The study area is located in the northern edge of the Yangtze platform and the core parts of the Changyang anticline (Zhang et al., 2013). It has developed the ancient North-south trending fault which is influenced by Yangtze plate extension. This fault has formed a nearly North-south trending faulted basin and block uplift in this area. Besides, due to the development of the Tianyangping ancient fracture, and its influence, the study area has also developed the north-west ancient fracture, whose main performance is lifting. So, affected by the above two kinds of faulting together, the checkerboard faulted basin formed, such as Gucheng basin, Paomaping basin, Huangjiaping basin and so on. These faulted basin accepted manganese sedimentation, developing into manganese basin.

The best manganese ore layers is Changyang-Gucheng in this region (lower series of Datangpo formation stratum, Nanhuan System). The manganese thickness is nearly from 12 to 14 m, and the thickest has reached 19.54 m. But Youxi (just a few kilometers of northeast Gucheng city) misses manganese rock series. The thickness of the Yangshuao manganese layer on the east of Changyang anticline plunging in Gucheng is only 0.7–3.04 m. Although Nanhua System is widespread in the region, but the development degree of manganese rock series around is much different. This phenomenon explains that ancient basement fracture contributes to limited fault basin in the late Liantuo sandstone sedimentary period of early Nanhua system.

By the study of the Gucheng manganese and the surrounding rock series, we summed up its metallogenic regularities. Manganese ore enrichment characteristics of layer structure have three parts, and formed the sedimentary enrichment characteristics in profile that is “lean in the upper and lower, rich in the middle”. The bonanza are formed in the sedimentary center, appearing alternately the lean ore zone round, which has a positive correlation with the sedimentary thickness of manganese rock series.

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4 Manganese Mineralization Model

This manganese mineralization model study is based on the analysis of the regional ore-forming geological background, ore-controlling lithofacies palaeogeography conditions and regional manganese metallogenic regularities.

During the ice age of faulted basin, the frequent volcanic activity underwater provides well abundant source for manganese. With the mixture of them, formed the manganese under the reduction condition. When it reaches a certain concentration, especially after mixing with bottom ash, the sedimentation started. With the rising ocean currents which are in rich of manganese, a set of black rock series of manganese in Datangpo stage deposited, through biological chemical and mechanical chemical mineralization and precipitation including the formation of ore deposits in Gucheng city. As shown in Figure 1.

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References