Supplementary Table S1. Daily maximum and minimum O_2, pH, Ω_{Ar} with ranges in chronological order for each site. i.e. as the time of the deployment only allowed for identification of the first maximum (Max 1), the first range (Range 1) is the difference between Max 1 during the day and the subsequent minimum (Min 1) at night while the second range (Range 2) is the difference between this minimum and the subsequent maximum at day 2.

	Santa Maria 1			**Santa Maria 2**			**St. Elm 1**			**St. Elm 2**			**Magalluf 1**			**Magalluf 2**		
	O_2	*pH*	Ω_{Ar}	*O_2*	*pH*	Ω_{Ar}	*O_2*	*pH*	Ω_{Ar}	*O_2*	*pH*	Ω_{Ar}	*O_2*	*pH*	Ω_{Ar}	*O_2*	*pH*	Ω_{Ar}
Max 1	8.02	8.10	3.49	6.72	8.05	3.20	6.83	8.06	3.23	-	8.12	3.67	6.54	8.09	3.42	7.46	8.12	3.63
Range 1	2.35	0.11	0.67	1.42	0.07	0.41	1.15	0.06	0.30	-	0.10	0.63	1.05	0.04	0.31	0.83	0.09	0.59
Min 1	5.67	7.99	2.82	5.30	7.98	2.78	5.68	8.00	2.93	-	8.02	3.04	5.49	8.04	3.11	6.63	8.03	3.04
Range 2	1.01	0.05	0.29	1.66	0.06	0.38	0.89	0.04	0.16	-	0.06	0.35	1.27	0.03	0.24	0.91	0.06	0.40
Max 2	6.68	8.04	3.11	6.96	8.04	3.16	6.57	8.04	3.09	-	8.08	3.39	6.76	8.08	3.35	7.54	8.09	3.45
Range 3	1.29	0.08	0.43	1.85	0.08	0.45	1.25	0.06	0.30	-	0.08	0.47	1.27	0.04	0.31	1.72	0.07	0.46
Min 2	5.39	7.96	2.68	5.11	7.96	2.71	5.32	7.98	2.79	-	8.00	2.91	5.49	8.03	3.04	5.82	8.02	2.98
Range 4	0.71	0.05	0.29	1.69	0.07	0.40	1.30	0.06	0.28	-	0.07	0.39	1.29	0.07	0.45	0.95	0.08	0.52
Max 3	6.10	8.01	2.97	6.80	8.03	3.11	6.62	8.04	3.07	-	8.07	3.30	6.78	8.10	3.49	6.77	8.10	3.51
Range 5	1.53	0.11	0.56	2.62	0.11	0.59	1.12	0.05	0.25	-	0.08	0.47	1.34	0.06	0.39	1.53	0.07	0.47
Min 3	4.57	7.90	2.41	4.18	7.92	2.52	5.50	7.99	2.83	-	7.99	2.83	5.44	8.04	3.10	5.24	8.03	3.03

	Son Veri Nou 1			**Son Veri Nou 2**			**Cala Blava 1**			**Cala Blava 2**			**Magalluf 3**			**Puerto Portals 1**			**Puerto Portals 2**		
	O_2	*pH*	Ω_{Ar} *a*	*O_2*	*pH*	Ω_{Ar}	*O_2*	*pH*	Ω_{Ar}	*O_2*	*pH*	Ω_{Ar}	*O_2*	*pH*	Ω_{Ar}	*O_2*	*pH*	Ω_{Ar}	*O_2*	*pH*	Ω_{Ar}
Max 1	8.67	8.17	3.59	8.35	8.05	2.85	11.70	8.15	3.39	11.13	8.22	3.85	9.15	8.20	3.80	9.32	8.20	3.83	9.09	8.20	3.86
Range 1	2.64	0.17	0.99	2.25	0.10	0.52	4.94	0.20	1.04	4.45	0.23	1.31	2.15	0.09	0.59	3.85	0.17	1.09	3.57	0.17	1.08
Min 1	6.03	8.00	2.60	6.10	7.95	2.33	6.76	7.95	2.34	6.68	7.99	2.54	7.00	8.11	3.21	5.47	8.03	2.74	5.52	8.03	2.78
Range 2	2.56	0.09	0.53	2.45	0.12	0.64	3.86	0.15	0.82	3.90	0.16	0.92	2.47	0.12	0.75	4.72	0.21	1.35	4.33	0.20	1.29
Max 2	8.59	8.09	3.13	8.55	8.07	2.98	10.62	8.10	3.16	10.58	8.15	3.46	9.47	8.23	3.96	10.19	8.24	4.09	9.85	8.23	4.06
Range 3	2.65	0.14	0.75	2.96	0.15	0.75	5.33	0.23	1.15	4.98	0.24	1.28	2.74	0.13	0.81	3.45	0.14	0.96	3.19	0.16	1.05
Min 2	5.94	7.95	2.38	5.59	7.92	2.22	5.29	7.87	2.01	5.60	7.91	2.18	6.73	8.10	3.15	6.74	8.09	3.13	6.66	8.07	3.01
Range 4	2.75	0.11	0.60	2.85	0.13	0.66	4.38	0.19	0.95	4.29	0.20	1.05	2.26	0.09	0.57	2.65	0.12	0.80	2.52	0.13	0.83
Max 3	8.69	8.06	2.98	8.44	8.05	2.89	9.67	8.06	2.95	9.89	8.11	3.23	8.99	8.19	3.72	9.39	8.22	3.93	9.18	8.20	3.85
Range 5	2.59	0.13	0.67	2.75	0.13	0.65	4.07	0.16	0.79	3.91	0.18	0.93	2.12	0.08	0.51	3.25	0.14	0.97	2.97	0.14	0.99
Min 3	6.10	7.93	2.31	5.69	7.92	2.24	5.60	7.90	2.16	5.98	7.93	2.30	6.87	8.11	3.20	6.14	8.07	2.96	6.21	8.06	2.85

Supplementary Table S3. Results from Generalized Linear Mixed Models (lme4 package in R) with Gaussian distribution, and link identity with site as a random effect (repeated measures) testing the effect of structural parameters on the mean, max, min and range of pH and Ω_{Ar}. Where no results are given the noslope model explained more variation.

		Shoot density		Biomass		LAI	
		χ^2	p	χ^2	p	χ^2	p
O_2	Mean	0.512	0.47	4.4755	**<0.05***	11.451	**<0.001*****
	Max	0.0178	0.89	5.6205	**<0.05***	11.519	**<0.001*****
	Min	2.902	0.09	4.0027	**<0.05***	8.1588	**<0.01****
	range	-	-	3.6632	0.06	7.6857	**<0.01****

Significance levels: *p<0.05, **p<0.01, ***p<0.001

Figure S2. The relationships between leaf area index (LAI) and a) max, b) mean, c) min oxygen concentrations (mg L^{-1}) and the d) range of oxygen concentrations. The linear regression for maximum O_2 (red circles) is 1.37 LAI + 5.71 (r^2=0.57). Mean Ω_{Ar} are black diamonds with 0.78 LAI + 5.44 (r^2=0.62), Minimum Ω_{Ar} are blue squares with 0.42 LAI + 4.99 (r^2=0.30) while the range of Ω_{Ar} (right y-axis) are white triangles with linear regression 0.97 LAI + 0.60 (r^2=0.60).

Figure S4. Correlation O_2 concentration (mg L^{-1}) and pH_{NBS} during measurements.

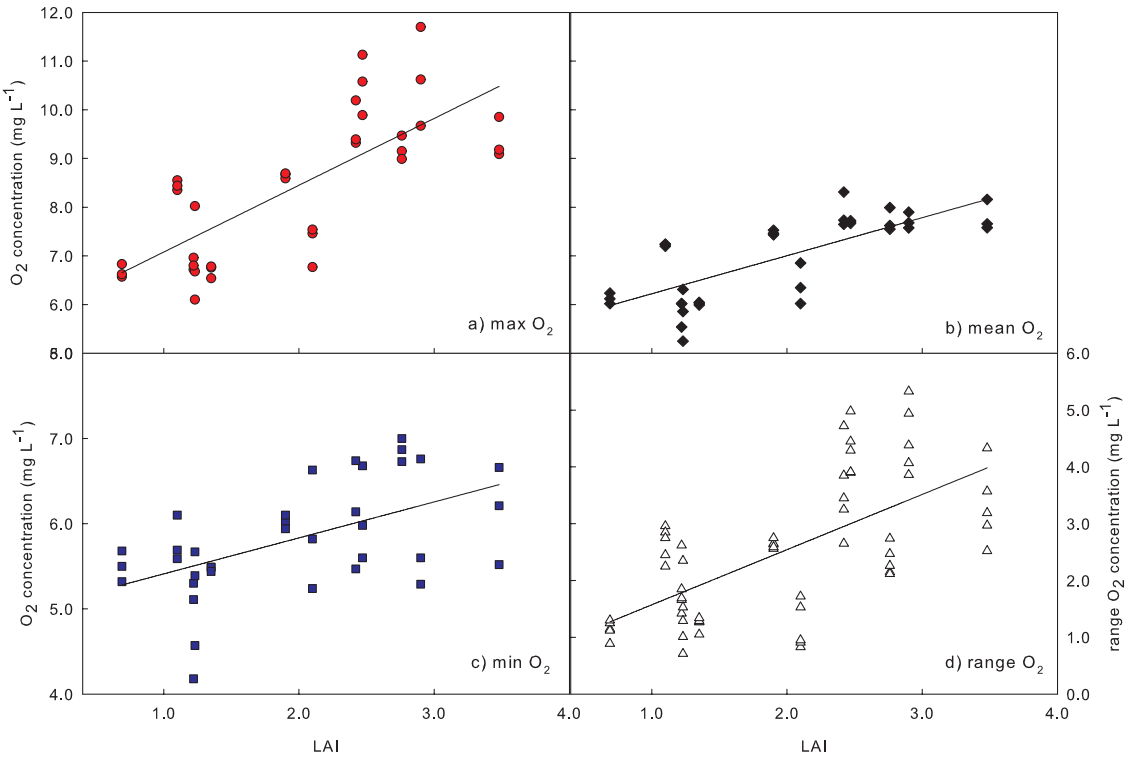
a) max O2
b) mean O2
c) min O2
d) range O2
O2 concentration (mg L-1)
range O2 concentration (mg L-1)
LAI
LAI

Figure S2

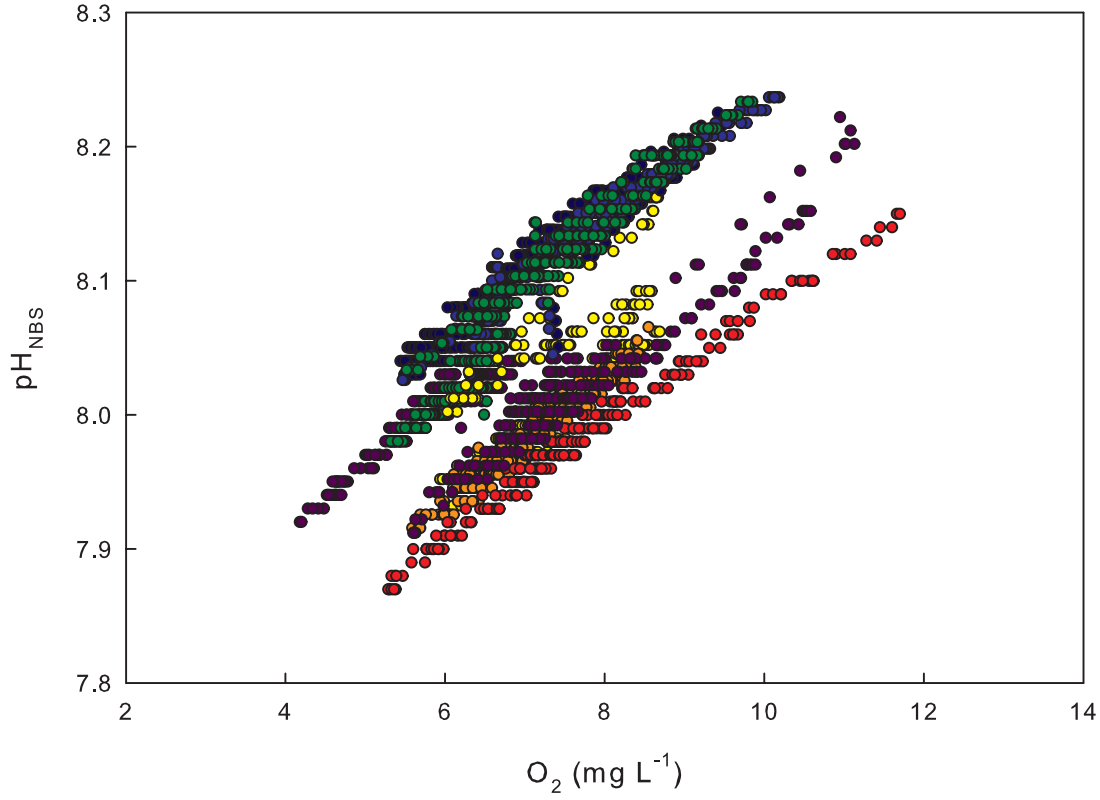

Figure S4