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Matthew Novack* (mnovack@math.utexas.edu) and **Alexis Vasseur**. *Global Classical Solutions to the 3D Quasi-Geostrophic System*.

We show the existence of global in time classical solutions to the 3D quasi-geostrophic system with Ekman pumping for any smooth initial value (possibly large). This system couples an inviscid transport equation in \mathbb{R}_+^3 with an equation on the boundary satisfied by the trace. The proof combines the De Giorgi regularization effect on the boundary $z = 0$ –similar to the so called surface quasi-geostrophic equation– with Beale-Kato-Majda techniques to propagate regularity for $z > 0$. A bootstrapping argument combining potential theory and Littlewood-Paley techniques is used to strengthen the regularization effect on the trace up to the Besov space $\dot{B}_{\infty,\infty}^1$. (Received February 05, 2018)