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中国大陆现今构造作用的地块运动和连续变形耦合模型 [点此下载全文](#)

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摘要:

板块构造基本理论(特别是其刚性块体假设)能否应用于大陆,是大陆动力学研究所面临的主要问题之一,不同的理论模型给出不同的回答.缺乏完整、可靠的构造变形运动学图像使得无法对不同的理论模型给予约束和检验,以至于无法回答上述基本问题.本文以中国大陆及其周边近年来的1350个GPS观测资料为主,结合活动断裂和地震活动性资料,研究中国大陆现今构造变形的运动学特征.中国大陆的现今构造变形既有刚性地块的运动,如塔里木、鄂尔多斯、华南等地块;又有非刚性的连续变形,如青藏高原和天山.在大陆构造变形过程中,由于岩石圈性质的不同而造成变形的分区差异和上部脆性地壳的分块运动,不仅有整体性好的刚性地块运动,也有刚性很差的连续变形.以粘塑性流变为特征的下地壳和上地幔在周边板块作用下发生连续流动,从底部驱动着上覆脆性地壳的运动,而不同活动地块本身的性质决定着地块的整体性和变形方式,中国大陆的现今构造变形可以用耦合的地块运动和连续变形模式来描述.

关键词: [刚性块体](#) [连续变形](#) [大陆动力学](#) [GPS观测](#)

A Coupling Model of Rigid-block Movement and Continuous Deformation: Patterns of the Present-day Deformation of China's Continent and Its Vicinity [Download Fulltext](#)

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Abstract:

One of the critical questions about continental dynamics is whether the preliminary assumption of rigid plate rotation is applicable to the continental lithosphere that possesses a long history of geological evolution. Different theoretical models give diverse answers that are difficult to test due to the lack of coherent and reliable kinematical constraints. In this paper, we study kinematical patterns of present-day tectonic deformation (or crustal movement) of China's continent and its vicinity on the basis of 1350 Global Positioning System measurements in combination with active faults and seismic activity studies. The present-day tectonic deformation of China's continental is characterized by the coupling of rigid block movement and continuous deformation. For example, the Tarim basin, the Ordos block and the South China block behave as coherent blocks similar to the oceanic rigid block without internal deformation, whereas the Tibetan Plateau and the Tianshan Mountains seem to deform continuously with significant internal deformation. Mechanical and rheological properties of the lithosphere indicate a style of regional deformation. Regions of high rigidity feature rigid block-like movements, while those of low rigidity are characterized dominated by continuous deformation. Rheological flows in the lower crust and upper mantle play an important role in controlling deformation of the upper crust. The present-day tectonic deformation of China's continent can be described in terms of a coupling model of rigid block movement and continuous deformation.

Keywords: [rigid block movement](#) [continuous deformation](#) [continental dynamics](#) [GPS measurements](#)

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