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# Influence an endothermic phase transition on mantle convection.

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Reconstruction of the mantle flows within the mantle is essential for understanding of the Earth evolution. Endothermic phase transition at a depth of 660 km in the mantle partially slows down mantle flows. Many models considering the possibility of temporary layering of flows with separation of convection in the upper and lower mantle have been constructed over the past two decades. The slowing-down effect of the endothermic phase transition is very sensitive to the slope of the phase curve. So we take into account all possible processes which affect on phase transition. We study the effects of thickness of transition zone, nonlinear dependence of phase slope on temperature (different slope for downwellings and upwellings), kinetic effects of phase transition (duration of phase transition and slow growth of grain sizes of new phase), joint effects of phase transitions on the depth 410, 520-580, 660, 750 and 2700km. We present results of calculations of mantle flows within a wide range of phase-transition parameter values, determine ranges of one- and two-layer convection, and derive dependences of the amplitude and period of oscillations on phase transition parameters. We analyze 2-and 3-D mantle flow models with strong viscosity variations and phase transition to investigate this effect. For 2-D models we employ the generalized Moresi method. The 3-D models are calculated with the CITCOM code.