

Supplemental Information

A Southern Hemisphere Bathyal Fauna

Is Distributed in Latitudinal Bands

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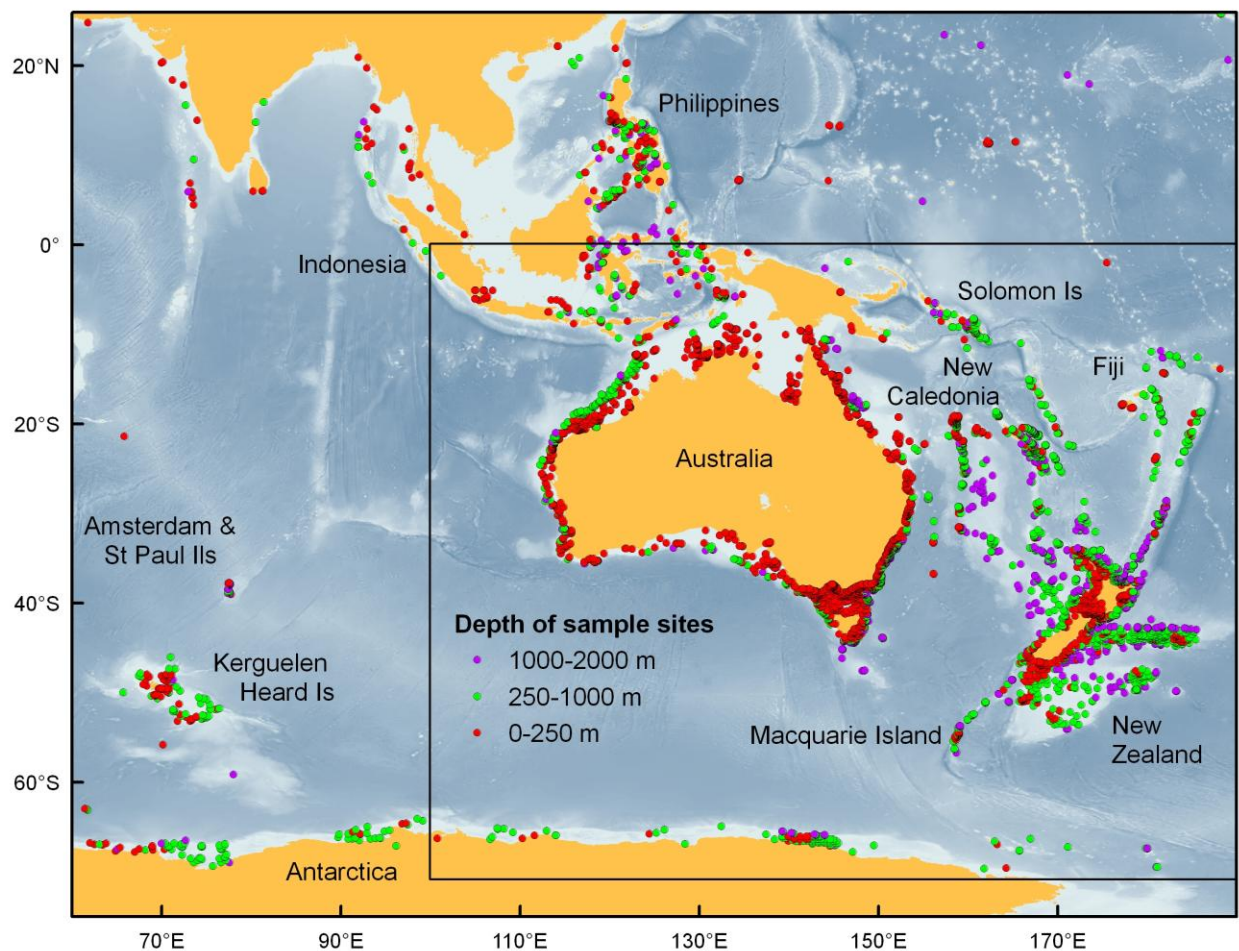


Figure S1. Map of the 6950 Sample Sites (0-2000 m Depth, Red Dots, Many Overlapping) and Prediction Area for the Species Habitat Models (Lower Right Rectangle)

The prediction area is a subset of the study area to avoid edge effects in the species modeling (see text).

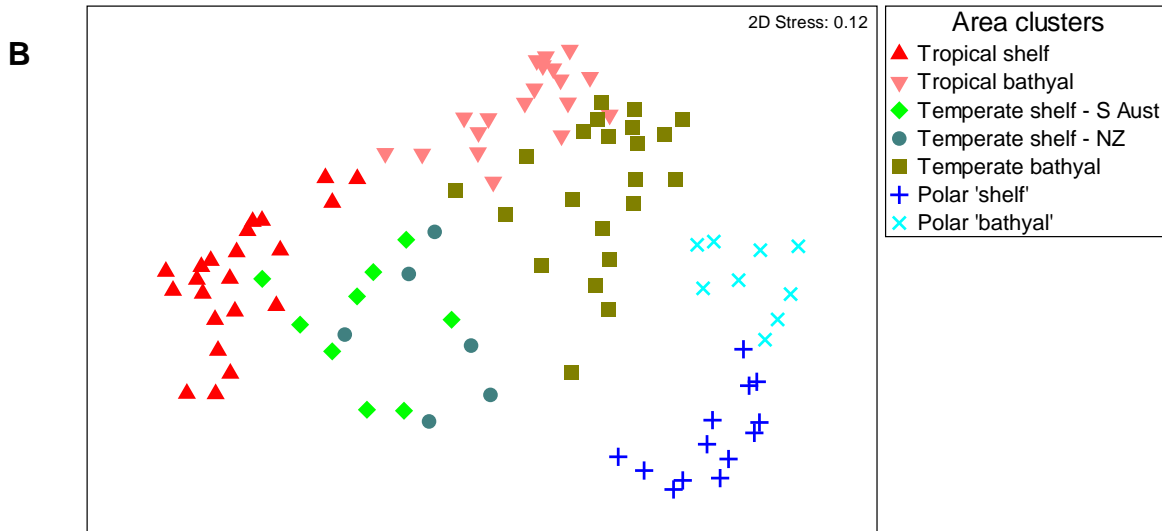
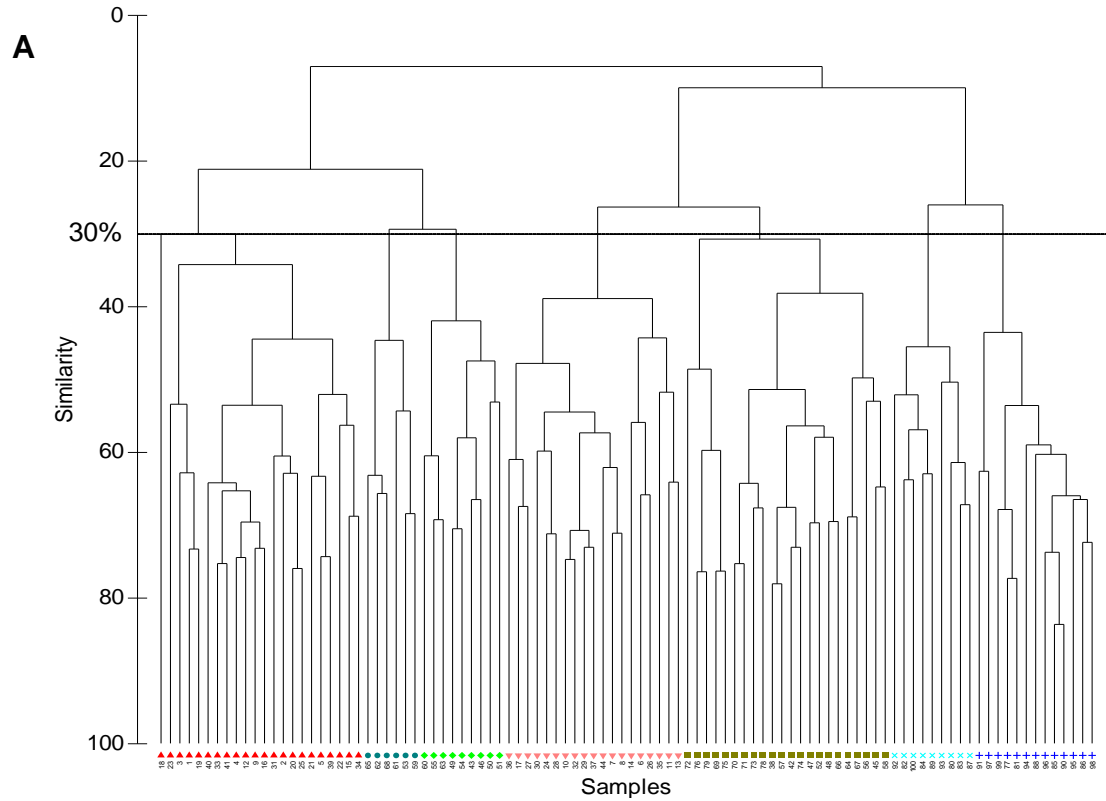
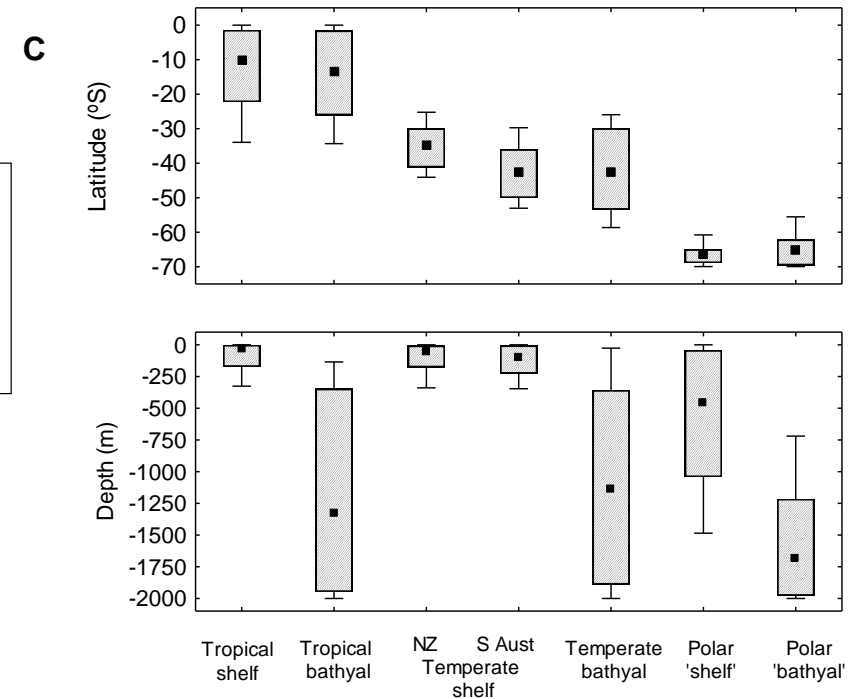


Figure S2 (Related to Figure 1). Area Clusters Derived from Multivariate Analyses of 687,576 MaxEnt Logistic Scores from 267 Modeled Species Distributions

The analyses included two steps: 1) a non-hierarchical (k-means) clustering of the MaxEnt logistic predictions into 100 groups, then 2) a hierarchical cluster analysis and MDS ordination of the mean logistic score for each species for each of the 100 groups.

Seven area-based clusters were defined at the 30% similarity level in the second cluster analysis (A), plotted onto an MDS ordination (B) and their extent summarized as box-plots (C) with the black squares representing the median value, the whiskers the outlier range, and the hatched boxes 95 % of the included pixels.

The temperate/tropical groups and the southern Australian/New Zealand groups are separated on the z axis of the 3D MDS (not shown).



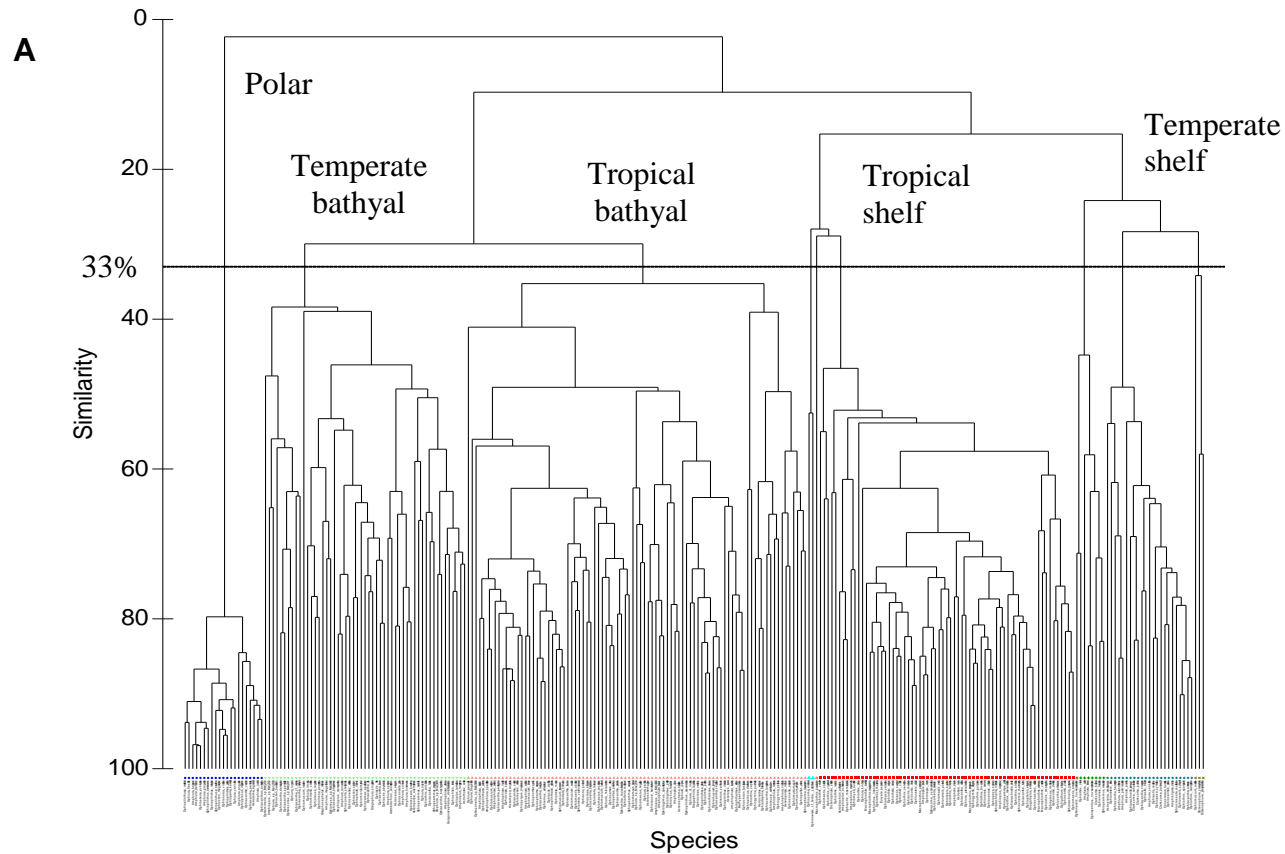
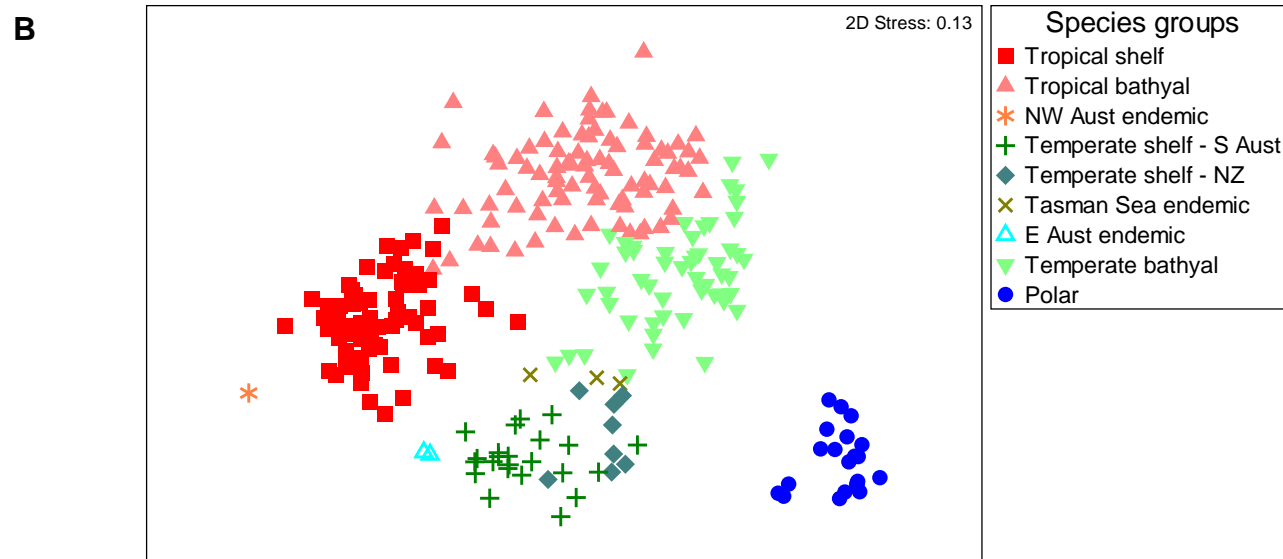


Figure S3 (Related to Figure 2). Species Groups Derived from Multivariate Analyses of 10,000 Randomly Selected MaxEnt Logistic Scores from 267 Modeled Species Distributions

(A) Six major and three minor species-groups were defined at the 33% similarity level in the cluster analysis. The minor groups consisted of 1-3 species with relatively restricted distributions across northwestern Australia (NW Aust), eastern Australia (E Aust), and the Tasman Sea. No polar bathyal species groups were derived.



(B) The MDS ordination shows some overlap between tropical and temperate bathyal species-groups and between tropical shelf and bathyal groups. The southern Australian (S Aust) and New Zealand (NZ) shelf groups separated on the z-axis in three dimensional plots (not shown).

Supplemental Experimental Procedures

Correlation of multivariate patterns generated from MaxEnt logistic predictions were compared to those created from applying various presence/absence thresholds. Bray-Curtis similarity matrices were derived from 10,000 randomly selected pixels for 267 species using logistic scores and each threshold rule. The resulting matrices were rank correlated using the Spearman method.

The methods were generally strongly correlated ($\rho \geq 0.88$) except the 10 percentile training presence. Consequently, the logistic scores were used to generate multivariate analyses (Figures S2 and S3), as they were considered to be more biologically meaningful (the probability of presence declining gradually from core regions).

	Logistic scores	Balance training omission predicted area and threshold value	Minimum training presence	10 percentile training presence	Equate entropy of thresholded and original distributions	Maximum training sensitivity plus specificity
Balance training omission predicted area and threshold value	0.97					
Minimum training presence	0.91	0.90				
10 percentile training presence	0.86	0.84	0.83			
Equate entropy of thresholded and original distributions	0.94	0.93	0.90	0.90		
Maximum training sensitivity plus specificity	0.89	0.88	0.86	0.92	0.94	
Equal training sensitivity and specificity	0.90	0.89	0.88	0.93	0.95	0.96