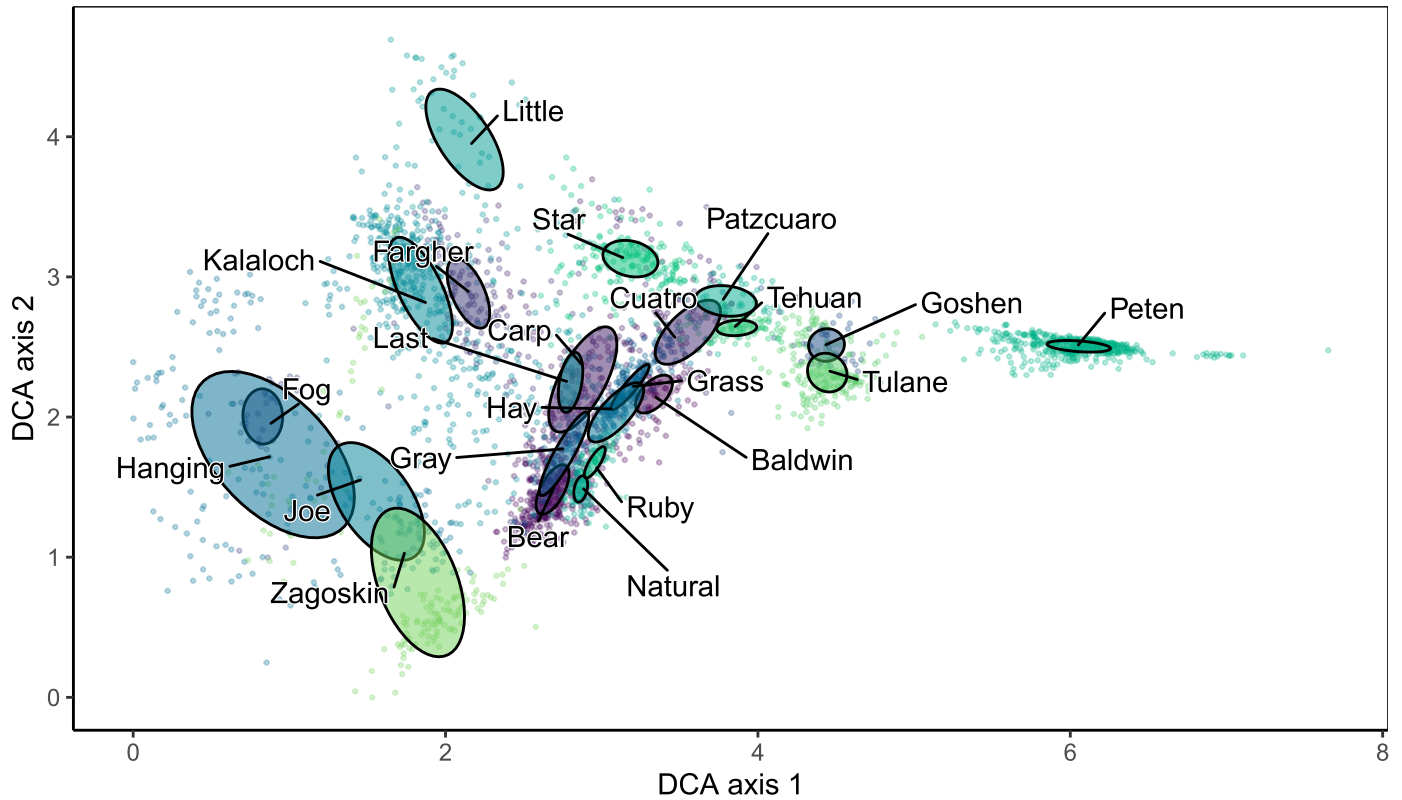
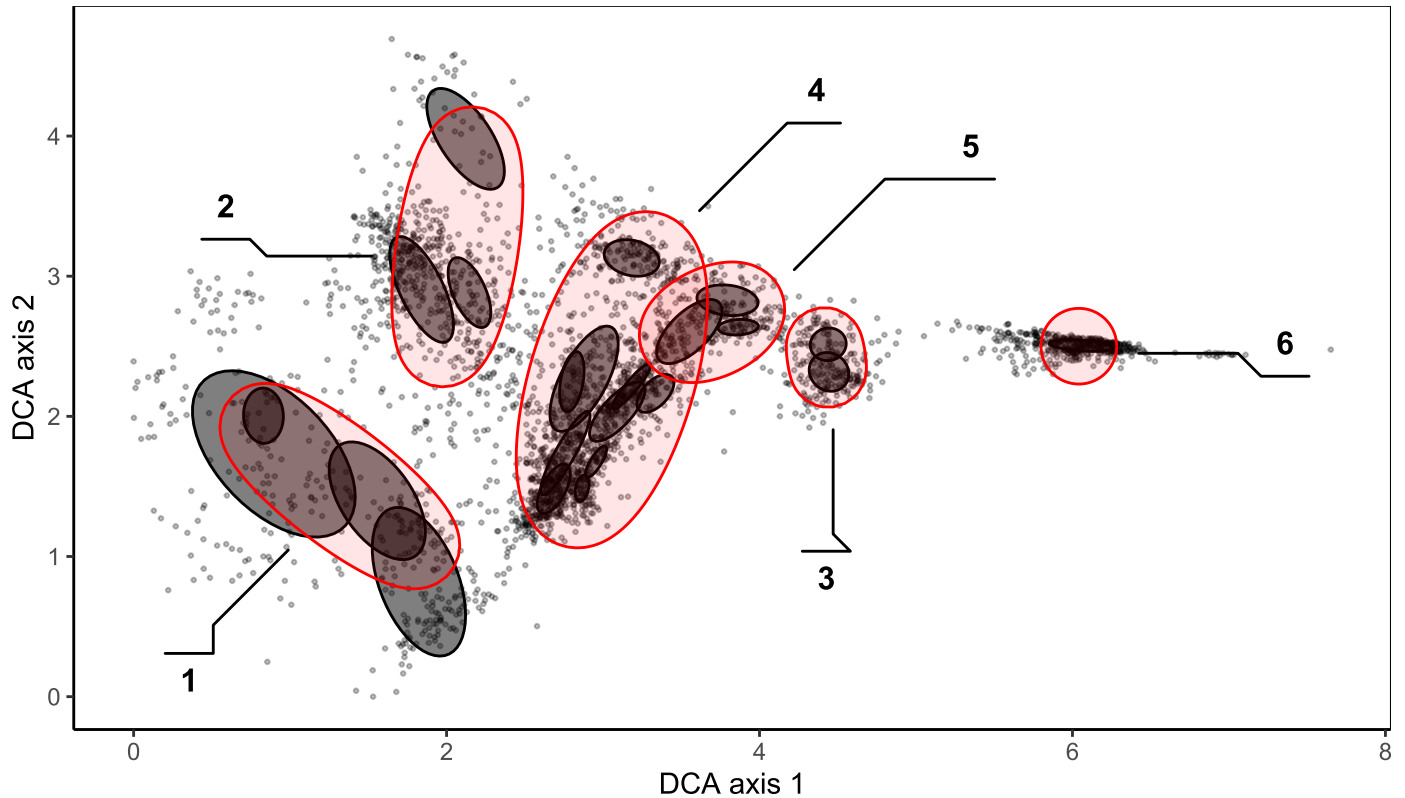


Site DCA

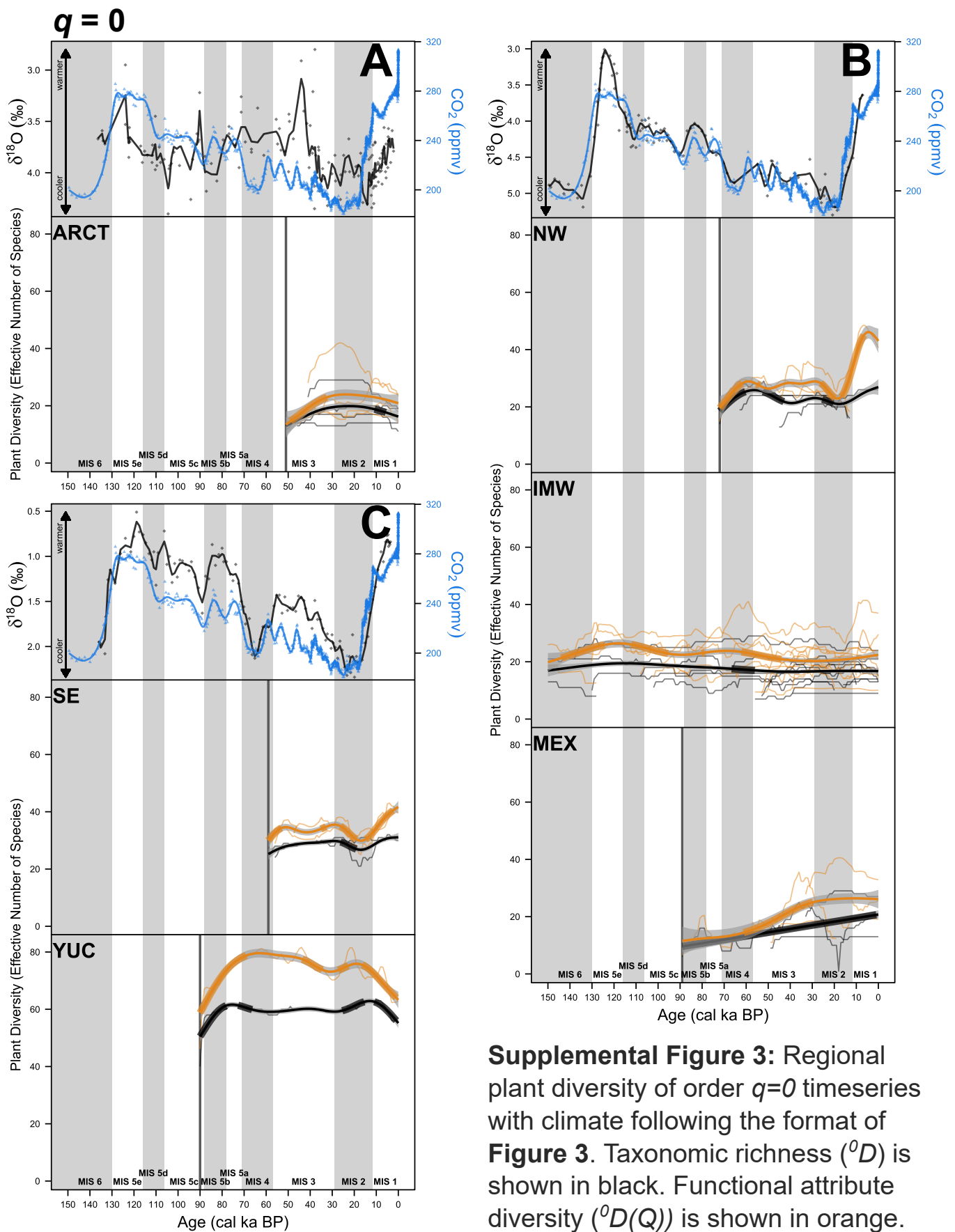


Supplemental Figure 1: DCA of the 23 sites used in our study. Small dots represent individual samples within a site while large ellipses indicate the 30% confidence interval (CI) of the spread of each site. Sites vary in color for visual distinction rather than based on a specific variable. Each 30% CI ellipse is labeled with the site name.

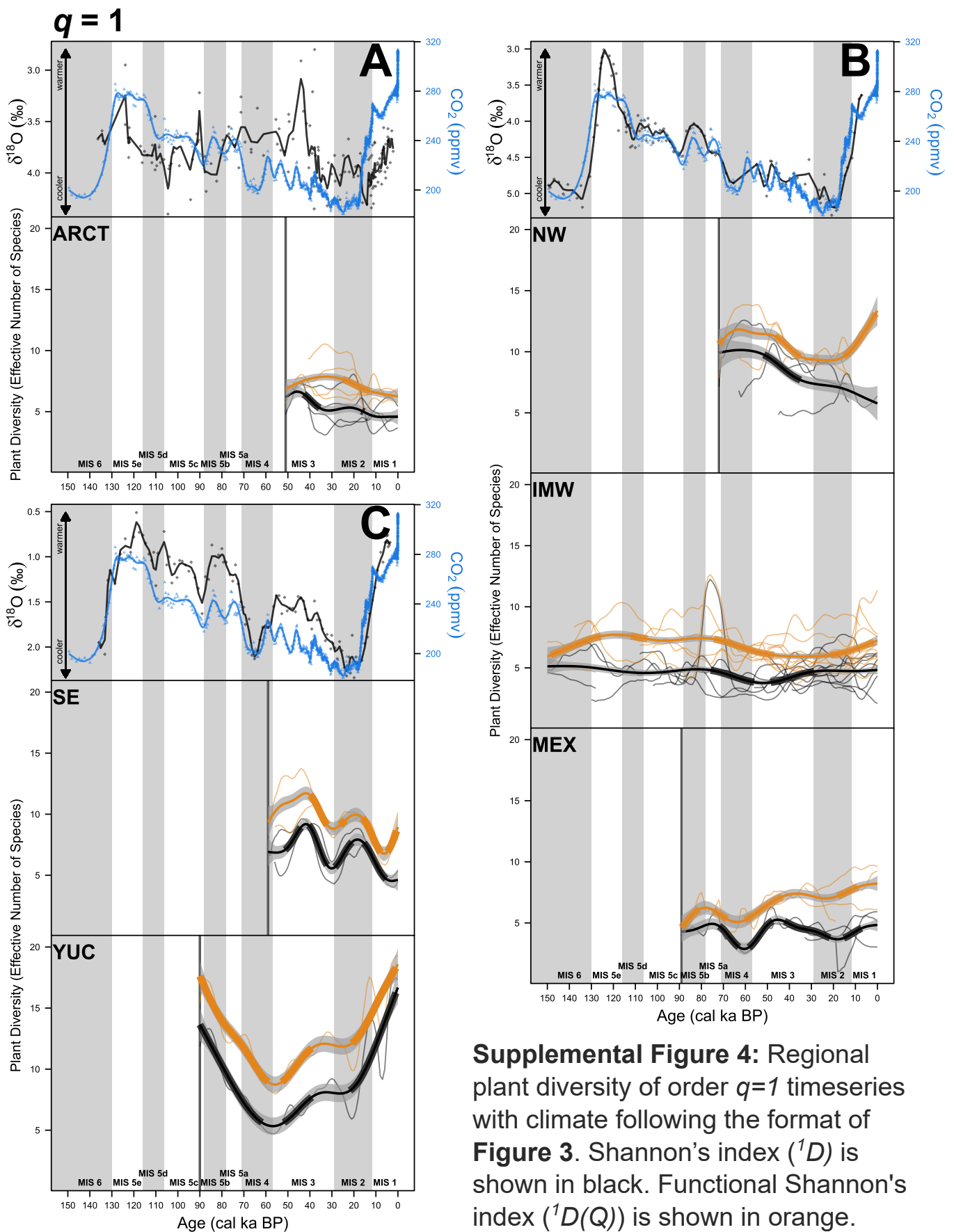
Transformed ellipse with Regions

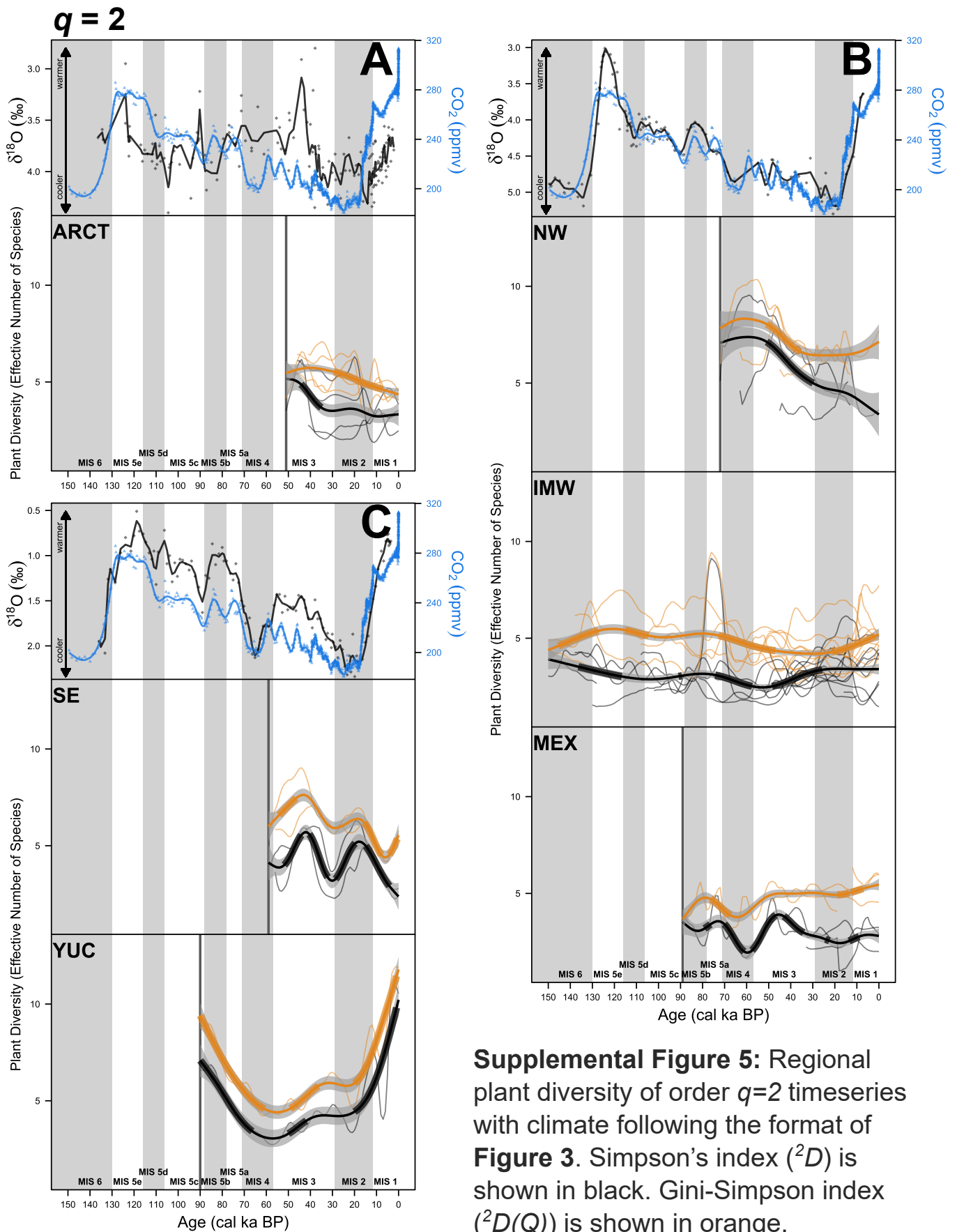


Supplemental Figure 2: The base DCA shown in Supplemental Fig. 1 is displayed again without color or site names. Red ellipses indicate the 6 groupings of sites for our 6 geographic regions. Labeled numbers correspond with region numbers and are as follows: 1 = the Arctic, 2 = the Pacific Northwest, 3 = the Southeast, 4 = the Intermountain West, 5 = Mexico, and 6 = the Yucatán. Note regions with similar climates plot near each other on the DCA.



Supplemental Figure 3: Regional plant diversity of order $q=0$ timeseries with climate following the format of **Figure 3**. Taxonomic richness (0D) is shown in black. Functional attribute diversity (${}^0D(Q)$) is shown in orange.





Supplemental Figure 5: Regional plant diversity of order $q=2$ timeseries with climate following the format of Figure 3. Simpson's index (2D) is shown in black. Gini-Simpson index (${}^2D(Q)$) is shown in orange.

Table 1: Table of all the taxa used in the diversity estimates and their associated functional traits

Taxa	Specific Leaf Area	σ_x	Leaf Lifespan	σ_x	Max Plant Height	σ_x	Max Plant Longevity	σ_x	Seed Mass	σ_x	Whole Plant Growth Form	Whole Plant Woodiness	Obs num
Abies	7.00	1.65	103.00	7.00	14.64	0.02			22.29	11.73	tree	woody	904889
Acacia	15.34	1.77			5.54	0.08			42.53	17.69	liana, shrub, tree	herbaceous, woody	12203
Acalypha					4.53	1.99					herb, shrub, tree	herbaceous, woody	694
Acer	22.33	0.46	5.27	0.16	15.62	0.01			55.72	11.47	shrub, tree	woody	2226459
Agave									11.40	1.30	shrub	herbaceous, woody	166
Alnus	14.27	4.31			17.42	0.06			0.60	0.11	shrub, tree	woody	35123
Alternanthera					0.17	0.07			0.39	0.04	herb, shrub, vine	herbaceous	125
Amaranthaceae	14.59	3.28			2.88	1.65			1.15	0.35	herb, liana, shrub, tree	herbaceous, woody	6309
Ambrosia	12.68	3.13			0.64				6.14	2.44	herb, shrub	herbaceous, woody	290
Anacardiaceae	18.60	1.48			10.07	0.32			784.15	213.55	liana, shrub, tree, vine	woody	15309
Apiaceae	14.81	3.41			0.89	0.14			6.34	0.73	herb, tree	herbaceous, woody	6437
Arcuthobium											shrub	woody	44
Arecaceae	18.33	0.46			9.00	0.04			7758.40	971.47	liana, tree, vine	woody	70456
Artemisia	7.44	1.89			2.22	0.56			0.23	0.07	herb, shrub	herbaceous, woody	1135
Asteraceae	11.97	0.52	2.75	0.13	0.53	0.03			6.84	0.28	herb, liana, shrub, tree, vine	herbaceous, woody	42921
Begonia					0.40						herb, liana, tree, vine	herbaceous, woody	436
Betula	22.68	2.03	4.55	0.95	16.24	0.01			0.99	0.32	tree	woody	445392
Bignoniaceae	21.99	0.65			11.32	0.10			45.50	3.90	liana, shrub, tree, vine	herbaceous, woody	22121
Brassicaceae	22.18	2.64			0.53	0.06			1.43	0.27	herb	herbaceous, woody	9022
Brosimum	19.40	0.79			27.40	5.89			658.61	126.12	tree	woody	5379
Bursera	13.51	1.28			7.94	0.11			32.27	17.39	tree	woody	2433
Buxus	6.73	0.40			2.25	0.51			13.54	0.57	shrub, tree	woody	157
Byrsonima					7.92	0.52			291.00		tree	woody	1309
Caesalpinia	17.17	1.30			9.25	1.41			9.67	1.17	shrub, tree	woody	762
Camassia					0.85	0.15			5.71	1.84		herbaceous	23
Campanulaceae	20.07	2.43			0.84	0.26			0.05	0.00	herb, shrub	herbaceous, woody	3013
Caprifoliaceae	25.72	0.99			2.05	0.65			4.21	0.94	herb, shrub, vine	herbaceous, woody	3289
Carya	21.71	0.31			16.66	0.02					tree	woody	454202
Caryophyllaceae	20.27	3.06			0.45	0.05			0.40	0.16	herb	herbaceous, woody	6099
Casaria	21.60	1.13			5.75	0.09			5.23	1.25	tree	woody	7855
Cassia					4.26	3.06						woody	324
Castanea	19.89	1.31			7.35	0.13					tree	woody	4185
Ceanothus	3.40	0.70			5.22	2.51			6.27	0.73	herb	woody	584
Cecropia	11.20	0.82			13.29	0.21			3.02	1.64	tree	woody	3420
Celastrus											liana, tree	woody	268
Celtis	33.09	2.05			14.60	0.03					liana, shrub, tree	woody	109862
Ceratiola ericoides							40.00				shrub	woody	8
Cercocarpus	4.12	0.54			4.11	0.02						woody	28205

Combretaceae	20.11	1.34			8.24	0.18			9.46	4.87	liana, tree	woody	8238
Connarus									1271.61	202.18	liana	woody	562
Convolvulaceae	21.31	7.39			8.25	6.75	100.00	0.00	106.09	50.79	herb, liana, shrub, tree, vine	herbaceous, woody	2994
Corylus	23.32	6.91			6.49	2.41			447.50		shrub, tree	woody	644
Croton	22.43	1.06			5.35	0.40			10.08	4.82	shrub, tree	herbaceous, woody	3401
Cupressaceae	4.30	1.26	68.10	38.71	10.22	0.01	300.50	115.18	24.71	9.50	shrub, tree	woody	1288572
Cyclachaena xanthiifolia	24.46	1.53			1.24	0.12			0.75	0.05	herb		88
Dodonaea	9.15	0.17			6.71						shrub	woody	292
Ephedra									49.60	14.90		woody	124
Ericaceae	11.26	0.63			11.45	0.02	39.00	0.00	10.69	1.60	herb, liana, shrub, tree	herbaceous, woody	202118
Eriogonum	0.14								0.98	0.14	herb	herbaceous, woody	427
Eugenia	20.77	0.91			5.79	0.12			211.98	47.44	tree	woody	7240
Euphorbiaceae	18.11	0.54			10.03	0.06			33.27	1.01	herb, liana, shrub, tree	herbaceous, woody	48447
Fabaceae	20.43	0.42			10.68	0.02			2239.68	431.41	herb, liana, shrub, tree, vine	herbaceous, woody	325023
Fagaceae	14.26	0.23	5.50	0.50	15.38	0.01	86.25	6.52	3156.37	269.40	shrub, tree	woody	4133409
Ficus	10.49	0.60			10.63	0.83			172.64	171.56	tree	woody	4509
Fraxinus	26.13	0.47	5.70		16.68	0.02			24.47	5.83	tree	woody	488102
Galium	12.17	5.64			0.45	0.08			2.61	1.20	herb, shrub	herbaceous, woody	2042
Gentianaceae					0.57	0.15			0.66	0.57	tree	herbaceous, woody	2141
Gustavia	22.71	1.14			21.00				10774.57	2110.93	tree	woody	929
Hedyosmum	22.13	0.77									tree	woody	1171
Hieronyma	18.60	1.83			34.00				6.41	1.89	tree	woody	972
Hymenaea	9.23	1.59			11.75	0.48			54907.79	13000.75	tree	woody	807
Ilex	13.28	1.25			7.23	0.02			31.21		shrub, tree	woody	109306
Inga	16.37	0.55			11.30	0.21			499.05	45.84	tree	woody	13241
Iresine					24.00				1.00		herb, liana	herbaceous, woody	134
Iva									2.07	0.73	herb		64
Juglans	22.90	3.32			17.16	0.04			9090.91		tree	woody	61423
Lamiaceae	30.29	1.10			2.06	0.27			2.76	0.79	herb, liana, shrub, tree	herbaceous, woody	11203
Leitneria floridana					4.72	0.15						woody	3
Liliaceae	11.23	10.97			1.09	0.30			5.07	0.79	herb	herbaceous, woody	1130
Lindernia									0.00			herbaceous	71
Liquidambar	19.54	1.33			14.48	0.01					tree	woody	1106144
Lysichiton									61.63			herbaceous	7
Machaerium	15.19	1.68									liana, tree	woody	2174
Magnolia	10.11	0.71			13.02	0.02					shrub, tree	woody	197523
Malpighiaceae					7.71	0.48			690.72	133.05	liana, shrub, tree, vine	woody	4752
Malvaceae	25.36	0.91			19.05	0.03			4485.04	1892.72	herb, liana, shrub, tree	herbaceous, woody	143766
Mandevilla											liana	woody	310
Melastomataceae	14.16	0.27			6.85	0.18			5228.12	1130.48	herb, shrub, tree	herbaceous, woody	24071
Meliaceae	20.23	0.69			10.43	0.08			224.34	66.70	tree	woody	24295

Micranthes								herb	96				
Moraceae	24.13	0.83			11.22	0.03		272.99	56.30	shrub, tree	herbaceous, woody	80258	
Myrica					7.32	0.93		14.79	5.84	shrub, tree	woody	273	
Myrsine	7.61	0.45			6.86	0.50				tree	woody	3654	
Myrtaceae	17.67	0.96			8.04	0.08		394.36	77.08	tree	herbaceous, woody	41452	
Nyssa	22.95	1.24			14.43	0.01	102.00	0.58		tree	woody	851072	
Olacaceae	19.35	1.02			14.50	3.50		183.90	18.21	liana, tree	woody	6641	
Onagraceae	13.01	4.96			1.19	0.26		0.27	0.06	herb, tree	herbaceous, woody	2722	
Opuntia					2.23	2.03		28.33	10.19	shrub, tree	herbaceous, woody	419	
Ostrya	29.88	1.88			10.86	0.02	40.00	0.00		tree	woody	99942	
Oxalidaceae	57.02				0.28	0.12		1.25	0.65	herb	herbaceous, woody	866	
Papaver								0.09			herbaceous	288	
Paullinia	19.40	0.71						21674.35	11727.66	liana, vine	woody	2501	
Pedicularis					0.40			0.52	0.08	herb	herbaceous	488	
Phlox	0.19	0.05			0.70	0.25		3.62	1.29	herb, shrub	herbaceous	195	
Picea	3.62	0.32	90.00		11.72	0.02		3.52	0.83	tree	woody	749528	
Pinus	8.67	0.99	35.67	12.33	14.87	0.00		88.47	45.17	tree	woody	6256705	
Plantago	13.83	2.09			7.03	1.74		0.70	0.14	herb	herbaceous	2229	
Poaceae	26.31	0.54			0.37	0.01		12.74	11.07	herb, liana, tree	herbaceous, woody	69089	
Polemoniaceae	4.45	2.75			0.48	0.19		0.93	0.20	herb, shrub	herbaceous, woody	1075	
Polygalaceae					2.54	2.07				herb, liana, shrub	herbaceous, woody	3251	
Polygonaceae	14.23	2.04			5.27	0.13		6.77	2.55	herb, liana, shrub, tree	herbaceous, woody	11086	
Populus	11.54	0.77	3.88	0.28	16.21	0.01		87.64	5.39	tree	woody	742696	
Portulacaceae								0.29	0.16	herb	herbaceous	220	
Potentilla	10.51	5.99			0.38	0.21		0.36	0.09		herbaceous, woody	2293	
Prosopis	12.51	1.70			4.57	0.02		24.81	15.57		woody	48099	
Protium	13.57	0.25			14.46	0.92		221.60	65.80	liana, tree	woody	12730	
Pseudotsuga	5.80	1.24			19.91	0.02		12.32	1.35		woody	516812	
Psychotria	19.24	0.96			5.06	0.26		23.37	13.48	herb, shrub, tree	herbaceous, woody	4886	
Quercus	13.62	0.18	6.00		15.36	0.01	86.25	6.52	3271.99	253.27	shrub, tree	woody	3814369
Ranunculaceae	11.46	2.65			0.82	0.24		1.36	0.22	herb, liana, shrub	herbaceous, woody	6455	
Rhamnaceae	22.50	0.75			4.04	0.09		10.61	2.52	herb, liana, shrub, tree	woody	6484	
Rhododendron	10.23	1.79			7.92	1.26		0.22	0.05	shrub, tree	woody	4002	
Rhus	10.91	1.19			9.06	1.67		25.87	2.33	shrub, tree	woody	772	
Ribes	25.28	3.38			2.09	0.24		3.19	0.40	shrub	woody	976	
Rosaceae	16.79	0.44			13.02	0.02		89.48	29.68	herb, liana, shrub, tree, vine	herbaceous, woody	339124	
Rubiaceae	9.18	0.43			5.56	0.11		139.50	23.52	herb, liana, shrub, tree, vine	herbaceous, woody	46259	
Rumex	24.12	1.96			1.00	0.23		1.29	0.29		herbaceous, woody	1360	
Sabal					9.06	0.04				tree	woody	27212	
Salix	11.52	0.75			13.47	0.05				herb, shrub, tree	woody	32334	
Sambucus	19.96	5.05			7.95	1.14		1.89		shrub, tree	herbaceous, woody	496	
Sanguisorba	24.85	3.60			0.34	0.05		5.85	0.67	herb	herbaceous	220	

Sapium	17.14	0.59		11.97	0.84	25.49	11.20	tree	woody	2194
Sarcobatus vermiculatus								shrub	woody	4
Saxifragaceae	17.31	16.90		0.50	0.15	0.10	0.02	herb	herbaceous	1109
Schinus	7.84			14.02	3.35				woody	123
Serenoa				6.25	0.15				woody	7
Spermacoce								tree	herbaceous	193
Spiraea	14.41	2.67				0.09	0.01		woody	387
Spondias	35.49	3.46		12.91	1.25	638.65	322.84	tree	woody	1504
Stellaria	35.88			0.39	0.08	0.27	0.07		herbaceous	524
Taxodium	12.44	4.64		16.56	0.02				woody	259132
Taxus brevifolia	9.24	0.90		6.03	0.10	30.96	0.44		woody	1750
Thalictrum				0.67	0.29	1.19	0.30	herb	herbaceous	561
Trema	17.33	2.73		5.18	0.19	1.84	0.72		woody	783
Tsuga heterophylla	7.79	1.34	50.40	17.68	0.04	1.78	0.14	tree	woody	162285
Tsuga mertensiana				12.56	0.04			tree	woody	74893
Ulmus	24.41	0.74		12.98	0.02			shrub, tree	woody	384868
Viburnum	13.68	0.87	5.64	0.02	8.35	0.78		shrub, tree	woody	9241
Vitex				13.30	2.02			tree	woody	1110
Vitis	24.31	1.23		12.00		49.25	15.35	herb, liana, tree, vine	woody	4457
Yucca				3.36	0.11	43.08	10.85	shrub	herbaceous, woody	439
Zanthoxylum	10.14	0.81		11.33	0.33	11.84	1.32	tree	woody	2601