



Tectonic-depositional environment and proto-type basins evolution of the Late Ordovician in the Tarim Basin

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The tectonic-depositional environment of the Tarim Basin underwent a rapid and dramatic change in the Late Ordovician. The restoration of the proto-type basins has a great significance for the reveal of the basin-mountain coupling and basin fill process. Based on the newest data of drillings, seismic profiles and outcrops, with the analysis of sedimentary facies and the combination of basins and orogenic belts, this paper reconstructed the Late Ordovician tectonic-depositional environment of the Tarim Basin and established the models of basin-mountain couplings and basin fill processes, by employing the method of “point → line → face”. In the Tumuxiuke Formation stage, the inundated platform-deep water basin sedimentary system was developed in the western part of the Tarim Basin and the Bachu-Tazhong area was denudated; In the Lianglitage Formation stage, the open platform-deep water basin sedimentary system was developed and the Yudong-Tanggubasi area underwent the transition from the carbonate basin to the turbidite basin; in the Sangtamu Formation stage, the mixed shelf deposit- turbidite basin sedimentary system was developed and the under-filling deposit was only developed in the Kalpin; In the Tierenkewati Formation stage, the shore-shelf sedimentary system was developed. In the Tumuxiuke Formation-Sangtamu Formation stages, the turbidite basin sedimentary system was continually developed in the eastern part of the Tarim Basin; In the Tierenkewati Formation stage, the clastic shelf sedimentary system was developed in this area. The tectonic-depositional pattern of Tarim Basin in the Late Ordovician had the feature as the following: the platform-basin pattern differentiated from east to west was overlaid with the uplift-depression pattern differentiated from north to south. In the Tumuxiuke Formation stage, the unified platform in the west of the basin had broken down leading to the development of uplift-depression pattern differentiated from north to south. In the Lianglitage Formation-Sangtamu Formation stages, the subsidence and deposition fill occurred overall the basin, the depression died out making the depocenter reversed. In the Tierenkewati Formation stage, the northern and southern part of basin uplifted severely and became land, only the middle part of the basin was covered by water, marking the formation of the uplift-depression pattern differentiated from north to south. Under the background that the coupling between basins and orogenic belts increasingly strengthened, the injection of large terrigenous clastics and the up and down of topography made tectonic-depositional environment change rapidly. At the end of the Ordovician, with the sea level descended drastically and the emergence of provenance basin within the basin, the Tarim Basin terminated the history that carbonate sediment grew extensively, signing that basin evolution entered into a new stage.

Key words: tectonic-depositional environment; proto-type basin; Late Ordovician; Tarim basin