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Lagrangian analysis of rotating Rayleigh-Bénard turbulence KIM ALARDS, HADI RAJAEI, RUDIE KUNNEN, FEDERICO TOSCHI, HERMAN CLERCX, Eindhoven University of Technology — Transitions between turbulent states can occur in Rayleigh-Bénard convection, for example, due to rotation, which is known to change the flow structure and the heat transport. In this study we want to characterize these different states of turbulence using Lagrangian statistics of tracer particles. Rayleigh-Bénard convection is modeled using DNS and tracer particles that perfectly follow the flow are included. The fluid velocity and the temperature at the particle position are calculated using a linear interpolation scheme. Lagrangian statistics of 1e6 particles are measured in the form of velocity, acceleration and temperature pdfs for different rotation rates. The influence of rotation on the flow structure and heat transport is analyzed. Statistics obtained in the cell center and near the top and bottom plate are compared in order to investigate the influence of the boundary layers on RB convection. On top of that the results are compared with experiments, in which neutrally buoyant particles are tracked in a rotating cylindrical RB setup. A good agreement between experiments and numerics is found.

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