Review of "Detection of large-scale cloud microphysical changes and evidence for decreasing cloud brightness within a major shipping corridor after implementation of the International Maritime Organization 2020 fuel sulfur regulations" by Diamond (egusphere-2023-971)

The study analyzes cloud microphysical changes in the southeast Atlantic using satellite data and advanced statistical methods. The author utilizes a recent regulation on sulfur in shipping fuel to constrain how aerosol-cloud interactions affect the radiative properties of clouds by comparing data from before and after the regulation's implementation. The author shows, inter alia, that the regulation causes an increase in the cloud droplet effective radius and a decrease in cloud albedo in the years after the regulation, an expected result due to the reduced number of sulfate aerosol particles produced by the ships. Overall, this is a relevant study, well-written, and I only have a few minor suggestions. Thus, I fully support the manuscript's publication in ACP Letters.

Minor Comments

Ll. 29 ff.: I believe the author refers to the cloud-top effective radius in the remainder of the study.

Ll. 51 – 53: I understand the benefits of the chosen region to analyze the effects of the regulation. However, can such an analysis be conducted for other parts of the globe? What differences are expected?

Ll. 80 – 82: The author writes that the effect of the regulation on the annually averaged cloud albedo is more ambiguous. The author indicates that this is due to the lower background cloud albedo. However, a lower background cloud albedo should be more susceptible to changes in the aerosol or cloud droplet concentration, and thus provide a stronger signal. Please elaborate on this.

Ll. 159 – 161: Considering that the multi-year cloud-top effective radius reaches values of up to 13.6 µm (Fig. 4), it is likely that (some) clouds produce drizzle. Thus, liquid water and cloud fraction adjustments will accompany the Twomey effect. How would they affect the forcing derived in ll. 163 –168?

Technical Comments

Ll. 63 ff.: While the abbreviation D20 has been introduced in l. 52, its use is somewhat erratic.

Figs. 1 and 2: I suggest increasing the font of the panel labels.

Fig. 2: The center column shows $A_{cld,NoShip}$, not $A_{cld,Ship}$. Adapt the title of the contour label bar.

Fig. 5b: I recommend replacing the equations with something more accessible.