1085-76-202 **Mohamed Moustaoui***, School of Mathematical and Statistical Scienc, tempe, AZ 85287.

Nonlinear wave-wave and vortex interactions and impact on Lagrangian transport of Chemicals in the atmosphere.

Multi-nested high resolution simulations for real environmental conditions that integrate computational models of disparate scales show that observed distributions of chemicals in the atmosphere can be modulated by nonlinear dynamical processes induced by interactions between waves with different scales evolving on top of a background state that is perturbed by vortex dynamics. A wave with a large wavelength evolving on this perturbed state causes horizontal variations in the mean gradients. Short waves evolving in these perturbed gradients induce wave signatures in chemicals, with amplitudes and phase relationships that depend on the vertical gradients encountered. The proposed mechanism is confirmed by Lagrangian reconstruction of observed tracer variations deduced under this dynamical process. This is further supported by analytical mathematical calculations that use background mean profiles from the observations, where the tracer variations induced by mutual wave-wave interaction are investigated. (Received September 10, 2012)