

地球动力学★地震学

横向黏度变化对球层中热对流的影响

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摘要 本文在常黏度的基础上, 加上横向黏度变化, 纯粹研究了横向黏度变化对球层中热对流的影响. 结果表明, 横向黏度变化可以加速或阻碍球层中的热对流, 并对球层中热传输方式有调节作用, 但是横向黏度变化对球层中热对流的影响会限制在一定的强度范围内, 并且难以改变球层中热对流的格局. 横向黏度变化所产生的环型场速度占总速度场的比例最多为十几个百分点, 难以解释观测到的地表板块运动中的环型场能量大小.

关键词 [热对流](#) [横向黏度变化](#) [牛顿流体](#) [球层](#)

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Effects of lateral viscosity variation on thermal convection in a spherical shell

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Abstract In this paper, the effects of lateral viscosity variation (LVV) on thermal convection in a spherical shell are studied for the case of the summation of constant viscosity and LVV. The results show that LVV may accelerate or decelerate thermal convection and adjust thermal transport way in a spherical shell. However, the LVV of affecting thermal convection will be limited in a certain range and can't change the patterns of thermal convection. The ratio of the toroidal velocity due to LVV to total one is at most over ten percents, which can't match the energy of the observed toroidal field of surface plate motions.

Key words [Thermal convection](#); [Lateral viscosity variation](#); [Newtonian fluid](#); [Spherical shell](#)

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