Available online at www.sciencedirect.com
SCIENCE DIRECT®
International Journal of Multiphase Flow 31 (2005) 767–768
International Journal of Multiphase Flow
www.elsevier.com/locate/ijmulflow

Letter to the Editor

International Journal of Multiphase Flow 31 (2005) 93

T. Elperin *, N. Kleeorin, I. Rogachevskii

Pearlstone Center for Aeronautical Engineering Studies, Department of Mechanical Engineering, Ben-Gurion University of the Negev, P.O. Box 653, Beer-Sheva 84105, Israel

Received 1 February 2005; received in revised form 17 February 2005

Recently Reeks (2005) published a paper in International Journal of Multiphase Flow where he compared the Advection Diffusion Equation (ADE) approach and the two-fluid model approach based on the PDF method for particle dispersion in inhomogeneous turbulence. Because of the lack of references in Reeks (2005) a reader may get the wrong impression that the author of Reeks (2005) was the first who (1) derived a drift term in the equation for the mean particle mass flux associated with the compressibility of the particle velocity field caused by their inertia, (2) considered the compressibility of the particle velocity field along a particle trajectory, and (3) derived the equation for particle mean mass flux containing higher order spatial derivatives. However, the real situation is completely different.

The drift term in the equation for the mean particle mass flux associated with the compressibility of particle velocity field caused by their inertia was derived first in our study (Elperin et al., 1996a). In our subsequent studies (Elperin et al., 1996b, 1997a,b, 1998a,b,c, 2000a,b,c, 2001, 2002; Buchholz et al., 2004; Eidelman et al., 2004) we explored various phenomena that arise due to this drift term (e.g., turbulent thermal diffusion and turbulent barodiffusion of inertial particles and gaseous admixtures) and even validated these effects experimentally in Buchholz et al. (2004), Eidelman et al. (2004). In particular, in Elperin et al. (2000c) and Elperin et al. (2002) we introduced compressibility of particle velocity field calculated at Lagrangian trajectories of particles and in (Elperin et al., 2001) we derived the equation for the mean number density of particles that includes higher order derivatives.

* Corresponding author. Tel.: +972 8 6477078; fax: +972 8 6472813.
E-mail address: elperin@bgu.ac.il (T. Elperin).

0301-9322/$ - see front matter
doi:10.1016/j.ijmultiphaseflow.2005.02.006

References

Reeks, M.W., 2005. On model equations for particle dispersion in inhomogeneous turbulence. Int. J. Multiphase Flow 31, 93–114.

Elperin, T., Kleeorin, N., Rogachevskii, I., 1996a. Turbulent thermal diffusion of small inertial particles. Phys. Rev. Lett. 76, 224–227.

Elperin, T., Kleeorin, N., Rogachevskii, I., 1996b. Self-excitation of fluctuations of inertial particles concentration in turbulent fluid flow. Phys. Rev. Lett. 77, 5373–5376.

Elperin, T., Kleeorin, N., Rogachevskii, I., 1997a. Turbulent barodiffusion turbulent, thermal diffusion and large-scale instability in gases. Phys. Rev. E 55, 2713–2721.

Elperin, T., Kleeorin, N., Podolak, M., Rogachevskii, I., 1997b. A mechanism for the formation of aerosol concentrations in the atmosphere of Titan. Planet. Space Sci. 45, 923–929.

Elperin, T., Kleeorin, N., Rogachevskii, I., 1998a. Effect of chemical reactions and phase transitions on turbulent transport of particles and gases. Phys. Rev. Lett. 80, 69–72.

Elperin, T., Kleeorin, N., Rogachevskii, I., 1998b. Formation of inhomogeneities in two-phase low-Mach-number compressible turbulent flows. Int. J. Multiphase Flow 24, 1163–1182.

Elperin, T., Kleeorin, N., Rogachevskii, I., 1998c. Dynamics of particles advected by fast rotating turbulent fluid flow: fluctuations and large-scale structures. Phys. Rev. Lett. 81, 2898–2901.

Elperin, T., Kleeorin, N., Rogachevskii, I., 2000a. Mechanisms of formation of aerosol and gaseous inhomogeneities in turbulent atmosphere. Atmos. Res. 53, 117–129.

Elperin, T., Kleeorin, N., Rogachevskii, I., Sokoloff, D., 2000b. Passive scalar transport in a random flow with a finite renewal time: mean-field equations. Phys. Rev. E 61, 2617–2625.

Elperin, T., Kleeorin, N., Rogachevskii, I., Sokoloff, D., 2000c. Turbulent transport of atmospheric aerosols and formation of large-scale structures. Phys. Chem. Earth A 25, 797–803.

Elperin, T., Kleeorin, N., Rogachevskii, I., Sokoloff, D., 2001. Mean-field theory for a passive scalar advected by a turbulent velocity field with a random renewal time. Phys. Rev. E 64, 026304-1–026304-9.

Elperin, T., Kleeorin, N., L'vov, V., Rogachevskii, I., Sokoloff, D., 2002. Clustering instability of inertial particles spatial distribution in turbulent flows. Phys. Rev. E 66, 036302-1–036302-16.

Buchholz, J., Eidelman, A., Elperin, T., Grunefeld, G., Kleeorin, N., Krein, A., Rogachevskii, I., 2004. Experimental study of turbulent thermal diffusion in oscillating grids turbulence. Exp. Fluids 36, 879–887.

Eidelman, A., Elperin, T., Kleeorin, N., Krein, A., Rogachevskii, I., Buchholz, J., Grunefeld, G., 2004. Turbulent thermal diffusion of aerosols in geophysics and in laboratory experiments. Nonlin. Processes Geophys. 11, 343–350.