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Qingshan Chen* (qsc@clermson.edu), Department of Mathematical Sciences, Clemson University, Clemson, SC 29634. *The barotropic quasi-geostrophic equation under a free surface.*

When the length scale of the flow is on the same order of the Rossby deformation radius, the classical rigid-lid assumption is no longer valid, the impact of the free surface deformation on the the vorticity field is no longer negligible, and therefore it has to be accounted for in the model. In this talk, we present some new results concerning the well-posedness of the barotropic quasi-geostrophic equation under a free surface. Both simply connected domains and domains with holes representing above-surface islands will be considered. The connection of the QG model to other more complex and more realistic models will also be discussed. (Received January 26, 2017)