Supplementary Material

Short-Term and Long-Term Predictions: Is the Green Crab *Carcinus maenas* a Threat to Antarctica and Southern South America under a Climate-Change Scenario?

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FIGURE S1. Current distribution of *Carcinus maenas* based on available occurrence data (2000-present).

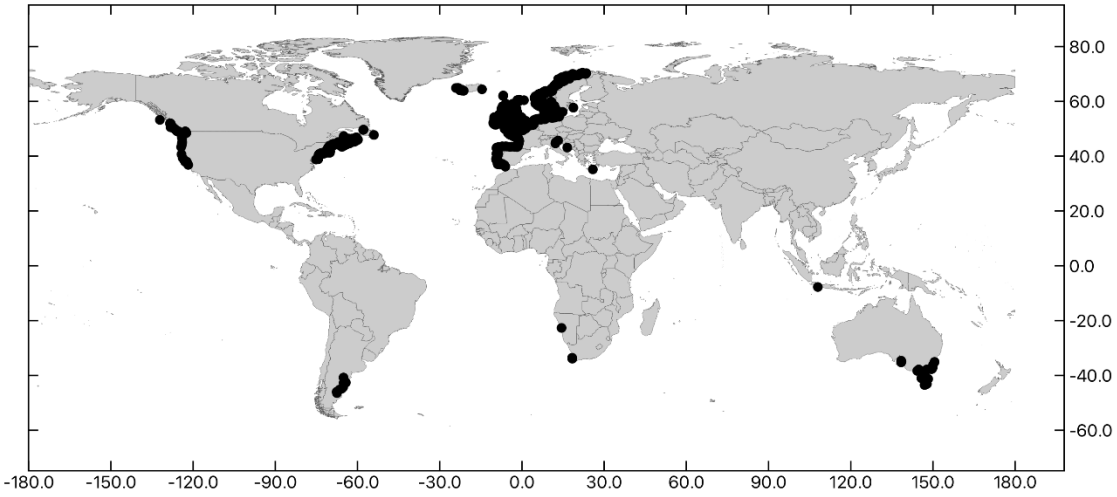


Figure S2. Correlation analysis to select predictors to model the potential distribution of *Carcinus maenas*. A pairwise correlation value >|0.85| was considered as collinearity and only one predictor was selected from the pair. The selected predictors are highlighted in green.

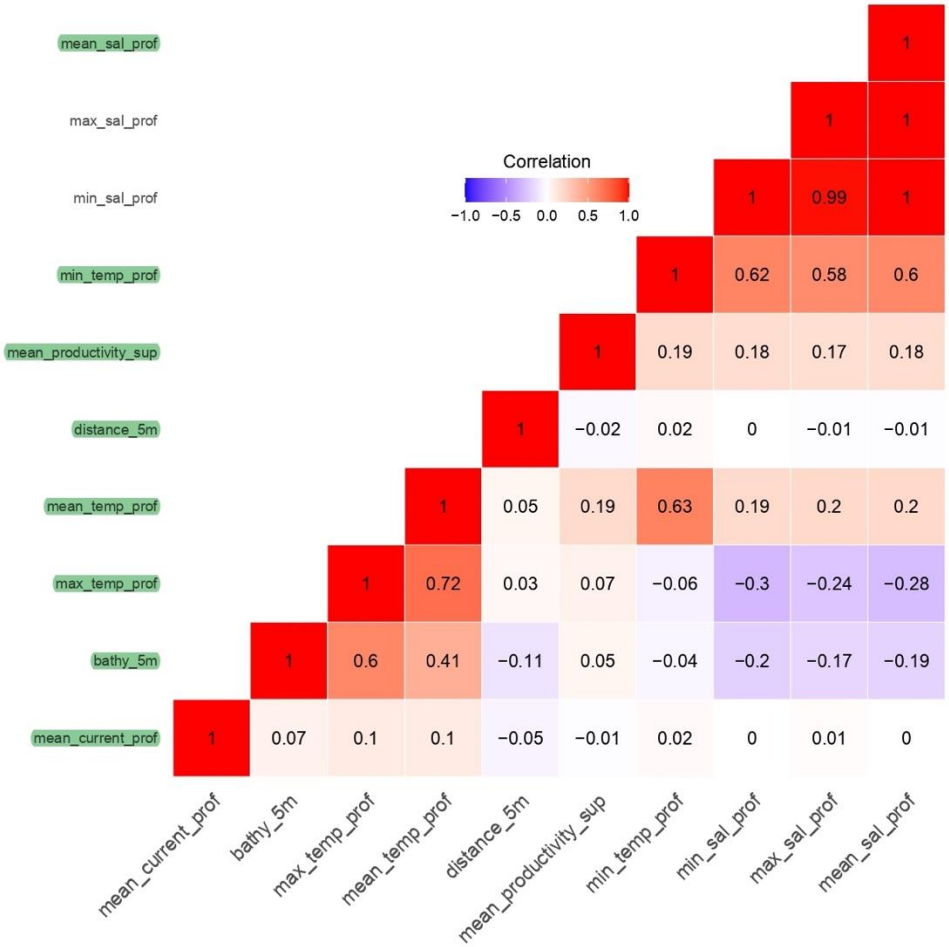


FIGURE S3. Environmental analogy between the current and each future climate change scenarios based on the multivariate environmental similarity surface analysis (MESS). Negative values denote non-analog areas.

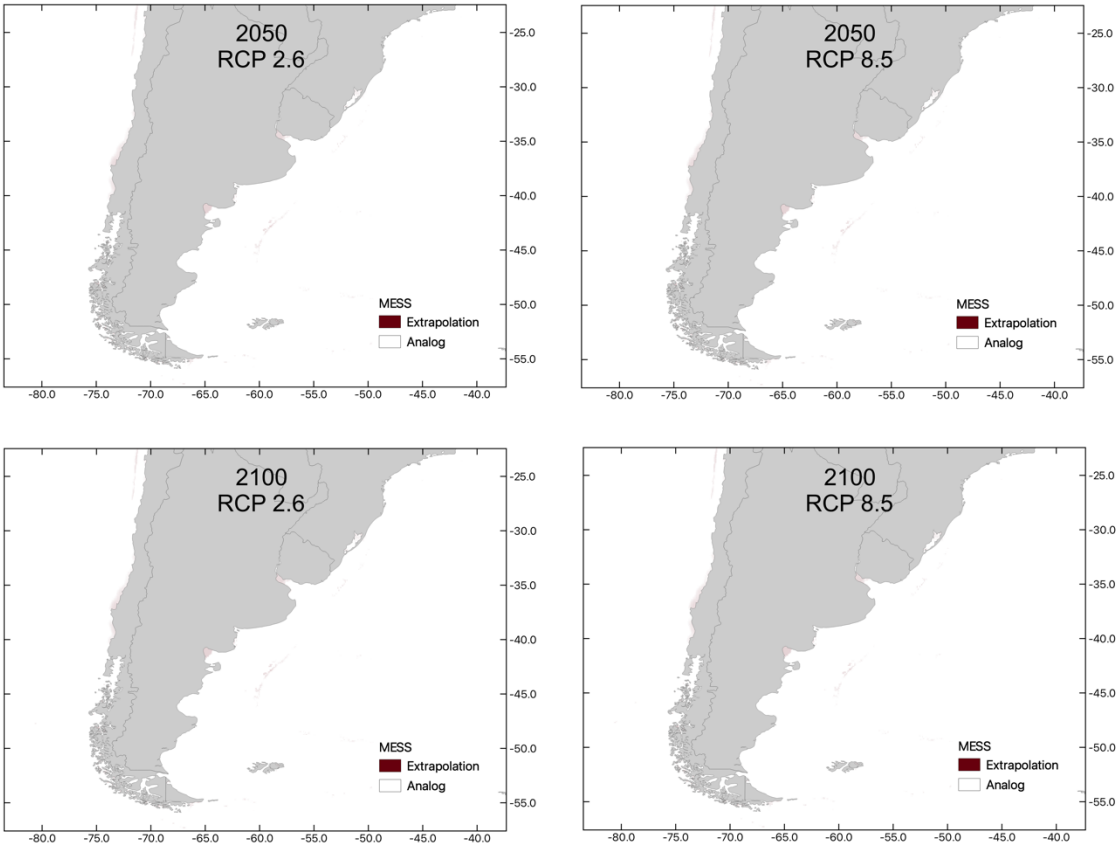


FIGURE S4. Model selection (delta AICc) and performance assessment (average AUC) for the species distribution model of *Carcinus maenas*. The model selected was the one with the lowest AICc.

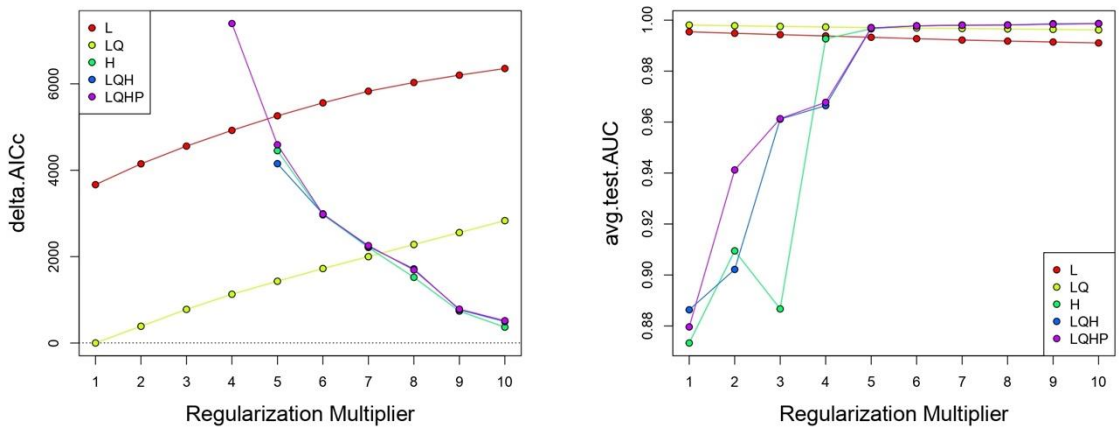


FIGURE S5. Response curves of *Carcinus maenas* to bathymetry, distance to shore, mean seafloor temperature and mean seafloor salinity.

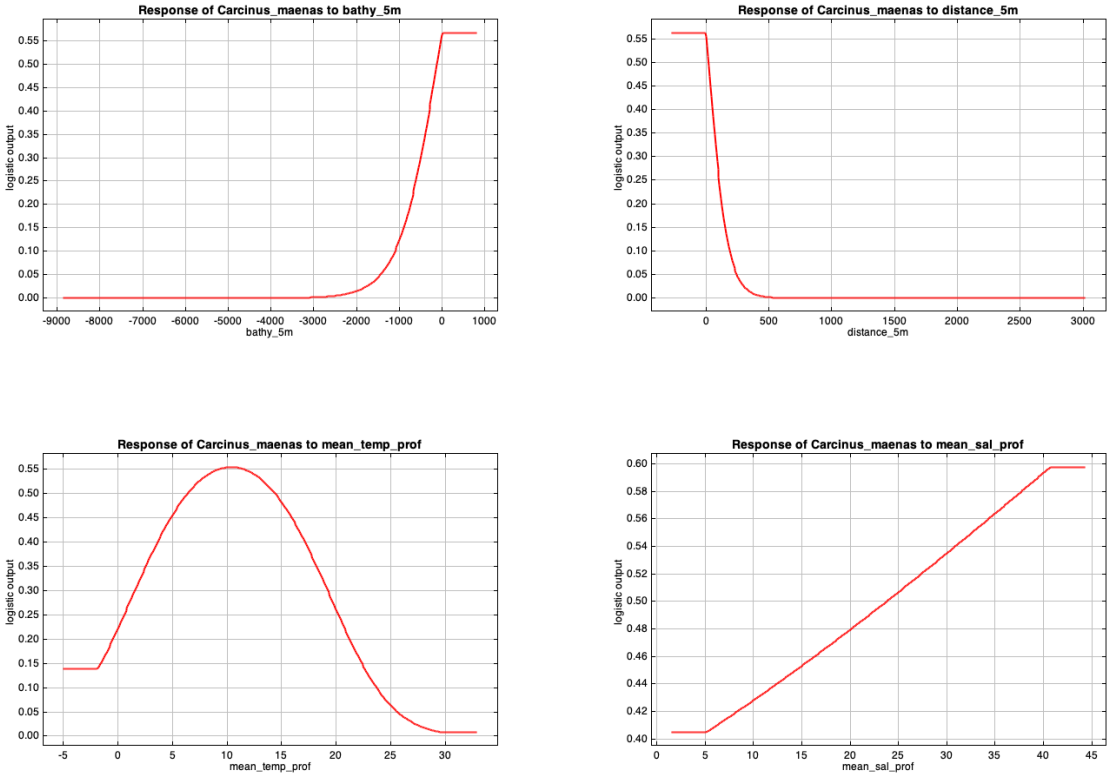


TABLE S1. Summary of percent contribution and permutation importance of each predictor to the model used to build the potential distribution map.

Predictor	Percent contribution (%)	Permutation importance (%)
Bathymetry	47.65	47.52
Distance to shore	18.09	48.79
Maximum seafloor temperature	12.02	0.08
Mean seafloor temperature	7.04	2.13
Minimum seafloor temperature	9.94	1.33
Mean seafloor salinity	3.56	0.09
Mean surface primary productivity	0.38	0.00
Mean seafloor current velocity	1.27	0.03

TABLE S2. Summary of the evaluation for the selected model for the green crab *Carcinus maenas*. Akaike Information Criterion (AICc) is a measure of relative adjustment proportional to the likelihood of the model and the number of parameters. Omission Rate (OR) denotes the percentage of test occurrences that falls into pixels not predicted as suitable for the species; it should be low for a good model performance. Partial Receiver Operating characteristic curve (pROC) is a significance test to demonstrate the performance of the model is better than random. Area under the ROC (AUC) is a measure of model discrimination (i.e., the ability to distinguish presences from absences) and values closer to 1.0 denote a better model performance. Boyce's index is a measure of model calibration (i.e., how well the model predicts the gradual occurrence probability) and values closer to 1.0 denote a better performance.

FC	RM	Parameters	AICc	OR	pROC	AUC	Boyce's index
LQ	1	11	31323.62	0.001	1.9951 (p=0.000)	0.998	0.967

FC = Feature Class combination; L = Linear; Q = Quadratic, RM = Regularization Multiplier

TABLE S3. Location, latitude and references of records of *Carcinus maenas* along the coast of Argentina.

Location	Latitude	Reference
Puerto Madryn	42° 46' S	Torres & González-Pisani 2016
Punta Tombo	43° 59' S	Yorio et al 2020
Isla Blanca Mayor	44° 46' S	Yorio et al 2020
Bahía Camarones	44° 47' S	Vinuesa 2005
Punta del Márquez	44° 54' S	Vinuesa 2007
Isla Buque	45° 03' S	Yorio et al 2020
Isla Gaviota	45° 05' S	Yorio et al 2020
Comodoro Rivadavia	45° 52' S	Vinuesa 2005
Rada Tily	45° 56' S	Vinuesa 2005
Las grutas	40° 49' S	Müller et al. 2022

FIGURE S6. Species Distribution Models for the green crab *Carcinus maenas* along the coast of southern South America by 2050 under the RCP 2.6 scenario (A), by 2050 under the RCP 8.5 scenario (B), by 2100 under the RCP 2.6 scenario (C), and by 2100 under the RCP 8.5 scenario (D).

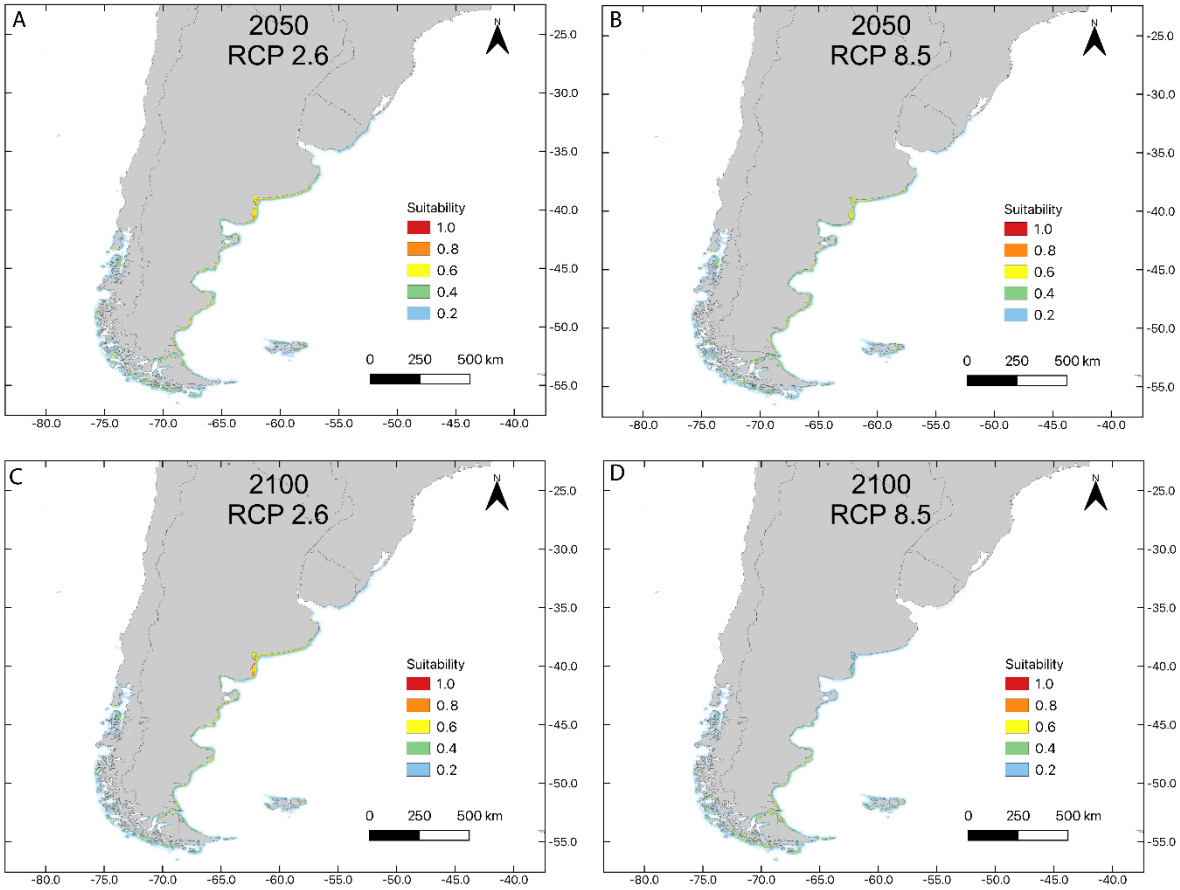
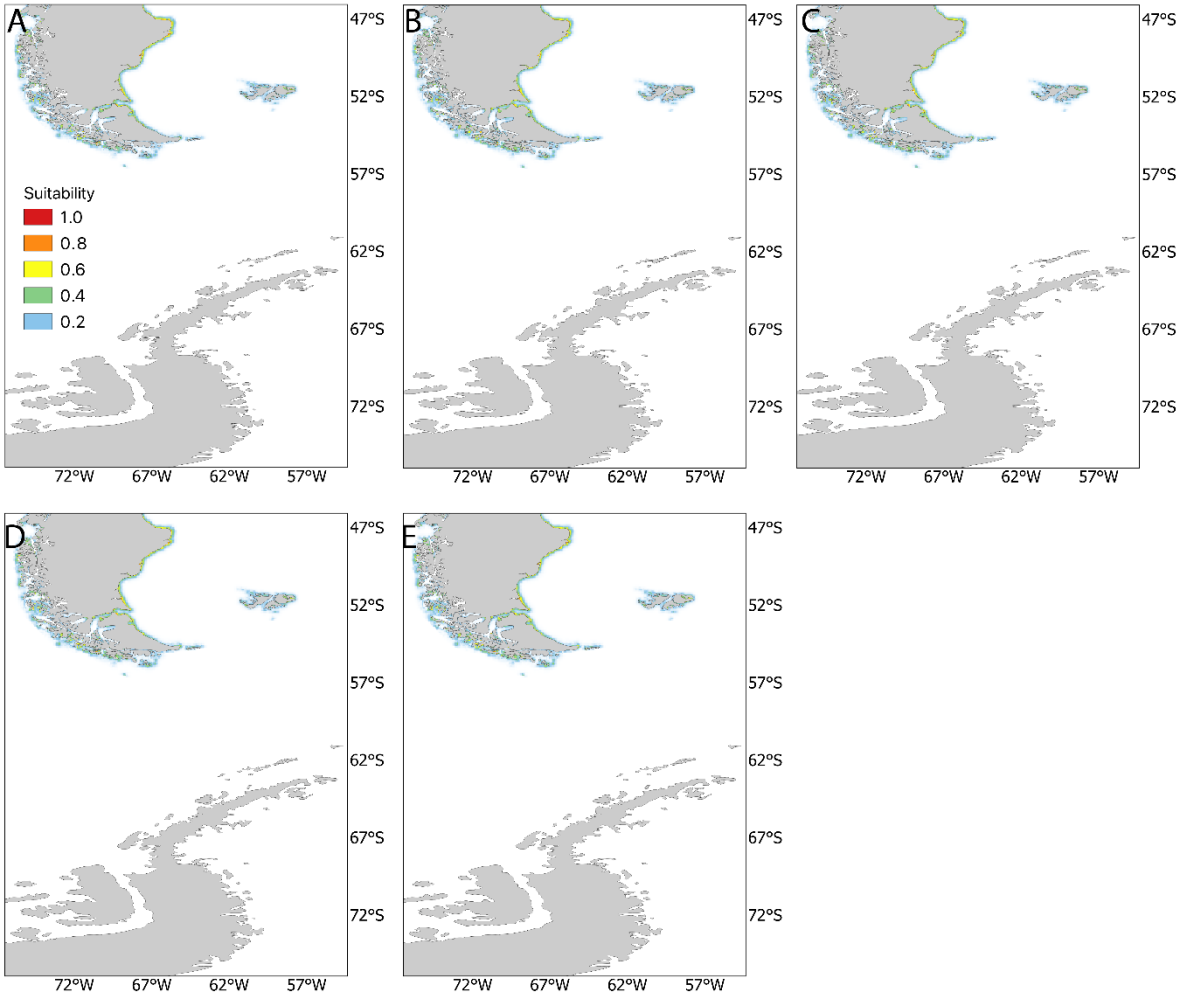


FIGURE S7. Species Distribution Models for the green crab *Carcinus maenas* along the Antarctic peninsula under current conditions (A), 2050 conditions based on RCP 2.6 (B), 2050 conditions based on RCP 8.5 (C), 2010 conditions based on RCP 2.6 (D), and 2100 conditions based on RCP 8.5 (E).



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