

## Influences of wave fetch, tidal flow and ocean colour on subtidal rock communities

Michael T. Burrows\*

Department of Ecology, Scottish Association for Marine Science, Scottish Marine Institute, Oban, Argyll,  
PA37 1QA UK

\*Email: mtb@sams.ac.uk

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**Supplement.** Supplemental tables containing definitions of abundance categories used in MNCR subtidal rock surveys; details of the species used in analyses, including abbreviations, functional types, correlations with principal component scores and regression parameters; and the number of surveys by region, depth and wave fetch category. Fig. S1 shows the distribution of a fuller set of species (c.f. Fig. 3) across wave fetch and depth gradients as predicted from ordinal logistic regression models. Five of the species listed in Table S2 are not plotted because they either occurred infrequently (6 of 5959 surveys), or never reached the Common abundance category.

Table S1. Abundance categories for species in the UK Marine Nature Conservation Review (Hiscock 1996): S, superabundant; A, abundant; C, common; F, frequent; O, occasional; R, rare. Categories depended on percentage cover for space occupying species, and changed according to growth form, with a separate classification for those species recorded by population density.

% Cover	Growth form		Size of individuals / colonies				Density	
	Crust / Meadow	Massive / Turf	<1 cm	1–3 cm	3–15 cm	>15 cm		
>80%	S		S				>1 / 0.0001 m <sup>2</sup> (1 x 1 cm)	>10,000 m <sup>-2</sup>
40–79%	A	S	A	S			1–9 / 0.001 m <sup>2</sup> (3.16 x 3.16 cm)	1000–9999 m <sup>-2</sup>
20–39%	C	A	C	A	S		1–9 / 0.01 m <sup>2</sup> (10 x 10 cm)	100–999 m <sup>-2</sup>
10–19%	F	C	F	C	A	S	1–9 / 0.1 m <sup>2</sup>	10–99 m <sup>-2</sup>
5–9%	O	F	O	F	C	A	1–9 / m <sup>2</sup>	
1–5% or density	R	O	R	O	F	C	1–9 / 10 m <sup>2</sup> (3.16 x 3.16 m)	
<1% or density		R		R	O	F	1–9 / 100 m <sup>2</sup> (10 x 10 m)	
					R	O	1–9 / 1000 m <sup>2</sup> (31.6 x 31.6 m)	
						R	>1 / 10,000 m <sup>2</sup> to <1 / 1000 m <sup>2</sup> (100 x 100 m)	

Table S2. Species used in analyses of subtidal rock community structure, with their correlation with principal components scores (PCA1–PCA3) and parameters for ordinal logistic regressions of ranked abundance categories with  $\log_{10}$  chl *a* ( $\text{mg m}^{-3}$ ),  $\log_{10}$  tidal power ( $\text{kW m}^{-2}$ ) and the interaction between the 2 predictor variables. Parameter values significantly different from zero at  $p < 0.05$  are shown in bold. Abbreviations: TL, trophic level; 1, primary producer; 2, grazer; 2.2, suspension or filter feeder; 3, predator; AG, algal group (Steneck & Dethier 1994); 3.5, corticated foliose; 4, corticated macrophyte; 5, leathery macrophyte; 6, articulated calcareous; 7, crustose (\* indicates maerl-forming species). ‘Var’ gives the 5-letter abbreviation used to identify points for species on Fig. 5, while ‘Type’ gives a brief indication of the species type. The 6 scarcest species of the original set of 52 are omitted here; they were present in 13 surveys or less out of 5959.

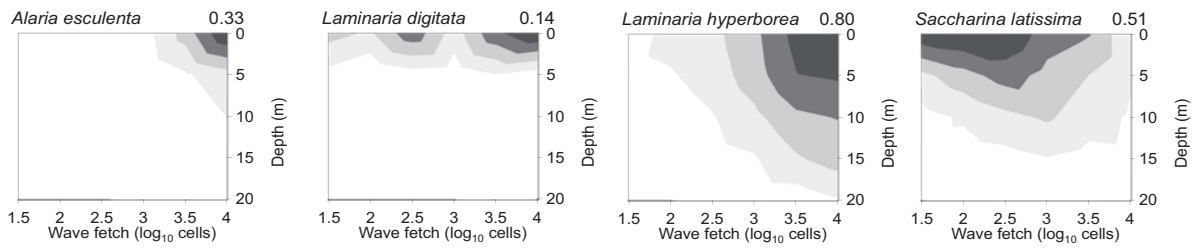
TL	AG	Var	Species	Type	Parameters					
					PCA1	PCA2	PCA3	Chl <i>a</i>	Tide	Interaction
1	7	Melme	<i>Melobesia membranacea</i>	Non-geniculate coralline	0.033	-0.111	0.130	1.982	0.343	-1.300
1	7	Melic	<i>Mesophyllum lichenoides</i>	Non-geniculate coralline	0.019	-0.081	0.066	-8.046	-0.667	-2.826
1	7	Litso	<i>Lithothamnion sonderi</i>	Non-geniculate coralline*	0.018	0.017	0.096	-3.773	0.504	-0.363
1	7	Phyla	<i>Phymatolithon laevigatum</i>	Non-geniculate coralline	0.050	-0.100	0.184	-5.697	0.859	-0.578
1	7	Phypu	<i>Phymatolithon purpureum</i>	Non-geniculate coralline	0.048	-0.086	0.051	-3.965	-0.138	-0.252
1	7	Tipus	<i>Titanoderma pustulatum</i>	Non-geniculate coralline	0.092	-0.165	0.155	-4.183	0.504	-1.198
1	7	Litco	<i>Lithothamnion corallioides</i>	Non-geniculate coralline*	0.017	-0.038	-0.076	-1.120	<b>-0.797</b>	0.978
1	7	Litgl	<i>Lithothamnion glaciale</i>	Non-geniculate coralline*	0.047	-0.036	-0.098	-2.063	0.147	<b>-0.657</b>
1	7	Phyca	<i>Phymatolithon calcareum</i>	Non-geniculate coralline*	0.040	-0.126	-0.105	0.908	-0.138	0.208
1	6	Cooff	<i>Corallina officinalis</i>	Geniculate coralline	0.228	-0.398	0.241	<b>-2.122</b>	0.098	-0.120
1	6	Coral	Corallinaceae	Geniculate coralline	0.467	0.264	-0.008	<b>-2.077</b>	<b>0.158</b>	<b>-0.552</b>
1	5	Alesc	<i>Alaria esculenta</i>	Kelp	0.188	-0.324	0.117	<b>-3.037</b>	0.170	-0.024
1	5	Ladig	<i>Laminaria digitata</i>	Kelp	0.139	-0.268	0.054	-1.412	0.035	-0.176
1	5	Lahyp	<i>Laminaria hyperborea</i>	Kelp	0.745	-0.173	0.005	<b>-1.873</b>	0.042	0.016
1	5	Salat	<i>Saccharina latissima</i>	Kelp	0.236	-0.157	-0.540	<b>-1.484</b>	-0.025	<b>-0.259</b>
1	5	Sapol	<i>Saccorhiza polyschides</i>	Kelp	0.286	-0.095	-0.272	<b>-3.239</b>	<b>0.181</b>	<b>-0.715</b>
1	4	Cheri	<i>Chondrus crispus</i>	Red alga	0.210	-0.329	-0.031	-0.892	0.132	-0.126
1	3.5	Boasp	<i>Bonnemaisonia asparagoides</i>	Red alga	0.413	0.100	-0.313	<b>-5.101</b>	<b>0.160</b>	<b>-0.864</b>
1	3.5	Crram	<i>Cryptopleura ramosa</i>	Red alga	0.656	-0.161	-0.067	<b>-1.921</b>	<b>0.149</b>	<b>-0.282</b>
1	3.5	Deacu	<i>Desmarestia aculeata</i>	Red alga	0.376	-0.110	-0.368	<b>-2.057</b>	0.060	-0.218
1	3.5	Didic	<i>Dictyota dichotoma</i>	Red alga	0.568	0.104	-0.183	<b>-2.184</b>	0.035	-0.086

TL	AG	Var	Species	Type	Parameters					
					PCA1	PCA2	PCA3	Chl <i>a</i>	Tide	Interaction
1	3.5	Hyhyp	<i>Hypoglossum hypoglossoides</i>	Red alga	0.439	-0.106	0.036	-0.491	<b>0.186</b>	-0.085
1	3.5	Papal	<i>Palmaria palmata</i>	Red alga	0.355	-0.282	0.035	<b>-1.427</b>	<b>0.253</b>	-0.120
1	3.5	Phrub	<i>Phycodrys rubens</i>	Red alga	0.578	-0.054	-0.276	-0.570	0.057	-0.094
1	3.5	Plcar	<i>Plocamium cartilagineum</i>	Red alga	0.628	-0.227	-0.126	<b>-1.336</b>	0.048	-0.109
2		Caziz	<i>Calliostoma zizyphinum</i>	Mollusc	0.551	0.244	0.139	0.551	-0.013	<b>0.390</b>
2		Gicin	<i>Gibbula cineraria</i>	Mollusc	0.539	0.099	-0.271	-0.584	0.023	0.157
2		Ecesc	<i>Echinus esculentus</i>	Urchin	0.405	0.504	0.019	<b>-1.629</b>	<b>0.117</b>	<b>-0.262</b>
2.2		Bosch	<i>Botryllus schlosseri</i>	Ascidian	0.511	-0.119	0.278	-0.734	0.031	-0.030
2.2		Bacre	<i>Balanus crenatus</i>	Barnacle	0.299	0.020	0.210	<b>1.380</b>	-0.048	<b>0.415</b>
2.2		Elpil	<i>Electra pilosa</i>	Bryozoan	0.479	-0.217	0.023	-0.259	-0.120	0.288
2.2		Memem	<i>Membranipora membranacea</i>	Bryozoan	0.542	-0.135	-0.094	<b>-2.575</b>	0.018	<b>-0.456</b>
2.2		Anbif	<i>Antedon bifida</i>	Feather star	0.315	0.486	0.044	-0.053	<b>-0.242</b>	<b>0.342</b>
2.2		Obgen	<i>Obelia geniculata</i>	Hydroid	0.519	-0.098	-0.117	<b>-2.888</b>	0.098	<b>-0.424</b>
2.2		Myedu	<i>Mytilus edulis</i>	Mussel	0.005	-0.169	0.218	0.076	<b>0.290</b>	<b>-1.035</b>
2.2		Aldig	<i>Alcyonium digitatum</i>	Sponge	0.252	0.385	0.454	0.102	-0.016	0.121
2.2		Hapan	<i>Halichondria panicea</i>	Sponge	0.196	-0.342	0.330	<b>0.926</b>	-0.080	0.306
2.2		Henri	<i>Henricia</i>	Starfish	0.292	0.072	0.267	0.979	0.021	<b>0.612</b>
2.2		Potri	<i>Pomatoceros triqueter</i>	Tubeworm	0.294	0.465	0.052	0.359	0.043	0.000
2.2		Asmen	<i>Ascidia mentula</i>	Tunicate	0.082	0.468	-0.177	0.149	-0.013	0.091
2.2		Asasp	<i>Ascidella aspersa</i>	Tunicate	-0.051	0.163	-0.158	<b>1.408</b>	<b>-0.275</b>	0.166
2.2		Ciint	<i>Ciona intestinalis</i>	Tunicate	0.054	0.506	0.010	0.846	<b>-0.179</b>	0.267
2.2		Cllep	<i>Clavelina lepadiformis</i>	Tunicate	0.376	0.426	0.004	-0.295	0.020	0.169
3		Saele	<i>Sagartia elegans</i>	Anemone	0.362	-0.016	0.500	-0.763	<b>0.266</b>	-0.260
3		Urfel	<i>Urticina felina</i>	Anemone	0.437	0.056	0.460	<b>1.660</b>	-0.047	<b>0.470</b>
3		Asrub	<i>Asterias rubens</i>	Starfish	0.174	0.266	0.125	<b>2.112</b>	<b>-0.269</b>	<b>0.559</b>

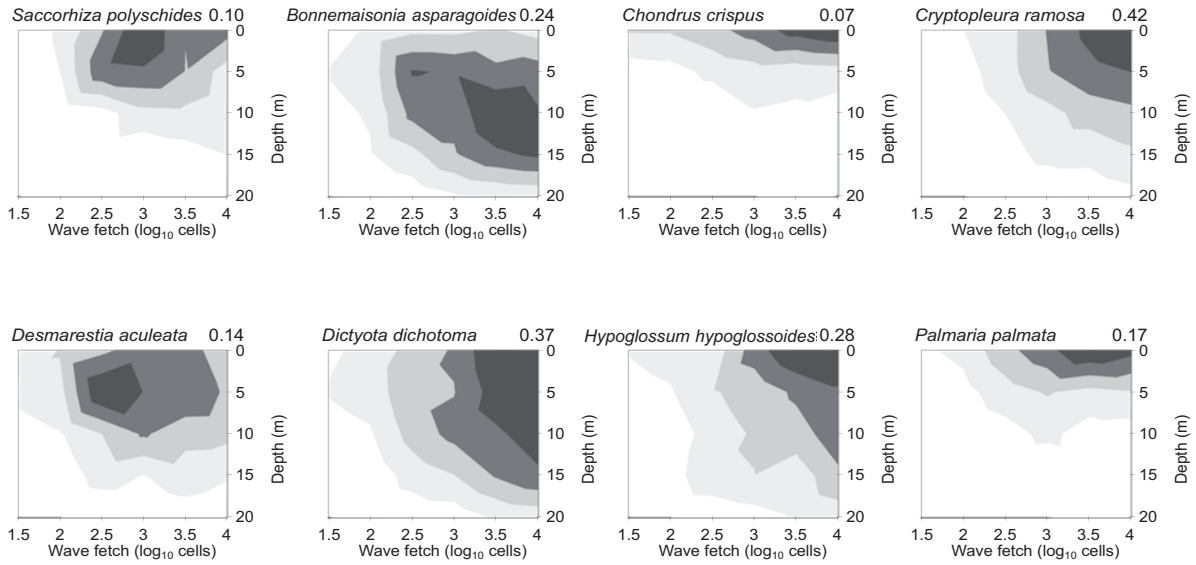
Table S3. Number of surveys per region, depth, and wave fetch class.

Region	Depth (m)	Wave fetch, $\log_{10}(\text{cells})$					
		1.5–2.0	2.0–2.5	2.5–3.0	3.0–3.5	3.5–4.0	>4
SW England	0–5	32	44	30	59	157	95
	5–10	25	11	13	23	126	119
	10–15	9	3	10	12	53	101
	15–20			1	7	26	102
	>20				3	12	169
Irish Sea	0–5	16	32	17	16	120	24
	5–10	8	17	3	14	129	45
	10–15	2	9		3	126	70
	15–20		4	1		64	51
	>20		1	1		33	28
SW Scotland	0–5	13	105	49	27	7	3
	5–10	5	98	61	31	18	6
	10–15	1	88	60	24	14	7
	15–20	1	67	45	14	13	11
	>20	3	104	72	26	14	6
NW Scotland	0–5	34	107	27	45	12	10
	5–10	26	114	49	88	42	29
	10–15	17	95	55	76	56	35
	15–20	7	90	41	55	53	16
	>20	1	87	45	73	58	46
NE Scotland	0–5	19	24	38	17	35	24
	5–10	8	25	38	25	21	26
	10–15	5	32	24	28	35	28
	15–20	4	17	12	28	37	26
	>20	5	19	24	32	60	74
E England	0–5	3	4	6		35	110
	5–10	1	3	7	4	30	120
	10–15	1		2	7	20	82
	15–20			1	3	6	61
	>20				1	3	95
Grand total		246	1200	732	741	1415	1619

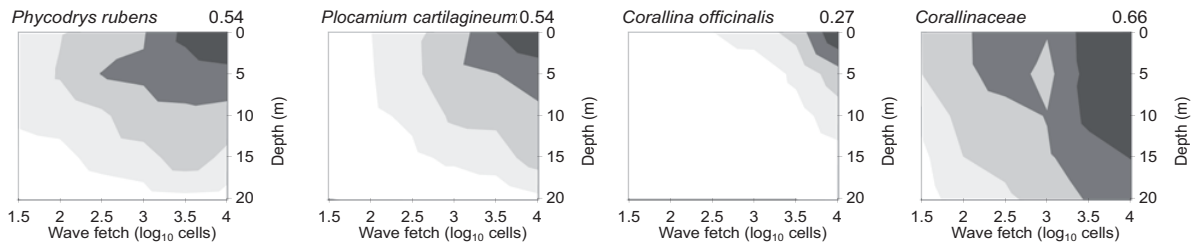
### (A) Kelp



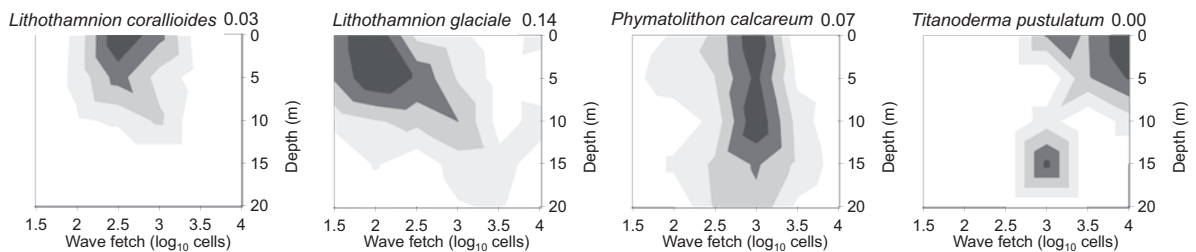
### (B) Red algae



### (C) Geniculate corallines



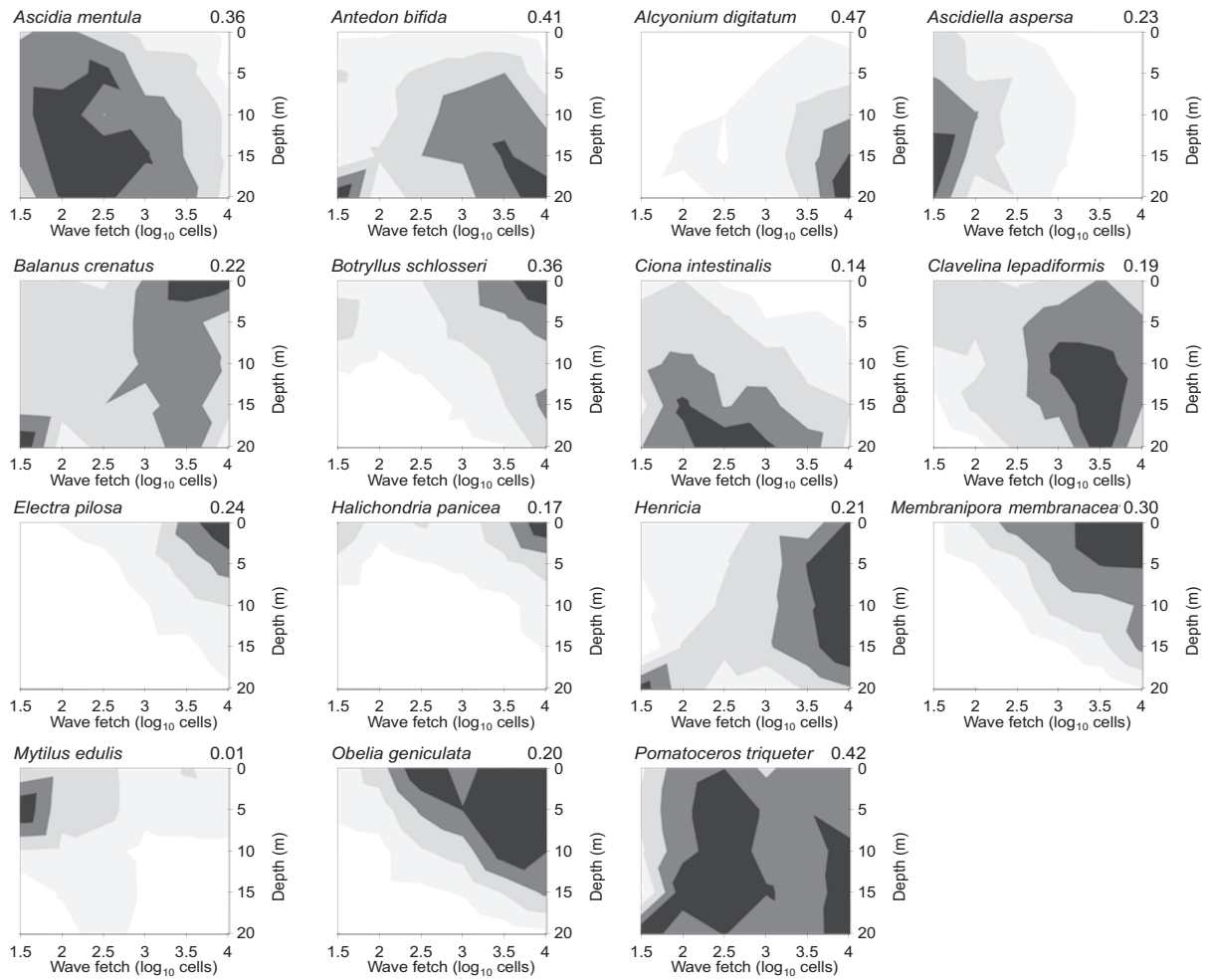
### (D) Non-geniculate corallines



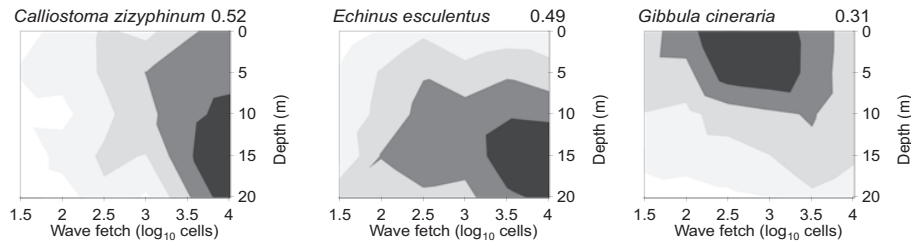
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Fig. S1. Distributions of species across wave fetch and depth gradients. Plots show the predicted probability of a species being at least Common from ordinal logistic regression of abundance categories against wave fetch and depth classes. Responses are scaled in 20% classes between 0 (white) and 100% (dark grey) of the maximum probability (shown top right)

### (E) Suspension feeders



### (F) Grazers



### (G) Predators

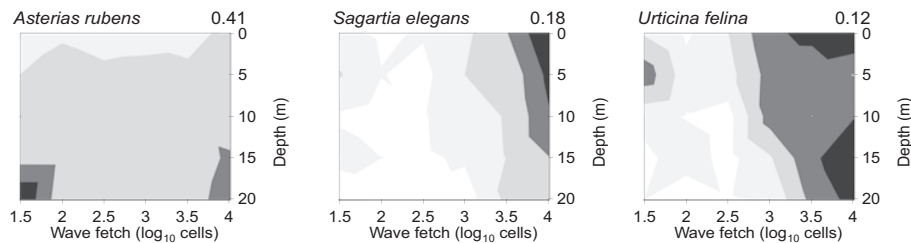


Fig. S1. Distributions of species across wave fetch and depth gradients (continued)