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南海东部海盆扩张过程的数值模拟

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Numerical simulation of Eastern South China Sea basin expansion

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摘要

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摘要 南海的形成演化一直是国内外关注的热点之一,南海的扩张发生在早渐新世-早中新世,并且在南海的扩张中至少包括一次洋脊跃迁.本文采用上升离散地幔流和热对流耦合模型模拟了南海东部海盆扩张、洋中脊跃迁和扩张停止后岩石圈的热结构演化和岩浆熔融过程.数值模拟结果表明,洋中脊跃迁是南海扩张中的一个重要的过程,由于洋脊跃迁使得在两洋脊之间形成一个部分熔融岩浆区,岩浆部分熔融的存在使洋脊之间海底火山分布也相对较多以及地形相对较高,同时造成南侧的洋脊两侧地形以及海山都分布不对称的现象,这反过来也能论证跃迁模型的可行性.

关键词: 张裂大陆边缘 上升离散地幔流 热流 洋中脊跃迁 岩浆熔融

Abstract: The formation and evolution of South China Sea has been one of the hot spot of attention at home and abroad. The expansion of the South China Sea happened in early Oligocene-early Miocene, and the expansion of South China Sea includes ridge transition once at least. This paper uses a model of rising divergent mantle flow and convection coupling to simulate the expansion of eastern sea basin of the South China Sea, the ridge jump, and the process of lithosphere hot structure evolution and melting of magma after expansion. Numerical simulation results indicate that the ridge jump is an important process of the South China Sea expansion. Ridge jump forms a magma chamber between the two ridges, and the existence of the magma chamber makes the submarine volcanoes relatively more and also the terrain relatively high between the ridges. At the same time, it also leads to the terrain of both sides of south side ridge and the distribution of submarine volcano asymmetric, which in turn can also demonstrate the reasonability of the ridge jump model.

Keywords: Rifted continental margin Upwelling divergent mantle flow Heat flow Ridge jump Mantle melting

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