

Rapport's Rule, Ecotone Concept, and Salinity Gradient Predict the Distribution of Benthic Foraminifera in a Southeastern Pacific Estuary

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Table S1. Distribution and abundance of benthic foraminiferal species along the longitudinal gradient of the Contaco Estuary. The first column lists the abbreviated names of the identified foraminiferal species. The cells display the recorded abundance for each species at sampling sites located at various distances (in meters) from the estuary mouth, as shown in the row labeled "Sampling site." Salinity values (in PSU) are indicated in the second row. Sampling sites are color-coded to represent water type classification based on salinity: green for euhaline waters, yellow for brackish waters, and blue for freshwater zones. This classification provides a visual representation of how foraminiferal abundance corresponds to environmental conditions across the estuarine gradient. Species codes: *Ammonia* spp. (Ammsp), *Angulogerina angulosa* (Aangul), *Astronionion echolsi* (Aechol), *Bolivina pseudoplicata* (Bpseud), *Buccella peruviana* (Bperuv), *Buliminella elegantissima* (Belega), *Cassidulina crassa* (Ccrassa), *Cassidulina pulchella* (Cpulche), *Cassidulinoides parkerianus* (Cparker), *Cibicides aknerianus* (Cakner), *Cibicides ornatus* (Cornatu), *Cibicides variabilis* (Cvariab), *Cribrostomoides hancocki* (Chanck), *Cribrostomoides subglobosum* (Csubgl), *Cribrorotalia meridionalis* (Cmerid), *Discorbis corus* (Dcorus), *Discorbis isabelleanus* (Disabel), *Discorbis peruvianus* (Dperan), *Ehrenbergina pupa* (Epupa), *Glabrattella pileolus* (Gpileo), *Guttulina problema* (Gprob), *Haplophragmoides wilberti* (Hwilb), *Lepidodeuterammmina ochracea* (Lochra), *Miliammina fusca* (Mfusca), *Miliolinella subrotunda* (Msubro), *Nonionella auris* (Nauris), *Nonionella chiliensis* (Nchilie), *Oolina vilardeboana* (Ovilard), *Tiphotrocha comprimata* (Tcompr), *Trochammina peruviana* (Tperian), *Trochamminita salsa* (Tsalsa).

Sampling site	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550
Salinity (psu)	33.3	33.4	34.2	30.2	3.2	3.0	2.7	2.1	1.5	1.2	1.0	0.9	1.0	0.9	0.7	0.8	0.6	0.7	0.5	0.4	0.5	0.3	0.4	0.6	0.5	0.4	0.3	0.2	0.3	0.4	0.4	0.3
Ammspa	589	459	387	361	301	33	12	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aangula	15	3	2	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aechola	6	12	15	8	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bpseuda	35	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bperuva	80	32	12	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Belegaa	15	22	15	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ccrassaa	52	15	4	5	8	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cpulcha	9	3	5	8	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cparker	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cakner	4	4	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cornatua	10	8	12	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cvariaba	12	8	5	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cmerida	45	33	35	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dcorusa	18	17	25	4	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disabela	12	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dperana	8	4	9	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epupaa	15	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gpileoa	10	8	3	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gproba	7	9	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Msubroa	8	3	4	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Naurisa	8	15	12	15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nchiliea	26	22	11	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ovilarda	35	25	3	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chanckb	0	0	0	0	25	32	52	43	32	38	21	15	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Csubglb	0	0	0	0	32	55	21	25	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hwilbb	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	158	105	98	101	123	125	146	71	25	0	0	0	0	0	0	0
Lochrab	0	0	0	0	45	48	33	25	28	31	22	18	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mfuscab	0	0	0	0	55	555	482	502	475	452	466	442	482	455	496	305	336	298	278	270	196	158	108	195	185	171	152	148	99	81	61	38
Tcomprb	0	0	0	0	44	55	69	52	78	82	56	32	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tperianb	0	0	0	0	0	0	0	0	21	54	80	25	23	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tsalsab	0	0	0	0	35	492	455	472	444	391	392	218	205	184	156	147	128	127	130	166	182	133	125	115	101	95	102	139	142	52	41	22

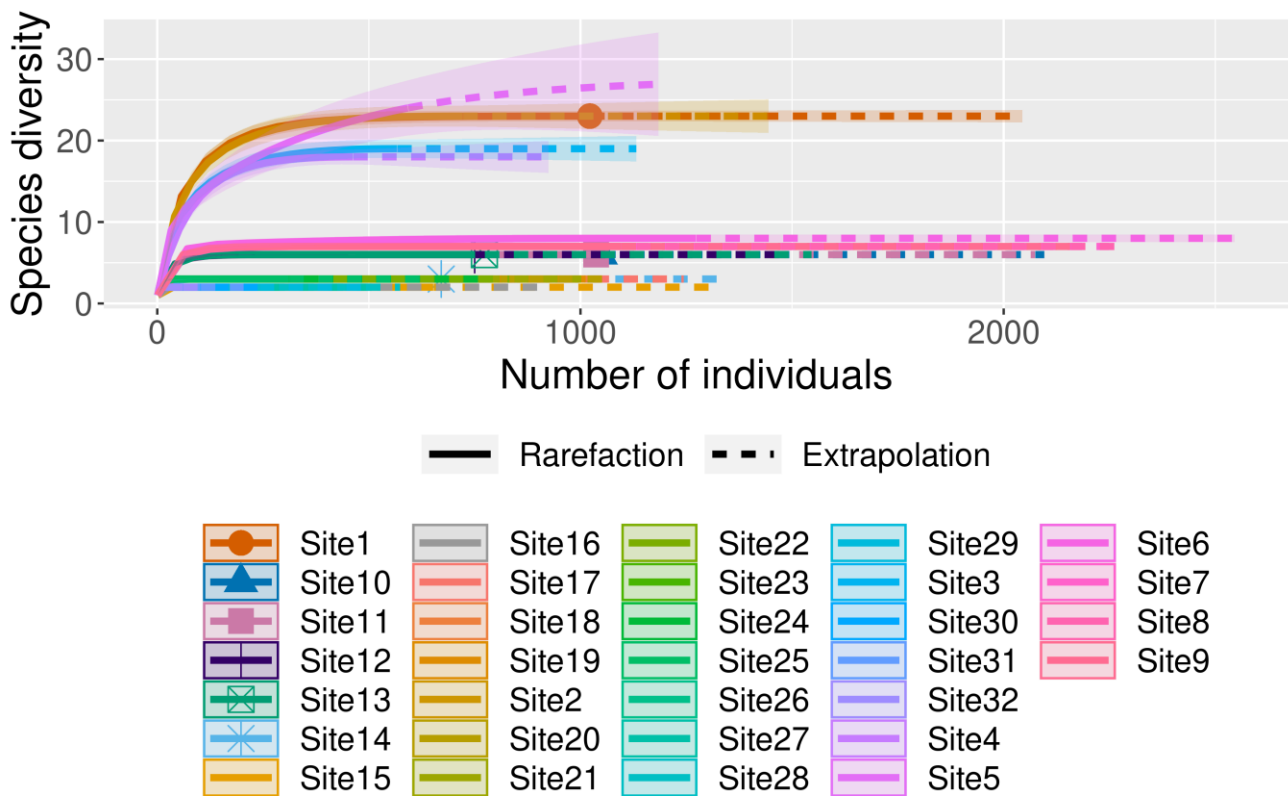


Figure 15. Rarefaction and extrapolation curves for benthic foraminiferal diversity across the 32 sampling sites in the Contaco Estuary, estimated using the package iNEXT. The x-axis represents the number of individuals sampled, while the y-axis shows species diversity. Solid lines indicate rarefaction, and dashed lines indicate extrapolation. Shaded areas around each curve represent the 95% confidence intervals. Sampling sites are sequentially distributed along the estuarine gradient, sampled at 50 m intervals, from Site 1 (0 m from the estuary mouth) to Site 32 (1,550 m from the estuary mouth). Each curve represents the diversity pattern for a specific site, highlighting spatial differences in community structure along the salinity gradient.

Reference

1. Chao, A.; Gotelli, N.J.; Hsieh, T.C.; Sander, E.L.; Ma, K.H.; Colwell, R.K.; Ellison, A.M. Rarefaction and extrapolation with Hill numbers: A framework for sampling and estimation in species diversity studies. *Ecol. Monogr.* **2014**, *84*, 45–67.