

APPENDICES

APPENDIX A - CUMULATIVE-ARITHMETIC CURVES

HACKETT SECTION

GRAIN SIZE DATA

CUMULATIVE CURVES

POCOLA SECTION

GRAIN SIZE DATA

CUMULATIVE CURVES

STANDARD DEVIATION CALCULATIONS

APPENDIX B - THIN-SECTION DESCRIPTIONS

HACKETT SECTION

POCOLA SECTION

APPENDIX A

GRAIN-SIZE DATA

CUMULATIVE-ARITHMETIC CURVES

STANDARD DEVIATION CALCULATIONS

Table 13

GRAIN SIZE DATA - HACKETT SECTION

Plot#	Sample#	Mdo					Grain Size	Sorting	Skewness
		5 ϕ	16 ϕ	50 ϕ	84 ϕ	95 ϕ	M ϕ	σ	Sk $_I$
1	H-14	1.17	1.31	1.67	2.17	2.82	1.72	0.47	+0.28
1D	H-14	1.15	1.41	1.26	2.25	2.75	1.81	0.46	+0.20
2	H-13	1.75	1.87	2.14	2.64	3.06	2.22	0.39	+0.35
3	JH-1	1.87	2.06	2.31	2.70	3.10	2.36	0.35	+0.25
4	MY-330B	1.50	1.79	2.09	2.49	2.83	2.12	0.38	+0.13
5	H-50B	1.62	1.92	2.24	2.92	3.43	2.36	0.52	+0.34
5D	H-50B	1.56	1.85	2.21	2.88	3.47	2.31	0.55	+0.31
6	LL-1	1.88	2.18	2.89	3.33	3.90	2.80	0.60	-0.09
7	DP-9	1.87	2.12	2.59	3.04	3.26	2.58	0.44	-0.03
8	DP-7	1.86	2.10	2.45	2.95	3.37	2.50	0.44	+0.20
8D	DP-7	1.78	2.09	2.44	3.00	3.30	2.51	0.46	+0.19
9	KM2-4	1.94	2.03	2.44	2.99	3.26	2.49	0.46	+0.15
10	MLJ-2	1.95	2.17	2.56	3.04	3.37	2.59	0.44	+0.12
11	H-17	1.59	1.83	2.14	2.46	3.05	2.14	0.38	+0.13
12	DP-5	1.37	1.62	2.00	2.57	3.06	2.06	0.50	+0.22

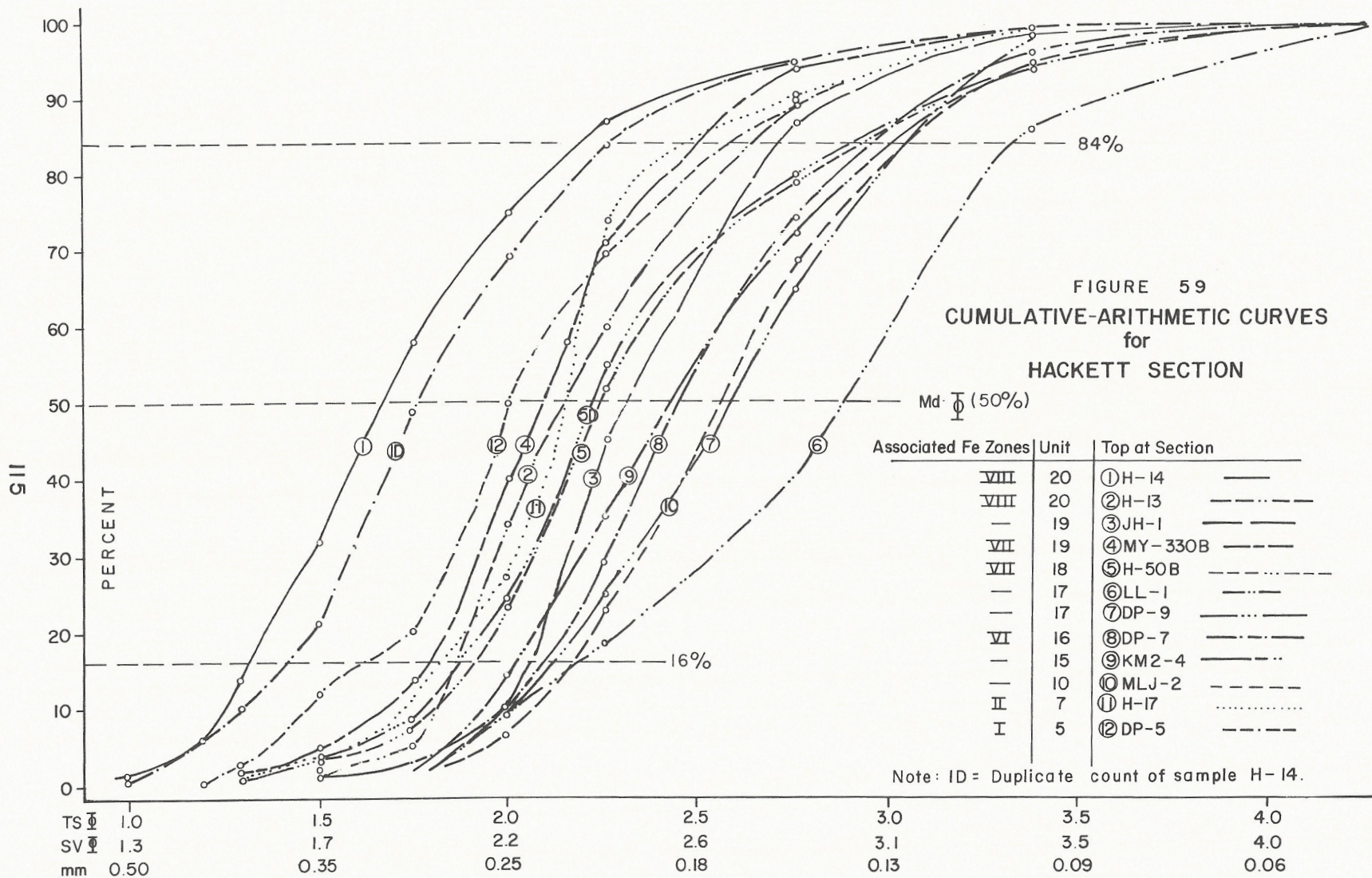
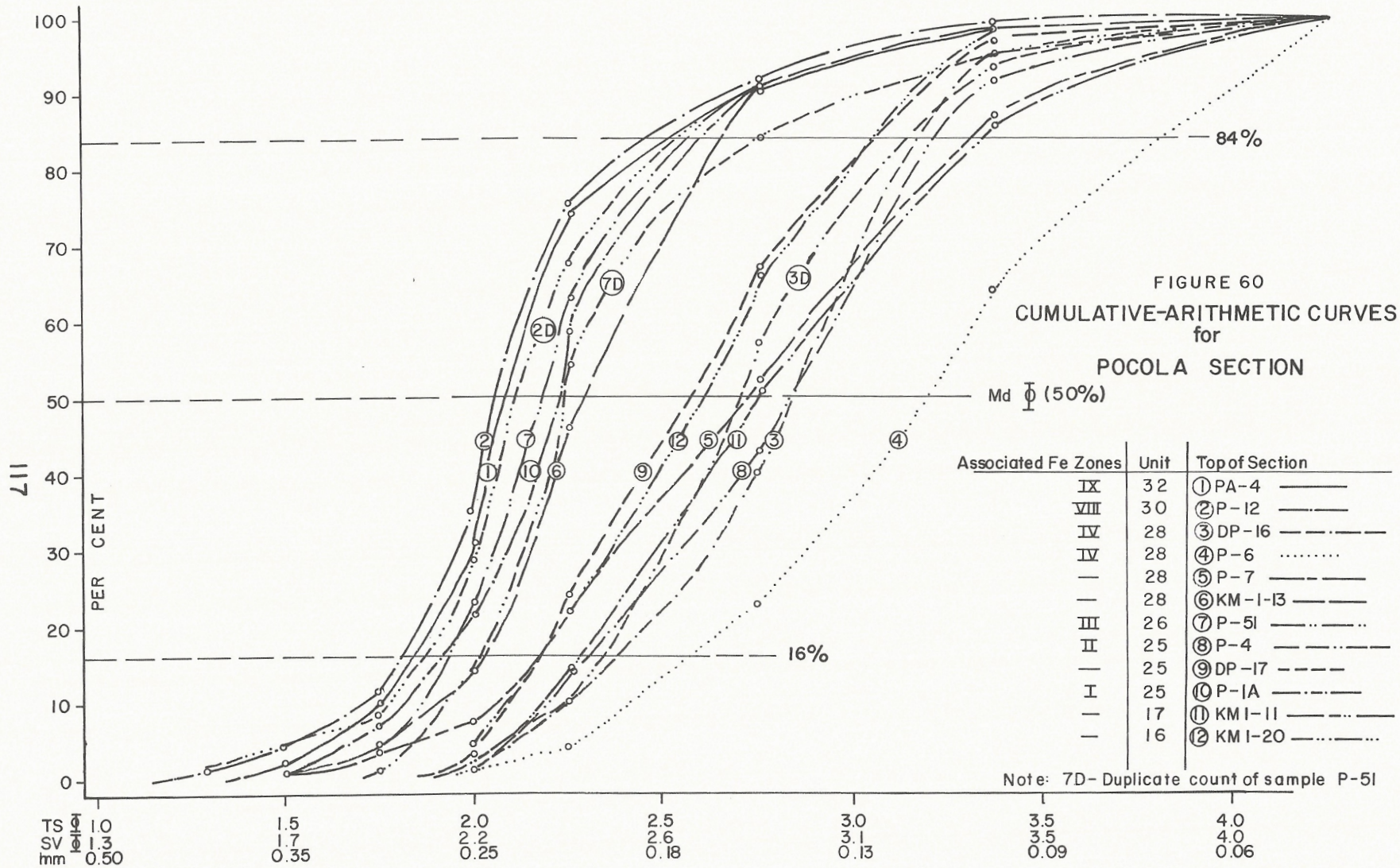


Table 14

GRAIN SIZE DATA - POCOLA SECTION

Plot#	Sample#	Grain Size					Sorting σ	Skewness Sk _I	
		5 ϕ	16 ϕ	M ₅₀ 50 ϕ	84 ϕ	95 ϕ			
1	PA-4	1.61	1.84	2.08	2.50	3.02	2.14	0.38	+0.31
2	P-12	1.52	1.79	2.05	2.45	2.91	2.10	0.38	+0.23
2D	P-12	1.50	1.87	2.11	2.53	3.00	2.17	0.40	+0.23
3	DP-16	2.11	2.37	2.83	3.17	3.38	2.79	0.39	-0.15
3D	DP-16	2.08	2.29	2.85	3.21	3.60	2.78	0.46	-0.12
4	P-6	2.28	2.57	3.20	3.80	4.13	3.19	0.59	-0.01
5	P-7	1.85	2.16	2.72	3.31	3.77	2.73	0.58	+0.06
6	KM1-13	1.77	2.02	2.29	2.64	3.00	2.32	0.35	+0.15
7	P-51	1.85	1.93	2.17	2.55	2.98	2.22	0.33	+0.33
7D	P-51	1.84	2.10	2.21	2.63	3.12	2.13	0.32	+0.50
8	P-4	2.08	2.34	2.70	3.14	3.45	2.73	0.41	+0.10
9	DP-17	2.08	2.17	2.57	3.06	3.30	2.60	0.41	+0.15
10	P-1A	1.67	1.91	2.22	2.59	2.98	2.24	0.37	+0.12
11	KM1-11	2.08	2.27	2.75	3.34	3.83	2.79	0.54	+0.17
12	KM1-20	2.01	2.17	2.60	3.05	3.26	2.61	0.41	+0.04



STANDARD DEVIATION CALCULATIONS: TOTAL COUNTING ERRORS

$$\sigma^2 = \sum_{q=1}^N \left[\frac{1}{n} \left(\sum_{i=1}^n \left(\frac{x_i - \bar{x}}{\bar{x}} \right)^2 / (n-1) \right) \right] / \sum_{q=1}^N \sum_{i=1}^n$$

where: N = number of samples
 n = number of replicate analyses
 on a given sample
 X_i = value of individual analysis

$\sum_{q=1}^N \sum_{i=1}^n$ = total number of analyses on all samples

	$M_z(\bar{D})$	\bar{x}	$\sigma_I(\bar{D})$	\bar{x}	Sk_I	\bar{x}
<u>Hackett Section</u>						
Sample H-14						
Count# 1	1.72	1.765±	0.47	0.465±	+0.28	+0.24±
Count# 2	1.81	8.6%	0.46	11.2%	+0.20	33.8%
Sample H-50B						
Count# 1	2.36	2.335±	0.52	0.535±	+0.34	+0.325±
Count# 2	2.31	8.6%	0.55	11.2%	+0.31	33.8%
Sample DP-7						
Count# 1	2.50	2.505±	0.44	0.45±	+0.20	+0.195±
Count# 2	2.51	8.6%	0.46	11.2%	+0.19	33.8%
<u>Pocola Section</u>						
Sample P-12						
Count# 1	2.10	2.135±	0.38	0.39±	+0.23	0
Count# 2	2.17	8.6%	0.40	11.2%	+0.23	
Sample DP-16						
Count# 1	2.79	2.785±	0.39	0.425±	-0.15	-0.135±
Count# 2	2.78	8.6%	0.46	11.2%	-0.12	33.8%
Sample P-51						
Count# 1	2.22	2.265±	0.33	0.325±	+0.33	+0.415±
Count# 2	2.31	8.6%	0.32	11.2%	+0.50	33.8%

STANDARD DEVIATION CALCULATIONS (Continued)

	$M_Z (\%)$	$\sigma_I (\%)$	Sk_I
1 Standard Deviation Unit =	4.3%	5.6%	16.9%
2 Standard Deviation Units =	8.6%	11.2%	33.8%

$$M_Z = \frac{\$16 + \$50 + \$84}{3}$$

$$\sigma_I = \frac{\$84 - \$16}{4} + \frac{\$95 - \$5}{6.6}$$

$$Sk_I = \frac{\$16 + \$84 - 2(\$50)}{2(\$84 - \$16)} + \frac{\$5 + \$95 - 2(\$50)}{2(\$95 - \$5)}$$

APPENDIX B

THIN SECTION DESCRIPTIONS
HACKETT AND POCOLA SECTIONS

HACKETT SECTION - BRIEF THIN SECTION DESCRIPTIONS

Note: All samples described below used for grain size analysis

<u>Sample #</u>	<u>Description</u>
H-14	Angular to subangular, Fe clasts show flowage (soft when ripped and redeposited). Some clasts may be squashed burrow tubes. Some of calcite may be individual pieces of carbonate, partly replaced by FeCO_3 = calcite unstable in environment stable to FeCO_3 ? Also see grains of plagioclase w/ calcite draping (near corner w/ "X"). Quite a few strained Qtz. Some Fe clasts contain ring of micaceous material around them.
H-13	Angular to subrounded. Brachiopod cross-section lower center of slide. Echinoderm plates intact: size 2mm. Burrows filled w/ Fe material. Also large brachiopod shell not replaced. Calcite common.
JH-1	Angular to subrounded. Considerably more clay mineral than above. Plagioclase altering to micaceous mica minerals. Much more plagioclase and chert than above. Zircons and reddish-brown tourmalines common. Few splotches of calcite.
MY330-B	Angular to subangular, w/ few subrounded. Feldspar fresher than above. No fossil frags. Increase in heavy mineral content(1%); grains well rounded to rounded, some anhedral to euhedral. No calcite.
H-50B	Subrounded to subangular. Calcite in matrix common. Fe bands. Fossil frags: large echinoderm plates and spines. Calcitic material associated w/ Fe material. Fe as cement. As above w/ calcite 2%. less clay minerals, plagioclase, RFs. Calcite as fragments of limestone or fossils.
LL-1	Angular to subangular. More clay than H-50B. Similar to MY330-B. No fossil frags or calcite.
DP-9	Subangular to subrounded. Similar mineral assemblage as LL-1, but w/ calcite as pieces only. Some cement. Feldspar ----- clay minerals, most plagioclase is fresh. No fossils or sign of burrows.
DP-7	Subangular to subrounded. More clay than DP-9, especially more green pleachroic clay minerals w/ high birefringence. Qtz: sutured w/ inclusions Calcite: fossil frags Clay Minerals: after qtz and feldspars? Micas: after qtz? Glauconite?

HACKETT THIN SECTION DESCRIPTIONS (Continued)

<u>Sample #</u>	<u>Description</u>
KM2-4	Subangular to subrounded. Calcite as cement and pieces. No fossils.
MLJ-2	Subangular to subrounded. As above w/ thin laminae (25mm). Sandstone was not dumped continually, but fines settled during nondeposition? Mica parallel within Fe laminae, not in "normal" sandstone - movement via burrowing alignment?
H-17	Subangular to subrounded, coarser than above, w/ less clay minerals, but w/ burrows (round ones) w/ frags of echinoderms in center. Fossil burrow filled w/ calcite (being optically contiguous crystals - near top of slide in middle. Gastropod cross-section - upper right corner. Other fossil in various stages of calcite replacement by Fe. Many grains oriented with long axis parallel to bedding.
DP-5	Subangular to subrounded. Echinoderm plates mostly calcite w/ some Fe replacement. Good cross-section of gastropod. Mineral assemblage similar to above. Qtz: undulatory extinction and suturing.

POCOLA SECTION - BRIEF THIN SECTION DESCRIPTIONS

Note: All samples described below used for grain size analysis

<u>Sample #</u>	<u>Description</u>
PA-4	Subrounded to subangular. Al grains surrounded w/ muddy Fe material. Fe coating - few grain to grain contacts, few scattered echinoderm frags, also of calcite. Less clay minerals.
P-12	Subrounded to subangular. Large echinoderm frags. Fe filled, some partly of calcite replaced by Fe. Carbonaceous frag showing woody structure. Large grachiopod frag is calcite. Muddy Fe patches in lower part of slide, may be burrowed. Fe fills voids as cement and around grains, but mostly grain to grain contact.
DP-16	Subangular to subrounded. Very similar to DP-9 in Hackett Section.
P-6	Subrounded to subangular. Fe material as laminae associated w/ burrows - maybe fecal material that is left in the burrows (or is part of the wall of the burrow altering to siderite).
P-7	Subangular to subrounded. Fe material as cement and matrix. Few echinoderm plates. Some crystals in pore space are larger than muddy material.
KM1-13	Subangular to subrounded, tiny crystals are scattered throughout, but preferred site with calcite masses; some calcite is stil "fresh" however and without Fe crystals. Size of crystals suggests in place formation. No fossil frags noted. Although not apparent in hand sample, this slide shows burrows.
P-51	Subrounded to subangular. Few frags of echinoderm. One burrow filled w/ calcite. Scatter w/ Fe material. Otherwise nothing new.
P-4	Subrounded to subangular. Scattered crystals masses of Fe around calcite - burrowed. Sediments may express: 1) Pre-burrowing; 2) Minor burrowing: beginning of burrowing; 3) Peak-burrowing activity; 4) Post-burrowing-sédiment depleted of food. Depends on sedimentation role(?)
DP-17	Subangular to subrounded. No fossil frags. Calcite altering to Fe. As above. Qtz: welded and sutured.
P-1A	Subangular to subrounded. Fe material associated w/ burrowing? No fresh fossil frags. May be cement within Fe zones now obscured. Fe scattered and associated w/ calcite

POCOLA THIN SECTION DESCRIPTIONS (Continued)

<u>Sample #</u>	<u>Description</u>
P-1A	and qtz. Decrease in feldspar (plagioclase). Considerably less clay minerals. Fine qtz always within burrows.
KM1-11	Subangular to subrounded. Burrowed sample. Scattered crystalized burrows of Fe material. No change in minerals. No fossil frags.
KM1-20	Subangular to subrounded. More zircons than any other sample. Burrows w/ calcite or micaceous lining. No fossil frags.

Miscellaneous
Samples

PA-3	Fe Zone. Fe frags may be fossils - altered.
P-51	Abundant calcite in matrix as isolated pieces. Echinoderm frags (Fe). Are bands result of burrows?
P-56	Fe mud w/ echinoderm frags (not fresh). Spotty fresh calcite in Fe zones, micas all parallel to direction of burrow or Fe band.