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深部天然核反应堆——一种可能的山脉隆升动力源 [点此下载全文](#)

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摘要:

板块碰撞造山模式难以解释造山作用在时间上的“滞后”和在空间上的“差位”现象, 大量研究表明山脉隆升的动力来自深部, 因此, 探索深部地质过程的物理和化学机制及其导致的能量再分配是认识山脉隆升动力学机制的关键, 若干线索表明地幔中的核反应中可能在岩石圈动力学演化过程中起过不可忽视的作用, 通过分析U, Th等元素的地球化学性质及其在深变质过程中的行为, 认为伴随板块俯冲发生的陆壳物质向地幔的再循环有可能在办流圈顶部形成富含U, Th, K等放射性亲石元素和碳质(石墨)的地质体, 通过理论上的论证和对Oklo天然核反应堆遗迹的反演表明这些地质体可能有一部分具备了形成石墨核反应堆的条件。这种反应堆在亚临界状态下的断续运行有可能为其上方岩石圈中的岩浆作用提供热源, 进入超临界状态时将可能导致深部核爆炸, 成为地震, 火山爆发和岩石圈破裂的动力来源, 据此建立的山脉隆升的动力学初步模式, 可以解释造山带的形成, 高原的隆升, 深源地震及其前兆的成因和金刚石及其相关岩石地壳浅部位置的机制。

关键词: [天然核反应堆](#) [造山作用](#) [地幔](#) [幔源物质](#) [动力学机制](#) [铀](#) [钍](#)

Deep-seated Natural Nuclear Reactor?-A Possible Dynamic Model of Mountain Uplift [Download Fulltext](#)

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Abstract:

The model of plate-collisional orogene fails to explain why the uplift zone of an erogenic belt always lies at the inland side of the active continental margin with a certain distance away from the collision zone and why the uplift of the mountain range often happens quite a long time later after the convergence of two continental plates while the regional crust is relatively stable during that period. Many investigations have indicated that the dynamic force of mountain range uplift comes from the deep inner earth. Hence to explore the physical and chemical mechanism of the geologic processes in the deep part of the earth and their consequent re-distribution of energy is of key importance to understanding the dynamics of mountain uplift. Some clues have led the authors to associate nuclear reaction occurring in the mantle with the dynamic mechanism of the lithospheric evolution. The geochemical properties of U and Th and other lithophile elements and their behaviours during deep-seated metamorphic processes suggest that the recycling of continental crustal materials into the mantle concomitant with plate subduction may result in U, Th and other lithophile elements as well as carbon (graphite) at the top of the asthenosphere. Theoretical verification and inversion deduction of the remains in the Oklo natural nuclear reactor indicate that at least some of the geologic bodies may have the requisites for the formation of natural graphite nuclear reactors. The off-and-on operation of these reactors in the sub-critical state may provide heat for magmatism in the lithosphere above them, and once the reactors run beyond their critical state, huge nuclear explosion may take place in the deep levels of the earth, giving rise to earthquakes, volcanic eruption and rupturing of the lithosphere. Thereupon a mountain uplift dynamic model has been constructed here to explain the formation of orogenic belts, uplift of the plateau, origin of deep-focus earthquakes and their precursors, as well as the emplacement mechanism of diamonds and their related rocks in the shallow levels of the crust.

Keywords: [deep geochemistry](#) [crust-mantle recycling](#) [natural nuclear reactor](#) [orogeny](#)

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