Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Segregation of particles in incompressible random flows:singularities, intermittency and random uncorrelated motion MICHAEL REEKS, Newcastle University, ELENA MENEGUZ, UK Met Office — We report recent measurements of the segregation of small inertial particles advected via Stokes drag in an isotropic homogeneous incompressible turbulent flow using a full Lagrangian method (FLM) to calculate the compressibility of an elemental volume of particles measured along a particle trajectory. The flow field was generated by a random Fourier mode kinematic simulation (KS) and by DNS. Numerical results show that the average compressibility decreases continuously with time if the value of the Stokes number is below a threshold value 1, indicating that the segregation continues indefinitely. We find that the probability distribution of the compression tends to a Gaussian distribution except in the wings due to the occurrence of singularities in the particle concentration which makes the process highly intermittent. The distribution of singularities over a fixed interval of time for a range of Stoke numbers is shown to be well approximated by a Poisson distribution. Finally, we show that the occurrence of singularities is related to the formation of caustics and the occurrence of random uncorrelated motion (RUM).

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Date submitted: 14 Jul 2012 Electronic form version 1.4