

Interactive comment on “Remote sensing of the tropical rain forest boundary layer using pulsed Doppler lidar” by G. Pearson et al.

Anonymous Referee #1

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General comments:

The paper documents original and interesting observations of Doppler lidar at a tropical rain forest. The data would be useful for future studies of the boundary layer in similar environment and the development of parameterization of climate models.

Major comments:

To assist the reader, the authors are suggested to include the followings in the paper: (a) a small section on the characteristics of the Doppler lidar in use for the study; (b) a section discussing how the results obtained in the paper could be useful in the development of parameterization of climate models, with explicit discussions of the impact of the study on the existing parameterization schemes. This would give more

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weight on the scientific significance of the results of the paper.

Moreover, the paper presents the different ways of determining MLH using the lidar data, as presented in Fig. 10. This is the most important result of the paper. However, there does not seem to be discussions on which estimate of MLH is the best. Could the best estimate of MLH be established, say, with independent measurements? Moreover, how do the different estimates compare with climate model or other numerical weather prediction model? The different estimates for the present study may be used to illustrate their impact on the development of climate model.

Specific comments:

Fig. 6 and Fig. 7 - The SNR thresholds of -5 dB and -17 dB are used for discriminating cloud and aerosol returns. Any references to support this, or previous measurements with similar lidars to support this? As pointed out by the authors in the text, the use of different thresholds could result in different appearance of the MLH estimate based on backscatter signal. As such, more detailed justifications of the use of the threshold values seem to be necessary.

Fig. 8 - Using standard deviation of the vertical velocity, the rise and fall of MLH does not seem to be evident (at least as compared with similar evolution of the backscattered signal, Fig. 6 and 7). It is mentioned in Fig. 10 that a threshold of 0.3 m/s is used. How is this 0.3 m/s threshold determined? What's the basis?

Fig. 9. - It has been said in the main text that the weather conditions throughout the study period were broadly similar, yet there seems to be significant variations in the wind profiles in the study period. In particular, the maximum winds in the order of 8 to 12 m/s are much larger than the mean winds. Are the maximum winds realistic? Do they compare well with other available observations? Given such large variations of the wind speeds, could we really say that the weather conditions in the study period remain largely unchanged? The authors are suggested to include more discussions on these points.

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