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Cenozoic tectonic characteristics in the Adare Basin, West Ross Sea

Qiao Zhang (1,2), Jinyao Gao (1,2), Weifeng Ding (1,2)

(1) Key Laboratory of Submarine Geosciences, State Oceanic Administration, Hangzhou, China (jifeii@163.com), (2) Second Institute of Oceanography, State Oceanic Administrate, Hangzhou, China

Based on the geophysical data in the Adare Basin and its adjacent region, West Ross Sea, frequency wave-number filtering technique has been employed to recover the newly processed dataset with high signal noise ratio and complete seismic event which highly contributes to reveal more detailed deep-seated geological structures than previously thought. The structural features and magmatism of the study area in Cenozoic have been classified and analyzed. Combined with glaciation, the associated sedimentary facies are summarized systematically. Our analysis finds that at 16 Ma, under the influence of the thermal effect due to residual magmatism and asymmetric spreading of Adare Basin in the initial period, surrounding area of two flanks of the Adare trough is characterized with uplift folds and tilted uplift zone, respectively. The small-scale uplift folds zone features nearly upright faults and folds which is located in the south part of eastern flank. While the tilted uplift zone dominates in the corresponding district of western flank that reaches to continental margin. By utilizing the contact relationship between igneous rocks and surrounding rocks, igneous rocks can be divided into two periods: early-stage and late Cenozoic igneous rocks. The early-stage rocks are generally located dispersedly in the tilted uplift zone and the age is poorly known. We suggest they are related to the residual magmatism. On the other hand, the spatial distribution of late Cenozoic igneous rocks, forming not earlier 5.5 Ma, is extensive and scattered with almost covering the entire study area, which indicates they maybe unrelated to the rifting in spatial and time, instead they are affected decompression melting of the mantle because of the large-scale deglaciation since Pliocene.