Supplementary Figures

Coral settlement competency curves

The peak competency for *Acropora* larvae was set between 4-8 days with some larvae starting to settle after 48 hours (Toh et al. 2012). Little is known about the competency rate of gonochoric *Porites* spp.; based on previous observations from Jell (1980), larvae started to be competent 24 hour post-fertilization, with a peak settlement between 2 and 6 days.

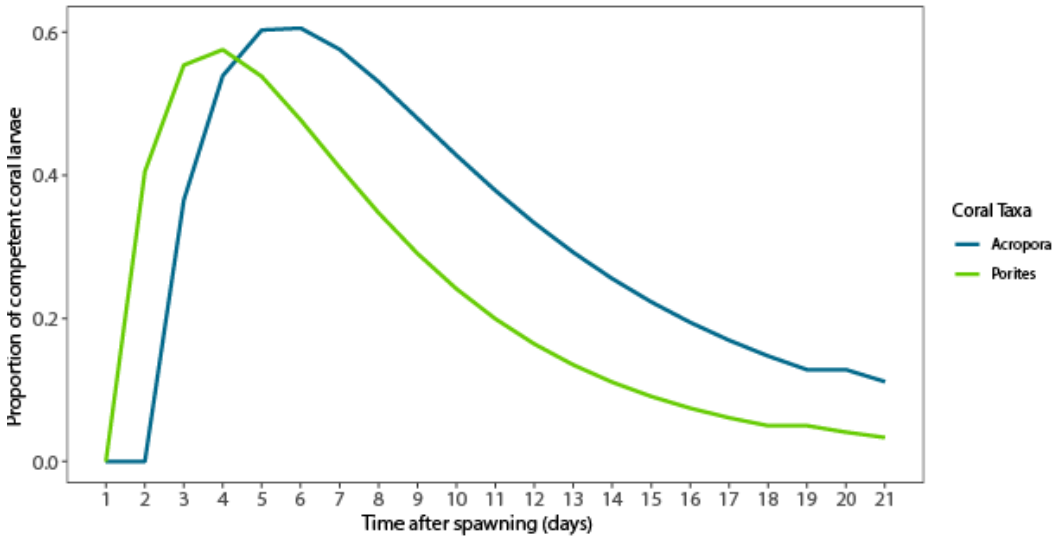

Figure S1 Settlement competency rate of the two studied coral taxa during the 21 days following fertilization using the Equation from Connolly and Baird (2010) but with modified parameters. For Acropora, a = 0.5 and b = 0.14. For Porites, a = 0.6 and b = 0.2

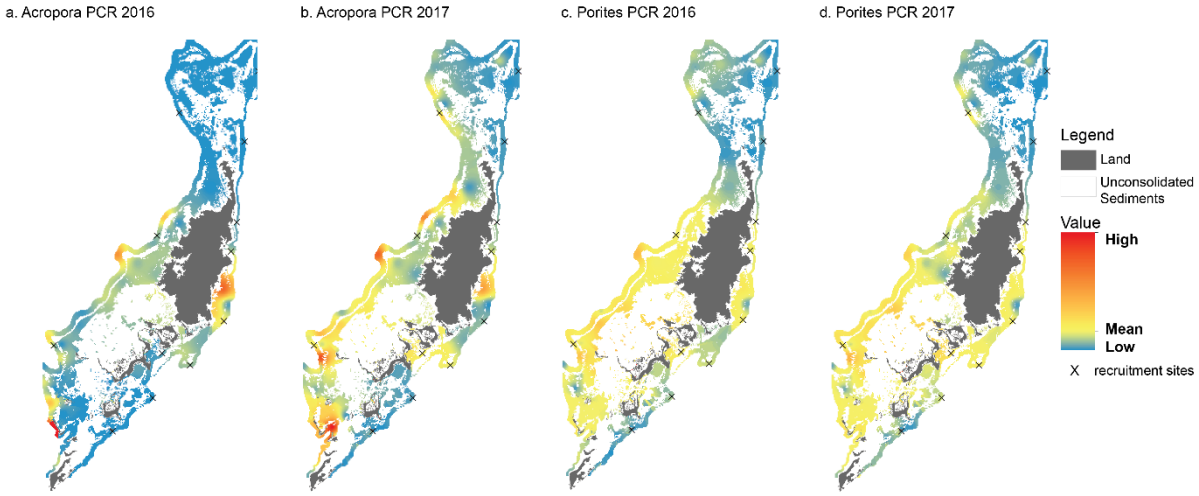

Figure S2 Particles concentration residency during year 2016 and 2017 used for model validation. Values are specific to each coral group and centered to the highest mean between 2016 and 2017.

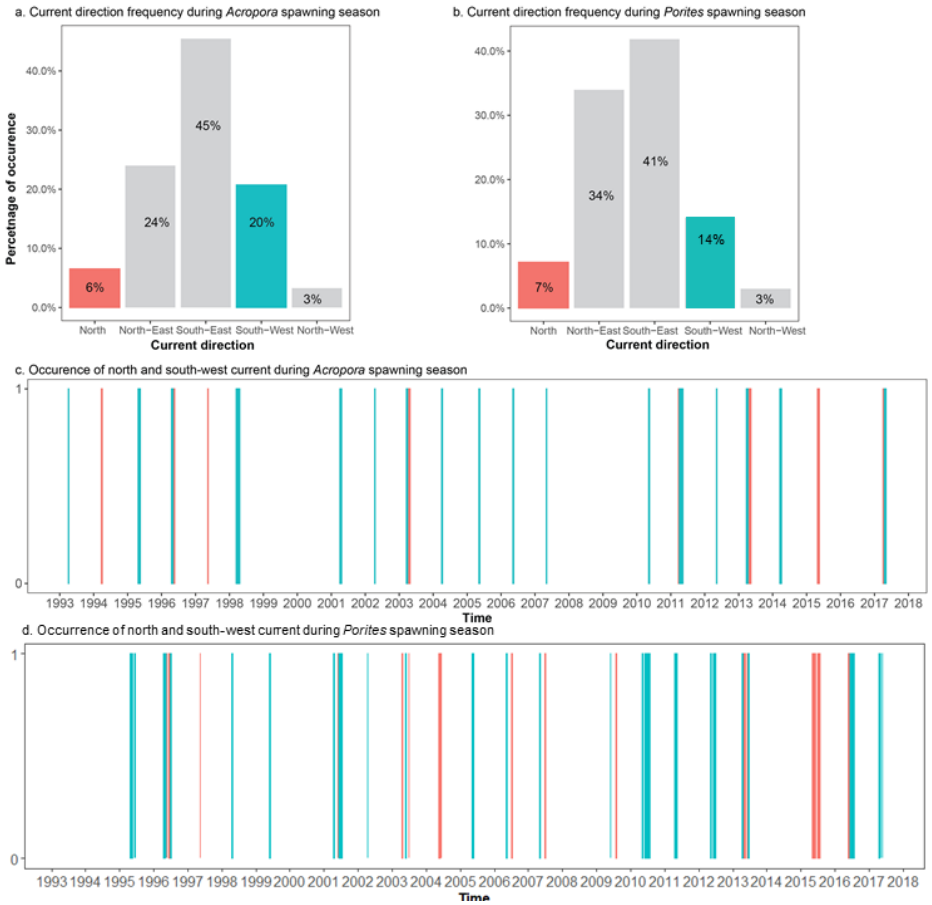

Figure S3 Frequency of current direction conditions during the main coral spawning season (March-June) between 1993 and 2018 and the specific occurrence in time for *Acropora* (a,c) and *Porites* corals (b,d). 0=no occurrence of north or southwest oceanic current at 5 days interval (ie. a single thin line represents 5 days, the wider the lines the longer the conditions persisted), 1=occurrence)

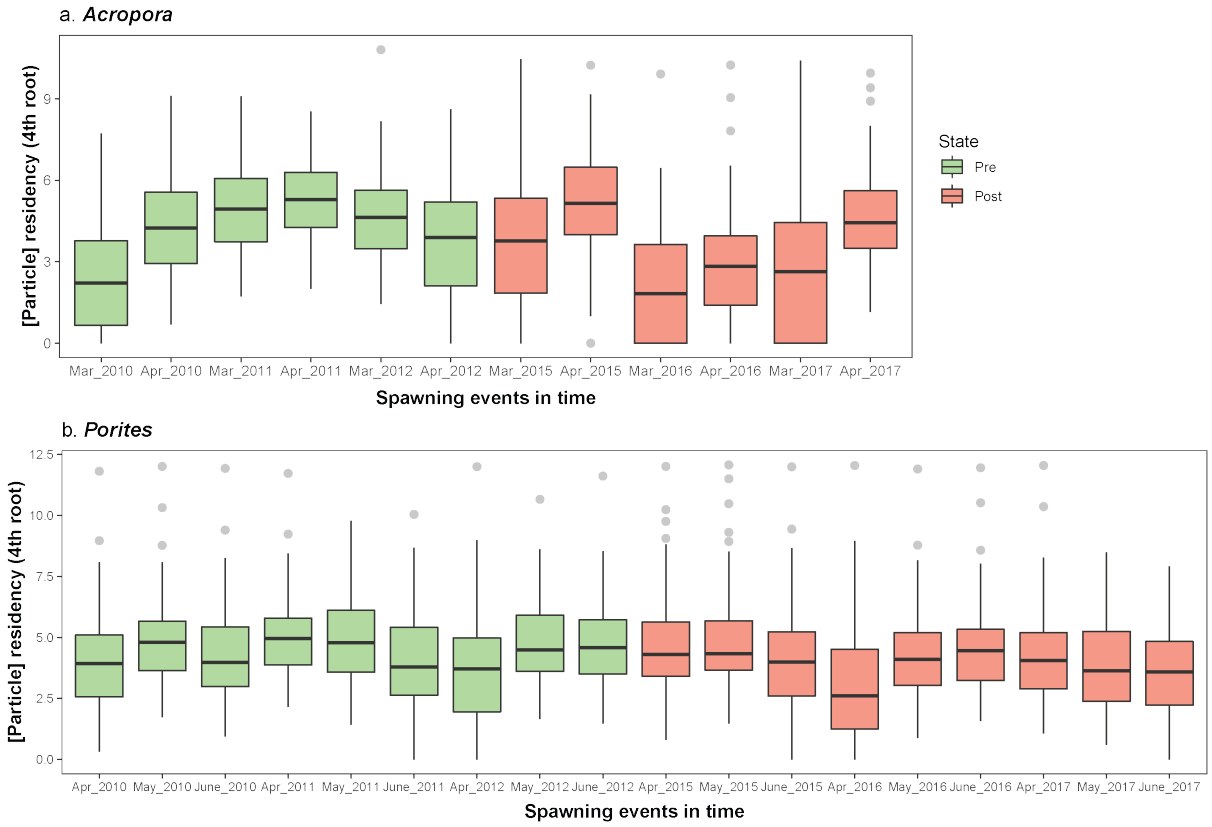

Figure S4 Box plot showing the variability in particle concentration residency across the studied spawning events for *Acropora* (a) and *Porites* (b)

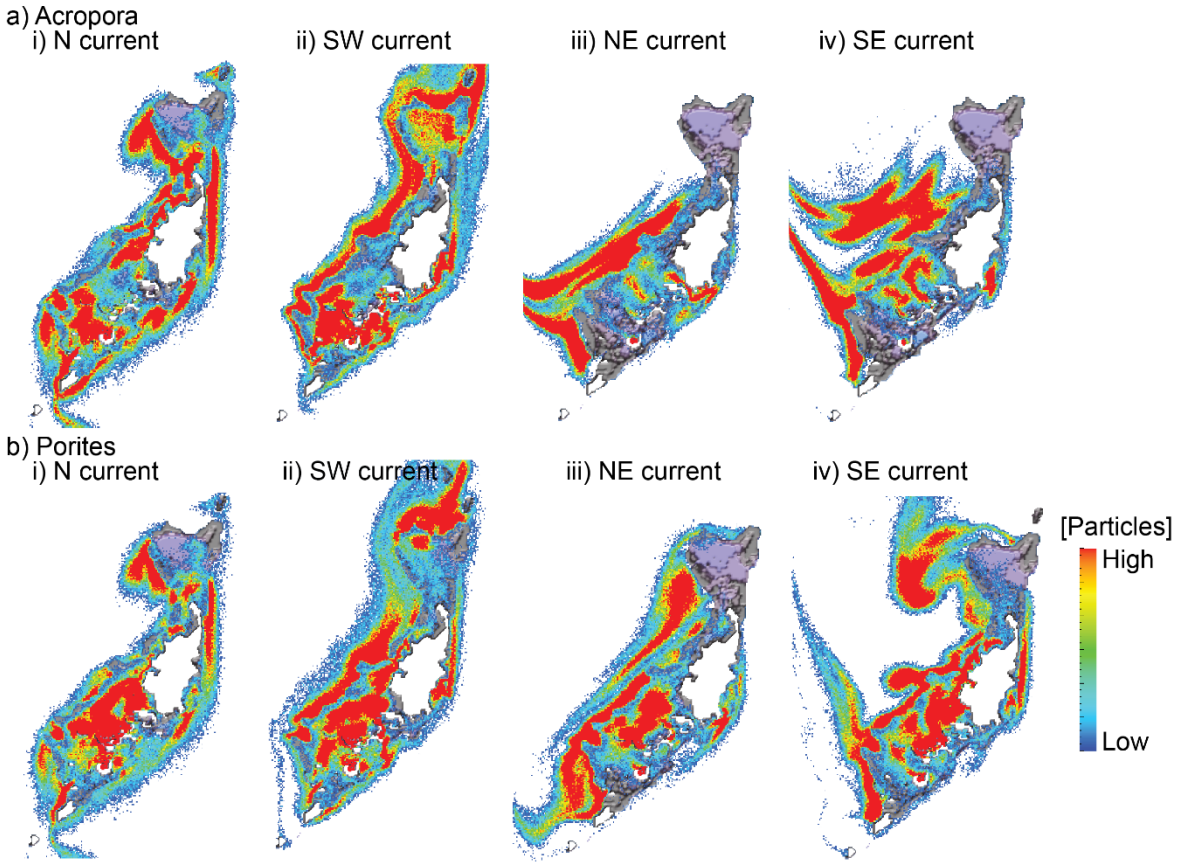

Figure S5 Coral larval-model model animations frame at day 5 following spawning for the four different categories of current direction (i-iv) for two coral groups (a-b). Note that competency rates of particles are not included here.

Supplementary Tables

Table S1 showing the results on the variability of particle concentration residency across dispersal events (referred to as 'Time') for each coral taxon

Response Variable	Explanatory variables	df	SumSq	Mean Sq	F value	P-value
Linear models						
Acropora						
[Part] residency	Time	11	1323.3	120.299	3.76	<0.001
	Residuals	1128	4273.1	3.78		
Porites						
[Part] residency	Time	17	665.9	39.17	10.5	<0.001
	Residuals	1692	6311.2	3.73		

Table S2 showing the likelihood ratio tests of the most simplified GLMM models displaying the effects from system state (Pre, Post, No) and/or region (east and west) and their interactions on particle concentration residency for each coral taxon.

Model	Response var	Explanatory var	df	AIC	LRT	Pr(Chi)	PH
Acropora							
gamma(log) glmm	[Part]residency	System state	2	22872	0.4619	0.7938	
		Region	1	22877	3.2209	0.0727	
		State:Region	2	22876	4.1971	0.1226	
Porites							
gamma(log) glmm	[Part]residency	State:Region	2	38343	9.232	**<0.01**	E: No > Post

Table S3 showing the likelihood ratio tests from the most simplified linear models displaying the effect of oceanographic parameters on particles concentration residency

Variable	Df	SS	RSS	AIC	P	R^2	PH
Response: Particles concentration residence						**0.69 (for full additive model)**	
current_Dir_cat	3	1465809	2723738	501.49	<0.001	0.36	N & SW > others
current_speed	1	902919	2160848	495.07	<0.001	0.03	Very weak negative effect
Wind_Speed	1	406682	1664612	483.33	<0.001	0.28	negative effect

References

Jell, J. S. 1980. Skeletogenesis of newly settled planulae of the hermatypic coral Porites lutea. Acta Palaeontologica Polonica 25.

Miller, K., and C. Mundy. 2003. Rapid settlement in broadcast spawning corals: implications for larval dispersal. Coral Reefs 22:99–106.

Nozawa, Y., and P. L. Harrison. 2005. Temporal settlement patterns of larvae of the broadcast spawning reef coral Favites chinensis and the broadcast spawning and brooding reef coral Goniastrea aspera from Okinawa, Japan. Coral Reefs 24:274–282.

Toh, T. C., J. Guest, and L. M. Chou. 2012. Coral larval rearing in Singapore: observations on spawning timing, larval development and settlement of two common scleractinian coral species. Contributions to Marine Science. National University of Singapore:81–87.