地质学报
ACTA GEOLOGICA SINICA

李勇 ALDENSMORE 周荣军 M A ELLIS.青藏高原东缘龙门山晚新生代剥蚀厚度与弹性挠曲模拟[J].地质学报,2005,79(5):608-615

青藏高原东缘龙门山晚新生代剥蚀厚度与弹性挠曲模拟 点此下载全文

李勇 ALDENSMORE 周荣军 M A ELLIS

[1]成都理工大学油气藏及开发工程国家重点实验室,610059 [2]Institute of Geology,Department of Earth Sciences, ETH Zentrum, CH-8092 Ztirich, Switzerland [3]四川省地震局工程地震研究所,成都610041 [4]Center for Earthquake Research and Information, University of Memphis, 3890 Central Avenue, Memphis, TN 38152

基金项目：国家自然科学基金项目(编号40372084) 教育部优秀青年教师资助计划项目 四川省重点学科建设项目(编号SZD0408)资助的成果。

DOI：

摘要：

龙门山是青藏高原东缘边界山脉,具有青藏高原地貌、龙门山高山地貌和山前冲积平原三个一级地貌单元。利用数字高程模式图像和裂变径迹年代测定方法研究和计算龙门山晚新生代剥蚀厚度与剥蚀速率,结果表明:3.6 Ma以来龙门山的剥蚀厚度介于1.91-2.16 km之间,剥蚀速率介于0.53-0.60 mm/a之间。在此基础上,开展了该地区岩石圈的弹性挠曲模拟,结果表明龙门山的隆升机制具有以构造缩短隆升和剥蚀卸载隆升相叠合的特点。3.6 Ma之前,龙门山的隆升与逆冲推覆构造负载有关,以构造缩短驱动的构造隆升为特色;3.6 Ma之后,龙门山的隆升与剥蚀卸载驱动的抬升有关,并以剥蚀卸载隆升为特色,进而提出了龙门山晚新生代以来的隆升机制以剥蚀成山作用为主的认识。

关键词：数字高程模式 裂变径迹 剥蚀厚度 剥蚀速率 剥蚀卸载隆升 构造缩短隆升 弹性挠曲模拟 晚新生代 龙门山 青藏高原东缘

Late Cenozoic Erosional Thickness and Flexural Deflection along the Eastern Margin of the Tibetan Plateau Download Fulltext

LI Yong, A L DENSMORE, ZHOU Rongjun, M A ELLIS (1. National Key Laboratory of Oil and Gas Reservoir Geology and Exploitation, Chengdu University of Technology, Chengdu 610059;2. Institute of Geology, Department of Earth Sciences, ETH Zentrum,CH-8092 Ziir

Fund Project:

Abstract:

The large-scale morphology of the eastern margin of the Tibetan plateau can be divided into three zones, the Tibetan Plateau, Longmenshan and Sichuan Basin. To assess the large-scale erosional thickness and erosional rate of the region, we use digital elevation models (DEM) and fission-track thermorchronology to calculate the erosional thickness across the margin. We calculated the erosional rate of Longmenshan in the last 3. 6 Myr (ESR) , and the results indicate that the erosional thickness of Longmenshan is 1. 91-2. 16 km, and the erosional rate of Longmenshan is 0. 53-0. 60 mm/a. Based on results of simulation by flexural deflection, we inferred that the mountain building model of Longmenshan would have been constrained to both erosionally-driven uplift and tectonic shortening-driven uplift. Before 3. 6 Ma, the uplift of Longmenshan is driven by tectonic shortening related to the India-Asia collision, and after 3. 6 Ma the uplift of Longmenshan is driven by erosional unloading.

Keywords:digital elevation model fission-track thermochronology erosional thickness erosional rate erosional unloading-driven uplift tectonic shortening-driven uplift flexural deflection Late Cenozoic Longmenshan eastern margin of Tibetan plateau