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**Jiahong Wu\*** ([jiahong.wu@okstate.edu](mailto:jiahong.wu@okstate.edu)), 401 Mathematical Sciences, Department of Mathematics, Stillwater, OK 74078. *The two-dimensional Boussinesq equations with fractional dissipation.*

The Boussinesq equations concerned here model geophysical flows such as atmospheric fronts and ocean circulations. Mathematically the 2D Boussinesq equations serve as a lower-dimensional model of the 3D hydrodynamics equations. In fact, the 2D Boussinesq equations retain some key features of the 3D Euler and the Navier-Stokes equations such as the vortex stretching mechanism. The global regularity problem on the 2D Boussinesq equations with partial or fractional dissipation has attracted considerable attention in the last few years. This talk presents recent developments in this direction. In particular, we detail the global regularity result on the 2D Boussinesq equations with vertical dissipation as well as the result for the 2D Boussinesq equations with general critical dissipation. (Received February 14, 2015)