

**STRUCTURAL AND STRATIGRAPHIC EVOLUTION OF
THE LONGMENSHAN FOLD-THRUST BELT AND
SICHUAN BASIN: COMPLEX INTERPLAY
BETWEEN EXTENSIONAL TECTONICS
AND BASIN FORMATION**

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Abstract

The Longmenshan region, recognized as the present-day convergent boundary between the Tibet Plateau and South China Craton, has had a complex tectonic history since the late Proterozoic. It is widely accepted by most researchers that this region underwent periods of extension, tectonic quiescence and crustal shortening. Based on sedimentary studies and structural analysis, we know that the Longmenshan-Sichuan plain region presently forms an orogenic belt - flexural foredeep system.

Because the western Sichuan basin is located along a hinge position for three major geologic units (which are South China Block, North China Block, and Tibet plateau), investigating the evolution of this region will be helpful for better understanding the Indosinian tectonic evolution of China. Moreover, since the western Sichuan basin is a superimposed basin, its tectonic evolution in the Triassic is partly determined by the structures at great depth. So, this study is crucial for hydrocarbon resources exploration in deep level in this region.

The modeling of basin evolution is useful for understanding tectonic history, and exploring hydrocarbon resources (predicting source presence, reservoir quality, availability of traps, etc). In this thesis, I use the software *Tao* which is designed to calculate the interaction between lithospheric flexure, tectonic loading (e.g., by thrusting), and surface transport (erosion/deposition) to model and analyse the evolution of the Longmenshan foreland thrust belt and western Sichuan basin evolution during Mesozoic times. By comparing the model result to the data collected from basin sedimentary stratigraphy, in field work and from well logs, I confirm that western Sichuan foreland basin underwent a strong subsidence during Late Triassic times. Modeling the subsidence history of the western Sichuan foreland basin evolution by using the software *Tao* shows a correlation between thrusting /contractional events in the Longmenshan and subsidence in the Sichuan basin.