

Interactive comment on “Effects of ship wakes on ocean brightness and radiative forcing over ocean” by C. K. Gatebe et al.

Anonymous Referee #1

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The paper is an interesting contribution to studies of anthropogenic radiative forcing (ARF). The authors found that ship wakes can be a significant component currently missing in ARF calculations. Unfortunately, I can not recommend the publication of this paper. The revision is needed. The authors are advised to look in the following issues: 1. The foam is white and ocean reflectance decreases towards NIR. Therefore, the authors must explain the reason why the relative change in the reflectance at 472nm is significantly lower than at 682nm (see Table 1 and also Fig.3c). Is it supported by the measurements and theoretical calculations of whitecaps reflection in the UV-NIR? Please, give corresponding measurements supporting your results. I think, you need to tabulate not only relative but also absolute differences. Please, write "Altitude" in full in Table 1. 2. Remove the word "discovery" from line 2 of Section 3. This is too strong statement. 3. RF is defined as the difference of total fluxes $dF(\text{down-up})$ for the

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case of wakes and for the case of no wakes. The authors propose a simple equation for the calculation of radiative forcing. However, they need to explain all terms and run correspondent radiative transfer models accounting for the cloud fraction. They use the number "0.4" for cloud fraction, which I find unrealistic. The cloud fraction must be calculated only for areas with the intensive ship routes (see MODIS cloud fraction dataset). Also the area of $13km^2$ effected by a wake is unrealistic number on a global scale although this number can be correct for a given experiment. The wakes exist for a longer time for regular shipping routes and they are also longer as compared to the scale reported by the authors. The size of the ship has a role as well. Anyway, I guess, the authors can not claim 2 significant numbers in their calculations (0.003 looks better as compared to 0.0031). 4. Conclusions must be re-written and the measurements performed (which is a strong part of this paper) must be summarized in conclusions.

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