

Interactive comment on “Prediction of tropical cyclonegenesis over the South China Sea using SSM/I satellite” by C. Zhang et al.

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We are grateful to the reviewer for reviewing our manuscript. The followings are our answers and explanations for comments from referee#1.

General comments

1. How is disturbance size accounted for in this methodology. Using a static 500 km radius may not be appropriate, and in some cases, small disturbances (which might not meet the proposed threshold) can still develop into tropical cyclones.

Response: Thank you for your comments. This is an interesting question. There is a general size difference usually found between a larger developing monsoon depression versus a smaller westward moving cloud cluster (disturbance) moving into the

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South China Sea (SCS) from the Philippine Sea. In our manuscript, we only study the disturbances that formed originally in the SCS, most of which are generated along the monsoon trough. So we think a static radius of 500 km is reasonable for tropical disturbances formed in the SCS. There is still a lot of uncertainty in the technology to locate the center of the disturbances from satellite observations. In most actual conditions, a disturbance is often composed by several cloud clusters and we do not know which one would develop into the center of the depression. A static radius of 500 km is used in our study in order to cover all cloud clusters for one disturbance. We have also tried 600 km and found that there are nearly no differences in the results from those when using 500 km. It will be interesting to test other radius smaller than 500 km. And we agree that if we can detect the size of disturbances correctly, the forecasting correct rate may be increased. Wang et al. (2008) analyzed disturbances over the SCS in 2000 and 2001, indicating that $2 \times 10^{14} \text{W}$ and $6 \times 10^{14} \text{W}$ may be two important values of mean total latent heat release within 500 km of the center of tropical disturbance to distinguish the developing and non-developing tropical disturbances. This manuscript kept on the same algorithm in Wang et al. (2008). The forecasting system based on the method proposed in this manuscript has been run in real time by Chinese Meteorological Agency (CMA) from June 2010, and we are also working on the technical system to detect the size and center of disturbances using satellite observation. We will continue our study after that system is established.

2. Do the authors believe this method would show similar results in other tropical cyclogenesis regions?

Response: This is a sharp question. The criterion has been used for the tropical disturbances in the whole Northwest Pacific (including the SCS) in 2009 and 2010, and the success rate is still satisfactory for disturbances formed in the SCS but results are not so good for some other areas. We have checked the location for failed cases, most of which are the disturbances in the easterly wave. This suggested that our forecasting method proposed here is not well suitable for the tropical disturbances formed

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from the easterly wave, while it is satisfactory for tropical disturbances formed in the monsoon trough. The possible reason for this is that the developing mechanism may be different between the disturbances formed in monsoon trough and those from the easterly wave. And disturbances originally formed in the SCS are mostly formed in the monsoon trough, so the forecasting results are good for the SCS regions. We are working on the comparison of developing and non-developing disturbances in easterly wave in Northwest Pacific. We hope to improve our methods, especially for tropical disturbances in easterly wave.

3. Is it possible to use other microwave data (i.e., AMSR-E, TRMM, SSMIS, etc.) to increase the number of passes over a particular disturbance, possibly providing a better mean TLH?

Response: This is a valuable suggestion. The question about more microwave data to provide a better criterion is also considered in our later research. The data of TRMM Multi-Satellite Precipitation Analysis, which is acquired every three hours, is compared to the data of SSM/I in the years of 2000-2008. We expect this data could improve success rate for prediction of tropical cyclogenesis.

Specific comments

1. Page 1496, line 21: It is not clear how the site <https://listserv.illinois.edu/archives> is related to real-time observations. The information on this site is not observationsâ€™ products issued by various tropical cyclone warning centers.

Response: First of all, thank you very much for reminding us. The description for the records of tropical disturbances in our original paper is indeed not clear. The records of tropical disturbances over the SCS used in this study are from tropical disturbance alert messages forwarded by the University of Illinois at Urbana-Champaign (UIUC) weather server as Tropical Storm and Hurricane WX (WX-TROPL) products. The originator of these alert messages includes the various national weather services, including the Joint Typhoon Warning Center (JTWC), the Japan Meteorological Agency (JMA),

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the Hong Kong Observatory (HKO), and the National Hurricane Center (NHC). I have modified the manuscript according to your advice.

2. Page 1498, lines 3-5: The WX-TROPL listserv is not from the National Hurricane Center. The listserv is just a compilation of tropical cyclone products issued by all tropical cyclone centers around the world. In addition, the National Hurricane Center in Miami does not have tropical cyclone forecasting responsibility for the Western Pacific Ocean, only the Atlantic and Eastern Pacific Ocean. The products that the authors used like came from the Japan Meteorological Agency, the Joint Typhoon Warning Center in Honolulu, or the National Weather Service Office in Guam.

Response: Thanks a lot. Text revised.

3. Figure 1: the x-axis is not labeled, so it is unclear what the chart is showing.

Response: The disturbances in figure 1 are arranged in a descending order of latent heat release. Therefore, the x-axis in figure 1 is not labeled. We have added this information in our text.

Technical corrections

Numerous technical issues with English word usage, sentence structure, and clarity. There are too many to list, so it is recommended that the authors obtain some help in rectifying these issues.

Response: Thank you for your suggesting. We have rectified these issues with the help of an English editor.

Reference

Wang, L., Lau, K., Zhang, Q., and Fung, C.: Observation of non-developing and developing tropical disturbances over the South China Sea using SSM/I satellite. *Geophys. Res. Lett.*, 35, L10802, doi:10.1029/2008GL033446, 2008. Wang L. Study of tropical cyclogenesis over the South China Sea. Hong Kong: Hong Kong University

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of Science and Technology, 2008. (PH. D thesis)

Please also note the supplement to this comment:

<http://www.atmos-meas-tech-discuss.net/3/C812/2010/amtd-3-C812-2010-supplement.pdf>

Interactive comment on Atmos. Meas. Tech. Discuss., 3, 1495, 2010.