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A Biswas* (abiswas@umbc.edu), 1000 Hilltop Circle, Baltimore, MD 21250, and **V. Martinez** and **P Silva**. *Gevrey regularity for quasi-geostrophic equations with applications to decay in \mathbb{R}^2* . Preliminary report.

Foias and Temam introduced an effective approach to estimate space analyticity radius of solutions to Navier-Stokes equations via the use of Gevrey norms. Since then, this has become a standard tool for studying analyticity. We extend this approach to a class of dissipative equations, including critical and super-critical quasi-geostrophic equations, where the dissipation operator is a fractional Laplacian. This necessitates the use of sub-analytic Gevrey classes and "generalized" Gevrey norms and development of certain commutator estimates in Gevrey classes to exploit the cancellation properties of the equation. This is achieved via the Littlewood-Paley decomposition and the Bony paraproduct formula. Though not essential for applications to the the Navier-Stokes equations, such commutator estimates become crucial for the critical and supercritical quasigeostrophic equations. Applications include large time decay of higher order derivatives. (Received February 09, 2014)