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Experimental investigation of the effect of droplet size on the separation performance of a two-phase separator

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[1]Teesside University

June 14, 2022

Abstract

This paper investigates the effect of liquid flow and oil pad thickness on the droplet size and separation performance. The findings show that increasing the inlet flow rates of the oil and water results in size reduction of the droplets. Increasing the thickness of the oil pad increases the size of the droplets. The measured data were fitted with a simple Gaussian model, and the fitted parameters of mean, standard deviation and amplitude were determined for each data set. Trends have been obtained from the fitted parameters as a function of the Reynolds number. The key parameter to predict and fix the position of the Gaussian distribution was found to be the mean droplet size. Simple Ab initio calculation methods to estimate this parameter was tested against the experimental data to identify the most promising method to predict this parameter for modelling purposes.

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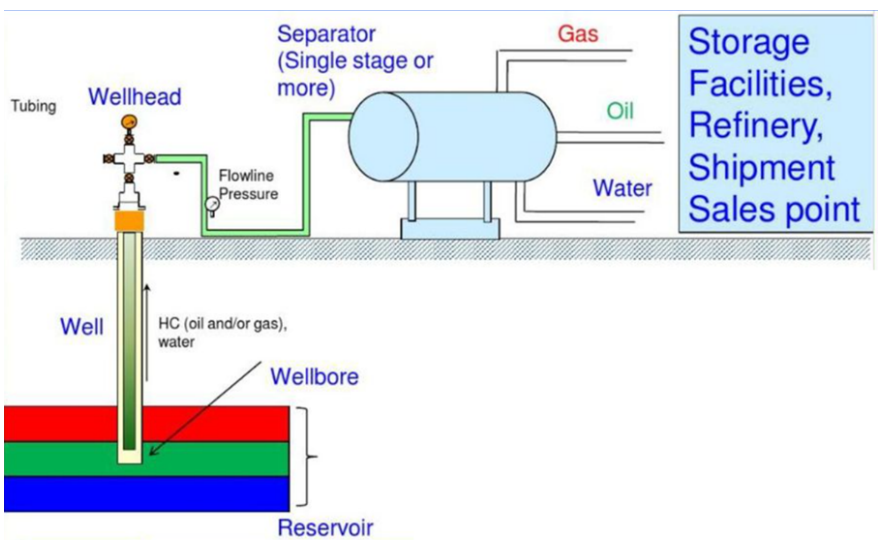

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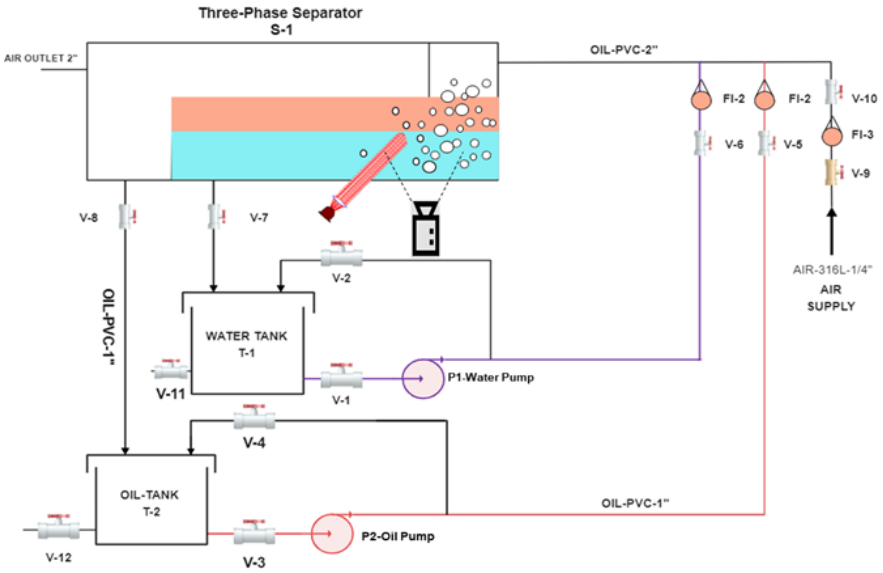

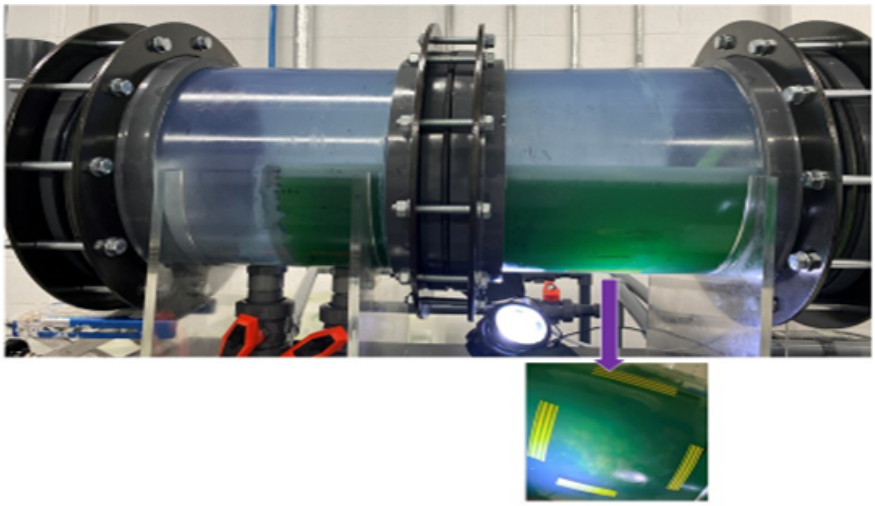

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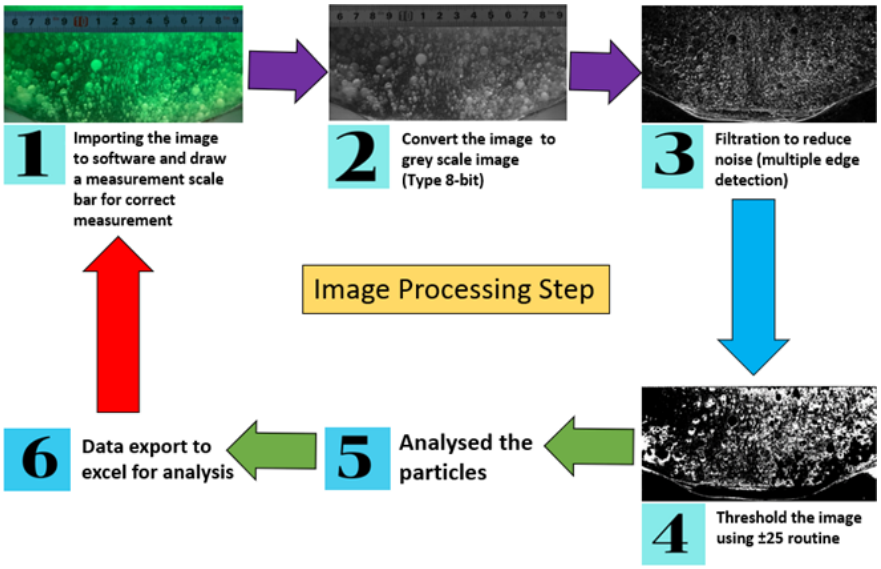

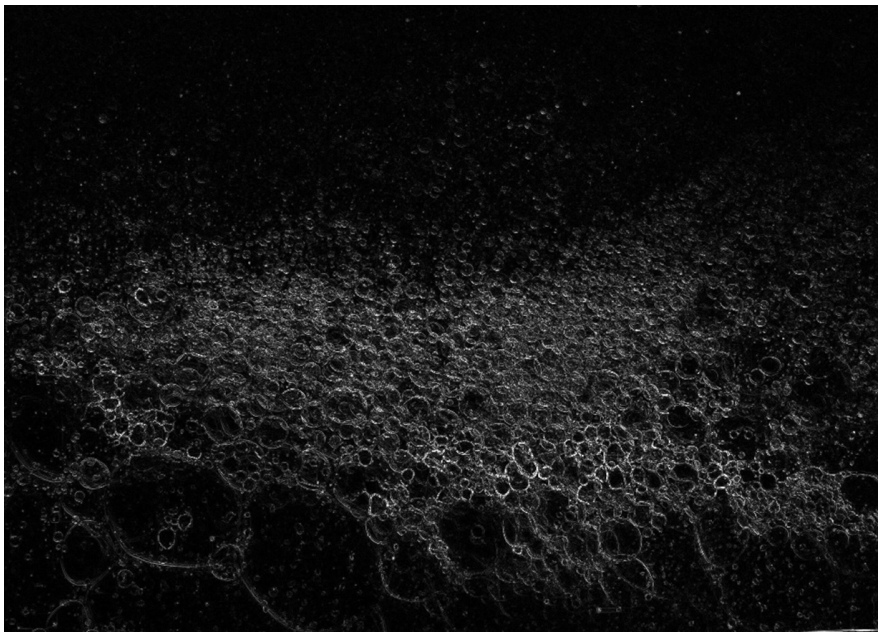

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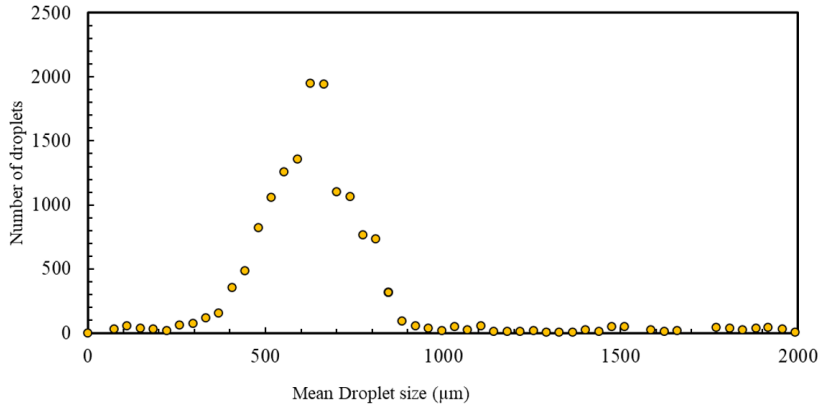

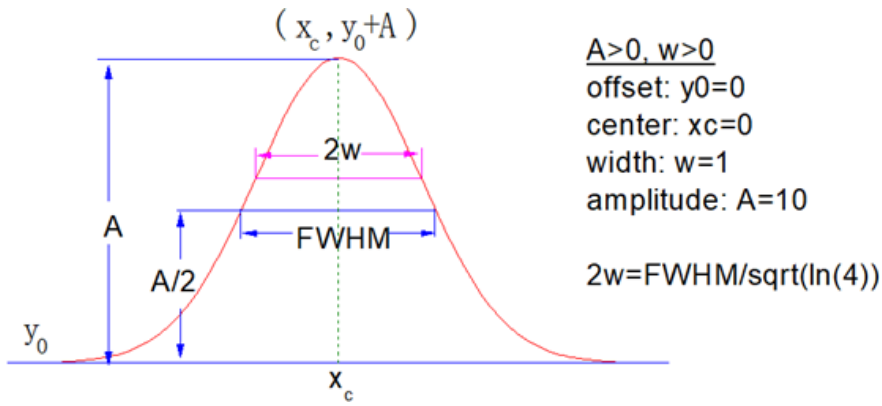

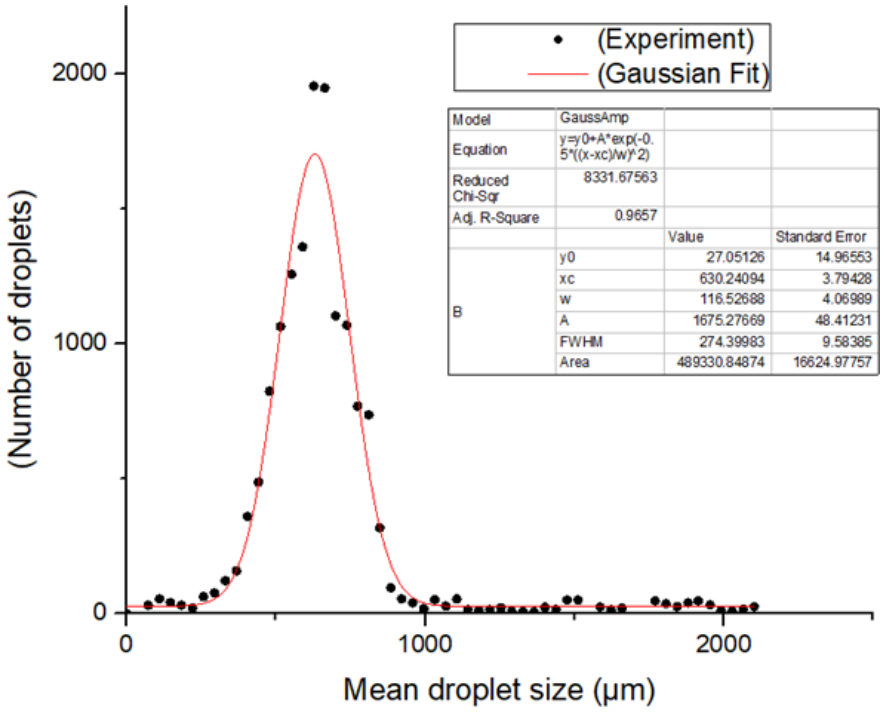

Model	GaussAmp		
Equation	y=y0+A*exp(-0.5*((x-xc)/w)^2)		
Reduced Chi-Sqr	8331.67563		
Adj. R-Square	0.9657		
		Value	Standard Error
B	y0	27.05126	14.96553
	xc	630.24094	3.79428
	w	116.52688	4.06989
	A	1675.27669	48.41231
	FWHM	274.39983	9.58385
	Area	489330.84874	16624.97757

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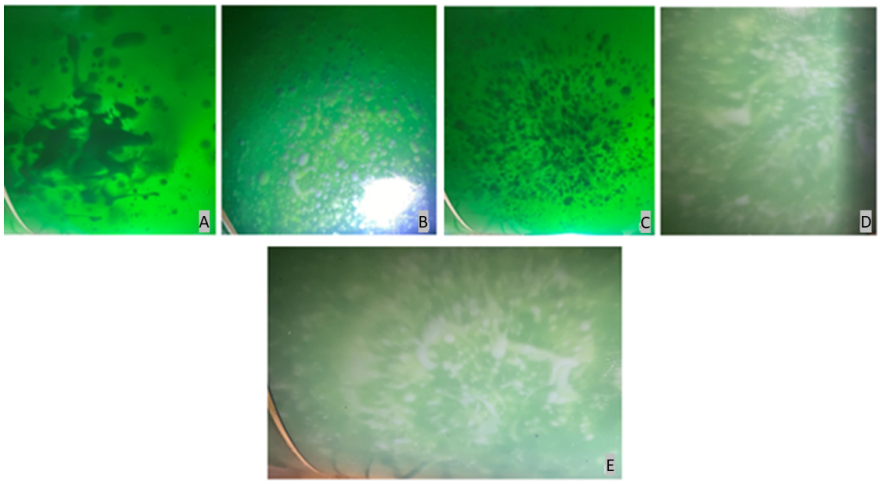

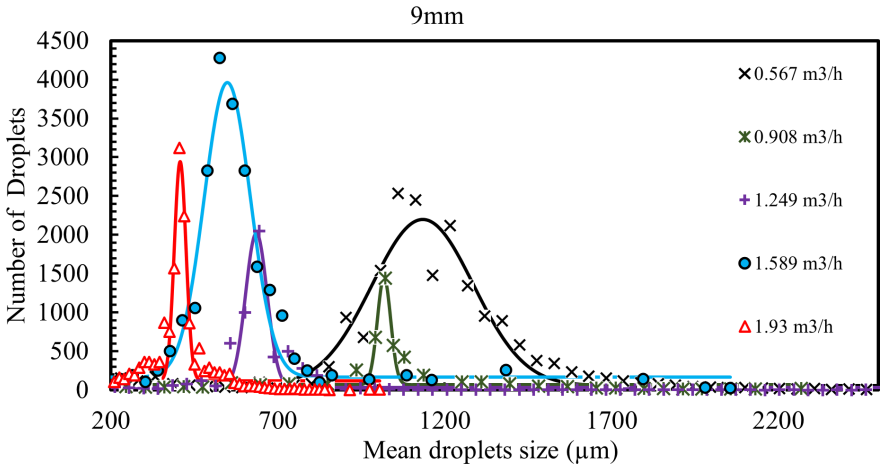

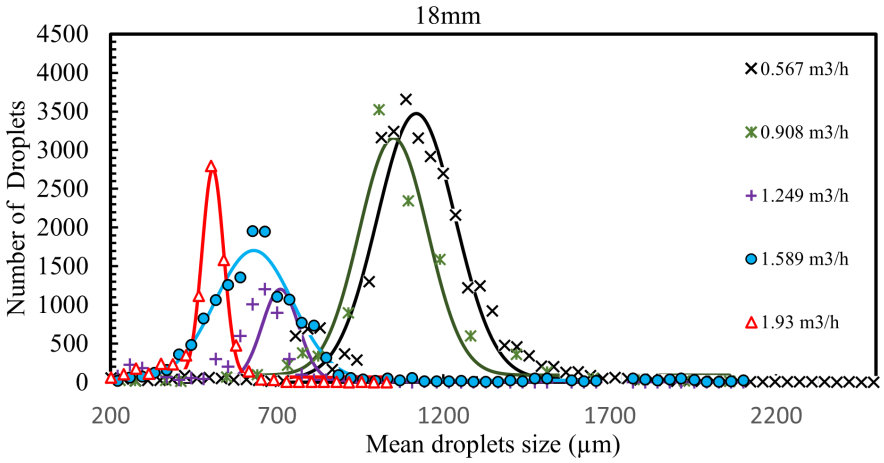

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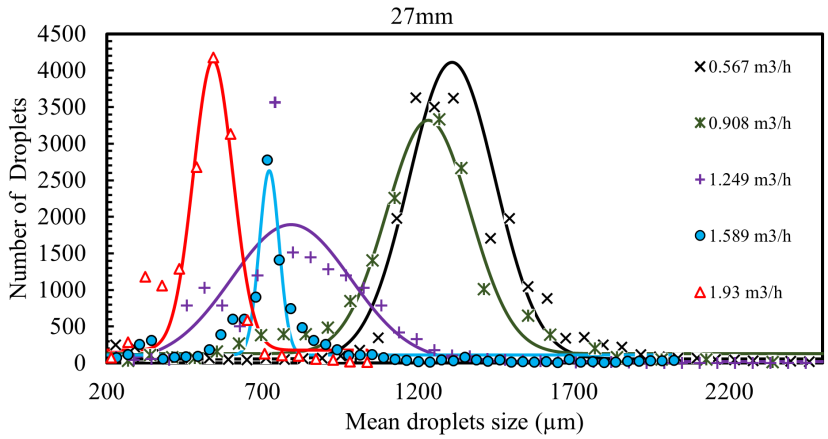

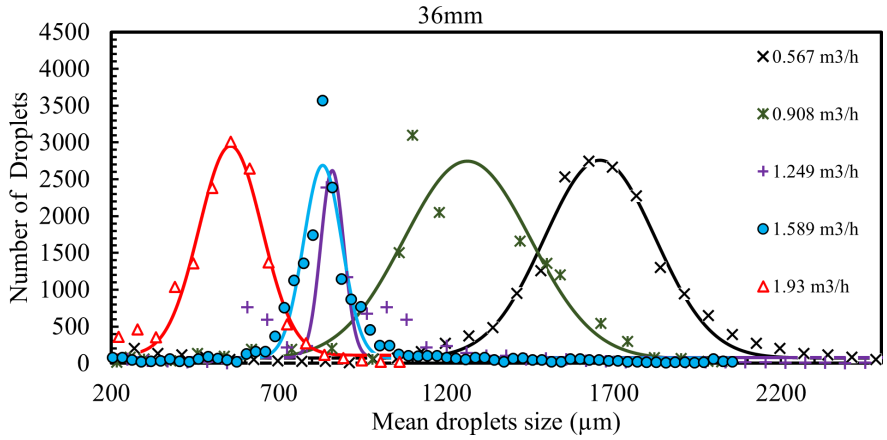

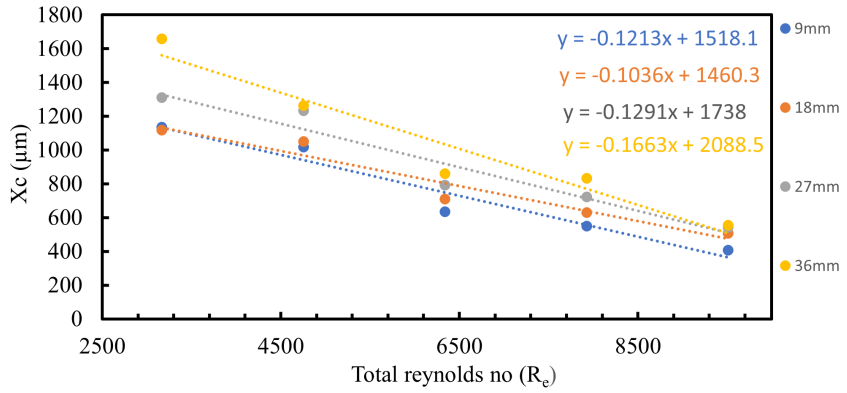

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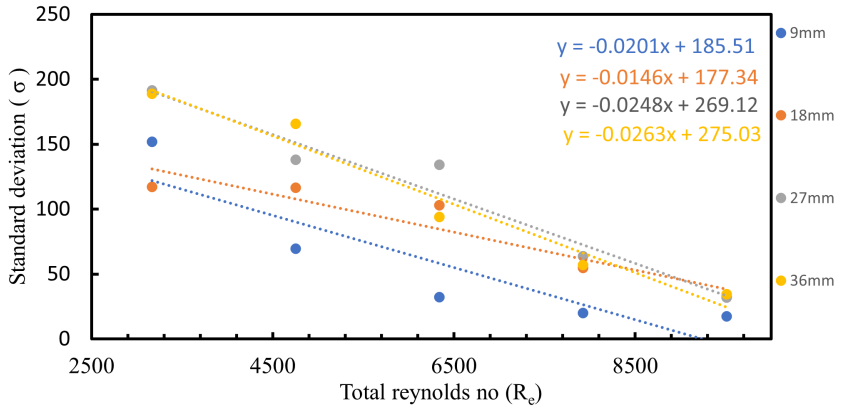

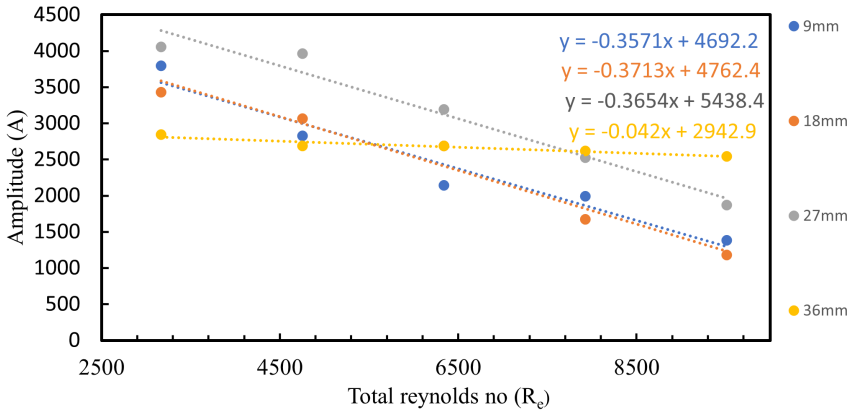

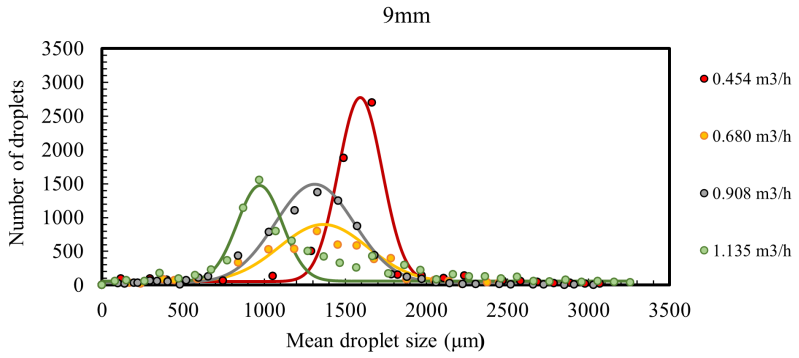

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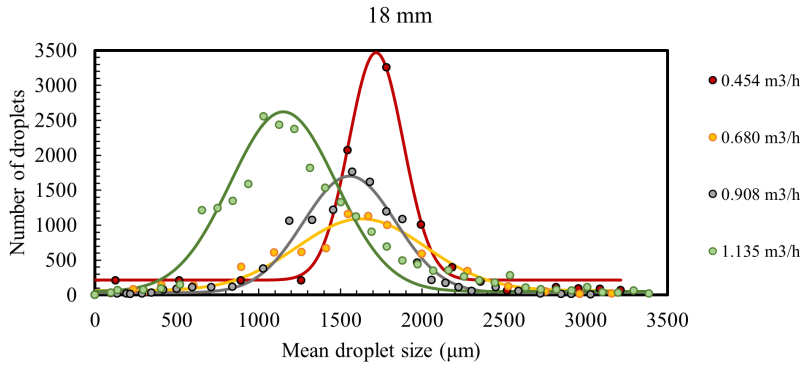

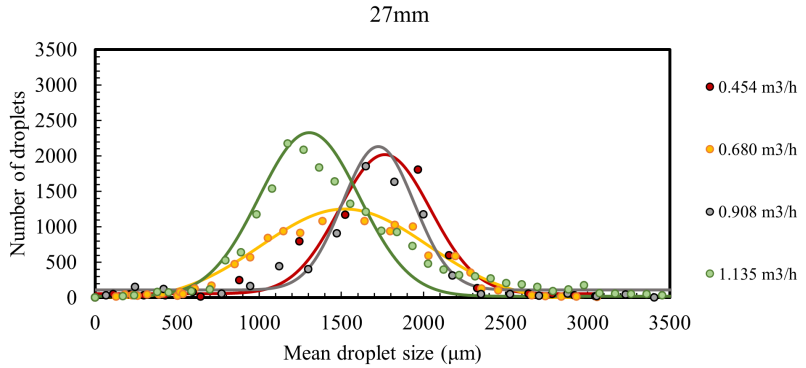

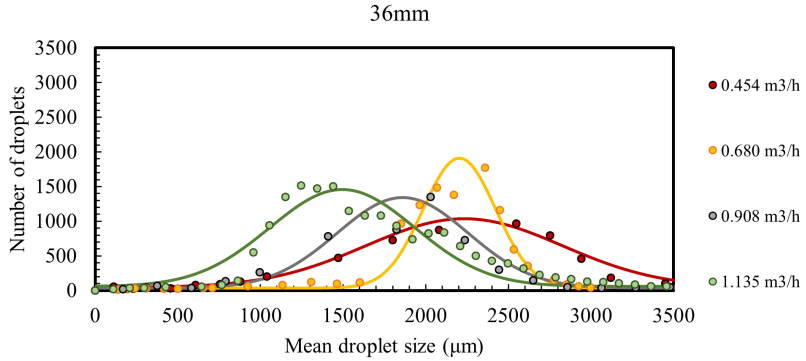

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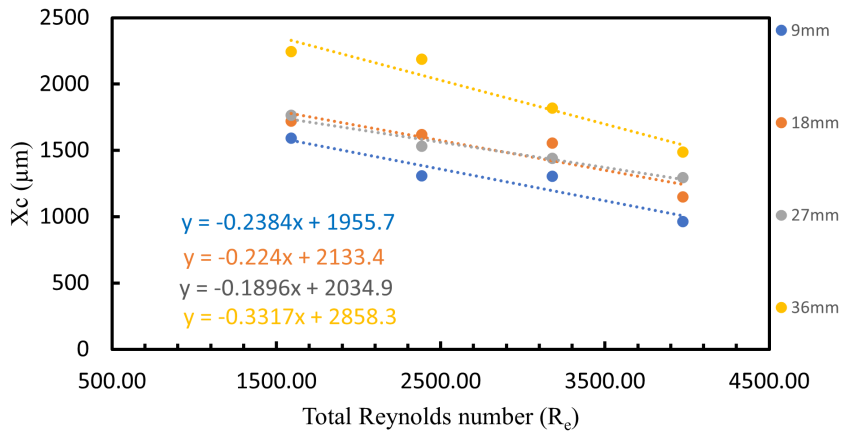

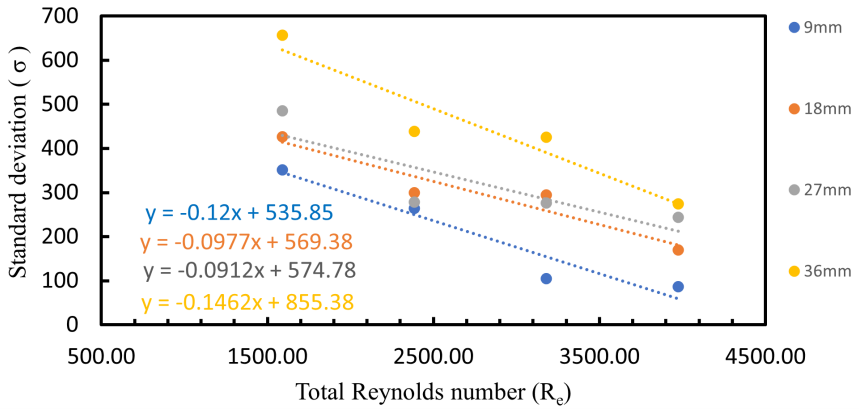

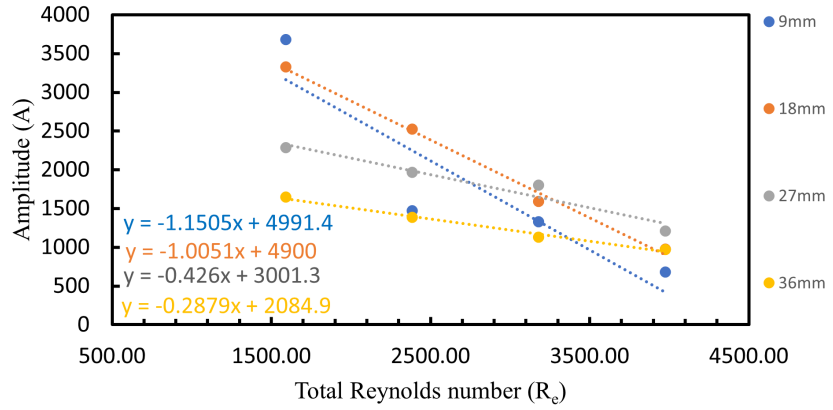

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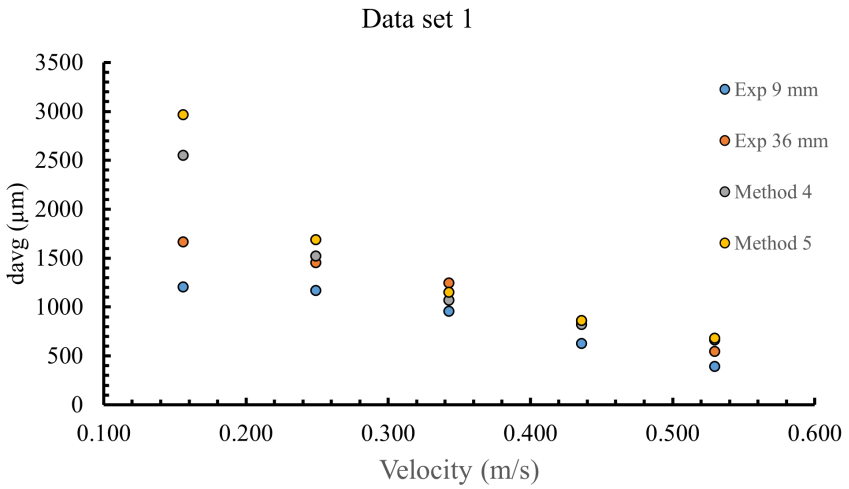

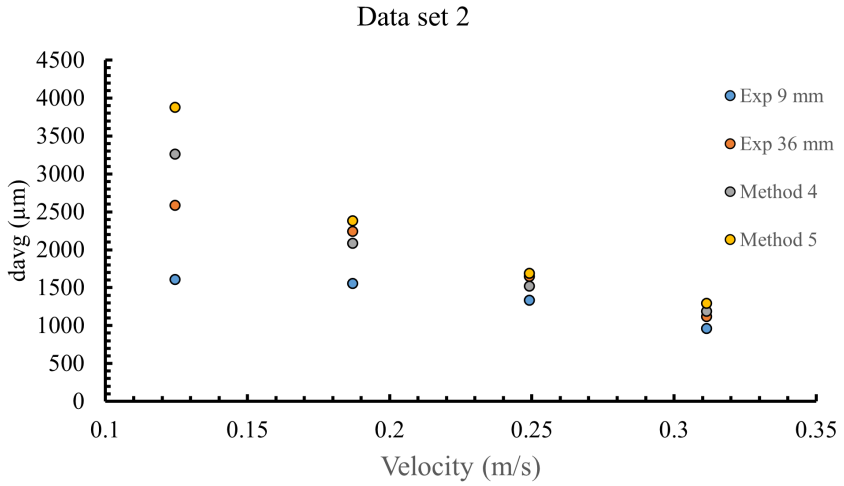

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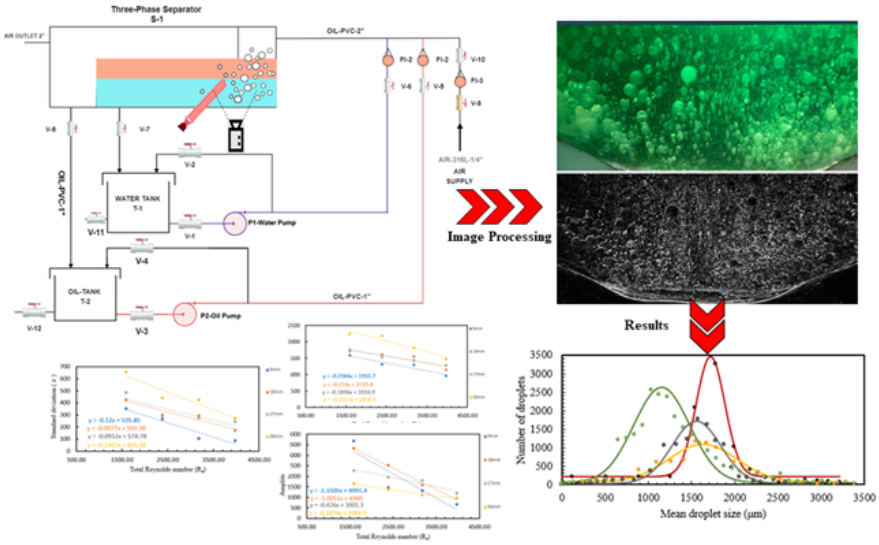
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