

Transition to time-dependent flow in very viscous horizontal convection

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Horizontal convection is studied numerically for the case of an infinite Prandtl number and different temperature distributions at the top boundary. The resulting steady state is unstable and likely to become unsteady, as the Rayleigh number increases. For $Ra > 5 \cdot 10^9$ even very high resolutions show time-dependent flow behavior for a linear temperature profile, whereas other temperature distributions show this transition at significantly lower Rayleigh numbers. The unsteady flow is characterized using plots of the phase space, showing a transition from periodic to chaotic flow behavior as the Rayleigh number is increased further. We conclude, that even for an infinite Prandtl number the steady boundary layer regime in horizontal convection becomes unstable at very high Rayleigh numbers.

I would prefer a poster.

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