the western slope can be divided into sub-Hangzhou slope, sub-Pinghu north slope, sub-Pinghu south slope and sub-Tiantai slope from north to south. (1) The sub-Hangzhou slope is a faulted-step gentle slope. In faulting episode I (Cretaceous-Paleocene), the slope was controlled by step faults. In faulting episode II (Early Eocene), the slope changed from fault-controlled slope to gentle strata slope. In depressional period (Late Eocene-Middle Miocene), the slope was a gentle strata slope. (2) The sub-Pinghu north slope is a graben-horst slope. In faulting episode I (Cretaceous-Paleocene), the slope was controlled by two sets of step faults with opposite tendencies. In faulting episode II (Eocene), the slope changed from fault-controlled slope to gentle strata slope. In depressional period (Oligocene-Middle Miocene), the slope was a gentle strata slope. (3) The sub-Pinghu south slope is a faulted-step steep slope. In faulted period (Cretaceous-Paleocene), the slope was controlled by Pinghu fault and secondary step faults. In depressional period (Oligocene-Middle Miocene), the activation of Pinghu fault became weak, but this fault still divided the strata. (4) The sub-Tiantai slope is a single-fault steep slope. In faulted period (Cretaceous-Paleocene), the slope was controlled by Baoshi fault. In depressional period (Oligocene-Middle Miocene), the activation of Baoshi fault became weak, but this fault still divided the strata. Differences of structural characteristics and evolution process influence the hydrocarbon accumulation in different sub-slopes.