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An Experimental Study of Flow Reversals in Quasi-2D Rayleigh-Benard Convection[1] RUI NI, TAK-SHING CHAN, SHENG-QI ZHOU, HENG-DONG XI, Department of Physics, The Chinese University of Hong Kong, Shatin, Hong Kong, China, KE-QING XIA, Department of Physics, The Chinese University of Hong Kong, Hong Kong, KAZU SUGIYAMA, ENRICO CALZAVARINI, CHAO SUN, DETLEF LOHSE, Department of Science and Technology, University of Twente, The Netherlands, SIEGFRIED GROSSMANN, Fachbereich Physik, Philipps-Universität Marburg, Germany — We present an experimental study of flow reversals of the large-scale circulation in turbulent Rayleigh-Benard convection in a quasi-2D rectangular convection cell with aspect ratio 0.84. Using water as the convecting fluid the range of Rayleigh number varied from around 10^8 to 10^{10} and the Prandtl number is around 5.8 in the experiment. From local temperature measurements it is found that, contrary to the 3D case, the rate of flow reversals has a strong dependence on the Rayleigh number, i.e. it decreases with increasing Ra. By using thermal plumes as tracer particles, we use shadowgraphs to obtain the velocity field of plume clusters. The results suggest the role played by the plumes in the reversal process.

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