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Holder regularity of the 2D dual semigeostrophic equations

The semigeostrophic equations are a simple model used in meteorology to describe large scale atmospheric flows. They can be derived from the three-dimensional incompressible Euler equations, with Boussinesq and hydrostatic approximations, subject to a strong Coriolis force. Since for large scale atmospheric flows the Coriolis force dominates the advection term, the flow is mostly bi-dimensional. In this talk, we discuss the Holder regularity of time derivative of solutions to the dual semigeostrophic equations in two dimensions when the initial potential density is bounded away from zero and infinity. Our main tool is an interior Holder estimate in two dimensions for an inhomogeneous linearized Monge-Ampere equation with right hand side being the divergence of a bounded vector field.