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Comparison between 2D and 3D turbulent Rayleigh-Bénard convection ERWIN VAN DER POEL, RICHARD STEVENS, DETLEF LOHSE, University of Twente — We provide a detailed comparison between the results for 3D and the computationally much cheaper 2D numerical simulation of Rayleigh-Bénard (RB) flow. The 2D character of the LSC in both 2D and 3D flows hints towards a large similarity, in particular for integral quantities. Moreover, theoretical concepts for the scaling relations in turbulent RB convection are not specific to 2D or 3D. We compare the global transport quantities, boundary layer profiles, and flow topology of 2D and 3D convection to find at which control parameters differences and similarities can be found. One of the pronounced differences is the limited motion of the LSC in 2D, which increases the accumulation of energy in corner-rolls, leading to large scale wind reversals and high sensitivity of global output parameters on the roll-state.

Erwin van der Poel
University of Twente

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