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Interactive comment on "Quantification of the fine-scale distribution of Mn-nodules: insights from AUV multi-beam and optical imagery data fusion" *by* Evangelos Alevizos et al.

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We welcome all recommendations from comments of reviewer #2 and we appreciate the time and effort put to review this manuscript. Reviewer #2 agrees in general with comments from reviewer 1, however he suggests a minor review. Below we present our reply for each of the reviewer's main points:

a) It is suggested that the title could be adapted to reflect the strong emphasis on sonar measurements. Reply: This suggestion is accepted and respective action will be taken in final version. b) Presentation of the data processing: It is suggested that some technical terms about software, data formats and data processing should be better

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expressed in the text. Reply: This suggestion is accepted and respective action will be taken in final version. c) It is considered that the analysis of optical imagery is short and that more information should be presented along with some minor figure improvements for better illustrating the impact of optical imagery in Mn-nodule mapping. Reply: This suggestion is accepted and respective action will be taken in final version. d) It is suggested that the role of sediment redistribution should be investigated further. Reply: Classification and prediction results based on hydro-acoustic data alone, suggest that there is a gradient of decreasing Mn-nodule densities in the N-S direction within the study area. However, some optical imagery results about Mn-nodule densities show very low Mn-nodule density in parts to the northwest of the study area. This is a clear indication that the optical analysis imagery has most likely under-estimated the amount of Mn-nodules per image due to the effect of sediment blanketing. This is further justified by the fact that the AUV MBES sonar frequency (250 kHZ) would penetrate a few millimetres of sediment veneer that occurred after re-deposition of the plume caused during the dredging experiment. Considering these facts it is concluded that partial or total nodule burial by a few millimetres of sediment would affect the estimation of Mn-nodules by means of optical imagery analysis. This explanation should be more explicitly presented in the Discussion section. Detailed information on “how to quantify this sediment blanketing from the automated analyses of optical imagery” can be found in: Peukert, A., Schoening, T., Alevizos, E., Köser, K., Kwasnitschka, T., and Greinert, J.: Understanding Mn-nodule distribution and evaluation of related deep-sea mining impacts using AUV-based hydroacoustic and optical data, Biogeosciences, 15, 2525-2549, https://doi.org/10.5194/bg-15-2525-2018, 2018

e) It is suggested to add recommendations for future surveys in the Discussion section. In addition it is requested to provide more explanations and numbers on the Discussion topic in line 445: "automated analysis of imagery is regarded as a very suitable method for quantitative mapping of Mn nodules".

Reply: An overall work-flow and/or a rule-set for Mn-nodule mapping should and would

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be included in the final version of this manuscript. Regarding the topic in line 445, the point is just to highlight the superiority of automated image analysis over manual image interpretation, particularly when the dataset includes several thousands of images. Thus there is no intention for an actual comparison of automated image analysis with other traditional methods.

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