Atmos. Chem. Phys. Discuss., 11, C6785–C6787, 2011
www.atmos-chem-phys-discuss.net/11/C6785/2011/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Coastal precipitation formation and discharge based on TRMM observations" *by* R. H. Heiblum et al.

Anonymous Referee #2

Received and published: 22 July 2011

This manuscript uses TRMM satellite derived products to investigate the formation of coastal winter-time clouds in the Eastern Mediterranean. This manuscript uses 13 years of satellite observations to analyze the mean and diurnal spatial distribution of the "Integrated Hydrometeor Mass" (IHM). The manuscript hypotheses that the land breeze is interacting with the synoptic wind to determine the location of the IHM. But, the manuscript does not present any temperature or wind data to support or document this conclusion. Without any other supporting data, it is not possible to isolate whether the observed distribution of IHM is due to orographic forcing or the interaction of the land breeze with the synoptic wind. Therefore, this manuscript documents the location of mean and diurnal variations of IHM using satellite observations, but does not quantify how or why those variations exist.

This manuscript would be more beneficial to the literature if either wind or temperature data are analyzed in a similar fashion as the satellite data to determine if there is any correlation between forcings and IHM. I encourage the authors to add the analysis of wind or temperature data to this manuscript.

Comments are in sequential order with significant comments identified.

1. Title, "Coastal precipitation formation and discharge based on TRMM observations". This manuscript does not address the "formation" of precipitation. It addresses the location of the precipitation as observed by TRMM observations. What is "discharge"? This word is only used in the title and the abstract. Please determine a more appropriate title.

2. (significant comment) Abstract, page 15660, line2 13-15. "The intra-seasonal and diurnal changes in the distribution of hydrometeor mass indicate that the land breeze is most likely the main responsible mechanism behind our results." The manuscript does not present any land breeze data or any data that can be considered a proxy for a land breeze. Therefore, this conclusion stated in the abstract is not supported in the body of the manuscript.

3. Page 15663, lines 17-24. Are the convergences in the Eastern Mediterranean (EM) during the winter-time comparable in magnitude to the convergences observed and modeled over the summer-time Florida Peninsula? Please explain to the reader that EM convergences are less than those modeled and observed in Florida.

4. (significant comment) Page 15666, paragraph starting on line 16. This paragraph defines the hypothesis that the interaction of synoptic wind and the land breeze (LB) determines the location of the precipitation. But no wind data is presented in this study to test this hypothesis. This raises many questions, for example, if the LB is driven by a temperature difference between the sea and the land, what is the temperature difference when clouds are present? What is the wind strength and direction of low level wind along the coast during synoptic weather events? What is the correlation

between wind strength and direction with IHM, both in the mean and at the diurnal temporal scale? Plus many more questions that could be addressed with some wind data.

5. (significant comment) Page 15673, lines 8-9. "...one most likely related to the convergence of LB and gradient winds (LB peak), and the other related to orographic lifting (orographic peak)." How were the two peaks objectively identified as being related to land breezes (LB) and orographic lifting in the satellite data? What data supports this "most likely" result?

6. (significant comment) Page 15674, paragraph starting on line 20 and Figures 7 and 9. In the IHM diurnal analysis plots shown in Figures 7 and 9, do the peaks at different distances occur at the same time or do they occur in different storms? The composite of 13 years of observations could show two peaks, but there may only be one IHM peak during each synoptic event. If I understand the manuscript, increased LB causes an increase in wind flow away from the shore. This would decrease the amount of on-shore flow and decrease the amount of orographic uplift. A cross-spectral analysis would reveal if the two peaks occur simultaneously.

7. Page 15678, lines 22-23. "Evening to morning hours exhibit an offshore transition of the IHM peak, while late morning to evening hours exhibit a transition of the IHM peak towards inland." Patterns in the diurnal plots do not indicate that the peak moves from one 'time zone' to another 'time zone' within the same event. Please re-phrase this sentence.

8. (significant comment) Page 15678, lines 26-29. "It is apparent however, that the offshore LB Gaussian during November-December is highly affected from the intense afternoon offshore peak (see Fig. 9), a fact which opposes our current proposed theory." This unexplained peak is the largest magnitude peak in Figure 9. Some observed wind or temperature data would enable the hypothesis to be tested.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 15659, 2011.