

Supplementary Information

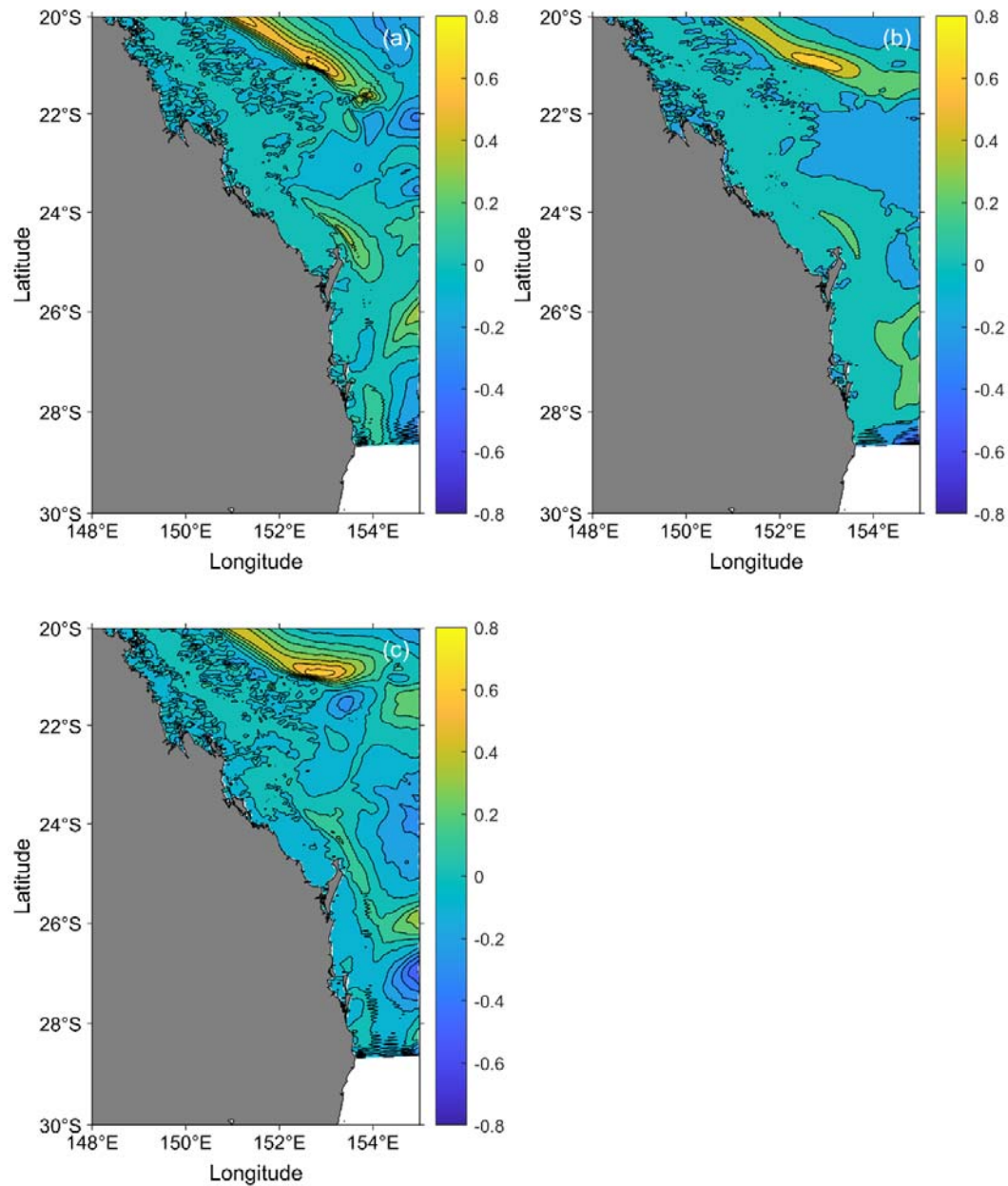


Figure S1. Mean u_{flow} (m s⁻¹) for August (a), September (b), and October (c) 2017 across the model domain used in an agent-based model for simulation of the migrating MC cohort of humpback whales along part of the east coast of Australia. Data was sourced from the eReefs ocean model, which does not extend below 29° latitude (depicted in white).

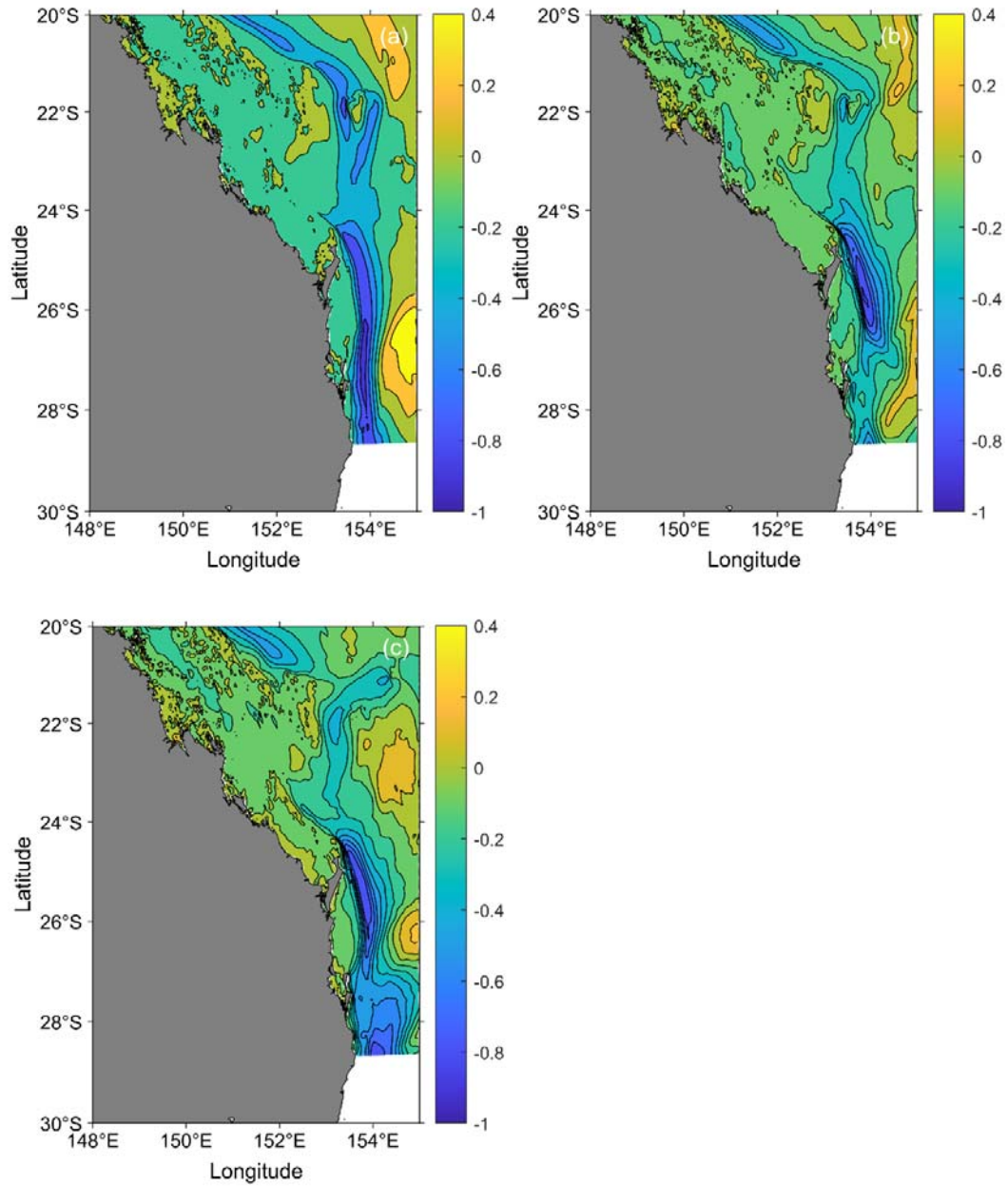


Figure S2. Mean v_{flow} (m s^{-1}) for August (a), September (b), and October (c) 2017 across the model domain used in an agent-based model for simulation of the migrating MC cohort of humpback whales along part of the east coast of Australia. Data was sourced from the eReefs ocean model, which does not extend below 29° latitude (depicted in white).

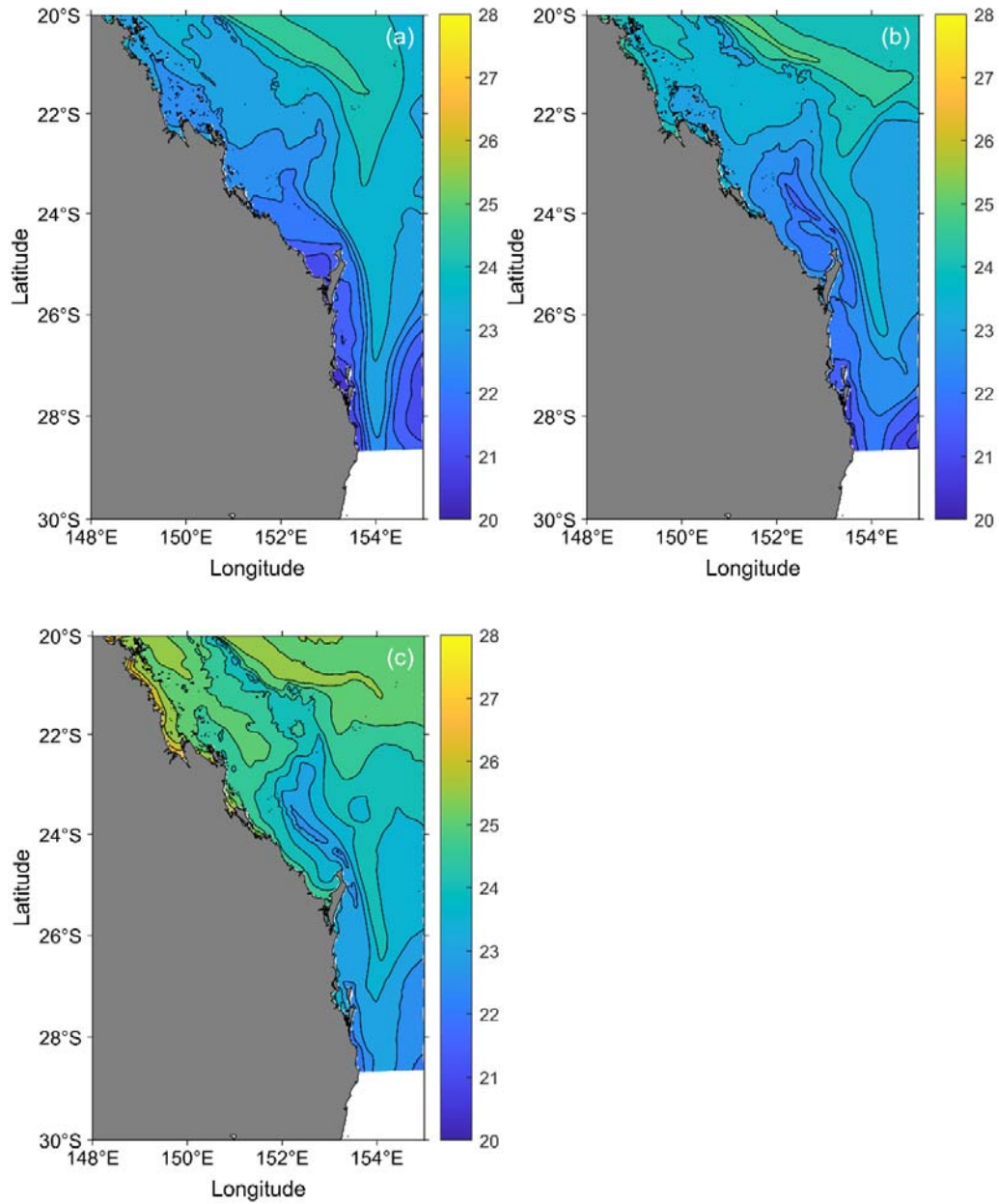


Figure S3. Mean SST (°C) for August (a), September (b), and October (c) 2017 across the model domain used in an agent-based model for simulation of the migrating MC cohort of humpback whales along part of the east coast of Australia. Data was sourced from the eReefs ocean model, which does not extend below 29° latitude (depicted in white).

Table S1. Detailed results of simulations of the migrating MC cohort of humpback whales along part of the east coast of Australia. HB = Hervey Bay, GC = Gold Coast, D = depth, SST = Sea Surface Temperature, T = time, n = number. See main text for more information.

SIMULATION #												SUCCESSFUL AGENTS													
	D_{land} (m)	$D_{shallow}$ (m)	D_{deep} (m)	θ (°)	σ_{θ} (°)	ϑ_{adjust} (°)	n moving	n in HB	n in GC	% success	SST_{HB} (°C)	D_{HB} (m)	D_{HB} (m)	D_{HB} (m)	D_{HB} (m)	T_{HB} (day)	SST_{GC} (°C)	D_{HBGC} (m)	D_{HBGC} (m)	D_{HBGC} (m)	D_{HBGC} (m)	T_{HBGC} (day)			
										% total	% in HB	max	median	max	25%	75%	mean	std	max	median	max	25%	75%	mean	std
A1	15	30	200	180	20	10	3000	1987	1954	65.1	66.2	27.0	18	71	16	24	9.98	13.1	25.3	54	788	43	61	4.5	0.4
A2	15	30	200	180	20	20	3000	2460	2418	80.6	82.0	27.3	18	71	16	25	9.37	12.8	25.5	54	533	44	61	4.5	0.4
A3	15	30	200	180	20	30	3000	2821	2796	93.2	94.0	27.1	23	71	17	28	6.96	8.99	25.4	55	780	45	62	4.5	0.4
A4	15	30	200	160	20	10	3000	2914	2909	97.0	97.1	26.7	27	75	20	36	5.43	5.27	25.5	903	479	77	165	4.0	0.4
A5	15	30	200	160	20	20	3000	2985	2981	99.4	99.5	26.8	29	84	25	38	4.89	3.11	25.3	239	403	63	896	3.4	0.3
A6	15	30	200	160	20	30	3000	2997	2996	99.9	99.9	26.6	31	83	27	39	4.83	1.82	25.0	189	324	63	265	3.4	0.2
A7	15	30	150	180	20	10	3000	2024	1983	66.1	67.5	26.8	18	71	16	23	10.6	14.7	25.3	54	866	43	61	4.5	0.4
A8	15	30	150	180	20	20	3000	2428	2401	80.0	80.9	27.4	19	71	16	26	8.50	11.4	25.4	54	944	44	61	4.5	0.4
A9	15	30	150	180	20	30	3000	2801	2790	93.0	93.4	26.7	23	71	17	29	6.49	7.46	25.5	55	366	45	62	4.5	0.3
A10	15	30	150	160	20	10	3000	2919	2911	97.0	97.3	26.8	26	86	19	36	5.56	5.88	25.6	894	466	74	156	4.0	0.4
A11	15	30	150	160	20	20	3000	2983	2982	99.4	99.4	26.7	30	85	25	39	4.81	2.65	25.3	184	387	62	701	3.4	0.2
A12	15	30	150	160	20	30	3000	2999	2998	99.9	100.0	26.6	31	83	27	39	4.80	1.55	24.9	142	309	64	203	3.5	0.2
B1	20	35	200	180	20	10	3000	3000	3000	100.0	100.0	25.0	25	71	22	31	5.90	0.81	24.1	55	104	46	62	4.5	0.4

B2	20	35	200	180	20	20	3000	3000	3000	100.	100.	25.	26	71	22	32	5.49	0.63	24.	56	748	47	63	4.5	0.4
										0	0	0							0					2	0
B3	20	35	200	180	20	30	3000	3000	3000	100.	100.	24.	28	71	24	34	5.16	0.58	24.	57	863	48	64	4.5	0.4
										0	0	9							0					1	0
B4	20	35	200	160	20	10	3000	3000	3000	100.	100.	24.	30	85	25	40	4.89	0.57	25.	903	479	80	164	4.0	0.4
										0	0	7							2		6		6	9	7
B5	20	35	200	160	20	20	3000	3000	3000	100.	100.	24.	34	86	29	41	4.74	0.54	25.	238	408	63	901	3.4	0.3
										0	0	7							1		8			3	0
B6	20	35	200	160	20	30	3000	3000	3000	100.	100.	24.	35	86	32	42	4.91	0.54	25.	189	338	64	269	3.4	0.2
										0	0	7							0		2			5	9
B7	20	35	150	180	20	10	3000	3000	3000	100.	100.	25.	25	71	22	31	5.89	0.72	24.	55	895	46	62	4.5	0.4
										0	0	0							0					6	0
B8	20	35	150	180	20	20	3000	3000	3000	100.	100.	25.	26	71	22	32	5.48	0.62	23.	56	512	47	63	4.5	0.3
										0	0	0							9					3	8
B9	20	35	150	180	20	30	3000	3000	3000	100.	100.	24.	28	71	24	34	5.16	0.58	24.	57	256	48	64	4.5	0.3
										0	0	9							1					2	8
B10	20	35	150	160	20	10	3000	3000	3000	100.	100.	24.	31	84	25	40	4.90	0.57	25.	893	479	76	157	4.0	0.4
										0	0	8							2		8		3	1	4
B11	20	35	150	160	20	20	3000	3000	3000	100.	100.	24.	34	86	29	41	4.75	0.54	25.	185	401	64	715	3.4	0.3
										0	0	9							1		1			1	0
B12	20	35	150	160	20	30	3000	3000	3000	100.	100.	24.	35	87	32	42	4.91	0.54	25.	143	308	66	203	3.5	0.2
										0	0	7							0		9			4	9
C1	25	40	200	180	20	10	3000	3000	3000	100.	100.	25.	29	71	26	34	5.90	0.70	24.	57	101	49	65	4.5	0.4
										0	0	0							3		4			0	3
C2	25	40	200	180	20	20	3000	3000	3000	100.	100.	25.	29	71	27	36	5.52	0.63	24.	58	889	49	66	4.4	0.4
										0	0	0							0					9	1
C3	25	40	200	180	20	30	3000	3000	3000	100.	100.	24.	31	81	27	37	5.23	0.59	24.	59	712	50	68	4.4	0.4
										0	0	9							4					6	0
C4	25	40	200	160	20	10	3000	3000	3000	100.	100.	24.	32	87	28	42	4.97	0.58	25.	905	479	91	166	4.0	0.4
										0	0	9							2		7		3	9	9
C5	25	40	200	160	20	20	3000	2998	3000	100.	99.9	24.	37	87	32	43	4.88	0.55	25.	244	393	66	908	3.3	0.2
										0		7							2		5			9	9
C6	25	40	200	160	20	30	3000	2817	3000	100.	93.9	24.	40	119	35	48	5.30	0.68	25.	192	359	69	273	3.4	0.2
										0		7							0		4			1	8
C7	25	40	150	180	20	10	3000	3000	3000	100.	100.	24.	29	71	26	34	5.90	0.70	24.	57	112	49	64	4.5	0.4
										0	0	9							2		9			2	1
C8	25	40	150	180	20	20	3000	3000	3000	100.	100.	24.	29	75	27	36	5.52	0.63	24.	58	669	49	66	4.4	0.4
										0	0	9							2					9	0
C9	25	40	150	180	20	30	3000	3000	3000	100.	100.	24.	31	79	27	37	5.22	0.59	24.	58	642	50	67	4.5	0.3
										0	0	9							2					0	9
C10	25	40	150	160	20	10	3000	3000	3000	100.	100.	24.	32	87	28	42	4.97	0.58	25.	898	479	83	159	4.0	0.4
										0	0	8							2		9		3	0	6

C11	25	40	150	160	20	20	3000	2998	3000	100.	99.9	24.	37	87	32	43	4.88	0.54	25.	188	380	66	719	3.3	0.2
C12	25	40	150	160	20	30	3000	2818	3000	100.	93.9	24.	40	86	35	48	5.29	0.70	25.	145	309	73	205	3.5	0.2
D1	30	45	200	180	20	10	2997	2997	2997	100.	100.	24.	32	81	30	37	8.25	2.14	24.	59	106	50	68	4.4	0.4
D2	30	45	200	180	20	20	2999	2986	2999	100.	99.6	24.	32	83	31	39	7.46	1.64	24.	60	927	52	72	4.4	0.3
D3	30	45	200	180	20	30	2999	2759	2999	100.	92.0	24.	34	87	31	41	7.02	1.41	24.	61	944	53	77	4.4	0.3
D4	30	45	200	160	20	10	2999	2139	2999	100.	71.3	24.	34	285	31	43	6.69	1.44	25.	901	475	102	168	4.1	0.5
D5	30	45	200	160	20	20	2999	459	2999	100.	15.3	24.	41	85	35	51	5.68	0.89	25.	277	380	70	937	3.4	0.3
D6	30	45	200	160	20	30	2999	19	2999	100.	0.6	24.	45	85	39	53	5.58	0.54	24.	200	265	66	364	3.4	0.3
D7	30	45	150	180	20	10	2999	2999	2999	100.	100.	24.	32	71	30	40	8.38	2.28	24.	59	949	51	68	4.4	0.4
D8	30	45	150	180	20	20	2999	2989	2999	100.	99.7	24.	32	87	31	39	7.47	1.68	24.	60	974	52	71	4.4	0.3
D9	30	45	150	180	20	30	2999	2795	2999	100.	93.2	24.	34	84	31	41	7.05	1.43	24.	61	931	53	75	4.4	0.3
D10	30	45	150	160	20	10	2999	2109	2999	100.	70.3	24.	34	300	31	43	6.72	1.46	25.	893	475	90	159	4.0	0.4
D11	30	45	150	160	20	20	2999	464	2999	100.	15.5	24.	41	95	35	51	5.71	0.99	24.	209	397	68	849	3.4	0.2
D12	30	45	150	160	20	30	2999	18	2999	100.	0.6	24.	45	70	39	53	5.56	0.49	24.	153	188	83	210	3.4	0.2
E1	35	50	200	180	20	10	3000	544	3000	100.	18.1	24.	39	79	36	47	6.42	0.70	24.	61	948	53	81	4.4	0.3
E2	35	50	200	180	20	20	3000	61	3000	100.	2.0	24.	40	70	36	47	6.01	0.62	24.	63	338	55	85	4.3	0.4
E3	35	50	200	180	20	30	3000	4	3000	100.	0.1	24.	41	66	37	50	5.93	0.42	23.	66	345	56	89	4.2	0.2
E4	35	50	200	160	20	10	3000	0	3000	100.	0	N/A													
E5	35	50	200	160	20	20	3000	0	3000	100.	0	N/A													
E6	35	50	200	160	20	30	3000	0	3000	100.	0	N/A													
E7	35	50	150	180	20	10	3000	525	3000	100.	17.5	24.	39	87	36	47	6.42	0.72	24.	61	138	53	79	4.4	0.3

E8	35	50	150	180	20	20	3000	54	3000	100. 0	1.8	24. 4	40	69	36	48	6.04	0.63	24. 2	64	713	55	85	4.3 3	0.3 9
E9	35	50	150	180	20	30	3000	7	3000	100. 0	0.2	24. 2	41	68	36	49	6.26	0.26	23. 7	63	252	55	84	4.3 0	0.3 5
E10	35	50	150	160	20	10	3000	2	3000	100. 0	0.1	23. 2	42	70	36	53	5.02	0.27	24. 5	902	437 1	146	226 5	4.9 8	0.2 1
E11	35	50	150	160	20	20	3000	0	3000	100. 0	0	N/A													
E12	35	50	150	160	20	30	3000	0	3000	100. 0	0	N/A													