

Rich and underreported: First integrated assessment of the diversity of mesopelagic fishes in the southwestern Tropical Atlantic

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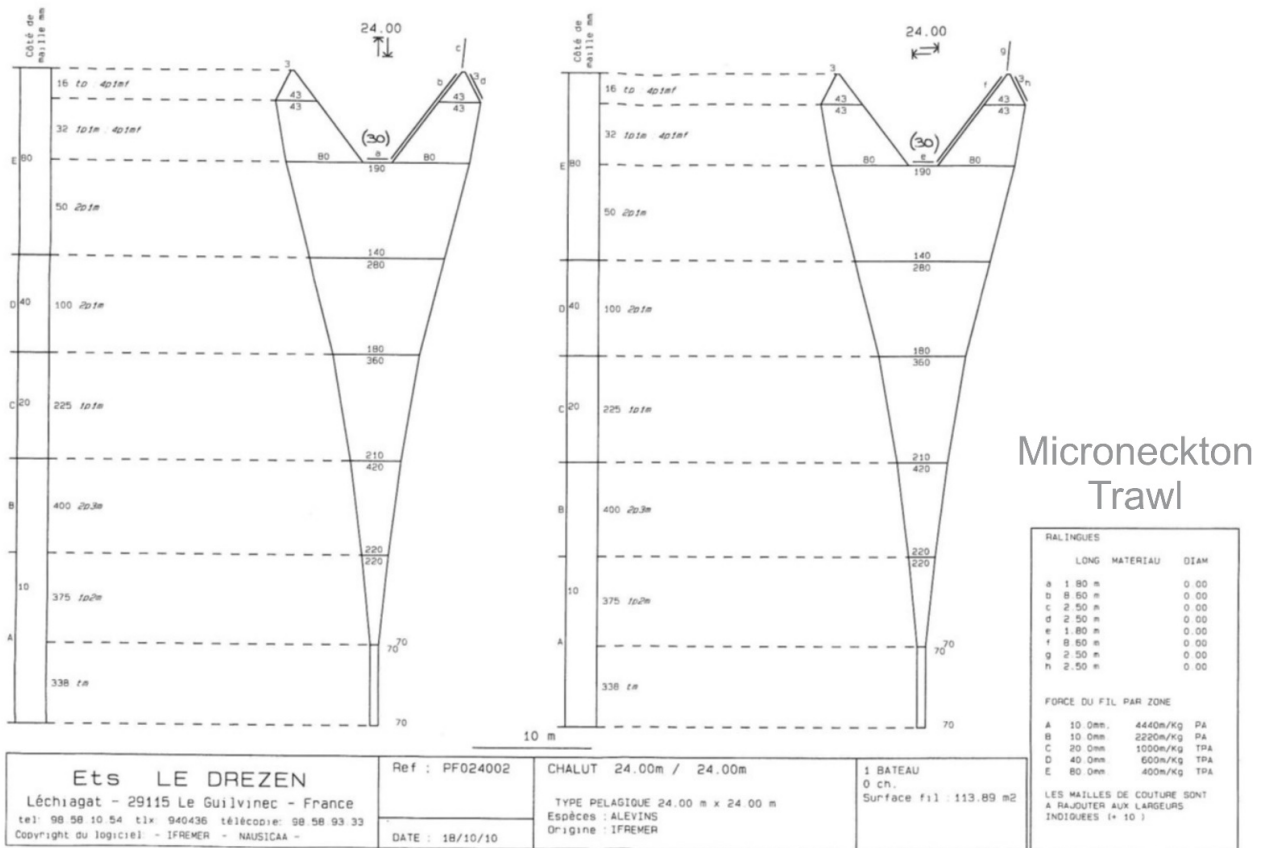
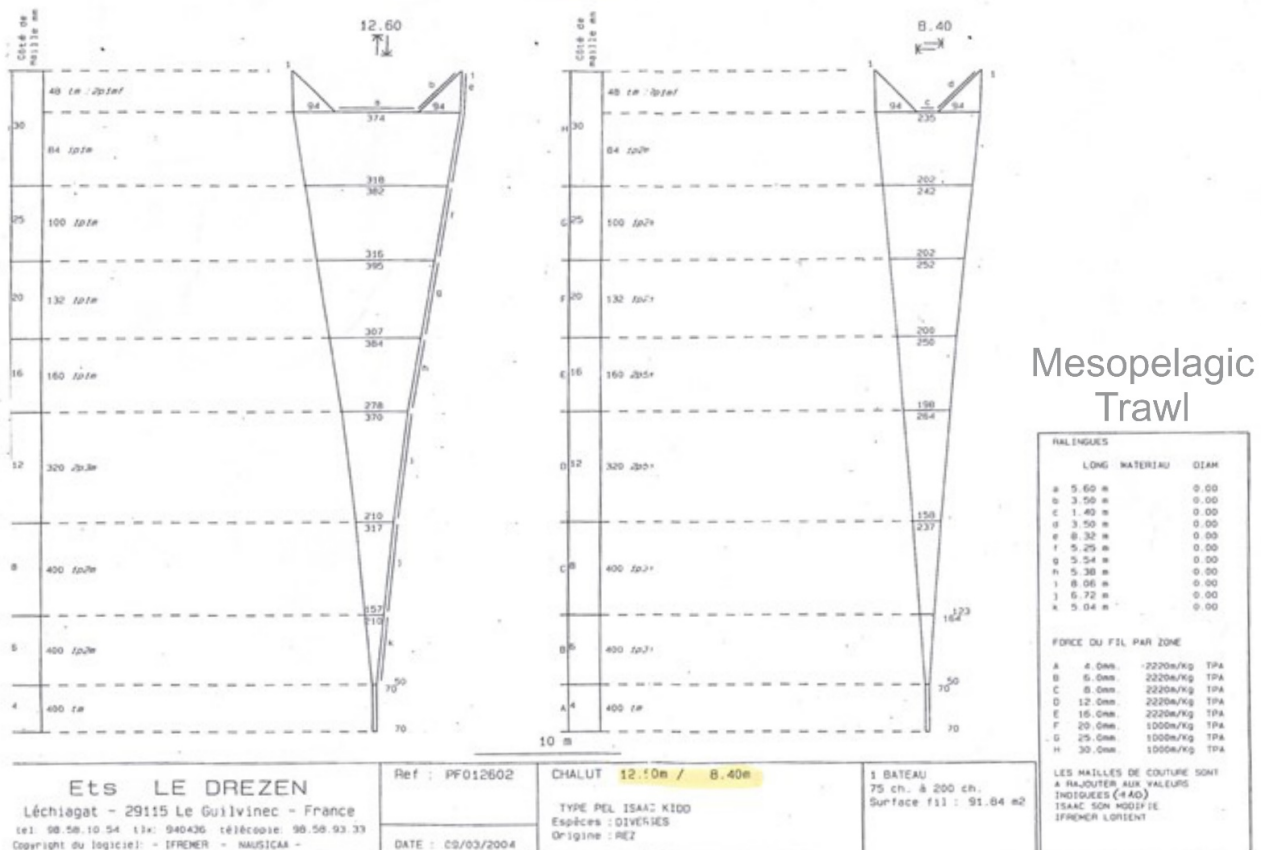
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Supplementary Material 1. List of midwater trawls performed during the ABRACOS 1 (AB1) and ABRACOS 2 (AB2) expeditions. FNR: Fernando de Noronha Ridge. RN: Rio Grande do Norte, PB: Paraíba, PE: Pernambuco, and AL: Alagoas.

Station	Site	Period	Latitude	Longitude	Depth	Station	Site	Period	Latitude	Longitude	Depth
AB1#1	FNR	Night	-3.772	-32.422	150	AB2#22	PB	Night	-6.888	-34.762	10
AB1#2	FNR	Day	-3.661	-32.218	110	AB2#26	RN	Day	-5.819	-34.813	100
AB1#3	FNR	Night	-3.640	-31.971	60	AB2#28	RN	Night	-5.617	-34.785	130
AB1#4	FNR	Day	-3.908	-32.340	90	AB2#31	RN	Day	-4.976	-34.951	450
AB1#5	FNR	Night	-4.090	-32.180	85	AB2#35	RN	Night	-4.327	-35.497	630
AB1#6	FNR	Day	-4.243	-32.613	85	AB2#39	FNR	Night	-4.874	-34.059	800
AB1#7	FNR	Night	-3.960	-32.532	58	AB2#40A	FNR	Day	-3.523	-32.528	440
AB1#8	FNR	Day	-3.736	-32.895	100	AB2#40B	FNR	Day	-3.520	-32.530	230
AB1#9	FNR	Night	-3.471	-32.759	105	AB2#41A	FNR	Night	-3.333	-32.412	430
AB1#11	FNR	Day	-3.750	-33.230	40	AB2#41B	FNR	Night	-3.321	-32.428	25
AB1#12	FNR	Night	-3.939	-33.511	130	AB2#42A	FNR	Day	-3.258	-31.808	780
AB1#13	FNR	Day	-3.917	-33.848	110	AB2#42B	FNR	Day	-3.262	-31.817	50
AB1#14	FNR	Night	-3.983	-34.056	510	AB2#44A	FNR	Day	-3.881	-32.293	850
AB1#15	FNR	Day	-3.734	-34.000	537	AB2#44B	FNR	Day	-3.872	-32.300	130
AB1#20	FNR	Night	-3.761	-33.880	60	AB2#45A	FNR	Night	-4.237	-32.035	30
AB1#21	FNR	Day	-3.657	-33.692	100	AB2#45B	FNR	Night	-4.239	-32.021	50
AB1#22	FNR	Night	-4.129	-33.790	525	AB2#46A	FNR	Day	-4.142	-32.304	360
AB1#23	RN	Day	-5.144	-34.713	100	AB2#46B	FNR	Day	-4.175	-32.268	440
AB1#26	RN	Day	-6.154	-34.576	560	AB2#48A	FNR	Day	-4.418	-32.964	505
AB1#27	RN	Night	-6.309	-34.979	100	AB2#48B	FNR	Day	-4.440	-32.938	70
AB1#29	PB	Day	-6.621	-34.760	15	AB2#49A	FNR	Night	-4.177	-33.269	1020
AB1#31	PB	Night	-6.734	-34.440	50	AB2#49B	FNR	Night	-4.176	-33.259	90
AB1#34	PB	Night	-7.190	-34.266	100	AB2#50A	FNR	Day	-3.817	-32.599	615
AB1#35	PB	Day	-7.486	-34.425	250	AB2#50B	FNR	Day	-3.812	-32.640	115
AB1#36	PE	Night	-7.602	-34.338	60	AB2#50C	FNR	Day	-3.836	-32.623	58
AB1#37	PE	Day	-7.867	-34.495	25	AB2#52A	FNR	Day	-3.721	-33.419	984
AB1#41	PE	Day	-8.274	-34.680	30	AB2#52B	FNR	Day	-3.699	-33.391	385
AB1#43	PE	Night	-8.415	-34.844	12	AB2#53A	FNR	Night	-3.816	-33.988	610
AB1#52	AL	Day	-9.066	-34.801	570	AB2#53B	FNR	Night	-3.830	-33.962	65
AB1#25	RN	Night	-5.803	-34.951	75	AB2#54A	FNR	Day	-3.771	-34.727	95
AB2#2	PE	Night	-8.857	-34.728	60	AB2#54B	FNR	Day	-3.755	-34.684	1030
AB2#5	AL	Night	-9.182	-34.758	117	AB2#56A	FNR	Day	-3.934	-35.421	110
AB2#6	PE	Day	-8.873	-34.599	240	AB2#56B	FNR	Day	-3.962	-35.406	260
AB2#7	PE	Day	-8.774	-34.742	112	AB2#58A	FNR	Day	-3.948	-36.104	520
AB2#8	PE	Day	-8.758	-34.785	17	AB2#58B	FNR	Day	-3.949	-36.155	90
AB2#9	PE	Night	-8.708	-34.745	95	AB2#58C	FNR	Day	-3.954	-36.183	90
AB2#10	PE	Night	-8.659	-34.761	15	AB2#59A	FNR	Night	-3.634	-36.053	1113
AB2#13	PE	Day	-8.317	-34.428	445	AB2#59B	FNR	Night	-3.643	-36.038	110
AB2#16	PE	Night	-7.604	-33.993	680	AB2#60A	FNR	Day	-3.531	-36.385	449
AB2#21	PB	Day	-6.841	-34.306	800	AB2#60B	FNR	Day	-3.529	-36.356	700

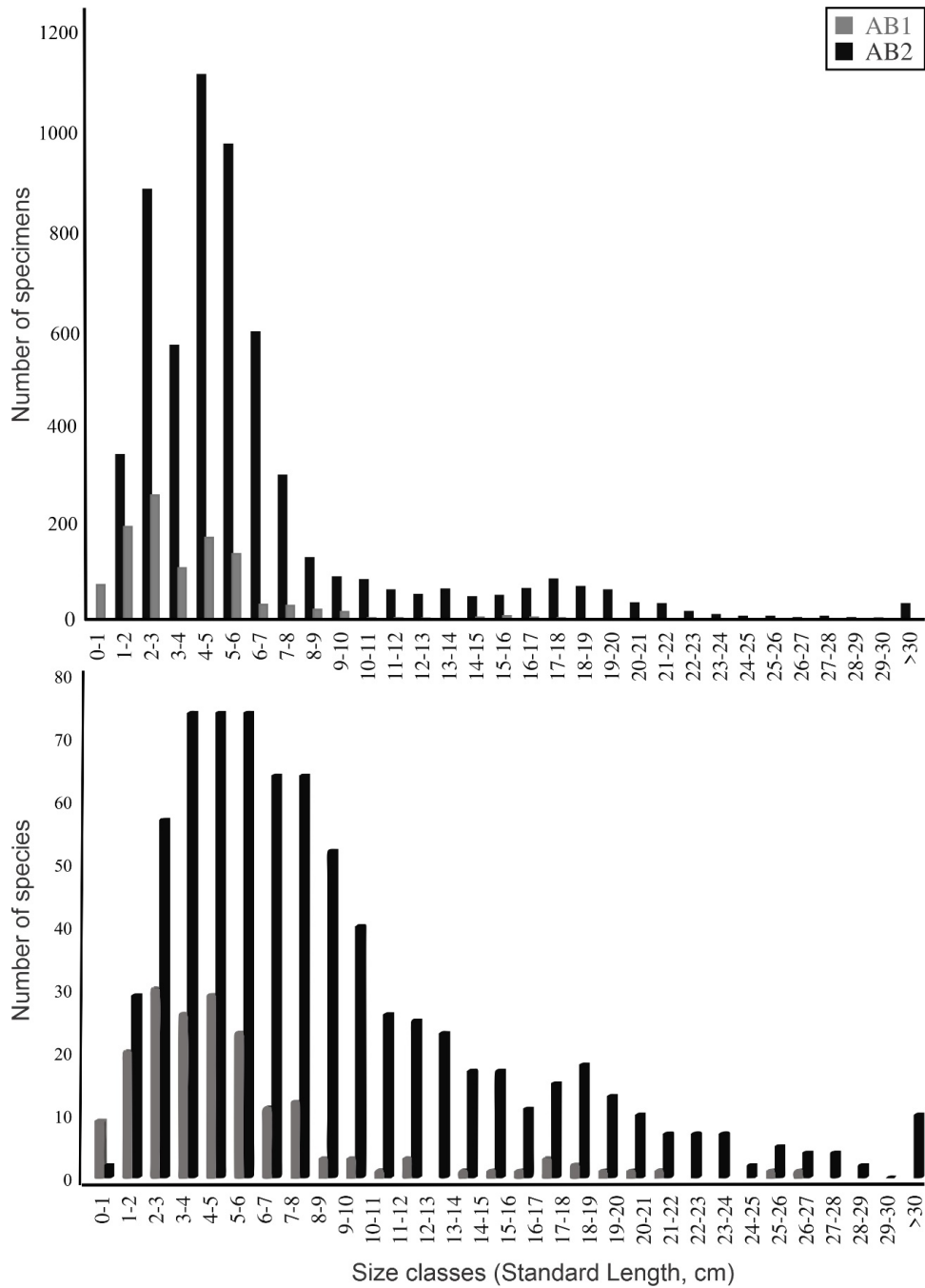
Supplementary Material 2. Detailed design of the mesopelagic and micronekton trawls utilized in the campaigns ABRACOS 1 and ABRACOS 2.



Supplementary Material 3. Mesopelagic fishes that could not be identified at species level due to their poor condition and/or extremely small size. Survey (1: ABRACOS 1; 2: ABRACOS 2), number of specimens (N), frequency of occurrence to overall samples (FO%) standard length (mean and range), total wet weight (mean and range), locality (PE: Pernambuco; PB: Paraíba; RN: Rio Grande do Norte; FNR: Fernando de Noronha Ridge), depth range, temperature range (T°C).

Species	Survey	N	FO%	SL (mm)	TW (g)	Locality	Depth (m)	T (°C)
ANGUILLIFORMES								
Nemichthyidae								
<i>Nemichthys</i> sp.	1-2	7	6.1	286(200–480)	5.4(2.4–9.3)	FNR-PE	40–800	4.7–26.6
Serrivomeridae								
<i>Serrivomer</i> sp.	2	2	2.4	236	0.5	FNR	70–900	4.3–25.8
ARGENTINIFORMES								
Bathylagidae								
<i>Bathylagus</i> sp.	2	5	3.7	79(63–98)	3.3(1.2–4.7)	FNR	430–800	4.6–8.54
STOMIIFORMES								
Gonostomatidae								
<i>Gonostoma</i> sp.	1-2	9	7.3	89(22–198)	8.5(0.3–29.5)	FNR-PB-PE	50–1000	4.3–27.6
<i>Gonostoma</i> sp.	2	3	2.4	27	1	FNR	720–780	4.6–4.9
Sternoptychidae								
<i>Sternoptyx</i> sp.	2	72	1.2	25(14–34)	1.6(0.4–4.8)	FNR	110	24.1
Phosichthyidae								
<i>Phosichthys</i> sp.	2	5	3.7	57	–	FNR	720–800	4.7–4.9
Stomiidae								
<i>Aristostomias</i> sp.	1-2	22	17.1	85(32–151)	6.3(1.0–19.5)	FNR-PB-PE	60–1000	4.3–26.6
<i>Astronesthes</i> sp.	1-2	8	7.3	51(26–76)	1.8(0.5–3)	FNR-PB	50–900	4.3–26.5
<i>Batophilus</i> sp.	2	1	1.2	16	3.5	FNR	385	9.2
<i>Eustomias</i> sp.	1-2	12	13.4	84(63–134)	3.6(0.6–7.9)	FNR-PB-PE	65–1000	4.3–26.5
<i>Leptostomias</i> sp.	2	3	2.4	109(67–165)	3.2(0.9–5.3)	FNR	90–430	8.5–25.1
<i>Melanostomias</i> sp.	1-2	3	2.4	126(30–176)	12.1(0.3–18.7)	PB-PE	50–680	5.2–26.5
<i>Photonectes</i> sp.	2	2	1.2	33(28–37)	0.04(0.04–0.05)	FNR	780	4.6
<i>Stomias</i> sp.	2	1	1.2	107	3.3	FNR	610	5.6
AULOPIFORMES								
Notosudidae								
<i>Scopelosaurus</i> sp.	2	3	4.9	34(33–35)	0.9(0.6–1.3)	FNR	100–800	4.7–24.6
Scopelarchidae								
<i>Schopelarchoides</i> sp.	2	1	1.2	75	2.8	FNR	610	5.6
<i>Scopelarchus</i> sp.	2	1	1.2	27	–	FNR	780	4.6
<i>Scopelarchus</i> sp.	2	1	1.2	76	4.3	FNR	900	4.3
Paralepididae								
<i>Stemonosudis</i> sp.	2	1	1.2	135	4.7	FNR	780	4.6
<i>Paralepidia</i> sp.	2	1	1.2	23	10.3	FNR	800	4.7
MYCTOPHIFORMES								
Myctophidae								
<i>Bolinichthys</i> sp.	2	20	6.1	43(25–76)	4.1(0.5–24.5)	FNR-PB-RN	630–900	4.3–5.6
<i>Diaphus</i> sp.	1-2	276	20.7	32(10–83)	2.0(0.1–9.3)	FNR-PB-PE-RN	60–900	4.3–26.6
<i>Lampadena</i> sp.	1-2	9	2.4	20(13–26)	0.4(0.1–0.8)	FNR	510–780	4.6–6.0
<i>Lampanyctus</i> sp.	1-2	93	19.5	46(21–125)	2.4(0.3–12.6)	FNR-PE-RN	25–900	4.3–28.8
<i>Nannobranchium</i> sp.	2	1	1.2	70	1.73	FNR	610	5.7
<i>Taaningichthys</i> sp.	2	7	6.1	53(43–72)	1.3(0.5–3.6)	FNR	720–800	4.6–4.98
<i>Myctophidae</i> spp.	1-2	138	35.4	40(14–135)	3.0(0.1–25.3)	FNR-PB-PE-RN	25–1000	4.3–28.8
GADIFORMES								
Macrouridae								
<i>Macrourus</i> sp.	2	2	2.4	275	12.6(4.1–21.1)	FNR	800–900	4.3–4.7
BERYCIFORMES								
Melamphidae								
<i>Scopeloberyx</i> sp.	2	3	3.7	25(20–32)	2.7(1.9–3.4)	FNR	720–800	4.6–4.9
PERCIFORMES								
Bramidae								
<i>Brama</i> sp.	1	11	8.5	11(08–15)	1.5(0.3–9)	FNR-PB	58–130	15.0–26.6
Caristiidae								
<i>Platyberyx</i> sp.	2	4	3.7	69(41–98)	12.7(2.3–25.1)	FNR-RN	450–720	4.9–8.5
SCOMBRIFORMES								
Gempylidae								
<i>Gempylus</i> sp.	2	6	6.1	31(12–55)	0.9(0.5–1.2)	FNR-PE	70–800	4.7–25.8
TRACHINIFORMES								
Chiasmodontidae								
<i>Chiasmodon</i> sp.	2	9	8.5	31(16–46)	1.9(0.5–4.4)	FNR-PE	112–800	4.6–24.1
LOPHIIFORMES								
Melanocetidae								
<i>Melanocetus</i> sp.	2	6	6.1	49(20–88)	11.6(2.1–33.2)	FNR-PE	680–900	4.3–5.2
Oneirodidae								
<i>Chaenophryne</i> sp.	1-2	2	2.4	22(17–28)	0.8(0.8–0.8)	PE	510–800	4.7–6.0
<i>Oneirodes</i> sp.	2	1	1.2	15	2.1	FNR	900	4.3
<i>Oneirodes</i> sp.	1-2	3	3.7	80	–	FNR	40–780	4.6–26.6
Ceratiidae								
<i>Ceratius</i> sp.	2	3	1.2	42(31–51)	2.7(1.4–4.6)	FNR	610–700	5.2–5.6
<i>Ceratiidae</i> sp.	1	1	1.2	30	–	RN	570	6.3
Gigantactinidae								
<i>Gigantactis</i> sp.	1	1	1.2	60	–	FNR	100	24

Supplementary Material 4. Number of specimens and species per size class of mesopelagic species of fishes collected on the ABRACOS 1 (mesopelagic trawl) and ABRACOS 2 (micronekton trawl) expeditions.



Supplementary Material 5. Abundance (individuals.hour⁻¹), Biomass (Kg.hour-1x10²), Number of species (N0), Margalef index, Hill's Shannon index (N1), and Hill's Simpson's index (N2) of mesopelagic species of fishes collected on the ABRACOS 1 (mesopelagic trawl) and ABRACOS 2 (micronekton trawl) expeditions. Stations with no collection of mesopelagic fishes were excluded.

Station	Abundance	Biomass	N0	Margalef	N1	N2
AB1#1	236.00	1.356	12	2.38	8.06	6.84
AB1#2	4.00	0.021	2	1.44	2.00	2.00
AB1#4	8.00	0.014	4	2.16	4.00	4.00
AB1#5	102.00	0.195	12	2.84	5.14	2.92
AB1#6	22.00	0.043	3	0.83	2.14	1.75
AB1#7	10.00	0.024	3	1.24	2.87	2.78
AB1#9	176.00	0.916	16	3.36	4.86	2.36
AB1#11	6.00	0.000	2	1.44	2.00	2.00
AB1#12	146.00	0.530	16	3.51	8.64	5.05
AB1#13	4.00	0.007	2	1.44	2.00	2.00
AB1#14	142.00	0.332	27	6.12	13.69	6.86
AB1#15	100.00	0.097	9	2.08	5.45	3.73
AB1#20	14.00	0.015	3	1.03	2.22	1.81
AB1#21	8.00	0.005	4	2.16	4.00	4.00
AB1#22	96.00	0.500	27	6.91	23.35	19.88
AB1#23	12.00	0.014	5	2.23	4.76	4.50
AB1#25	12.00	0.034	4	1.67	3.78	3.60
AB1#26	32.00	0.032	4	1.08	2.50	1.94
AB1#27	4.00	0.002	2	1.44	2.00	2.00
AB1#31	46.00	0.019	6	2.28	5.35	4.76
AB1#34	34.00	0.110	11	3.53	9.00	7.05
AB1#36	42.00	0.070	4	1.30	2.56	1.92
AB1#51	254.00	0.395	12	2.29	2.73	1.66
AB1#52	192.00	0.051	4	0.74	1.45	1.19
AB2#6	4.00	0.011	2	1.44	2.00	2.00
AB2#7	13.85	0.021	5	2.23	4.76	4.50
AB2#9	512.57	0.550	6	0.95	2.62	2.27
AB2#16	289.79	1.315	43	7.75	14.86	7.98
AB2#21	442.67	0.998	34	5.71	10.42	5.55
AB2#28	420.00	1.061	25	4.40	9.84	6.46
AB2#35	462.00	1.625	29	4.89	4.70	2.08
AB2#39	1134.67	3.245	70	10.23	8.11	3.12
AB2#40A	769.09	2.766	30	5.30	13.05	7.62
AB2#40B	405.60	0.563	4	0.58	1.24	1.09
AB2#41A	771.82	4.230	59	10.29	25.52	15.28
AB2#41B	104.00	0.790	9	2.52	7.34	6.40
AB2#42A	7900.00	70.722	68	11.42	18.78	7.90
AB2#42B	7.83	0.005	4	0.87	1.51	1.21
AB2#44A	1704.00	19.201	75	11.86	24.65	12.48
AB2#44B	51.00	0.081	8	1.68	2.33	1.54
AB2#45B	453.00	0.829	15	2.97	7.30	5.34
AB2#46A	18.00	0.031	3	0.96	2.46	2.13
AB2#46B	19.20	0.039	5	2.06	4.37	3.77
AB2#48A	113.33	0.612	11	2.61	4.06	2.37
AB2#48B	83.57	0.140	8	1.86	3.30	2.09
AB2#49A	340.59	2.196	48	8.98	24.22	13.83
AB2#49B	950.40	2.166	33	5.36	10.11	5.57
AB2#50A	150.86	1.355	25	5.46	13.90	7.55
AB2#52A	408.00	2.361	57	10.57	25.41	10.89
AB2#52B	494.00	1.488	25	4.36	9.57	6.31
AB2#53A	994.00	6.474	55	8.73	13.86	6.07
AB2#53B	60.00	0.171	12	3.27	6.58	3.81
AB2#54B	826.00	3.804	61	10.04	21.42	10.55
AB2#56B	86.25	0.086	4	0.79	1.61	1.27
AB2#56C	146.00	0.531	17	3.74	8.95	5.63
AB2#58A	164.00	0.678	14	2.98	7.60	5.38
AB2#59A	373.50	1.772	40	7.14	10.81	5.11
AB2#59B	422.50	0.879	17	3.19	6.12	3.60
AB2#60A	6.00	0.013	2	0.91	1.89	1.80
AB2#60B	220.00	1.602	18	3.62	7.03	4.21