We would like to thank all the reviewers for their constructive comments which helped improve the manuscript. Our replies to comments are covered below.

Overall review of submitted paper: This paper is about the lake water transparency (light extinction coefficient Kd) for the freshwater Lake Erie. Satellite-based lake water transparency values were compared with in-situ Secchi disk depths (SDD). Next, the 1D Flake model was run for several water transparency values and model results were compared with lake water surface temperature (LWST) measurements. It is a clearly written paper. I therefore recommend this paper for publication after minor revision. My remarks are summarized below:

Quality of model results (1):

The model results are compared with (Martynov, 2012) in which a light extinction coefficient Kd of 0.2 m-1 was used. This corresponds to a SSD of 8.5 m (see Eq. 2), which is not a very common value for SSD. Also, the Flake model results appear to be very sensitive for Kd values less than 0.5 m-1. Potes et al. (2012) used a Kd of 1.0 m-1 for clear water. Why didn’t the authors choose the more common SSD value of Potes for a comparison with their model results? This would also have been more in line with the Kd for the NDBC station with a minimum value of 0.58 m 1 and an average value is 0.9 m-1 over the period of 2003 to 2012. It is not very difficult to improve the results of (Martynov, 2012) because a rather unrealistic Kd value of 0.2 m-1 was applied in that paper. A reference value of 1.0 m-1 of Potes would probably have resulted in comparable results.

We agree that it is not very difficult to improve Martynov et al. (2012) using realistic Kd value; however, the challenge would be to extract this realistic value, which is one of the main point of our manuscript. Using Martynov et al. (2012) was very useful for us to use as they applied FLake model on Lake Erie and the same station of our study (NDBC station). Therefore results of that study are compared to ours to show how coupling satellite observation with lake modeling can improve results rather than using a generic constant value for Lake Erie NDBC station.

Quality of model results (2):

In this paper only a comparison with LWST is conducted. As stated on page 2, this is ‘one of the key variables’ for modeling thermal structures in lake-atmosphere models. Why didn’t the authors compare with other key variables, such as the thermal stratification? Are CTD-measurements available at buoy stations in Lake Erie? A comparison of computed isotherms with measured isotherms (cf. Fig. 13) may significantly improve the impact of this paper.

We agree with the reviewer’s comment but unfortunately CTD measurements for NDBC station were not available for Lake Erie.

Issues of less importance:

1- (page 7) Relation between Kd and SSD; The relation in Eq. (2) is applied. However, at the end of this page is stated that the extinction coefficient can be derived from the equation Kd =1.64 * SSSˆ(-0.76), which is a different one. This is confusing. Which equation is used?

Thanks for your comment. Equation $K_d = 1.64 \times SDD^{-0.76}$ is the reformed version of equation $SDD \times K_d = K$ (a general format of relationship between SDD and K_d), where the constant value of K is calculated and replaced.

2- (page 9/Fig. 9) Flake model depth; It is confusing that two model depths (12.6 and 20 m) are applied. Is a depth of 12.6 m applied in the simulations with varying Kd values applied, because this is the actual depth? I suggest to remove all results for the 20 m depth simulations, also because the results are quite similar to CRCM-12.6.

Thanks for your suggestion. The purpose of using 20m depth was comparing our results with the previous study and find out if results can be improved on Lake Erie by keeping everything constant with updating only Kd values. Therefore tile depth of 20 m was used in simulations to exactly reproduce the simulations of Martynov et al. 2012. We also compared results of CRCM-12.6 and CRCM-20 simulations to demonstrate the effect of depth on reproducing lake parameters.

3- (Figures 5 to 7) Contour interval; The interval is between 0 and 5. As a result, the interesting range of approximately 0.5 to 1.5 is not clearly visible in these figures.

Thanks for suggesting this. The corrections have been made in the new version of manuscript.

4- (Fig. 9) Thickness of lines; In Figure 9 for 2007 the observations are not visible for September to December 2007. This is caused by the thickness of the lines. Please use another order of the shown time series so that the measurements become visible.

The observations in the period of Sep-Dec 2007 were not available after August.

5- (general remark) It is beyond the scope of this paper, but why is 1D modeling applied? With the current computing power of off-the-shelf computers, 3D modeling of lakes like Lake Erie is (easily) feasible. Then, for example, horizontal circulation and the non-equidistant bed level can be taken into account. Please also note the supplement to this comment: http://www.hydrol-earth-syst-sci-discuss.net/hess-2016-82/hess-2016-82-RC1supplement.pdf

The 1D FLake Model is commonly used in the forecasting models and also applied on Great Lakes (Martynov A., L. Sushama and R. Laprise (2010), Simulation of temperate freezing lakes by onedimensional lake models: performance assessment for interactive coupling with regional climate models Boreal Env. Res. 15 143–164).

More complex 3-D lake models are now starting to be used to reproduce large lake properties. For example, Environment Canada has recently implemented a fully coupled 3-D atmosphere-lake modelling system to represent the complex air-lake interaction over the Great Lakes region (Dupont, F., Chittibabu, P., Fortin, V., Rao, Y. R., and Lu, Y. 2012. Assessment of a NEMO-based hydrodynamic modelling system for the Great Lakes. Water Quality Research Journal of Canada, 47, 198–214.).

The contribution of satellite-derived water clarity in improving simulations with more complex 3-D lake models such as NEMO could form the main body of a follow-up paper.