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Interactive comment on “The effects of aerosols on water cloud microphysics and macrophysics based on satellite observations over East Asia and the North Pacific” by T. Michibata et al.

Anonymous Referee #1

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General Comments:

This paper repeats several recent global scale analyses based on CloudSat and MODIS data in specific regions in the midlatitude Pacific ocean and the Eastern Asian continent. Mostly the methodology borrows from Kubar et al., 09 and Suzuki et al, 10. Findings on these regional scales tend to be similar to those found on the global scale. The methodology and analyses is generally sound while the interpretation is slightly suspect in a few areas outlined below. The paper doesn't add very much to the prior studies from which it borrows. There are interesting differences between land and ocean results which could be an area that could be much more thoroughly explored.

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This could be a fruitful area for the authors to explore in the future.

I recommend that the paper requires minor revision prior to publication

Minor Comments:

Page 5, Line 4: State that the cloudmask = 30 is from the Geoprof mask. Only very few people will know what mask = 30 means.

Page 7: The results for the inland industrial areas are very non-intuitive. Land or ocean one would expect precipitation occurrence to map most strongly into LWP based on simple microphysical arguments. Whether it be land or ocean, the Another plausible explanation might be that there are errors in the retrieval algorithms. Perhaps the cloud types are different over the industrial areas. I would think that there would be more cumulus than over the ocean. MODIS retrievals for cumulus clouds are much more prone to retrieval errors than are stratocumulus because of the horizontal inhomogeneity. See the recent publications from Zhibo Zhang for example.

Page 9, Line 6: The differences in LWP do not necessarily mean the cloud lifetime increases. Without a really good causal mechanism and a lot more analysis you shouldn't speculate about this.

Page 9: CloudSat cannot reliably measure cloud thickness. There are two problems. First for precipitating clouds there are reflectivity values that are from precipitation, not cloud. Second for non-precipitating clouds, the reflectivity at cloud base are most likely too weak to be observed. You need to mention these things. What you are really measuring is the hydrometeor thickness subject to the minimum detectable signal of the CloudSat radar.

Page 10, Line 19: cloud growth is insensitive to LTSS. I think that you have this backwards.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 10515, 2014.

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