

Zhuojian Yuan  
Department of Atmospheric Science  
Sun Yat-sen University  
Guangzhou, Guangdong 510275  
P. R. China  
April 3, 2010

**Dear Reviewer # 2:**

Thank you very much for the references in your comments on the manuscript entitled “*The basic mechanism behind the hurricane-free warm tropical ocean*” (acp-2009-742).

We have overlooked one of very important studies focusing on the small but not neglectable effect of  $\cos\varphi$  Coriolis terms on the global models done by White and Bromley (1995) since building completely-accurate global models is the destination of atmospheric science. So we are desperate for spelling out the “global model outputs” in the sentence listing the results of a large number of studies focusing on the effect of  $\cos\varphi$  Coriolis terms. The corresponding revised sentence should be:

*“A large number of studies (e.g., Garwood et al., 1985; Leibovich and Lele, 1985; Draghici, 1987; Mason and Thomson, 1987; Draghici, 1989; Shutts, 1989; Burger and Riphagen, 1990; White and Bromley, 1995) have emphasized the non-neglectable effect of  $\cos\varphi$  Coriolis terms on the outputs of global models, the synoptic-scale systems in the tropics, the turbulent kinetic-energy budget in the oceanic surface mixed layer, Ekman layer stability, boundary layer eddies and nonhydrostatic mesoscale atmospheric systems etc..”*

For a more precise discussion on term 1 in Eq. (1), we would like to replace the confusing sentence:

*“In a completely-resting atmosphere on the rotating Earth with  $\Omega > 0$  and  $N = 0$ ,*

*so long as the zonal wind is not zero at the Equator with  $\cos \varphi = 1$ , the magnitude of this term i.e.,  $2\Omega u$  could be at least as large as that of midlatitude  $\sin \varphi$  Coriolis term i.e.,  $2\Omega u \sin 45^\circ = \sqrt{2}\Omega u$  receiving most attention due to its significant role in the horizontal momentum equation”*

by the following sentence:

*“Starting with a completely-resting atmosphere on the rotating Earth with  $\Omega > 0$  and  $N = 0$ , so long as external forces generate equatorial ( $\cos 0^\circ = 1$ ) zonal wind,  $2\Omega u$  could be as large as the midlatitude  $\sin \varphi$  Coriolis term i.e.,  $2\Omega u \sin 45^\circ = \sqrt{2}\Omega u$  receiving most attention due to its significant role in the horizontal momentum equation”.*

Sincerely,

Zhuojian Yuan

Professor

### **Reference:**

- Burger, A. P., and Riphagen, H. A.: The basic equations in meteorological dynamics - A reexamination of unsimplified forms for a general vertical coordinate, Beitr. Phys. Atmos., 63, 151-164, 1990.
- Draghici, I.: Non-hydrostatic Coriolis effects in an isentropic coordinate frame, Sov. Meteorol. Hydrol., 17, 45-54, 1987.
- Draghici, I.: The hypothesis of a marginally-shallow atmosphere, Sov. Meteorol. Hydrol., 19, 13-27, 1989.
- Garwood, R. W., Gallacher, P. C., and Muller, P.: Wind direction and equilibrium mixed layer depth: General theory, J. Phys. Oceanogr., 15, 1325-1331, 1985.
- Leibovich, S., and Lele, S. K.: The influence of the horizontal component of Earth's angular velocity on the instability of the Ekman layer, J. Fluid Mech., 150, 41-87, 1985.

- Mason, P. J., and Thomson, D. J.: Large-eddy simulations of the neutral-static-stability planetary boundary layer, *Q. J. R. Meteorol. Soc.*, 113, 413-443, 1987.
- Shutts, G. J.: Planetary semi-geostrophic equations derived from Hamilton's principle, *J. Fluid Mech.*, 208, 545-573, 1989.
- White, A. A., and Bromley, R. A.: Dynamically consistent, quasi-hydrostatic equations for global models with a complete representation of the Coriolis force, *Q. J. R. Meteorol. Soc.*, 121, 399-418, 1995.