

Paper Number: 372

Analysis of Basin–Range Coupling Mechanisms during Epeirogenetic Uplift – A Case Study of Tectonic Coupling in the Songpan–Ganzi Plateau–Longmen Mountain–Sichuan Basin Region

Li Zhongquan^{1,2}, Li Hongkui^{1,2}, Long Wei^{1,2}

¹State Key Laboratory of Oil and Gas Reservoir Geology and Exploitation, Chengdu University of Technology, Chengdu 610059, China

²Key Laboratory of Tectonic Controls on Mineralization and Hydrocarbon Accumulation, Ministry of Land and Resources, Chengdu University of Technology, Chengdu 610059, China

The tectonodynamic evolution of the Songpan–Ganzi Plateau–Longmen Mountain–Sichuan basin region has been analyzed in this paper. The result suggested that the region had experienced principal four stages of evolution. The evolution was beginning with crystalline basement and folded basement formation in the pre–Sinian, then the carboniferous sedimentary basin from the Sinian to the Middle Triassic was followed by uplift and stretching of the land from the Late Triassic to the Middle Jurassic, and finally compressive orogenesis since the Late Jurassic was happened. To understand the uplift and stretching of the land from the Late Triassic to the Middle Jurassic, a physical modeling experiment was conducted. It was confirmed that a tectonic plateau–ramp–basin geomorphology pattern developed during this period, caused by the wide difference in uplift between the Songpan–Ganzi Plateau and the Sichuan Basin. In the plateau region, the tectonic dynamic environment of uplift and stretching of the land (trailing edge extension) had appeared, which was accompanied with the extensional structure styles such as normal faults and graben–horst structures. On the slope between the plateau and the basin, a bedding shear geodynamic environment was formed, and compressive slumped overthrust structure was found for the sliddown of decollement layers under the force of gravity. In the basin, compressive tectonic dynamic environment had emerged, which led to a compressive structure, such as thrust faults, overturned folds, and fault–related folds.

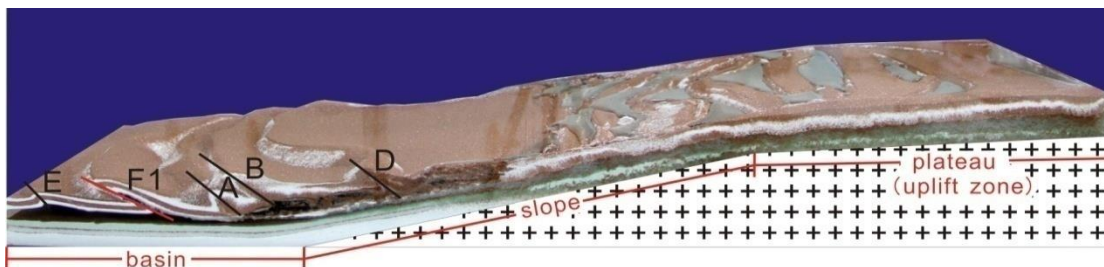


Figure 1: Schematic diagram of the modeling experiment

References:

[1] Li Zhongquan, Ma Chengdou, Ying Danling, et al. Tectonic dynamic evolution and analysis of basin-range coupling and basin-mountain coupling in Sichuan-Chongqing region, China. *Acta Petrologica Sinica*, 30(3), 2014, 631-640 (in Chinese with English abstract)

[2] Luo Zhili. The dynamical model of the lithospheric evolution TN Longmenshan orogenic belt. *Journal of Chengdu college of geology*, 1991, 18(1), 1-7 (in Chinese with English abstract)

[3] Liu Shugen, Deng Bin, Li Zhiwu, et al., 2013. Geological Evolution of the Longmenshan Intracontinental Composite Orogen and the Eastern Margin of the Tibetan Plateau. *Journal of Earth Science*, 24(6), 874-890

