Cohesive Bond Strength of Marine Aggregates and its Role in Fragmentation

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Table S1 Parameters to calculate cohesive strength

D_{99}, D_{99F} and D_{99L} indicate 99% cumulative size from whole, former and latter period of plateau phase, respectively.

Day	rpm	shear	D_{99}	D_{99F}	D_{99L}	Ratio	S	F_{hyd}	F_{coh}
2	7	3.37	6840	6854	5770	2.01	62.4	126	42.0
2	15	7.23	5170	5064	5364	1.07	43.0	186	62.0
2	22	10.6	3801	3832	3789	1.70	23.4	149	49.6
2	47	22.6	3312	3295	3292	2.10	13.9	189	63.0
4	7	3.37	8250	8461	8199	1.67	113	228	76.0
4	7	3.37	8201	7556	8603	1.75	105	212	70.8
4	15	7.23	5539	6109	5026	1.61	52.9	229	76.4
4	15	7.23	5540	5585	5474	1.58	54.2	235	78.2
4	22	10.6	5007	4923	5032	1.58	44.2	281	93.6
4	22	10.6	3871	3939	3817	1.64	25.2	160	53.4
4	47	22.6	2792	2819	2766	1.70	12.6	171	57.1
4	47	22.6	2983	3179	2809	1.79	13.5	184	61.2
6	7	3.37	9225	9266	9203	2.26	99.4	201	67.0
6	22	10.6	5331	5470	5180	1.60	49.3	313	104
6	22	10.6	4891	4985	4764	1.70	38.7	246	82.0
6	47	22.6	3753	3933	3585	1.62	24.2	328	109
6	47	22.6	4050	4123	4003	1.71	26.4	358	119

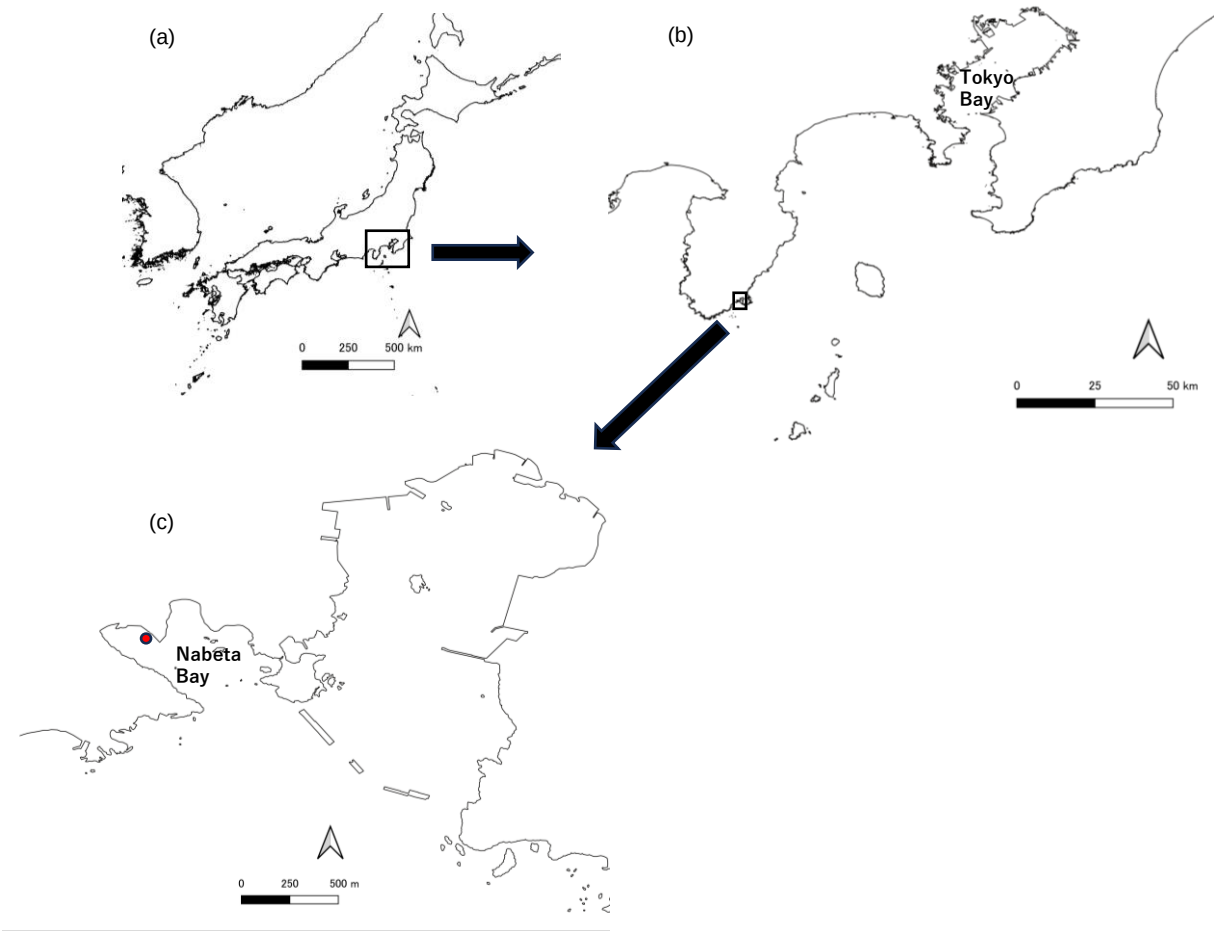

Fig. S1 Map of the study site

Circle in Nabeta bay is the location where we collected seawater for the experiment.

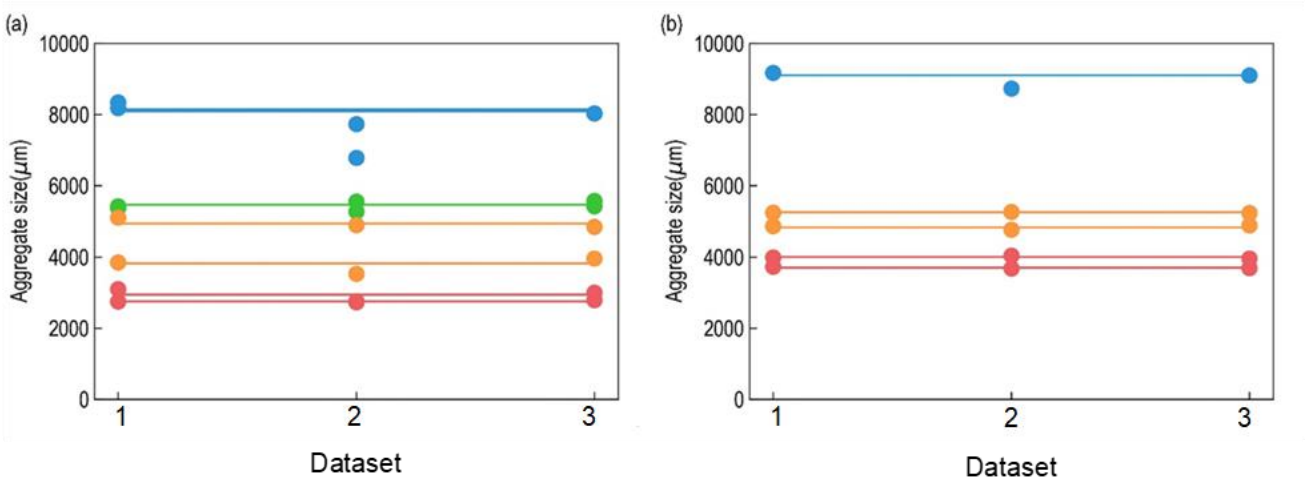

Fig. S2 D_{99} values estimated from splitted and whole datasets.

Ordinate and abscissa are size of aggregates (D_{99}: μm) and number of splitted dataset on day 4 (a) and 6 (b), respectively. Results from rotation speeds at 47 (red), 22 (orange), 15 (green) and 7 (blue) rpm were shown. The lines show calculated D_{99} value using whole dataset.

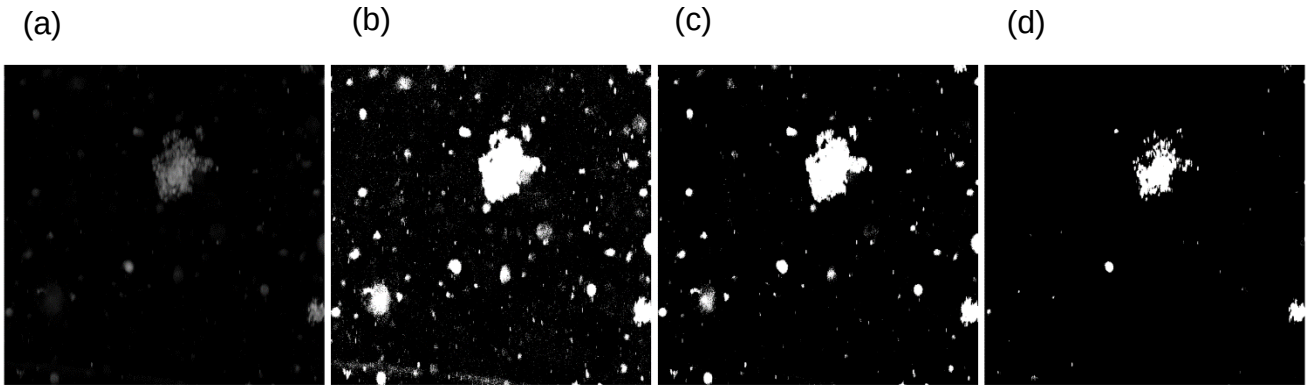

Fig. S3 Visualized images with the different level of binarization threshold

Raw images (a), threshold with 10 (b), 20 (c) and 60 (d) were shown.

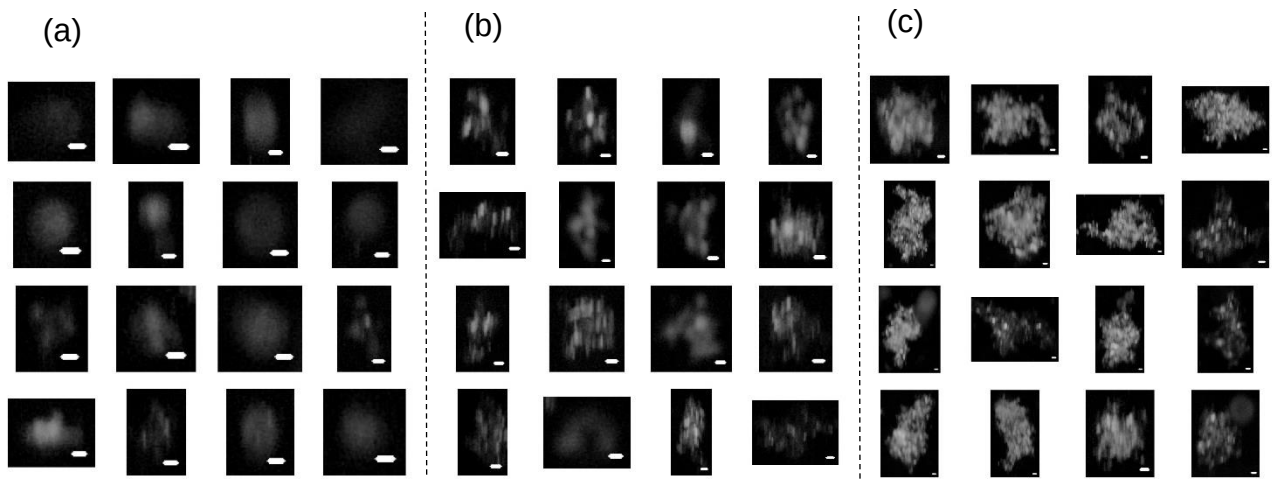

Fig. S4 Particles visualized in different size ranges

The images of particles in the ranges of 1000-2000 (a), 2000-5000 (b) and more than 5000 pixels (c) were shown. The scale bars showed 100 pixels.

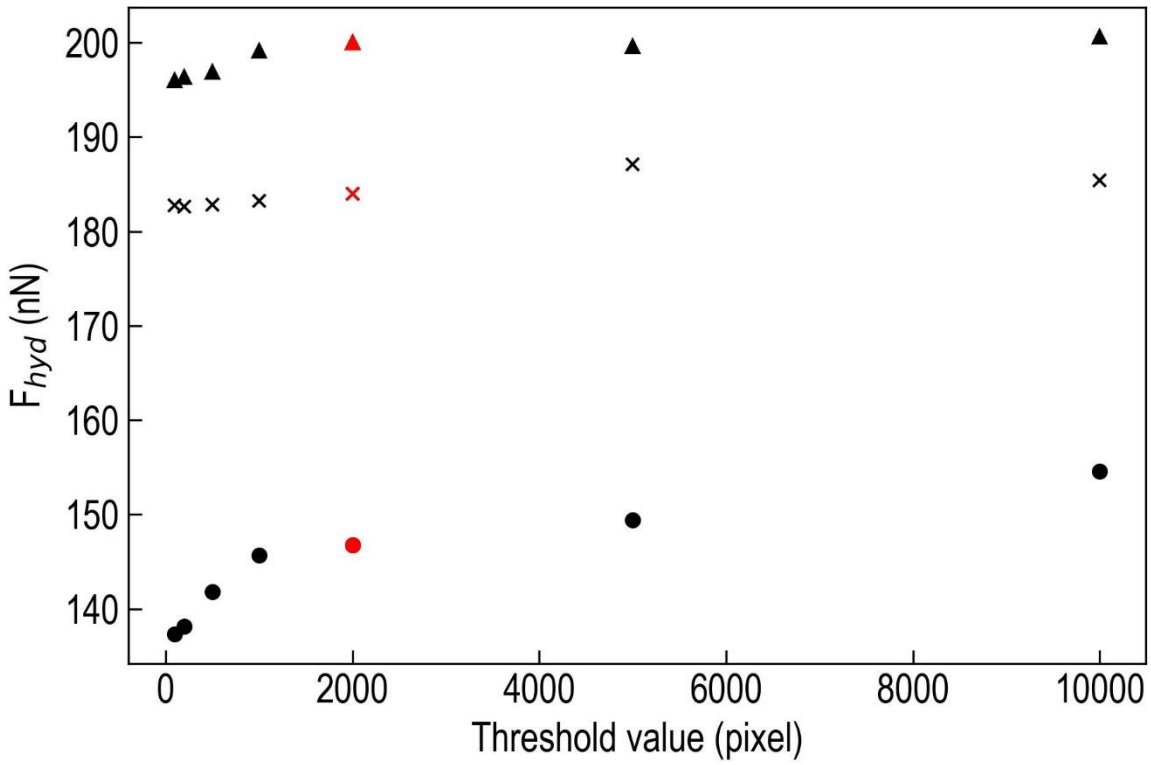

Fig. S5 Dependency of F_{hyd} on detection limit of visualization

Ordinate and abscissa are F_{hyd} (nN) and threshold of the detection limit (pixels). The data on day 2 (○), 4 (×) and 6 (△) were shown.

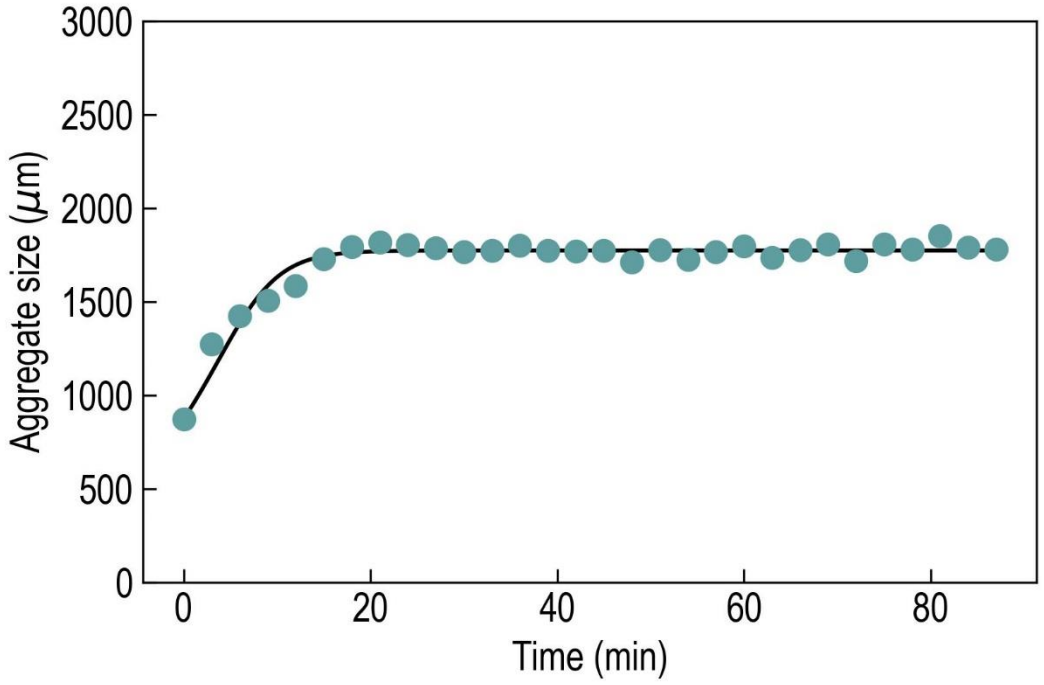

Fig. S6 A curve fitting for montmorillonite aggregate size vs time at a rotational speed of 7 rpm

Ordinate and abscissa are size of aggregate (μm) and time (min)