1032-76-96 **Leslie M. Smith*** (lsmith@math.wisc.edu), 480 Lincoln Drive, Department of Mathematics, University of Wisconsin, Madison, WI 53706, and **Jai Sukhatme**. *Eddies and Waves in a Family of Dispersive Dynamically Active Scalars.*

We consider the evolution of 2D dynamically active scalars from small-scale initial conditions. The scalar θ is advected by a streamfunction ψ with $\theta = -(-\triangle)^{\alpha}\psi$ where $\alpha > 0$ (e.g. $\alpha = 1$ is the beta-plane equation and $\alpha = 1/2$ is the surface quasi-geostrophic equation). Anisotropic dispersion arises through a linear term in the equation for θ with strength characterized by a parameter ϵ. Setting $\epsilon \sim 1$, one expects the spontaneous formation of alternating zonal flows. With increasing locality (smaller α), large-scale isotropic θ eddies emerge along with transient, spatially localized and strong zonal flows. As locality decreases, the scalar field is sheared into thin zonally oriented filaments driven in a predominantly passive manner by a large-scale coherent zonal flow. Hence there is an optimum locality near $\alpha = 1$ for the presence of coherent zonal flows and vigorous θ eddies. (Received August 15, 2007)