

Paper Number: 1749

Deformation characteristics of iron-ore-bodies in Xinyu iron deposit, Central Jiangxi Province and its implication for ore-prospecting

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Xinyu iron deposit, located in central Jiangxi province on eastern side of the Wugong Shan uplift, north to the South China Caledonian Fold belt, is hosted in the Late Proterozoic volcanic-sedimentary rocks, including sericite-chlorite pyhllite, magnetite-bearing chlorite phyllite or schist, magnetite quartzite, and schist [1-3]. Iron mines cluster along the southern limb of the Shenshan Anticlinorium.

Our field investigation revealed that regional penetrative mineral stretching lineation and A-type folds were well developed throughout the entire Xinyu iron deposit. Sheath folds were identified abundantly in Yangjiaqiao, Pitou mining areas in southern Xinyu. Systematic measurements indicated that the mineral stretching lineation and hinge lines of A-type fold vary from NW295° to NW320°, with their plunging angles less than 25°. The quartz-feldspar pebble in metamorphic pebble-bearing siltstones underlying the magnetite-quartz layer, was strongly elongated in the lineation direction. B-type folds were rarely observed in ore-bearing layers.

It is suggested that the Xinyu iron-ore deposits have experienced strongly regional plastic deformation after the sedimentation and metamorphism of BIFs. The ductile fabrics are regarded as the products of plastic deformation[4-6], rather than fold superimposition[1-3]. The different patterns of the stretching lineation, fold axis and occurrence of ore-bearing layers, normal or reverse suggested that the original form of the Xinyu iron-ore deposit area could be a giant sheath fold, generated from differential south toward viscous flow. Regional non-uniform tectonic uplifting and erosion after the plastic deformation resulted in various preservation in different parts of the regional sheath fold, presenting various structure patterns in different mining areas. For example, Dapi-Pitou and Zhaikou- Taipingshan-Liangshan areas, both located in the front of the regional giant sheath fold, are favorable spots for ore-forming material (iron) to be settled through differential flow, forming large, thick, and rich ore bodies, indicating that they are most favorable ore prospecting areas. Songshan-Yangjiaqiao mining area is located in the west limb of the large sheath fold, where developing ptigmatic folds and small sheath folds, producing periodic recurrence of the iron-ore bands in outcrop and ore-layers in cross-section, suggesting a favorable ore prospecting area too.

References:

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