Supplemental material:

Coastal processes modify projections of some climate-driven stressors in the California Current System

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	A. CCS (1 degree)	B. CCS (12 km)	C. N-CCS (1 degree)	D. N-CCS (12km)	E. N-CCS (1.5km)
TA surf	-20.41	-7.88 -5.88*	-26.01	-7.40 -6.29*	-7.46 -10.53*
TA 200m	-8.90	0.68 -3.10*	-7.72	1.91 -1.0*	-3.05 -8.22*
TA bot	-10.38	-0.03 -1.90*	-7.70	1.00 0.28*	-1.66 -4.17*
DIC surf	101.44	93.32 91.65*	80.52	89.93 91.26*	80.98 73.57*
DIC 200m	96.82	103.24 94.35*	78.04	89.49 91.74*	87.37 80.93*
DIC bot	66.33	75.25 92.51*	69.63	79.92 83.93*	77.66 83.71*
PO4 surf	-0.0561	-0.0727 -0.0754*	-0.0403	-0.0732 -0.0802*	N/A
PO4 200m	0.0655	0.0273 -0.0180*	0.0191	0.0337 0.0062*	N/A
PO4 bot	-0.0064	0.0112 0.0096*	0.0131	0.0397 0.0342	N/A
NO3 surf	-0.3216	-0.1869 -0.2831*	-0.3449	-0.3247 -0.3678*	
NO3 200m	1.1383	1.4705 0.5535*	0.8318	1.2999 0.8426*	
NO3 bot	0.6392	0.6374 0.7061*	0.6833	0.9136 0.8799*	

Table S1: Annual average differences between climate stressor variables in the future and the base/modern conditions for the 1 degree, 12-km, and 1.5-km projections over different regions of the water column (200 m averaged, surface, and bottom < 500 m). Column A includes the global (1 degree) ensemble average difference for the CCS region followed by, in column B, the CCS wide difference from the 12km downscaled results. The N-CCS region results span columns C-E in this table. The next three columns detail the differences in the Cascadia domain for the global ensemble average (column C), the 12-km (column D) and 1.5-km downscaled projections (column E). Within the downscaled simulation, values are also provided just on the shelf (< 200 meter isobath) and denoted with an asterisk (*) next to the number.

	200m avg	Surface	Bottom (<500m)
ΔpCO_2 (μatm) & ΔTA	0.94	0.19	0.92
ΔpCO_2 (μatm)& Δ DIC	0.04	0.34	0.99
ΔpCO_2 (μatm) & ΔNO_3	0.47	0.35	0.62
ΔpCO_2 (μatm) & Δ T	0.01	0.81	0.36
ΔpH & ΔTA	0.04	0.74	0.59, p=0.20
ΔpH & Δ DIC	0.001	0.81	0.28
ΔpH & Δ NO_3	0.03	0.56, p=0.3	0.003
ΔpH & ΔT	0.01	-0.19	0.03
ΔΩ & TA	0.27	-0.0009	0.66, p=0.21
ΔΩ & Δ DIC	0.25	0.99	0.71
ΔΩ & NO_3	0.0002	0.14	0.95
ΔΩ & T	0.24	0.22	0.002

Table S2: We examine the relationship between the carbon variables that are modified in the downscaled simulations and the other variables representative of different processes. The R^2 between the anomalies in Table 1 and either Table 1 or Table S1 with values >0.5 highlighted in grey. All p values were less than 0.05 indicating significant correlations.

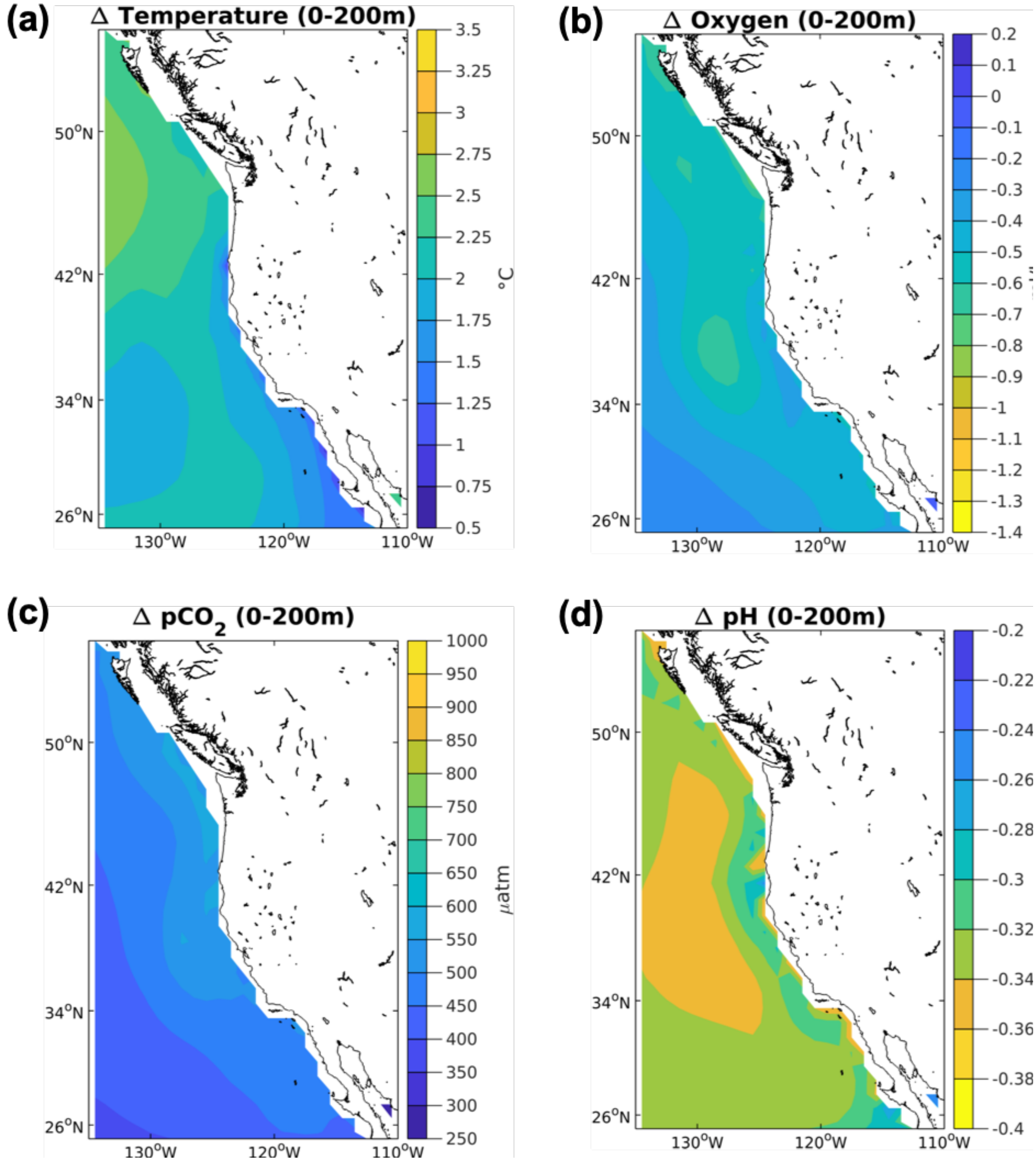

Figure S1. Global changes from the CMIP5 ensemble average for the CCS region - future minus base conditions (a) temperature (deg C) (b) O_2 (ml/l) (c) pCO_2 (µatm) (d) pH.

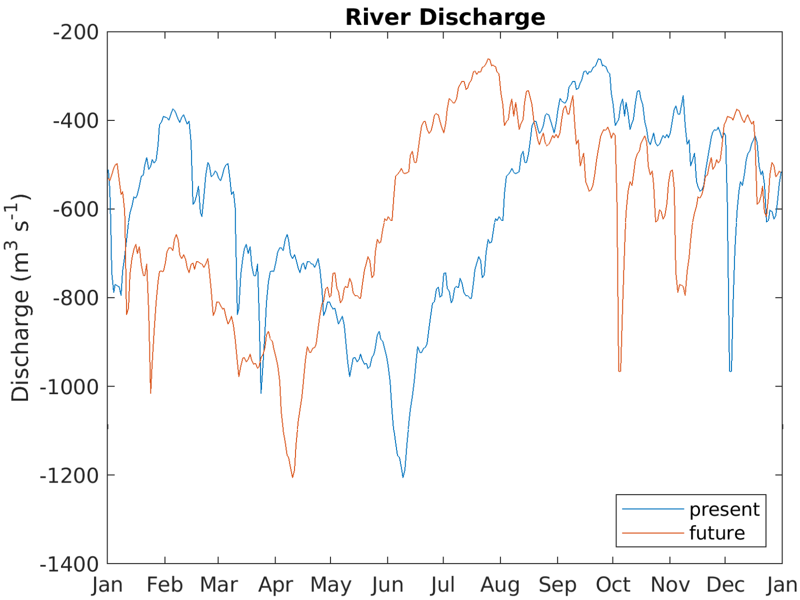

Figure S2. Freshwater discharge forcing for the 1.5 km simulation in the present and future simulations as described in the methods.