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The Coupling Relationship of Early Palaeozoic Geological Events Group in the North Margin of Qaidam Basin

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A geological events group is a series of events that are genetically related and spatiotemporally coexist,which reflects the process of geological evolution more profoundly than a single event does.It has great significance to define and characterize geological events in the research on regional tectonic evolution.In this paper,on the basis of detailed field geological survey in the north margin of Qaidam Basin,a description of depositional characteristics of geological events group in early Paleozoic is presented and its forming mechanism is investigated.Combined with chronology and geochemistry data,its material sources and tectonic background are analyzed.Moreover,a coupling relationship between characteristics of early Paleozoic geological events group and tectonic evolution of North Qaidam Orogenic belt is discussed.The North Qaidam Orogenic belt experienced a complicated ocean-land transformation process in the Pan-african-Qilian period,and developed a trench-arc-basin system in the convergent margin in Cambrian-Early Ordovician era.Consequently,it formed the NWW-SEE trending Tanjianshan island-arc belt and South-Oulongbuluq back-arc basin along the North Qaidam Orogenic belt,and developed a set of carbonate-clastic-volcanic sedimentary formation.During this time,it formed a basin-range coupling system between sedimentary evolution of the southern margin of Oulongbuluq microcontinent and convergence forces between Oulongbuluq microcontinent and Qaidam block.Then,it triggered a series of geological events,including Caledonian tectonic uplift event in Saishiteng-Xitie-Lvliang area,volcanic eruption events of Tanjianshan group and various types of depositional events in Chengqiang-Shihui area.There is a link among them on a series of genetic mechanisms,which have a common macroeconomic background.There was a tectonic shift from passive continental margin into active continental margin in the southern margin of Oulongbuluq microcontinent in the early Paleozoic era,as a consequence of northward subduction by the North Qaidam ocean.Then it induced multi-period volcanic eruption events,and formed multiple sets of volcanic rock,pyroclastic rock and intercalated metamorphic clasolite in the Tanjianshan island-arc belt.Meanwhile,the southern margin of Oulongbuluq microcontinent turned into deep water slope from shallow water carbonate platform,and developed regularly and concentratedly event deposits,such as carbonate gravity flow deposits(submarine fan,turbidite,etc.),slumping deposits and seismites.Furthermore,a mass of island-arc material and uplifted continental crust basement caused by subsequent arc-continent collision between Tanjianshan island-arc belt and Qaidam block provided important provenances to the later sandy debris flow and clastic turbidite deposition in the South-Oulongbuluq back-arc basin.On the formation mechanism,the subduction and arc-continent collision triggered volcanic activity and earthquakes,and volcanic eruptions made a series of volcanic rocks and pyroclastic rocks,seismic activity leaded to large sets of gravity flow deposites in the same period,and triggered relatively deep water sediments moving into deeper water area,making it into turbidite.The isotopic chronology data shows that the development time of these event deposits is consistent with the relatively most active period of tectonic activity in the north margin of Qaidam basin area in the early Paleozoic era.Therefore,these stable-distribution volcanics and the gravity flow deposits with concentrated and regular distribution formed in the background of subduction and arc-continent collision,and there is a coupling relationship between them.