1067-35-1840   **Dhanapati Adhikari*** (dadhika@math.okstate.edu), 401 Mathematical Sciences, Stillwater, OK 74078, and **Chongsheng Cao** and **Jiahong Wu**. *Global regularity results for the 2D Boussinesq equations with vertical dissipation.* Preliminary report.

This paper furthers the study of Adhikari, Cao and Wu [Journal of Differential Equations **249** (2010) No. 5 1078-1088] on the global regularity issue concerning the 2D Boussinesq equations with vertical dissipation and vertical thermal diffusion. The norm of the vertical velocity v in the Lebesgue space L^q with $2 \leq q < \infty$ is shown to be bounded by $C_1 q$ for C_1 independent of q. This bound significantly improves the previous exponential bound in q. In addition, we prove that, if v satisfies $\int_0^T \sup_{q \geq 2} \frac{\|v(\cdot, t)\|_{L^q}^2}{q} \, dt < \infty$, then the associated solution of the 2D Boussinesq equations preserve its smoothness on $[0, T]$. In particular, $\|v\|_{L^q} \leq C_2 \sqrt{q}$ implies global regularity. (Received September 22, 2010)

1