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Biogeosciences Discussions

Interactive comment on "Surface layer similarity in the nocturnal boundary layer: the application of Hilbert-Huang transform" *by* J. Hong et al.

J. Hong et al.

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Thank you very much and we appreciate your constructive comments on our manuscript. We, authors believe that your constructive comments improve this manuscript a lot. As you have suggested, we have revised the manuscript by incorporating all of the comments provided by the referee 2. Below is the authors' response to the reviewer.

*Page9684-Line17to21 Which data is used in this analysis? (synthesizing all of three sats?)

> Reply: We used the all data sets observed at different levels. The text was revised to clearly mention this issue.

*Page9686-Line7 "as z/L increase, $\psi_m = ln(z/z0) - ku/u_*$ linearly ..." Does this sentence mention Fig.7 ?

> Reply: The text was revised to discuss Figure 7.

*Page9686-Line15 "A plausible explanation is ..." Why normalized variance of c is constant when its vertical gradient is not zero?

> Reply: As z/L approaches to zero (neutral condition), fluctuations of temperature cannot produce heat flux, suggesting that $sigma_\theta/\theta_*$ is variable near the neutral condition. However, even near neutral condition, CO_2 fluxes can have non-zero values with non-zero vertical gradient of CO_2 concentration. We revised the text to incorporate the reviewer's comment.

*Page9686-Line21to24 "... with increased contribution of turbulent transport term..." The explanation of the TKE equation and its transport term seems not enough. It also helps readers a lot to note the characteristics of transport term under the z-less turbulent condition.

> Reply: This issue is well documented in Dias et al. (1995) which was cited in our manuscript many times. Also, we submitted another paper to simply discuss this issue. The text was revised to incorporate the reviewer's comment

*Fig.4 "... calculated after removing seven IMFs to contribute at low frequency" How the threthold of removing low frequecy contribution was determined?

> Reply: This is very important question. Unlike wavelet or Fourier transform, many portion of the HHT is still empirical and needs more theoretical study like Dr. Daubechies did for the wavelet transform. So our approach was to remove the longest IMF one by one until scatters in the plots were minimized. We just speculate that the removed components are related to gravity wave because of the stably stratification but it could not be completely assured since we did not have sensors to say the evidence of gravity wave such as a microbarograph in our field experiment. Absolutely, further

study should be done to solve this issue.

Interactive comment on Biogeosciences Discuss., 6, 9677, 2009.