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TheStructuralStyleinthe Western SichuanForeland Basin, Southwestern China

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Abstract: Western Sichuan foreland basinformed on one side of the continental margin which collision orogensdragged down and is belong to peripheral basin.Nowadays, the basin is long striped, because it controlled by the nappe tectonic belt in Longmen Mountains. The main depocenteris near the front of the Longmen Mountains. With the development of the exploration activity, the study of the foreland fold-and-thrust belt has become a hot geoscience research. The character of the Western Sichuan foreland basin is fault-related fold.The typical types are fault-bend fold, fault-propagation fold, duplex,sudden-deformation structure, for elimb-breakoutstructure, triangle belt and klippe and so on.Under the current conditions, it has theoretical and practical significance to study the foreland fold-and-thrust belt.

Keywords: *the western Sichuan foreland basin; structural styles; fault-bend fold; fault-propagation fold; duplex*

I. INTRODUCTION

As atectonicactivitybasin,foreland basin is tectonic activity of thrust belt and control the formation of the frontalbasin and itsfilling process.In the peripheral edge of the basin,deformationsof thrust structurefrom different stratigraphic sequence control the formation and evolution of the differentstratigraphic sequence,so that the basin formed different palaeogeomorphologicframeworkat different times[1-4].

The peripheral edge of the Western Sichuan Basin isconfined by many foldedobduction zone,including the Longmen Mountain inthe west, the MicangMountainin the north, and the DabaMountainin the northeast,fold beltof theEastern Sichuan andcomplex thrust structures of the SouthernSichuan. The Western Sichuan Basin is a structural activity basin[5-8], which is formed under the background of compressional structure and hasthousands metersofterrigenous sediment from Mesozoic to Cenozoic.

The character of the Western Sichuan foreland basin mainly develops fault-related fold.The typical types of the Western Sichuan Foreland Basin are fault-bend fold, fault-propagation fold, duplex,sudden-deformation structure,forelimb-breakoutstructure, triangle belt,klippeand so on. Thetransitive direction of the displacement is from the nappe tectonic belt in Longmen Mountains to the craton in Central Sichuan of the Yangtze Plate. Thetransitive pattern of the displacementis also consistent with bulldozers model of the foreland basin.

II. THE FAULT-BEND FOLD

It develops a fault-bend fold in Zhangjiaping district. There is a drag structurein the strata near the fault-bend fold.It formedan anticlinal structure which likes a box because of the uplift from the sudden structure (Figure 1).

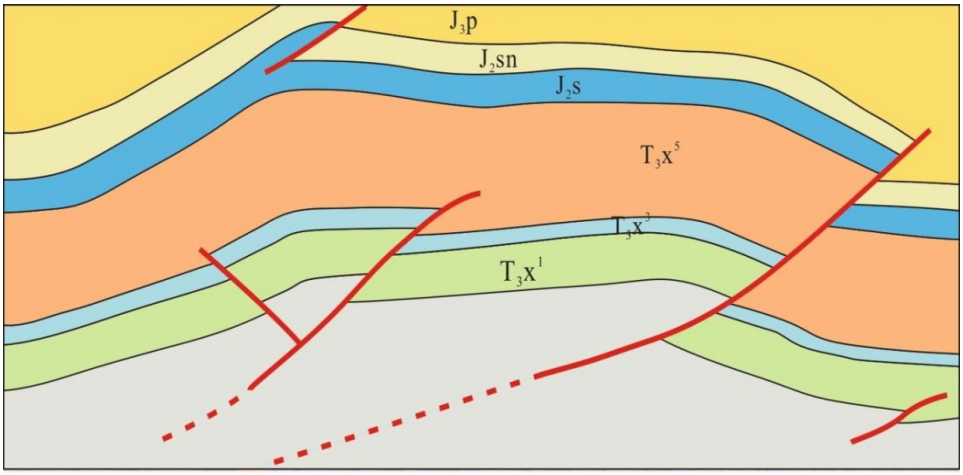

Fig.1 The structural style of the fault-bend fold from Zhangjiapingstructure

III. THE FAULT-PROPAGATION FOLD

It develops a fault-propagation fold and the lower decollement was a weakstratum from Cambrian system in Kuangshanliang. The fault propagation fold was formed in the foot wallbecause of the tectonic deformation. It's the mainly feature that the wingsare steep in southeast and gentle innorthwest (Figure 2).

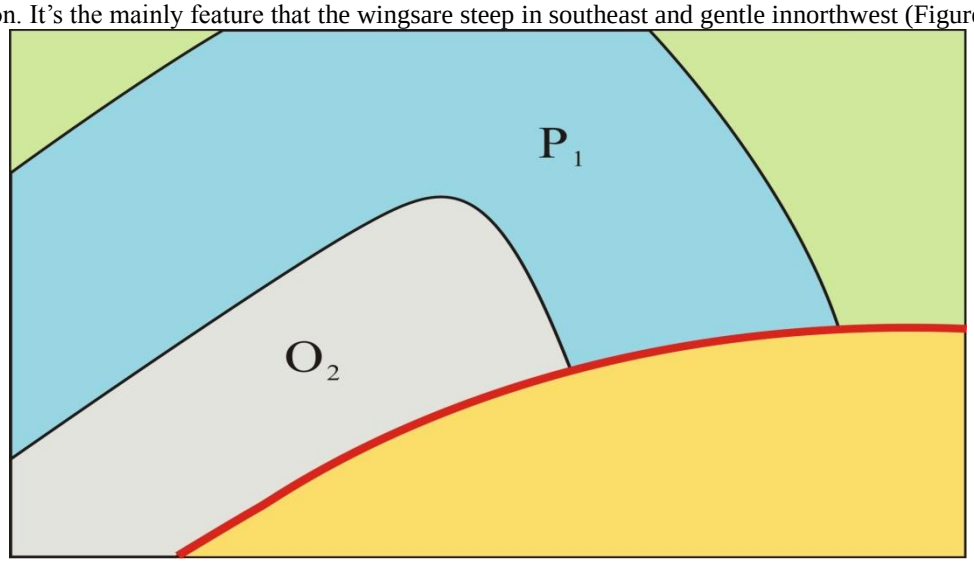

Fig.2 The structural style of the fault-propagation fold from Kuangshanliangstructure

IV. THE SUDDEN-DEFORMATION SRTUCTURE

It develops a sudden-deformation structure from TriassicXujiahe Formation in the Zhangjiaping district. The upperdetachmentof the positive dominant fault and the antitheticsecondary fault is argillutite in the 5th member of Xujiahe Formation. And the lower detachment is gypsolith in theJialingjiang Formation.The displacement of the dominant fault is large, while the displacement of the antithetic secondary fault is small (Figure 3).

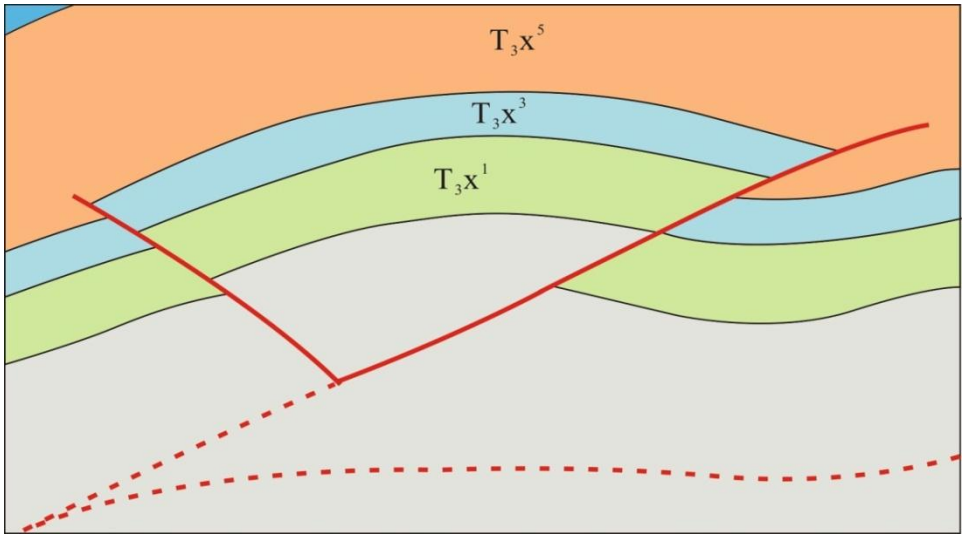

Fig.3 The sudden-deformationstructure from Kuangshanliang structure

V. DUPLEX

It develops a duplex consisted of 4-6 faults in the Zhangjiaping district. It is the product of the two-steptectonic movements from MesozoictoCenozoic. The faultsare superimposition. The fault throw near the earth surface are large, while the other fault throwinthe deep layer are small. The face of fault was reformed by thelatetectonic movementwhich causes the graduallydecreasing deformational amplitudefrom the top bottom. The lower decollement layers are all in Cambrian (Figure 4).

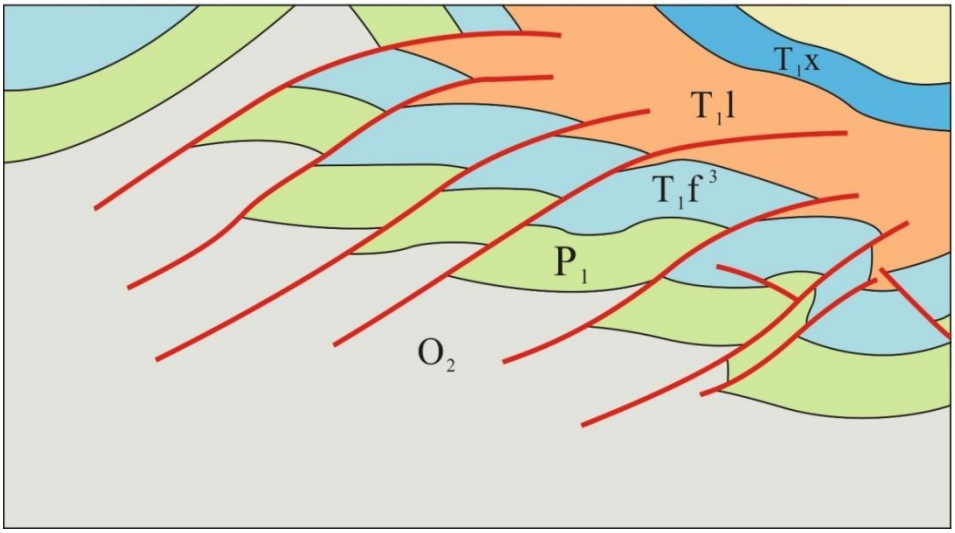

Fig.4 The duplex from Kuangshanliang structure

VI. THE TRIANGLE STRUCTURE

It developsa triangle structure in the Zhangjiaping. There is anantithetic thrust fault whichdeveloped from Ordovician to the Feixianguan Formation of Triassic in the southeast of the section. The triangle structure is made up of thethrust fault, the bottommost fault from the duplex and the fault which was controlled by the fold (Figure 5).

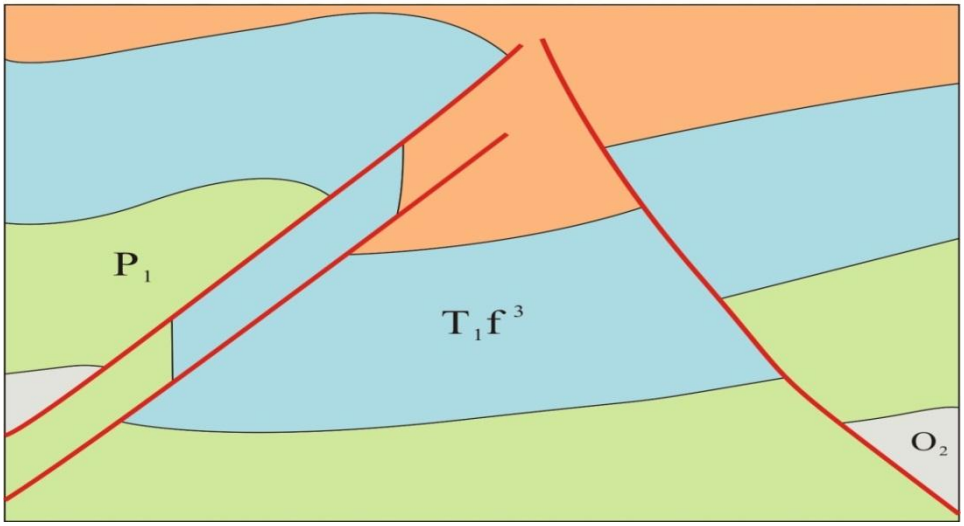

Fig.5 The triangle structure from Kuangshanliang structure

VII. CONCLUSION

(1) The structure characteristic of the Western Sichuan foreland basin is fault-related fold. The transitive direction of the displacement is from the nappe tectonic belt in Longmen Mountains to the craton in Central Sichuan of the Yangtze Plate. Thetransitive pattern of the displacementis also consistent with bulldozers model of the foreland basin.

(2) The typical structural types of the Western Sichuan Foreland Basin are fault-bend fold, fault-propagation fold, duplex,sudden-deformation structure,forelimb-breakoutstructure, triangle belt,klippe and so on.

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