Overall, this paper presents very interesting observations detailing bubble size distributions at depths of 2 and 4 m under high seas. The paper has significant structural problems with discussion mixed throughout the results. Also, the discussion section is rather long and somewhat repetitive. As such it needs significant revisions for clarity and other issues before the study is published.

Small item – but please use dissolved rather than destroyed, which suggests a violent and purposeful event. It seems like at line 664 you explain the concept; where you seem to propose that the bubble can maintain its size against hydrostatic pressure (like a ping-pong ball) and then collapse suddenly (as when one takes a pin-pong ball down in a ROV. Are you really implying that surfactant coatings have structural strength? This is a pretty radical proposal, and thus needs strong support.

Otherwise, the paper is very long and could really use a thorough editing to ensure that what is written is technically correct as written, that colloquial words and phrases are avoided, that run on and confusing sentences are rewritten, that duplicative material is removed, that unnecessary speculation are avoided, that discussion sentences are not in the results section (where all the data cannot be assembled to support the discussion sentences), but are in the discussion section.

This paper took me a very long time to review and as such I apologize in advance for any spelling or grammatical mistakes in the detailed items below.

39 – by high wind do you mean bubble formation 10 m/s or high wind as in storm > 15 m s-1. Please clarify

49 – Farmer et al (1993) is pretty old to use for a statement on much of the literature and was not a review….

55 – location is a bit vague in a moving frame of reference system (not specified).

58 – what do you mean by quantitative. This is a very vague term.

63 – Salt also strongly affects the initial size distribution or the fragmentation of the void. Not sure why you even need this (incorrect) sentence.

67 – you are not seriously proposing that bubble plumes in the lab are two dimensional? Even in the field, where wind and waves align, there is a directionality. Perhaps you mean boundary or wall effects.

67 - Some modeling studies and one citation? And what kind of models? Semi-empirical? CFD? If Fraga and Stoesser is a review, state.

71 – some studies have provided bubble details in this citation free declaration which really is so vague as to not actually say much of anything. Also sentence prior is a declaration without citation.

General going into problems with current knowledge before presenting current knowledge (75-94) seems backwards.

74 - Not sure how you know the time scale is a second. Really depends on the wave.

77 – Suggest you read Masuk et al 2021 10.1019/jfm.2020.933 and rephrase your comments on the Hinze scale.

79 – also bubble bursting.

84 – variability of the smaller bubbles is very vague.

87 – note, this is not an exhaustive list. For example, oxygen saturation or super saturation.

88 – bubbles also move due to turbulence

93 – numbers total or numbers per volumes

96-100 – words such as small and large are imprecise. Please suggest actual sizes.

107 – what is a partial model?

117 – most studies yet no citation(s).

127 – destruction?

127 – single bubble or do you mean more a group of bubbles in the statistical sense?

139 – platform. Was there a platform atop the buoy?

152 – I think there is some analysis before averaging… Also, where are the analysis algorithms described? As written Al-Lashi 2016 and 2018 are only citations for the camera.

155 – was the depth of the bubble camera with respect to waves known? I presume so, but it is not stated except in a statistical sense.

170 - 10^{-9} is a number $10^{-4.5}$ is a weird number. Two lines later you write $2x10^{-7}$, why not write $10^{-6.99}$? and elsewhere. We both know the answer.

172 - If the noise is 10^{-8}, then how do you measure 10^{-9}? Are there different noise levels at different depths? Why and please report nose levels for all depths.

174 – comma ", which"

172 – 177 – you mention 2 m depth, then 4 m depth, then its unclear if you did see plumes at 2 m and none at 4 m or you saw at both.

177 - void faction probability distribution – maybe define this? What does the word smooth mean in this sense (not a technically defined)? what time scale are the probability distributions assessed over? I realize this is in the companion paper, but please either restrict to just the needed info for this paper (why is smooth relevant), or provide more detail.

891 – Figure 1 please plot (a) as semiology or loglog. Here it clearly says normalized (how and why)

180 figure says normalized. How was it normalized? Why was it normalized – how much does the PDF increase in reality? The normalized suggests that perhaps 0-100 μm might decrease – but I suspect not. Worst case, please put un-normalized data in supplemental. How is the PDF or histogram calculated – uniform bins?

186 Why is there less data at high wind speeds? Maybe a PDF of wind speeds could be useful. In any case, if you aggregate 22 and 26 m s-1 bins (Why such weird wind speed bins) you have 122 photos but a clearly decreased maximum size at 100% probability. So this explanation is possible, but not that convincing, especially given how the camera is quite shallow a non-trivial amount of time.

191 – 201 - Seems more of a discussion section paragraph than a results paragraph.

205 – its not really an artefact – which is where an analyzer fails, it is the result of time averaged size distributions being affected by a bubble-size dependent residence time. Please rephrase.

215 - It would be clearer to just state what the new ranges are. I also see that whereas the un-normalized ranges are similar across radii, the normalized ranges are not as consistent. Additionally, 4m, station 3 normalized clearly is two part and should be modeled accordingly. If you define a variable in the caption for the slopes, why are you not using it in the text?

217 – comma after break

218-219 this is repeating line 215. Delete, or rewrite. Define low bubble number (note, I don't see the lack of collapse in the data)

221 – true that dispersion of bubbles is important, but very small bubble change size by dilution very rapidly, so I don't see how you can rule that out. At higher densities, they dissolve slower (due to saturation) and at lower densities, small bubbles dissolve faster. Agreed that larger bubble size change is not dominant. Please revise.

237 – Fig. (not Fig/)

239 noise or variability?

252-263 – this reads more like discussion, where other arguments can be made. Suggest reducing to one sentence or just deleting here, particularly sentences that say "critical question"

270 delete "positions" – you already said radii

274 – It seems to me (by definition) due to the bend to a slope greater than -3 (S2=-3.5), this bend occurs in the uncollapsed data as well. Suggest deleting this sentence.

279-280 – agree about the replacement, not certain about the conclusion. What about uniform dissolution and higher void fraction being from more intense wave breaking not more evolved plumes? And in any case, it seems that timescales are important for this conclusion and not mentioned for this (should be in the discussion) sentence. BTW my first through is the radius of the kink has more to do with turbulence velocities and the rise velocity of a 60-80 µm bubble, with rise velocity increasing rapidly leading to low sensitivity in r with respect to turbulence. Just a thought, and in any case, the place to discuss these issues is in the discussion. Note, the smaller possible radius of the bend-over at 50 µm as in 4m station 3, is consistent with decreased turbulence motions further from the interface.

290 – bubble destruction? Not sure what this means as written. Do you mean loss? Dissolution? Size change is certainly not destruction.

295 – what does wider range of conditions mean? I guess from the rest of the para that you mean higher and lower winds? Please report what the winds are for all three data sets in the text.

301-309 –move to discussion (could varying turbulence levels explain?)

Fig. 7 weird ylabel (why not use a more standard label as in Fig. 6.

321 and 322 peak radius as on 318. Please be consistent.

324 – Suggest "far greater variability below"

334 – 336 – discussion. Again, could it be weaker turbulence velocities for weaker wave breaking allowing larger bubbles to escape and only keeping smaller bubbles in suspension? Move fist sentence into next paragraph.

352 delete "seen"

351-352 – please explain why it is clear that individual patches (two dimensional – don't you mean blobs?) each follow their own pattern? Do you mean trajectory? As written it makes no sense. Do you mean each bubble plume has a distinct pattern?

354 - "striking" is colloquial.

359 – since significant non-linearities might be expected near the surface – how was the extrapolation done? What curve fit

362 – how do you know the surface ocean was always undersaturated? Doesn't this depend on your extrapolation and its accuracy? And surely you don't mean even in surfacing bubble plumes (as you note in the next paragraph).

364 – extrapolated is not observed.

373 – surely you could find a citation on this matter of saturation from waves. I will see if you have one in the discussion….

Section 2.5 – limitations – this is a discussion topic.

395 – and found no bubbles (missing verb)

400 "appear to be too low for the limiting factor to be the balance between buoyancy and turbulent flow."

441 – accumulation of surfactants also likely plays a role. In any case, surface bubbles are advected downwards anywhere as vertical fluid motions are by definition zero at the sea-air interface (except for breaking waves).

445 it is not the bubble size distribution that is advected – it is the bubble plume with a specific bubble size distribution that is advected. Suggest laterally rather than sidewise which is colloquial.

462 – destroyed? Maybe dissolved.

465 – pulled downwards? Suggest advected downwards

466 – delete gradually – you don't know if it is or is not gradual, and in any case, what is gradual? Not defined.

467 – "cannot last long enough" specify, please. Dissolve and/or rise too rapidly to form a background population.

479 – what do you mean by heterogeneity of the bubbles? Normal meaning is spatial heterogeneity; however, this makes no sense in this sentence.

487-494 this feels like a repetition of text earlier in this section. In fact, I think this whole section can be re-organized and shortened and better focused.

504 – note, when bubbles burst at the sea surface it creates new microbubbles.

506 – can you provide some guidance on what is a large bubble (r>??)

511 – you are not really suggesting anything. Perhaps better to explain this as a knowledge gap – proposing an unknown process or processes or series of processes but not proposing what they are is not actually proposing something.

515 – mix – I think you mean diffuse….

516-518 – citation needed (e.g., the work of Bruce Johnson)

519 – probably also the type and concentration of surfactant – not just its presence or absence – particularly given how much surface area is created by a bubble plume.

523 – destroyed is what a military does to a target with a missile! And if you check out the Johnson paper, you do not know if the bubble really is destroyed or shrinks to a stabilized microbubble of a few microns in a surfactant matrix. Just say dissolve or burst at the sea surface.

525-527 – these two sentences are repetitive and could be combined and shortened.

531 – why would there be a thin bubble free layer below the sea surface? This seems unlikely given that buoyancy does not disappear. Since it is speculative with no data and seemingly non-physical, suggest delete.

537 – suggest advect not pull.

537 – only bubbles with rise velocities less than the downwards velocity.

548 – what is the evidence that you larger bubbles are not trapped in the centre than edges. If this was in the companion paper it needs to be cited. Also how much larger is larger? This is a very qualitative assessment.

551 – destruction? I presume you mean dissolution.

555 also could be (split verbal construct)

556 – what about stabilized microbubbles? More accurate to say the vast majority or almost all, or something not so definitive. Also write in present tense, not passive past tense. Microbubbles could diffuse to the sea surface from those depths. Plus Langmuir circulation is not just down…

562 – forms

562 – all these bubble are injected into the ocean? They are already injected into the ocean!

556-569 – very long and convoluted sentence.

579 – as written this is not correct. The force on the bubbles is always in equilibrium. Furthermore, its hard to see how bubble dissolution could decrease saturation state. A very clumsy sentence grammatically. In any case, I am not certain if this section is really needed – it doesn't make many points and the one that it does – mixing lowers void fraction – which could be merged into other discussion sections.

586 -or they are produced rapidly and dispersed widely or transit to deeper depths and thus have limited residence time at this depth – Farmer ad Li (1995) show bubbles from Langmuir circulations to 10 m.

597 – we suggest that bubbles collapse . . . This is speculative, so please propose a new mechanism as dissolution is quite well understood and is not consistent with a sudden collapse. Or delete. Additionally, any talk of sudden and slow needs to specify what timescales are slow or sudden.

600-605 – The increase of hydrostatic pressure with depth (and decreasing saturation) is not new and is not a process that would be termed sudden collapse.

643 - Open questions should not be after conclusion! This seems more like a future research section in the discussion. Also, all these points have been brought up throughout the discussion section and even the paper, so this is a bit of a repetition – I think it is good to summarize them all somewhere, but then lessen the number of times these are mentioned throughout the paper.

i.   This is a long open question – maybe break into two. You have measurements of two environmental conditions – introduce with your findings and then be more specific on your open question

ii.   Couldn't you answer this with sonar data? At least roughly?

iii. timescales of advection at convergence zones. – you report 20-40 s, so this is not an open question or it is poorly phrased.

vi. nature of bubble coating – this was really not addressed in the paper, so seems beyond your paper's scope.

Viii (where did vii go?)