

Significance of a Quaternary Sedimentary Profile in Manjiang, Fusong County, Changbai Mountain Region

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The Quaternary sedimentary profile that was studied in Manjiang is located in the northwest of the region, about 5 km away from Manjiang, Fusong County. This profile is intact with good continuity. By using the Electron Spin Resonance (abbr. ESR) dating technique and adopting the Ti-center of quartz granules in the fine sand layer as the dating signal, we dated the fine sand layer in the Quaternary profile in Manjiang, and obtained an ESR age of 471 ± 47 ka BP. The contents of rare earth elements in the gravel layer, fine sand layer, and clay layer of the profile were tested and analyzed; meanwhile, the clay mineral of the sand and gravel sedimentary layers was analyzed. Based on the results of these analyses, in combination with the sedimentary characteristics of the profile, it was concluded that the gravel layer, fine sand layer, and clay layer of the profile were continuous fluvial facies sediments, all of which had the same provenance. During the erosion and sedimentation of these sediments, the weathering effect was stable and the sedimentation was continuous. Moreover, the pH of the sedimentary environment changed little, or became weakly alkaline. Based on the climatic fluctuation curve of marine oxygen isotopes and other results obtained in previous studies, it was shown in our analysis that the gravel layer, fine sand layer, and clay layer in the Quaternary profile of Manjiang all formed in the middle stage of the Middle Pleistocene, with a sedimentation time corresponding to MIS12. As recorded by marine oxygen isotopes, the global climate turned colder during this stage; the sedimentary characteristics of the Quaternary profile we studied also indicated a trend toward drier and colder conditions.