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xiaoming wang* (wxm@math.fsu.edu), Department of Mathematics, Florida State University, Tallahassee, FL 32306. *Large Prandtl Number Behavior of the Boussinesq System of Rayleigh-Benard Convection.*

We present a few results in the systematic study of the behavior of solutions to the Boussinesq system at large Prandtl number. We first establish the validity of the infinite Prandtl number model which is derived from the Boussinesq system by formally setting the Prandtl number to infinity as an approximation of the Boussinesq system at large Prandtl number on any finite but fixed time interval. Such an approximation is singular involving an initial transition layer. We then argue that individual trajectories of the Boussinesq system are not expected to remain close to those of the infinite Prandtl number model over a long period of time due to instability. The validity of the infinite Prandtl number model over long time interval is then studied in terms of the proximity of invariant measures (stationary statistical solutions) and global attractors which are commonly used in the study of long time behaviors. Finally we study the long time behavior of the infinite Prandtl number model. (Received August 17, 2006)