We thank the referee for the careful reading and the valuable comments, which helped to improve the paper. The referee comments are in blue, our answers are in black, and proposed modifications of text are in red.

Major comments:

(1) I do not think aerosols produced from a very narrow size range of bubbles (~5-10mm) can be called sea spray aerosols. They are certainly bubble bursting aerosols, which can be related to sea spray aerosols. But sea spray aerosols are produced from a wide range of bubbles. A recent study (Jiang et al. PNAS 2022 119:e2112924119) shows submillimeter bubbles would be more important in submicron sea spray aerosol generation. I would just call the spray aerosol produced from your setup "bubble bursting aerosols". Please remove sea spray aerosol from the title and discuss how your finding can be linked to sea spray aerosol.

We agree with the referee's suggestions and have modified the title and added a paragraph into discussion to take the comment into account.

The modified title is now: "Effects of temperature and salinity on bubble-bursting aerosol formation simulated with a bubble-generating chamber".

The existing discussion on relation of our results to the sea-spray formation in real atmosphere additional discussion has been extended accounting for the Jiang et al, 2022 work (Introduction and Discussion section 4.1).

(2) The figures of this article do not meet the publication quality, and I hope these can be improved. (see the details in specific comments)

The figures were updated according to the specific comments (see below).

(3) The fluid properties of water, such as density, dynamic viscosity, and surface tension, can be changed by water temperature. Salter et al. (2014 JGRA doi: 10.1002/2013JD021376) observed that the size range of bubbles on the water surface changed significantly with temperature; for example, bubbles with a radius of less than 2 mm observed a significant decrease in number with the temperature increased. Can you have some more discussions about this impact? I would add a figure to show the effect of temperature on the size of the bubble formation.

Thank you for pointing this out. Since the bubbles generated by the chamber were quite large and of well-defined size controlled by the capillary formation mechanism, we did not investigate this effect in this manuscript. It is, however, an interesting subject and we will address it in the follow-up studies, which will allow for a wider spectrum of generated bubbles.

(4) When the temperature is above ~10 °C, the dependencies of the aerosol production on the temperature are not obvious. It seems to be inconsistent with many previous publications. Can you have some more discussions about this impact?

We agree that it is an open question of high importance. As it is already mentioned in the manuscript (Sect. 4.5), there are also numerous recent publications showing this effect of temperature. For example, in the plunging jet setup by Salter et al., 2014, the ~10 ºC threshold was observed as a significant shift in bubble size spectra towards smaller sizes, the dependence of total particle concentration on temperature was strong below 10 ºC and insignificant above 10 ºC. Christiansen et al., 2019, in their plunger setup, showing different trends, manifested a clear minimum of production at 9-10 °C, above which the coarse particle outflow was not temperature-dependent. The discussion of Section 4.5 has been extended.

(5) Is the temperature of the input air stream in the chamber well controlled? Is it always at room temperature, or is it the same as the water temperature?

While testing the installation, the temperature of input air stream was controlled (the air was pre-cooled down to water temperature). The outcome was compared with room-temperature runs and no difference was found. Therefore, the main runs reported in the paper have been performed with room-temperature air, ~21°C. Clarification is added.

Specific comments:

Line 55: For the analysis of predominant (~60-80%) submicron particulates, Jiang et al. PNAS 2022 have proposed a newfound flapping mechanism that caused the film drop production in detail and can be discussed here.

The suggested description of film drop production due to flapping mechanism was added. The existing discussion on relation of our results to the sea-spray formation in real atmosphere additional discussion has been extended accounting for the Jiang et al, 2022 work (Introduction and Discussion 4.1).

Line 180: I would use the DMA selected NaCl particles to check if the OPS data can be used without any diameter conversion.

Thank you for the advice! We shall use the approach in the future experiments.

Figure 2: Please label the sub and superscript properly. Also, can you be more serious about the description of the horizontal and vertical axes?

Labels and descriptions were added to the figure following the suggestion (see at the end of the document).

Figure 4: Since the article has described the particle size conversion of each instrument, Dp should be added to the abscissa here.

D_p was added as suggested (see at the end of the document).

Figure 5: Why doesn't the vertical axis even have a title? Even the normalized proportions should be noted. Can the legend be put aside or some places more appropriate? I don't think the current position is proper.

The legend location has been moved to a more suitable location in the figure and the axis title was added to the Y-axis (see at the end of the document).

Line 404: It should be "10 °C".

Corrected as suggested.

Figure 6, 7, 8: If the color matching can be changed like this: as the temperature increases, the color of each line changes from light to dark or gradually increases to deeper color, which may be better for the trend display. Just like the salinity in Fig.5.

Thank you for the suggestion, the colors have been updated in Figures 6 and 8. Now all the figures are consistent with each other (see at the end of the document).

Line 460: In Jiang et al., bubbles smaller than about ~1 mm can predominantly contribute to submicron droplets, which can be discussed here.

The discussion on accounting for the Jiang et al, 2022 work has been added to both Introduction and this section

Figure 9: It is recommended to write clearly about the horizontal and vertical axes. The data calculated by which equation need to correspond to the red dot and yellow line in this figure. What does it mean to write eq.4 in the red dot legend and write eq.3 in the caption?

The legends and caption were modified to clearly describe connection between bubble lifetime calculated with equations 3 and 4 using observed foam area and bubble size, and the calculated estimation of the bubble lifetime derived from equation 5 (see at the end of the document).

Line 614: It should be "0.6 M of Na"

Corrected as suggested.

Updated tables and captions:

Table 1. Particle counters and their specifications used in the experiment. Flow rate refers to sampling flow rate of the devices.

Instrument	Measured parameter	Manufacturer, model	Size range	Sizing method	Time resolution	Flow rate
CPC	total particle concentration	Airmodus A20	> 5 nm	-	1 s	1 L/min
DMPS	number size distribution	Home made with Medium Hauke type DMA (Differential Mobility Analyzer) and TSI 3772 CPC	10 – 600 nm	electrical mobility diameter	~7 min	0.7 L/min
APS	number size distribution	TSI 3321	0.5 – 20 µm	aerodynamic diameter	1 min	1 L/min
OPS	number size distribution	TSI 3330	0.3 – 10 µm	optical diameter (light scattering)	10 s	1 L/min

Table 2: Description of experiments.

Experiment	Description	Varying parameter	Fixed parameters	Observed parameters
Bubble size experiment	Foam on the water surface at different bubble flow rates	Bubbling flow rate: 0.01 L min^{-1}, 0.2 L min^{-1}, 0.8 L min^{-1}, 1.5 L min^{-1} Dilution flow rate (respective to bubbling flow rate): 3.6 L min^{-1}, 3.4 L min^{-1}, 2.8 L min^{-1}, 2.1 L min^{-1} Solution: MQ; 0.1 M-0.6 M NaCl; Baltic & Mediterranean sea water	Temperature: 22 ºC	Bubble sizes on the surface, foam area
Air flow experiment	Aerosol production at different bubble flow rates	Bubbling flow rate: 0.1-1.9 L min^{-1} Dilution flow rate (respective to bubbling flow rate): 3.5-1.6 L min^{-1}	Temperature: 22 ºC Salinity: 0.2 M NaCl	Aerosol size spectrum
Salinity experiment	Aerosol production from water with different NaCl molality	Solution: MQ, 0.1 M-0.6 M NaCl	Bubbling flow rate: 0.8 L min^{-1} Dilution flow rate: 2.8 L min^{-1} Temperature: 22 ºC	Aerosol size spectrum
Temperature experiment	Aerosol production at different water temperatures	Temperature: 2-30 ºC Solution: Baltic & Mediterranean sea water, 0.1 M NaCl, 0.6 M NaCl	Bubbling flow rate: 0.8 L min^{-1} Dilution flow rate: 2.8 L min^{-1}	Aerosol size spectrum

Updated figures and captions:

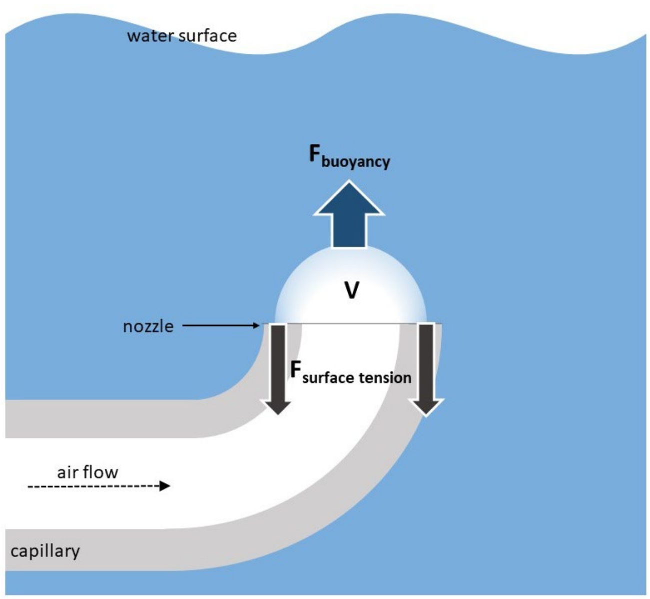

Figure 1. Schematic representation of forces affecting a bubble at the capillary nozzle surface. V is volume of the bubble, $F_{buoyancy}$ is Archimedean force and $F_{surface\ tension}$ to the the surface tension pulling down at the rim of the bubble.

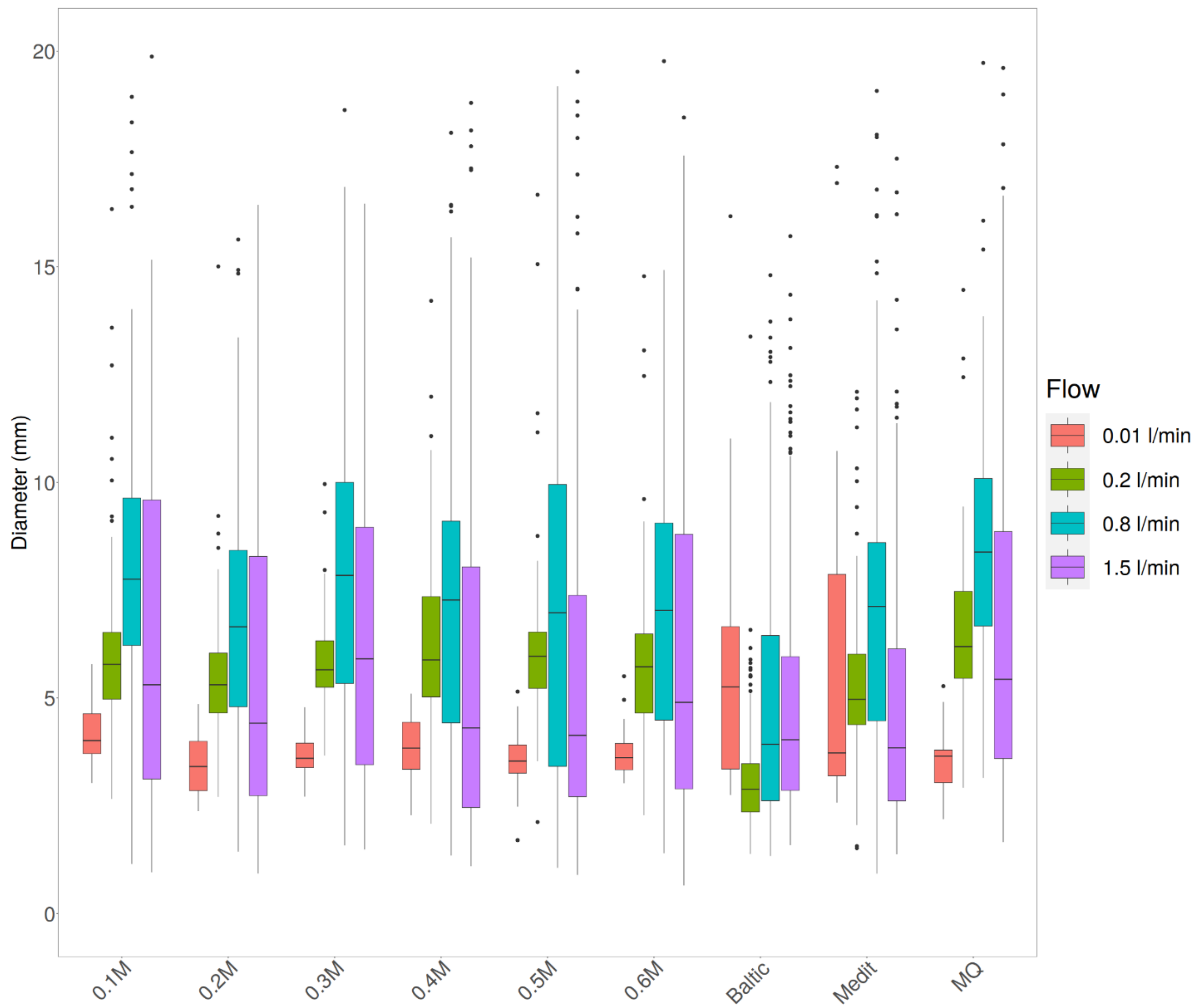

Figure 2. Bubble sizes for different flow rates and water salinities formed from upwards-looking capillary. Boxes span over quartiles Q1-Q3, with median shown as a horizontal dash. The upper whisker extends from the hinge to the highest value that is within 1.5 * IQR of the hinge (Q1-Q3 distance). The lower whisker extends from the hinge to the lowest value within 1.5 * IQR of the hinge. Data beyond the end of the whiskers are considered as outliers and plotted as points.

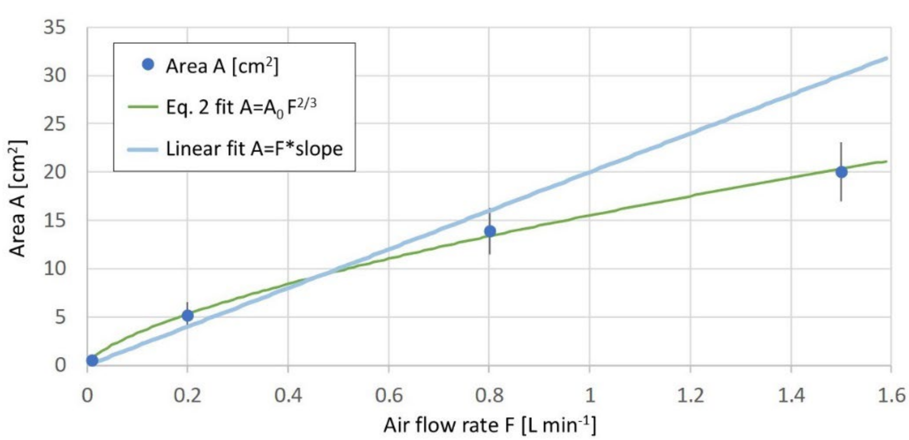

Figure 3. Bubble foam area vs flow rate, fit of Eq. (2). Mean foam area calculated from MQ and NaCl-solutions observations at +21 °C. The green line shows the fit of Eq. 2 and light blue line shows linear fit to the mean foam area A. Error bars show standard deviation.

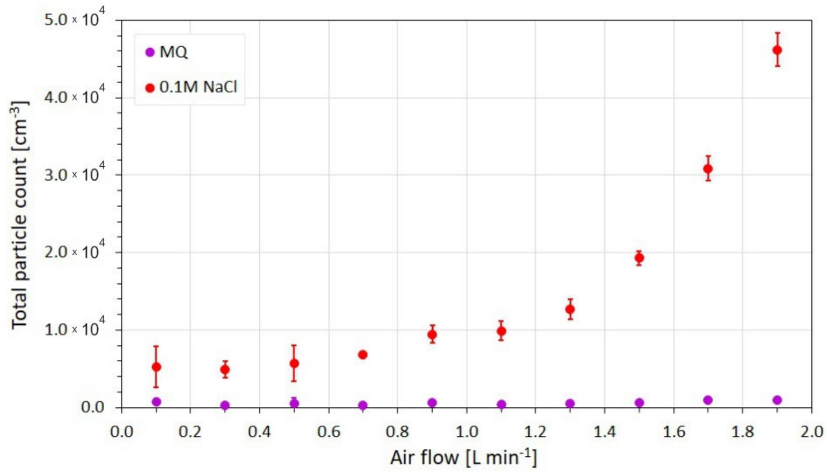

Figure 4. Total aerosol number concentration for MQ and 0.1 M NaCl -solution as a function of the flow rate from bubble generation line.

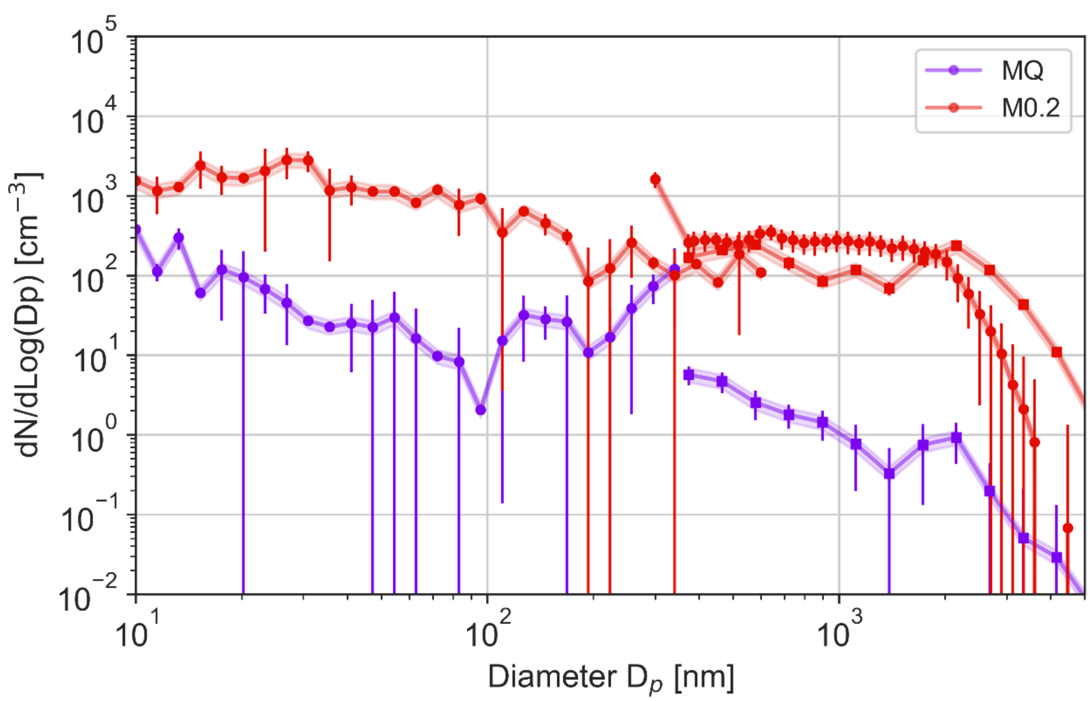

Figure 5. Aerosol size distribution for MQ water (lilas markers) bubbled at 0.8 L min^{-1} and 0.2M NaCl -solution (red markers) bubbled at 0.8 L min^{-1}; as measured with the DMPS (circles), APS (circles) and OPS (rectangles). Shading indicates pm 20% deviation and is based on a measured uncertainty range of the system using MQ water only. Error bars show the measured standard deviation during the experiments.

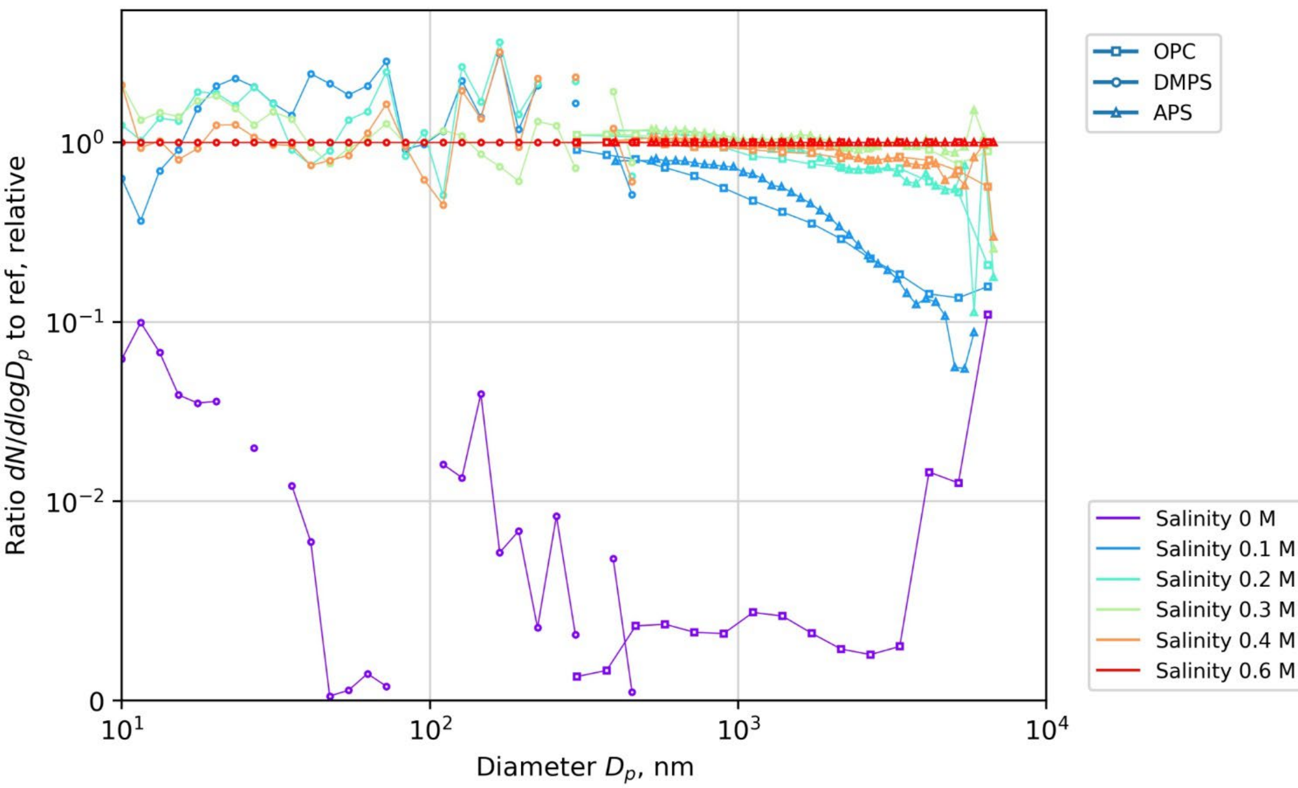

Figure 6. Salinity effect on particle size spectrum: the spectra for different salinities normalized with the spectrum of the salinity *S*=0.6 *M*.

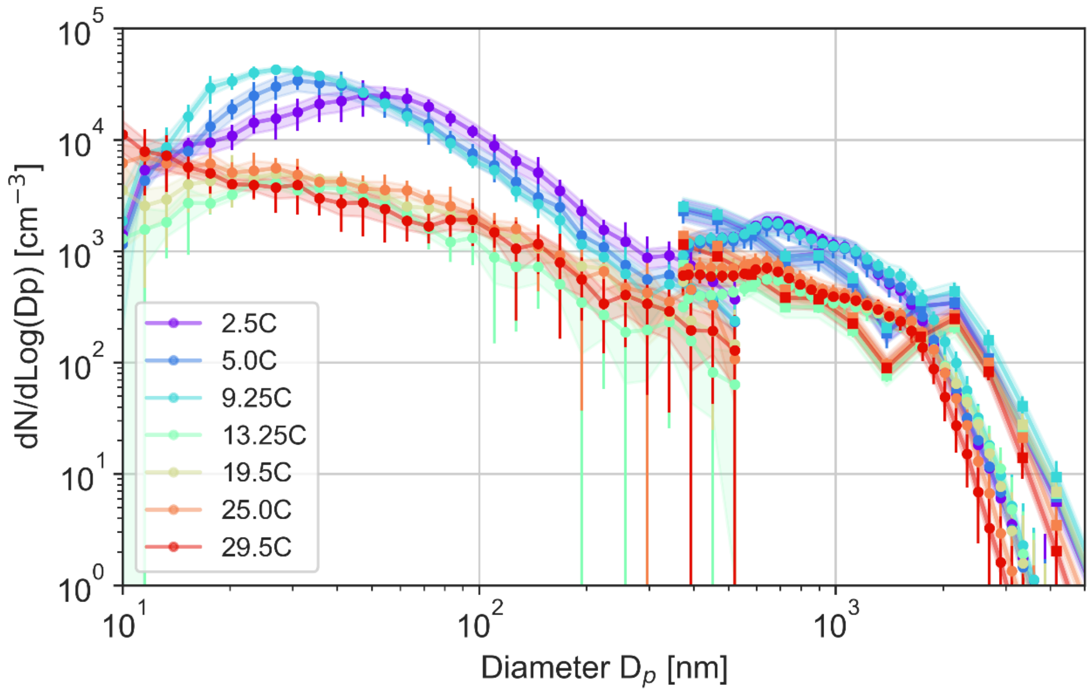

Figure 7. Aerosol size distributions for 0.1M NaCl solution bubbled at 0.8 L min^{-1}; as measured with the DMPS (circles), OPS (rectangles) and APS (circles) for different water temperatures. During the experiments (~30 min each), water temperature was rising/falling by 1-2 degrees max depending on the relation between water and room temperatures. Legend presents mean temperature for each experiment.

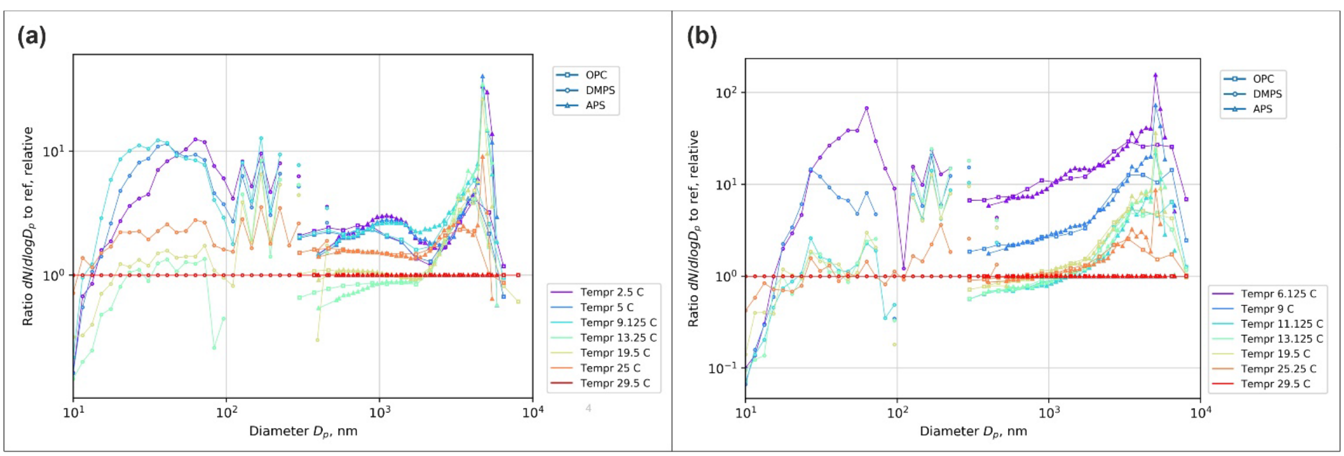

Figure 8. Water temperature effect on particle size spectrum for salinity S=0.1M (a) and S=0.6M (b). In both panels, the spectra for different temperatures are normalized with the spectrum at T=29.5C and the corresponding salinity. Color legends present mean temperatures of the experiments.

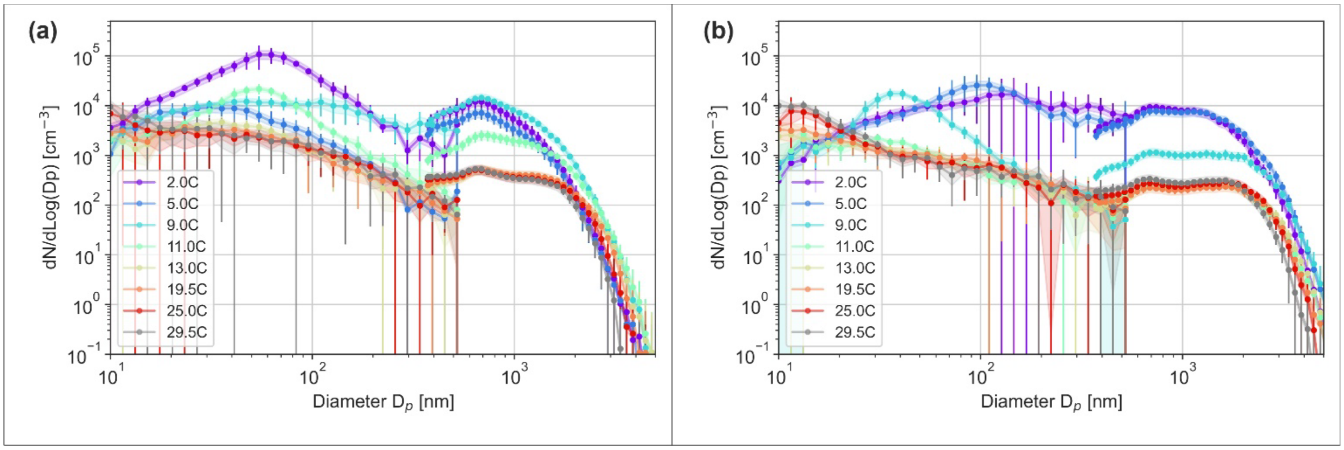

Figure 9. Temperature- dependent aerosol size distributions for Baltic (a) and Mediterranean (b) sea water bubbled at 0.8 L min^{-1} measured with DMPS (circles) and APS (circles).

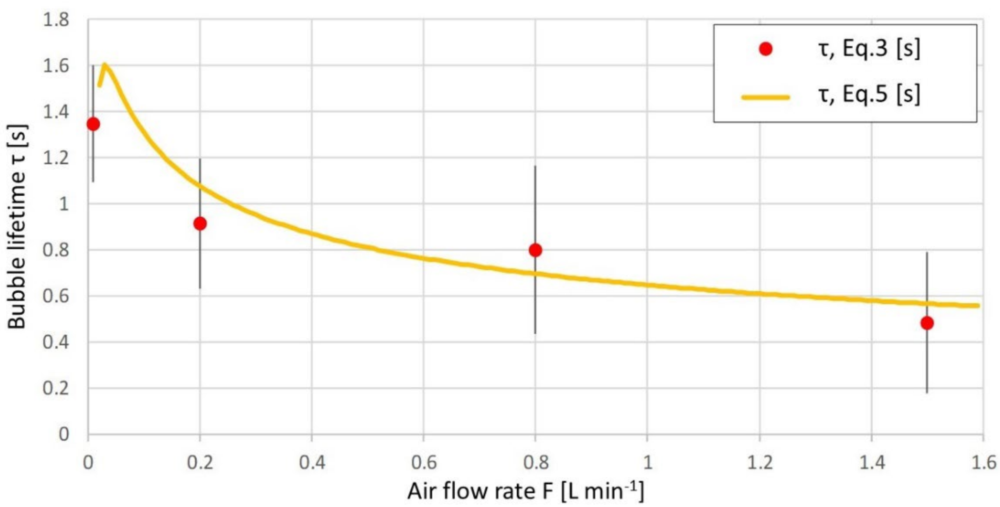

Figure 10. Bubble lifetime, derived from the observed foam area and mean bubble size with Eq. (3), approximation of the Eq. (4) assumes the foam thickness of 7 mm.

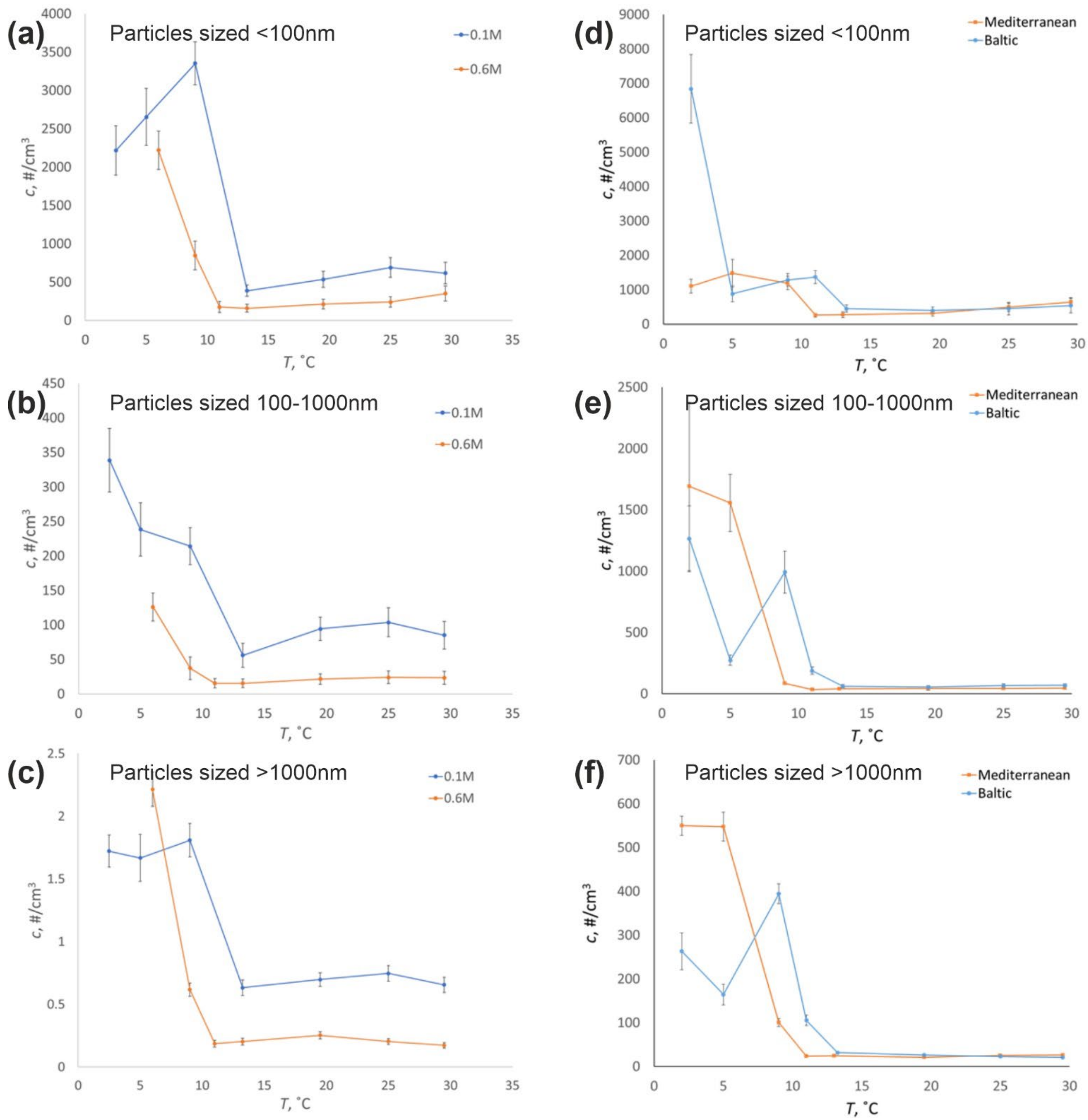

Figure 11. Temperature dependence on particle concentration for aerosols sized below 100 nm (panels (a) and (d)), from 100 to 1000 nm (panels (b) and (e)), and above 1000 nm (panels (c) and (f)) for 0.1M and 0.6M NaCl –solutions ((a)-(c)) and Mediterranean- and Baltic sea water ((d)-(f)) bubbled at 0.8 L min^{-1}.

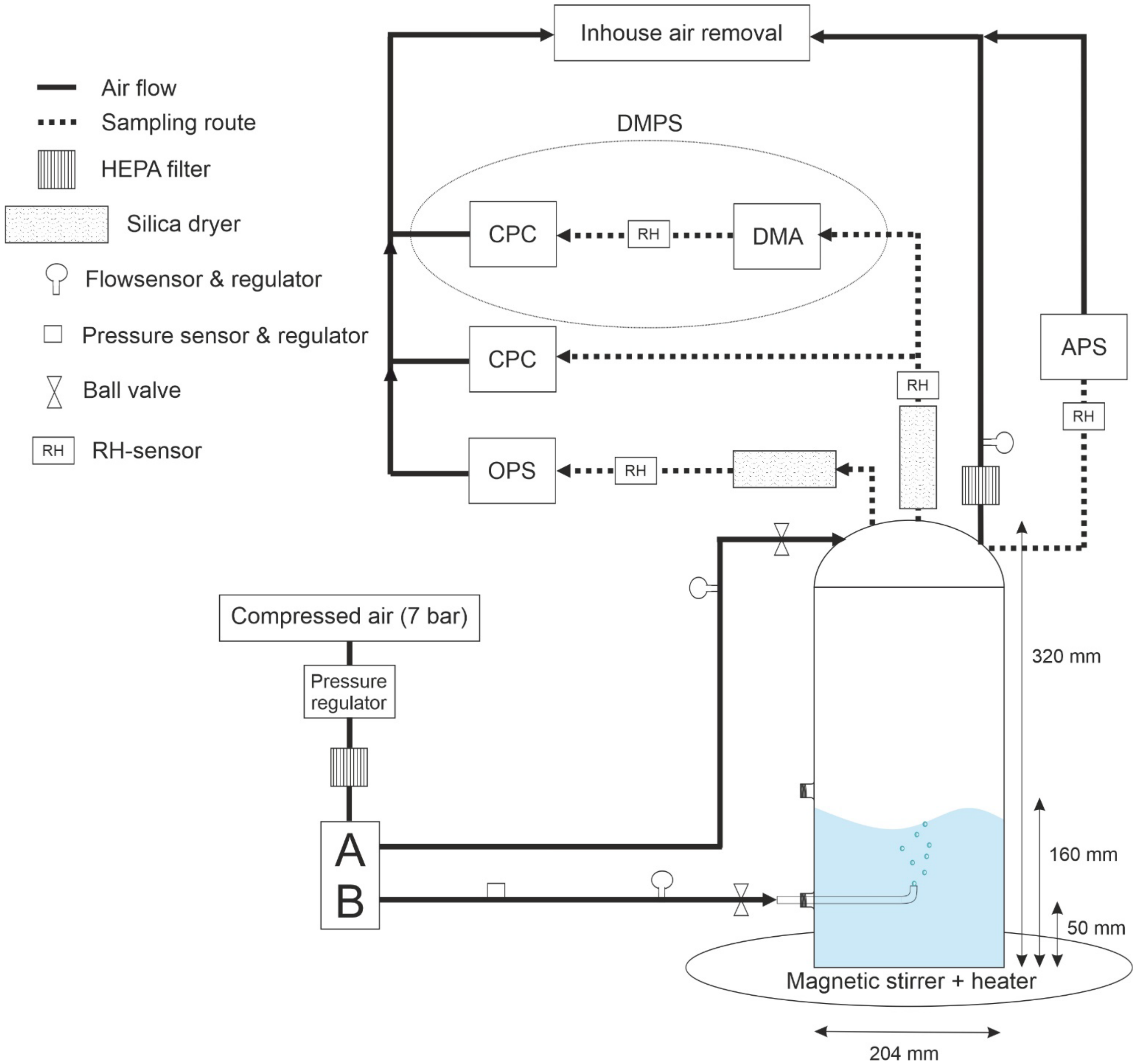

Figure B 1. Schematic representation of the bubble chamber.

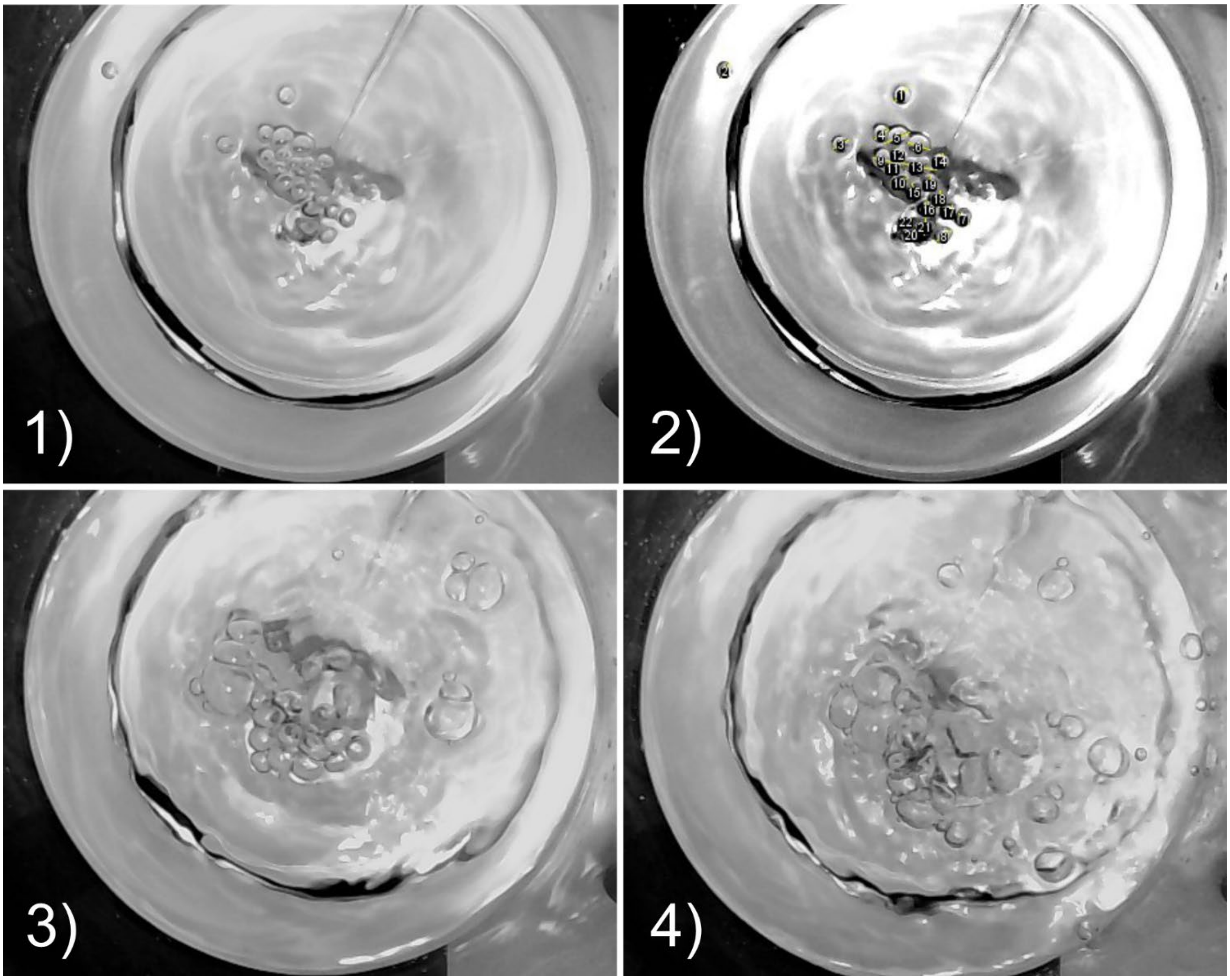

Figure C 1. One of five images taken at 0,2 L min^{-1}, 0.8 L min^{-1} and 1.5 L min^{-1} flow rates and *S*=0.1*M* water salinity from above the bubbling area. 1) The initial picture at 0.2 L min^{-1}. 2) Modified image at 0.2 L min^{-1} with the bubble diameters selected and numbered. 3) The initial picture at 0.8 L min^{-1}. 4) The initial picture at 1.5 L min^{-1}.