Prandtl number dependence of heat and mass transfer in horizontal convection[1] OLGA SHISHKINA, Max Planck Institute for Dynamics and Self-Organization — In a horizontal convection system heat and fluid flow occurs from a differential heating/cooling of the bottom surface of a fluid layer. In the present work we study how the convective heat transport, measured by the Nusselt number Nu, scales with the Rayleigh number Ra and Prandtl number Pr and derive multiple scaling regimes, one of which is the Rossby scaling (H.T. Rossby, Deep Sea Res., 12, 1965) for laminar horizontal convection flows. Our theoretical results are supported by direct numerical simulations for a wide range of Ra and Pr.

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