6000 0594

Mining District File Summary Sheet

DISTRICT	Rosebud
DIST_NO	4010
COUNTY If different from written on document	Pershing
TITLE If not obvious	Rosebud Mine - North Zone Resource
AUTHOR	K Allen; L.E Mackedon
DATE OF DOC(S)	1999
MULTI_DIST Y / N? Additional Dist_Nos:	
QUAD_NAME	Sulphur 7.5'
P_M_C_NAME (mine, claim & company names)	Rosebud Mine; Rosebud Mining Co. LLC; North Zone; Isaiah and Co.; Hecla Mining Co.
COMMODITY If not obvious	gold
NOTES	resources; statistics; handwritten notes; correspondence; assays 152p.

Keep docs at about 250 pages if no oversized maps attached (for every 1 oversized page (>11x17) with text reduce the amount of pages by ~25)

SS: DD 3/20/08
Initials Date

DB:
Initials Date

SCANNED:
Initials Date

Revised: 1/22/08

North-Zone Resource

6000 0594
4010

6000 0594

SURPAC THE ROSEBUD MINING COMPANY LLC 1999 North Zone
Measured, Indicated & Inferred Partial Block Model
Location : north_mii_partial Final Summary

MATERIAL	TYPE	VOLUME	TONS	gold
Zone 51				
Classes:				
	0.000 - 0.100	14763171.	1085093.	0.026
	0.100 - 0.180	0.	0.	
	0.180 - 0.250	0.	0.	
	0.250 - 0.900	0.	0.	
	+ 0.900	0.	0.	
	Material Total	14763171.	1085093.	0.026
Zone 52				
Classes:				
	0.000 - 0.100	95797.	7041.	0.094
	0.100 - 0.180	2911677.	214008.	0.139
	0.180 - 0.250	28989.	2131.	0.183
	0.250 - 0.900	0.	0.	
	+ 0.900	0.	0.	
	Material Total	3036463.	223180.	0.138
Zone 53				
Classes:				
	0.000 - 0.100	8125.	597.	0.015
	0.100 - 0.180	8342.	613.	0.143
	0.180 - 0.250	26016.	1912.	0.222
	0.250 - 0.900	1232043.	90555.	0.412
	+ 0.900	14492.	1065.	1.058
	Material Total	1289018.	94743.	0.412
Zone 54				
Classes:				
	0.000 - 0.100	0.	0.	
	0.100 - 0.180	0.	0.	
	0.180 - 0.250	307.	23.	0.193
	0.250 - 0.900	4653.	342.	0.709
	+ 0.900	156986.	11538.	1.997
	Material Total	161945.	11903.	1.957
Zone 61				
Classes:				
	0.000 - 0.100	5680025.	417482.	0.023
	0.100 - 0.180	0.	0.	
	0.180 - 0.250	0.	0.	
	0.250 - 0.900	0.	0.	
	+ 0.900	0.	0.	
	Material Total	5680025.	417482.	0.023
Zone 62				
Classes:				
	0.000 - 0.100	74961.	5510.	0.084
	0.100 - 0.180	244173.	17947.	0.143

0.180 - 0.250	51065.	3753.	0.194
0.250 - 0.900	0.	0.	
+ 0.900	0.	0.	
Material Total	370200.	27210.	0.138

Zone 63

Classes:

0.000 - 0.100	1649.	121.	0.040
0.100 - 0.180	1263.	93.	0.154
0.180 - 0.250	5545.	408.	0.208
0.250 - 0.900	117955.	8670.	0.394
+ 0.900	0.	0.	
Material Total	126411.	9291.	0.379

Zone 64

Classes:

0.000 - 0.100	0.	0.	
0.100 - 0.180	0.	0.	
0.180 - 0.250	0.	0.	
0.250 - 0.900	0.	0.	
+ 0.900	9665.	710.	2.023
Material Total	9665.	710.	2.023

Zone 951

Classes:

0.000 - 0.100	0.	0.	
0.100 - 0.180	0.	0.	
0.180 - 0.250	0.	0.	
0.250 - 0.900	0.	0.	
+ 0.900	0.	0.	
Material Total	0.	0.	

Zone 952

Classes:

0.000 - 0.100	0.	0.	
0.100 - 0.180	8.	1.	0.104
0.180 - 0.250	0.	0.	
0.250 - 0.900	0.	0.	
+ 0.900	0.	0.	
Material Total	8.	1.	0.104

Zone 953

Classes:

0.000 - 0.100	0.	0.	
0.100 - 0.180	0.	0.	
0.180 - 0.250	217.	16.	0.234
0.250 - 0.900	377333.	27734.	0.410
+ 0.900	0.	0.	
Material Total	377550.	27750.	0.410

Zone 954

Classes:

0.000 - 0.100	0.	0.	
0.100 - 0.180	0.	0.	

0.180 - 0.250	0.	0.	
0.250 - 0.900	5.	0.	0.738
+ 0.900	41445.	3046.	1.976
Material Total	41451.	3047.	1.976

Zone 961

Classes:

0.000 - 0.100	61385.	4512.	0.020
0.100 - 0.180	0.	0.	
0.180 - 0.250	0.	0.	
0.250 - 0.900	0.	0.	
+ 0.900	0.	0.	
Material Total	61385.	4512.	0.020

Zone 962

Classes:

0.000 - 0.100	3172.	233.	0.094
0.100 - 0.180	108016.	7939.	0.138
0.180 - 0.250	1601.	118.	0.190
0.250 - 0.900	0.	0.	
+ 0.900	0.	0.	
Material Total	112790.	8290.	0.137

Zone 963

Classes:

0.000 - 0.100	0.	0.	
0.100 - 0.180	0.	0.	
0.180 - 0.250	0.	0.	
0.250 - 0.900	22302.	1639.	0.364
+ 0.900	0.	0.	
Material Total	22302.	1639.	0.364

Zone 964

Classes:

0.000 - 0.100	0.	0.	
0.100 - 0.180	0.	0.	
0.180 - 0.250	0.	0.	
0.250 - 0.900	0.	0.	
+ 0.900	1474.	108.	2.143
Material Total	1474.	108.	2.143

Total	26053856.	1914958.	0.083

NORTH ZONE RESOURCE - 1999														
	Domains		Partial Blocks (Measured & Indicated)				Partial Blocks (Inferred)				Difference (Domains - Blocks)		
Zone	Volume	Tons	Volume	Tons	Grade	Ounces	Volume	Tons	Grade	Ounces	Volume	Tons	% Diff.
51	14,763,733	1,085,569	14,763,174	1,085,093	0.026	28,212	0	0	0.000	0	559	476	100.00%
52	3,037,028	223,311	3,036,463	223,180	0.138	30,799	8	1	0.104	0	557	130	99.98%
53	1,667,387	122,602	1,289,018	94,743	0.412	39,034	377,550	27,750	0.410	11,378	819	109	99.95%
54	203,949	14,996	161,945	11,903	1.957	23,294	41,451	3,047	1.976	6,021	553	46	99.73%
61	5,741,962	422,203	5,680,025	417,482	0.023	9,602	61,385	4,512	0.020	90	552	209	99.99%
62	489,095	35,963	370,200	27,210	0.138	3,755	112,790	8,290	0.137	1,136	6,105	463	98.75%
63	150,254	11,048	126,411	9,291	0.379	3,521	22,302	1,639	0.364	597	1,541	118	98.97%
64	12,967	953	9,665	710	2.023	1,436	1,474	108	2.143	231	1,828	135	85.90%
Totals	**26,066,375**	**1,916,645**	**25,436,901**	**1,869,612**	**0.075**	**139,654**	**616,960**	**45,347**	**0.429**	**19,452**	**12,514**	**1,686**	**99.95%**

NORTH ZONE RESOURCE - 1999 (INFERRED)

Zone	Grade Interval	Volume	Tons	Grade	Ounces
51	0.000 - 0.100	0	0	0.026	0
52	0.000 - 0.100	0	0	0.000	0
53	0.000 - 0.100	0	0	0.000	0
54	0.000 - 0.100	0	0	0.000	0
61	0.000 - 0.100	61,385	4,512	0.020	90
62	0.000 - 0.100	3,172	233	0.094	22
63	0.000 - 0.100	0	0	0.000	0
64	0.000 - 0.100	0	0	0.000	0
Total	0.000 - 0.100	64,557	4,745	0.024	112
51	0.100 - 0.180	0	0	0.000	0
52	0.100 - 0.180	8	1	0.104	0
53	0.100 - 0.180	0	0	0.000	0
54	0.100 - 0.180	0	0	0.000	0
61	0.100 - 0.180	0	0	0.000	0
62	0.100 - 0.180	108,016	7,939	0.138	1,096
63	0.100 - 0.180	0	0	0.000	0
64	0.100 - 0.180	0	0	0.000	0
Total	0.100 - 0.180	108,024	7,940	0.138	1,096
51	0.180 - 0.250	0	0	0.000	0
52	0.180 - 0.250	0	0	0.000	0
53	0.180 - 0.250	217	16	0.234	4
54	0.180 - 0.250	0	0	0.000	0
61	0.180 - 0.250	0	0	0.000	0
62	0.180 - 0.250	1,601	118	0.190	22
63	0.180 - 0.250	0	0	0.000	0
64	0.180 - 0.250	0	0	0.000	0
Total	0.180 - 0.250	1,818	134	0.195	26
51	0.250 - 0.900	0	0	0.000	0
52	0.250 - 0.900	0	0	0.000	0
53	0.250 - 0.900	377,333	27,734	0.410	11,371
54	0.250 - 0.900	0	0	0.000	0
61	0.250 - 0.900	0	0	0.000	0
62	0.250 - 0.900	0	0	0.000	0
63	0.250 - 0.900	22,302	1,639	0.364	597
64	0.250 - 0.900	0	0	0.000	0
Total	0.250 - 0.900	399,635	29,373	0.407	11,968
51	+ 0.900	0	0	0.000	0
52	+ 0.900	0	0	0.000	0
53	+ 0.900	0	0	0.000	0
54	+ 0.900	41,445	3,046	1.976	6,019
61	+ 0.900	0	0	0.000	0
62	+ 0.900	0	0	0.000	0
63	+ 0.900	0	0	0.000	0
64	+ 0.900	1,474	108	2.143	231
Total	+ 0.900	42,919	3,154	1.982	6,250
Total	+ 0.180	444,372	32,661	0.559	18,244

MATERIAL	STRINGS	VOLUME		
Zone 51	51	14763733.	0.	1,069,836
Zone 52	52	3037028.	0.	220,674
Zone 53	53	1667387.	0.	120,825
Zone 54	54	203949.	0.	14,779
Zone 61	61	5741962.	0.	416,084
Zone 62	62	489095.	0.	35,442
Zone 63	63	150254.	0.	10,888
Zone 64	64	12967.	0.	940

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4360.5 52 264

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4584.5 51 753

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4423.5 52 614

615

NORTH ZONE RESOURCE - 1999 (MEASURED & INDICATED RUN B&C)

Zone	Grade Interval	Volume	Tons	Grade	Ounces
51	0.000 - 0.100	14,759,143	1,084,797	0.026	28,205
52	0.000 - 0.100	124,565	9,156	0.092	842
53	0.000 - 0.100	5,853	430	0.014	6
54	0.000 - 0.100	0	0	0.000	0
61	0.000 - 0.100	5,680,025	417,482	0.023	9,602
62	0.000 - 0.100	74,961	5,510	0.084	463
63	0.000 - 0.100	1,649	121	0.040	5
64	0.000 - 0.100	0	0	0.000	0
Total	0.000 - 0.100	20,646,196	1,517,496	0.026	39,123
51	0.100 - 0.180	1,431	105	0.115	12
52	0.100 - 0.180	2,826,213	207,727	0.139	28,874
53	0.100 - 0.180	3,877	285	0.149	42
54	0.100 - 0.180	0	0	0.000	0
61	0.100 - 0.180	0	0	0.000	0
62	0.100 - 0.180	244,173	17,947	0.143	2,566
63	0.100 - 0.180	1,263	93	0.154	14
64	0.100 - 0.180	0	0	0.000	0
Total	0.100 - 0.180	3,076,957	226,157	0.139	31,509
51	0.180 - 0.250	0	0	0.000	0
52	0.180 - 0.250	75,136	5,522	0.186	1,027
53	0.180 - 0.250	12,991	955	0.226	216
54	0.180 - 0.250	307	23	0.193	4
61	0.180 - 0.250	0	0	0.000	0
62	0.180 - 0.250	51,065	3,753	0.194	728
63	0.180 - 0.250	5,545	408	0.208	85
64	0.180 - 0.250	0	0	0.000	0
Total	0.180 - 0.250	145,044	10,661	0.193	2,060
51	0.250 - 0.900	0	0	0.000	0
52	0.250 - 0.900	0	0	0.000	0
53	0.250 - 0.900	1,556,484	114,402	0.413	47,248
54	0.250 - 0.900	4,653	342	0.709	242
61	0.250 - 0.900	0	0	0.000	0
62	0.250 - 0.900	0	0	0.000	0
63	0.250 - 0.900	117,955	8,670	0.394	3,416
64	0.250 - 0.900	0	0	0.000	0
Total	0.250 - 0.900	1,679,092	123,414	0.412	50,906
51	+ 0.900	0	0	0.000	0
52	+ 0.900	0	0	0.000	0
53	+ 0.900	7,559	556	1.051	584
54	+ 0.900	156,986	11,538	1.997	23,041
61	+ 0.900	0	0	0.000	0
62	+ 0.900	0	0	0.000	0
63	+ 0.900	0	0	0.000	0
64	+ 0.900	9,665	710	2.023	1,436
Total	+ 0.900	174,210	12,804	1.957	25,062
Total	+ 0.180	1,998,346	146,879	0.531	78,029

NORTH ZONE RESOURCE - 1999										
	Domains			Partial Blocks (Run A)				Difference (Domains - Blocks)		
Zone	Volume	Tons		Volume	Tons	Grade	Ounces	Volume	Tons	% Diff.
51	14,763,733	1,085,569		14,760,574	1,084,902	0.026	28,207	3,159	667	99.98%
52	3,037,028	223,311		3,025,914	222,405	0.138	30,692	11,114	906	99.63%
53	1,667,387	122,602		1,642,000	120,687	0.412	49,723	25,387	1,915	98.48%
54	203,949	14,996		191,333	14,063	1.961	27,578	12,616	933	93.81%
61	5,741,962	422,203		5,680,025	417,482	0.023	9,602	61,937	4,721	98.92%
62	489,095	35,963		370,200	27,210	0.138	3,755	118,895	8,753	75.69%
63	150,254	11,048		126,411	9,291	0.379	3,521	23,843	1,757	84.13%
64	12,967	953		9,665	710	2.023	1,436	3,302	243	74.54%
Totals	**26,066,375**	**1,916,645**		**25,806,122**	**1,896,750**	**0.081**	**154,515**	**260,253**	**19,895**	**99.00%**

NORTH ZONE RESOURCE - 1999										
	Domains			Partial Blocks (Run B)				Difference (Domains - Blocks)		
Zone	Volume	Tons		Volume	Tons	Grade	Ounces	Volume	Tons	% Diff.
51	14,763,733	1,085,569		14,760,574	1,084,902	0.026	28,207	3,159	667	99.98%
52	3,037,028	223,311		3,025,914	222,405	0.138	30,692	11,114	906	99.63%
53	1,667,387	122,602		1,586,763	116,627	0.412	48,050	80,624	5,975	95.16%
54	203,949	14,996		123,429	9,072	1.904	17,273	80,520	5,924	60.52%
61	5,741,962	422,203		5,680,025	417,482	0.023	9,602	61,937	4,721	98.92%
62	489,095	35,963		370,200	27,210	0.138	3,755	118,895	8,753	75.69%
63	150,254	11,048		126,411	9,291	0.379	3,521	23,843	1,757	84.13%
64	12,967	953		9,665	710	2.023	1,436	3,302	243	74.54%
Totals	**26,066,375**	**1,916,645**		**25,682,981**	**1,887,699**	**0.076**	**142,537**	**383,394**	**28,946**	**98.53%**

NORTH ZONE RESOURCE - 1999										
	Domains			Partial Blocks (Run A)				Difference (Domains - Blocks)		
Zone	Volume	Tons		Volume	Tons	Grade	Ounces	Volume	Tons	% Diff.
51	14,763,733	1,085,569		14,760,574	1,084,902	0.026	28,207	3,159	667	99.98%
52	3,037,028	223,311		3,025,914	222,405	0.138	30,692	11,114	906	99.63%
53	1,667,387	122,602		1,642,000	120,687	0.412	49,723	25,387	1,915	98.48%
54	203,949	14,996		191,333	14,063	1.961	27,578	12,616	933	93.81%
61	5,741,962	422,203		5,680,025	417,482	0.023	9,602	61,937	4,721	98.92%
62	489,095	35,963		370,200	27,210	0.138	3,755	118,895	8,753	75.69%
63	150,254	11,048		126,411	9,291	0.379	3,521	23,843	1,757	84.13%
64	12,967	953		9,665	710	2.023	1,436	3,302	243	74.54%
Totals	**26,066,375**	**1,916,645**		**25,806,122**	**1,896,750**	**0.081**	**154,515**	**260,253**	**19,895**	**99.00%**

NORTH ZONE RESOURCE - 1999										
	Domains			Partial Blocks (Run B)				Difference (Domains - Blocks)		
Zone	Volume	Tons		Volume	Tons	Grade	Ounces	Volume	Tons	% Diff.
51	14,763,733	1,085,569		14,760,574	1,084,902	0.026	28,207	3,159	667	99.98%
52	3,037,028	223,311		3,025,914	222,405	0.138	30,692	11,114	906	99.63%
53	1,667,387	122,602		1,586,763	116,627	0.412	48,050	80,624	5,975	95.16%
54	203,949	14,996		123,429	9,072	1.904	17,273	80,520	5,924	60.52%
61	5,741,962	422,203		5,680,025	417,482	0.023	9,602	61,937	4,721	98.92%
62	489,095	35,963		370,200	27,210	0.138	3,755	118,895	8,753	75.69%
63	150,254	11,048		126,411	9,291	0.379	3,521	23,843	1,757	84.13%
64	12,967	953		9,665	710	2.023	1,436	3,302	243	74.54%
Totals	**26,066,375**	**1,916,645**		**25,682,981**	**1,887,699**	**0.076**	**142,537**	**383,394**	**28,946**	**98.53%**

NORTH ZONE RESOURCE - 1999										
	Domains			Partial Blocks (Run C)				Difference (Domains - Blocks)		
Zone	Volume	Tons		Volume	Tons	Grade	Ounces	Volume	Tons	% Diff.
51	14,763,733	1,085,569		14,760,574	1,084,902	0.026	28,207	3,159	667	99.98%
52	3,037,028	223,311		3,025,914	222,405	0.138	30,692	11,114	906	99.63%
53	1,667,387	122,602		1,289,018	94,743	0.412	39,034	378,369	27,859	77.31%
54	203,949	14,996		161,945	11,903	1.957	23,294	42,004	3,093	79.40%
61	5,741,962	422,203		5,680,025	417,482	0.023	9,602	61,937	4,721	98.92%
62	489,095	35,963		370,200	27,210	0.138	3,755	118,895	8,753	75.69%
63	150,254	11,048		126,411	9,291	0.379	3,521	23,843	1,757	84.13%
64	12,967	953		9,665	710	2.023	1,436	3,302	243	74.54%
Totals	**26,066,375**	**1,916,645**		**25,423,752**	**1,868,646**	**0.075**	**139,542**	**642,623**	**47,999**	**97.53%**

NORTH ZONE RESOURCE - 1999										
	Domains		Partial Blocks (Run A)				Difference (Domains - Blocks)		
Zone	Volume	Tons	Volume	Tons	Grade	Ounces	Volume	Tons	% Diff.
51	14,763,733	1,085,569	14,760,574	1,084,902	0.026	28,207	3,159	667	99.98%
52	3,037,028	223,311	3,025,914	222,405	0.138	30,692	11,114	906	99.63%
53	1,667,387	122,602	1,642,000	120,687	0.412	49,723	25,387	1,915	98.48%
54	203,949	14,996	191,333	14,063	1.961	27,578	12,616	933	93.81%
61	5,741,962	422,203	5,680,025	417,482	0.023	9,602	61,937	4,721	98.92%
62	489,095	35,963	370,200	27,210	0.138	3,755	118,895	8,753	75.69%
63	150,254	11,048	126,411	9,291	0.379	3,521	23,843	1,757	84.13%
64	12,967	953	9,665	710	2.023	1,436	3,302	243	74.54%
Totals	**26,066,375**	**1,916,645**	**25,806,122**	**1,896,750**	**0.081**	**154,515**	**260,253**	**19,895**	**99.00%**

NORTH ZONE RESOURCE - 1999									
	Domains		Partial Blocks (Run B)				Difference (Domains - Blocks)		
Zone	Volume	Tons	Volume	Tons	Grade	Ounces	Volume	Tons	% Diff.
51	14,763,733	1,085,569	14,763,171	1,085,093	0.026	28,212	562	476	100.00%
52	3,037,028	223,311	3,036,463	223,180	0.138	30,799	565	131	99.98%
53	1,667,387	122,602	1,586,763	116,627	0.412	48,050	80,624	5,975	95.16%
54	203,949	14,996	123,429	9,072	1.904	17,273	80,520	5,924	60.52%
61	5,741,962	422,203	5,680,025	417,482	0.023	9,602	61,937	4,721	98.92%
62	489,095	35,963	370,200	27,210	0.138	3,755	118,895	8,753	75.69%
63	150,254	11,048	126,411	9,291	0.379	3,521	23,843	1,757	84.13%
64	12,967	953	9,665	710	2.023	1,436	3,302	243	74.54%
Totals	**26,066,375**	**1,916,645**	**25,696,127**	**1,888,665**	**0.076**	**142,649**	**370,248**	**27,980**	**98.58%**

NORTH ZONE RESOURCE - 1999									
	Domains		Partial Blocks (Run C)				Difference (Domains - Blocks)		
Zone	Volume	Tons	Volume	Tons	Grade	Ounces	Volume	Tons	% Diff.
51	14,763,733	1,085,569	14,760,574	1,084,902	0.026	28,207	3,159	667	99.98%
52	3,037,028	223,311	3,025,914	222,405	0.138	30,692	11,114	906	99.63%
53	1,667,387	122,602	1,289,018	94,743	0.412	39,034	378,369	27,859	77.31%
54	203,949	14,996	161,945	11,903	1.957	23,294	42,004	3,093	79.40%
61	5,741,962	422,203	5,680,025	417,482	0.023	9,602	61,937	4,721	98.92%
62	489,095	35,963	370,200	27,210	0.138	3,755	118,895	8,753	75.69%
63	150,254	11,048	126,411	9,291	0.379	3,521	23,843	1,757	84.13%
64	12,967	953	9,665	710	2.023	1,436	3,302	243	74.54%
Totals	**26,066,375**	**1,916,645**	**25,423,752**	**1,868,646**	**0.075**	**139,542**	**642,623**	**47,999**	**97.53%**

NORTH ZONE RESOURCE - 1999 (MEASURED & INDICATED RUN B&C)

Zone	Grade Interval	Volume	Tons	Grade	Ounces
51	0.000 - 0.100	14,763,171	1,085,093	0.026	28,212
52	0.000 - 0.100	95,797	7,041	0.092	648
53	0.000 - 0.100	5,853	430	0.014	6
54	0.000 - 0.100	0	0	0.000	0
61	0.000 - 0.100	5,680,025	417,482	0.023	9,602
62	0.000 - 0.100	74,961	5,510	0.084	463
63	0.000 - 0.100	1,649	121	0.040	5
64	0.000 - 0.100	0	0	0.000	0
Total	0.000 - 0.100	20,621,456	1,515,677	0.026	38,936
51	0.100 - 0.180	1,431	105	0.115	12
52	0.100 - 0.180	2,911,677	214,008	0.139	29,747
53	0.100 - 0.180	3,877	285	0.149	42
54	0.100 - 0.180	0	0	0.000	0
61	0.100 - 0.180	0	0	0.000	0
62	0.100 - 0.180	244,173	17,947	0.143	2,566
63	0.100 - 0.180	1,263	93	0.154	14
64	0.100 - 0.180	0	0	0.000	0
Total	0.100 - 0.180	3,162,421	232,438	0.139	32,382
51	0.180 - 0.250	0	0	0.000	0
52	0.180 - 0.250	28,989	2,131	0.183	390
53	0.180 - 0.250	12,991	955	0.226	216
54	0.180 - 0.250	307	23	0.193	4
61	0.180 - 0.250	0	0	0.000	0
62	0.180 - 0.250	51,065	3,753	0.194	728
63	0.180 - 0.250	5,545	408	0.208	85
64	0.180 - 0.250	0	0	0.000	0
Total	0.180 - 0.250	98,897	7,270	0.196	1,423
51	0.250 - 0.900	0	0	0.000	0
52	0.250 - 0.900	0	0	0.000	0
53	0.250 - 0.900	1,556,484	114,402	0.413	47,248
54	0.250 - 0.900	4,653	342	0.709	242
61	0.250 - 0.900	0	0	0.000	0
62	0.250 - 0.900	0	0	0.000	0
63	0.250 - 0.900	117,955	8,670	0.394	3,416
64	0.250 - 0.900	0	0	0.000	0
Total	0.250 - 0.900	1,679,092	123,414	0.412	50,906
51	+ 0.900	0	0	0.000	0
52	+ 0.900	0	0	0.000	0
53	+ 0.900	7,559	556	1.051	584
54	+ 0.900	156,986	11,538	1.997	23,041
61	+ 0.900	0	0	0.000	0
62	+ 0.900	0	0	0.000	0
63	+ 0.900	0	0	0.000	0
64	+ 0.900	9,665	710	2.023	1,436
Total	+ 0.900	174,210	12,804	1.957	25,062
Total	+ 0.180	1,952,199	143,488	0.539	77,392

Domains 51 and 52 Run 2

All rotations are according to the MedSystem Conventions. These conventions are as follows:

1. First, rotate around the Z axis according to the left hand rule.
2. Second, rotate around the rotated X axis according to the right hand rule.
3. Third, rotate around the rotated Y axis according to the left hand rule.

The right and left hand rules are easy to follow. For example to rotate around the Z axis according to the left rule, imagine grabbing the Z axis with your left hand so that your thumb is pointing in the direction of of increasing Z values. Then the fingers will be pointing in the direction of a positive rotation. A negative rotation angle indicates a rotation in exactly the opposite direction. Note, the exponential ranges are accord ing to the MedSystem convention, i.e., one third of the practical range.

Nugget ==> 0.183
C1 ==> 0.651
C2 ==> 0.166

First Structure -- Exponential

Rotation about the Z axis ==> -68
Rotation about the X axis ==> 69
Rotation about the Y axis ==> -4

Range along the Z axis	==> 6.38	Azimuth ==> 287.73 Dip ==> -21.44
Range along the X axis	==> 10.17	Azimuth ==> 18.24 Dip ==> -1.29
Range along the Y axis	==> 2.60	Azimuth ==> 111.51 Dip ==> -68.51

Second Structure -- Exponential

Rotation about the Z axis ==> -21
Rotation about the X axis ==> 10
Rotation about the Y axis ==> -59

Range along the Z axis	==> 139.12	Azimuth ==> 255.67 Dip ==> -30.40
Range along the X axis	==> 91.37	Azimuth ==> 52.58 Dip ==> -57.47
Range along the Y axis	==> 30.26	Azimuth ==> 159.44 Dip ==> -10.48

417

90

Modeling Criteria

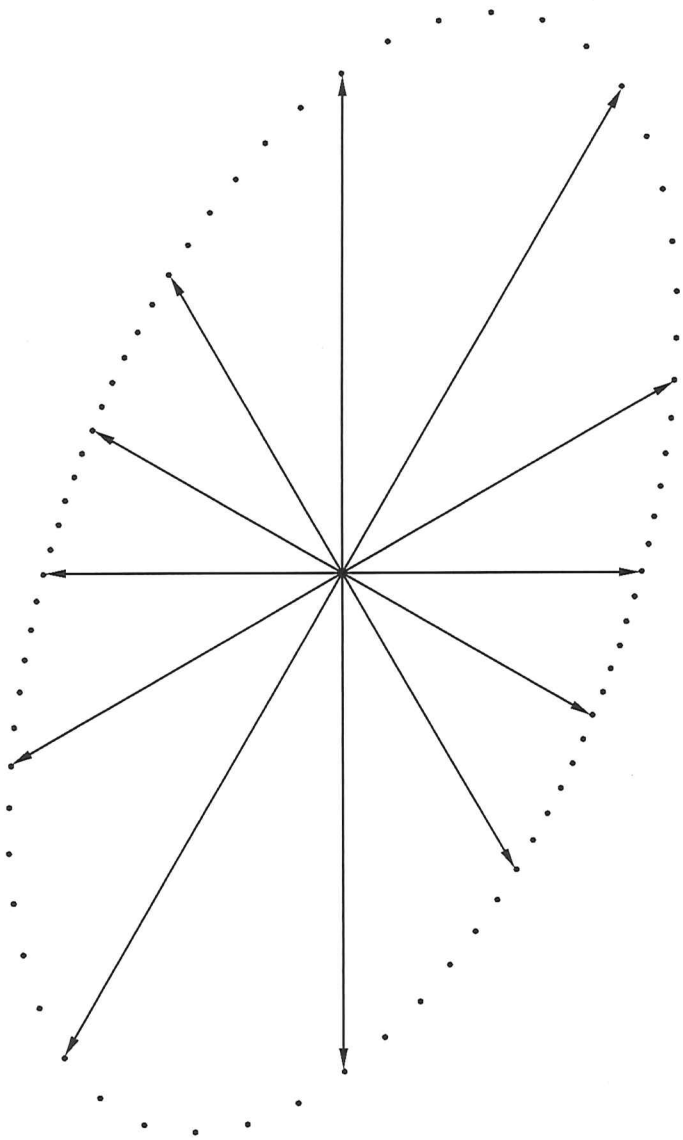
Minimum number pairs req'd ==> 200
Sample variogram points weighted by # pairs
Max allowable drift on head and tail means ==> 0.2

256
-30
+10
1.60
4.96

Structure Number 1

Rose Diagram of Ranges Dipping 0 Degrees
Scale:

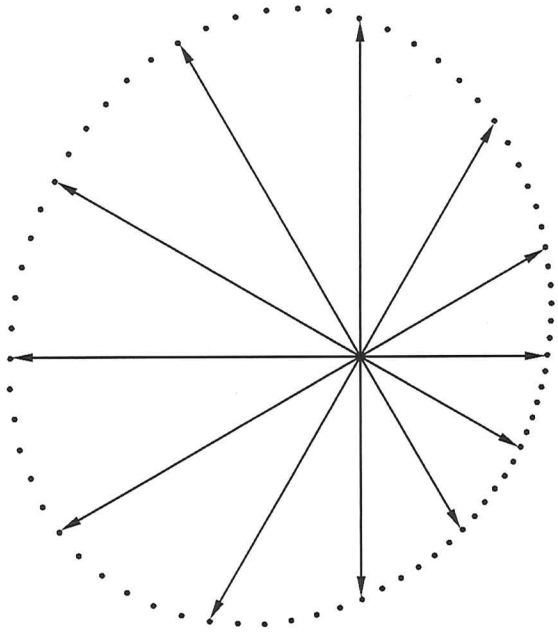
10 Units



Structure Number 1

Rose Diagram of Ranges Dipping 30 Degrees
Scale:

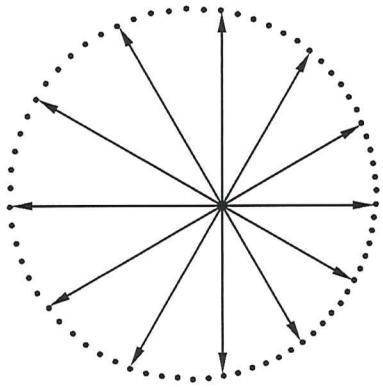
10 Units



Structure Number 1

Rose Diagram of Ranges Dipping 60 Degrees
Scale:

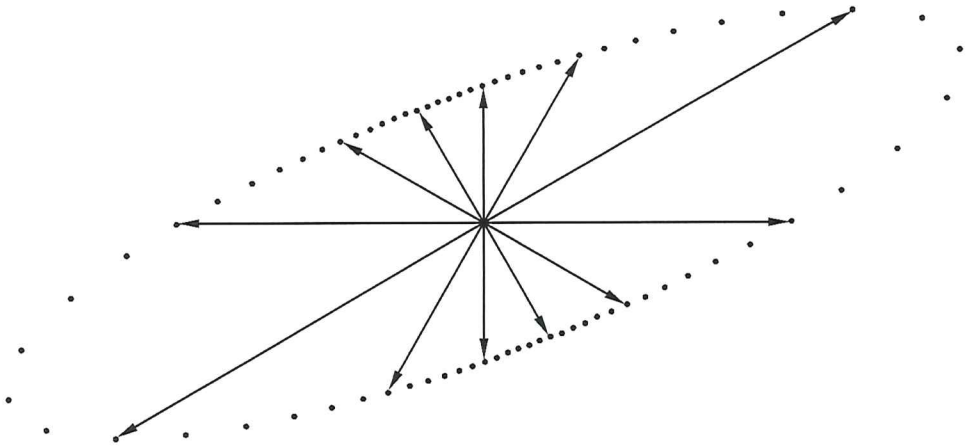
10 Units



Structure Number 2

Rose Diagram of Ranges Dipping 0 Degrees
Scale:

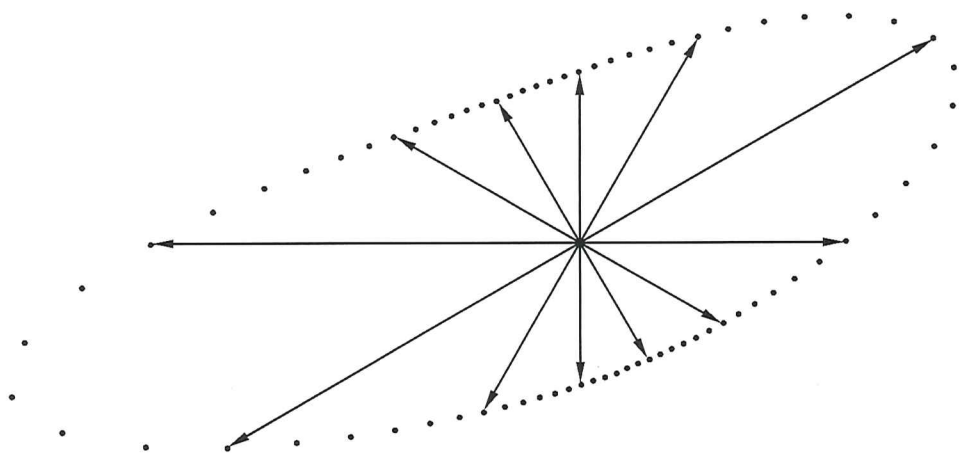
133 Units



Structure Number 2

Rose Diagram of Ranges Dipping 30 Degrees
Scale:

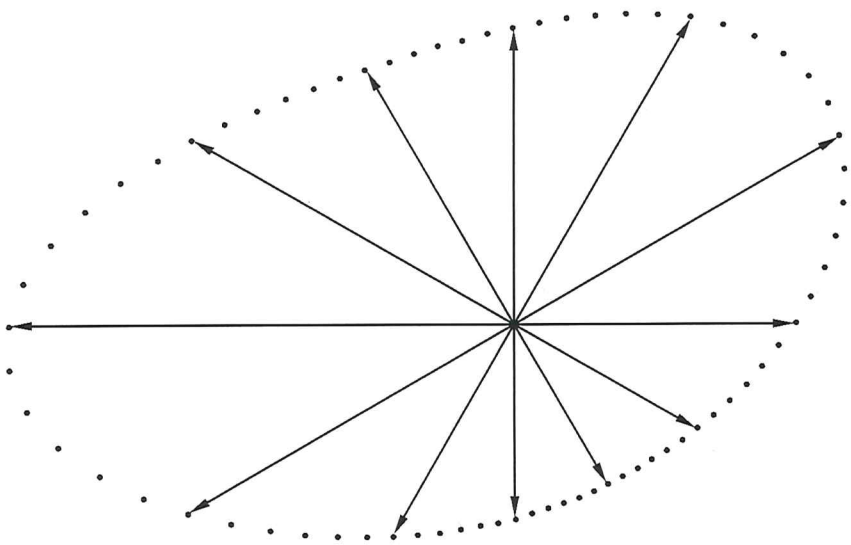
133 Units



Structure Number 2

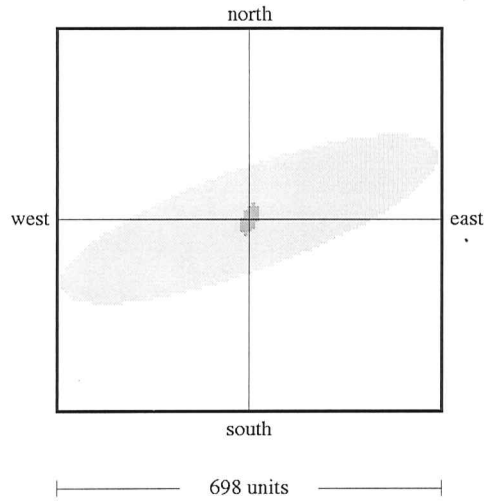
Rose Diagram of Ranges Dipping 60 Degrees
Scale:

133 Units

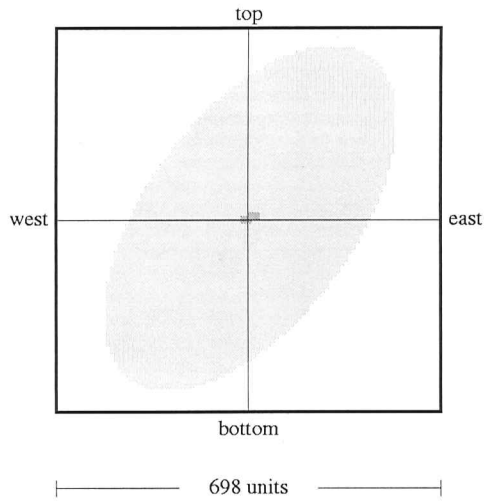


Sectional Views Through the Ellipsoids

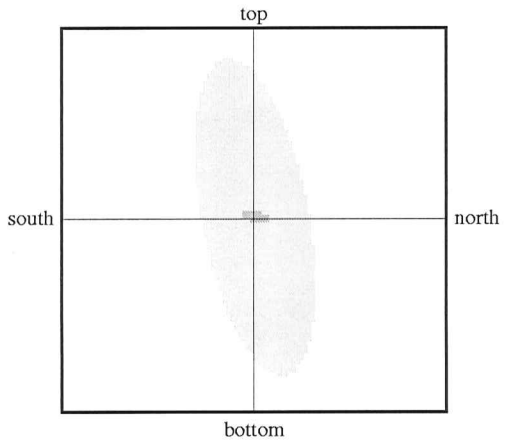
X-Y plane through origin looking down.



X-Z plane through origin looking north.

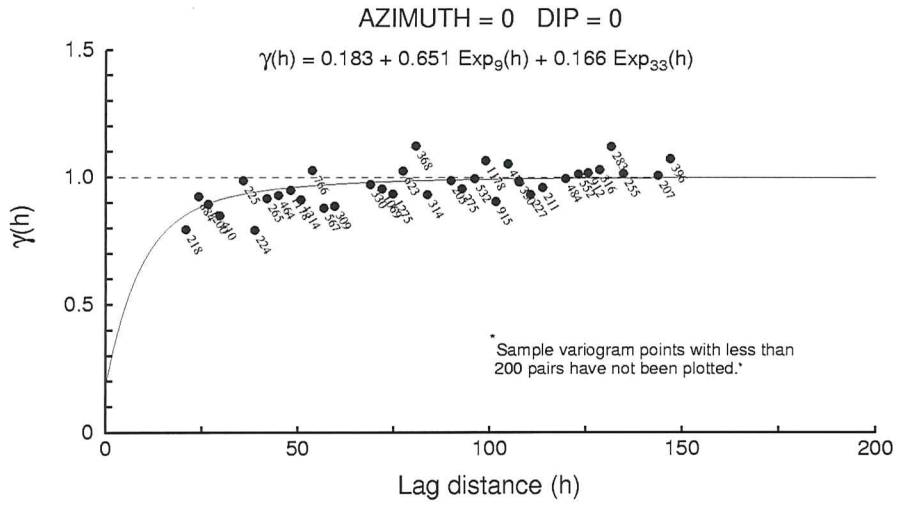


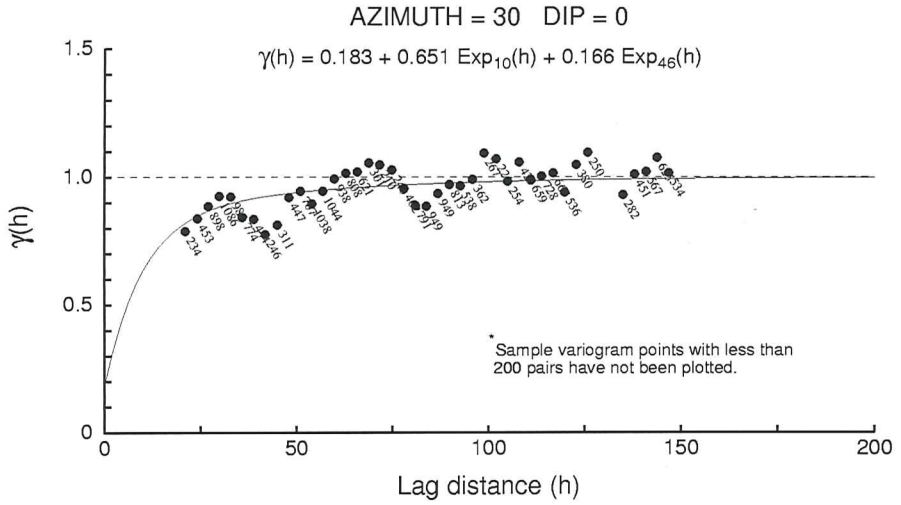
Y-Z plane through origin looking west.

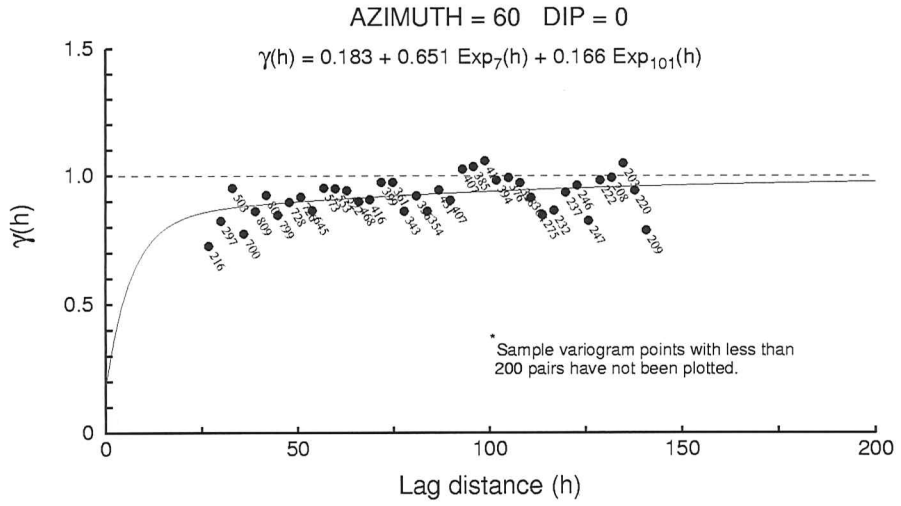


Note -- the orientation, dip and lengths of the ellipsoid axes in these figures may be "apparent" rather than "true".

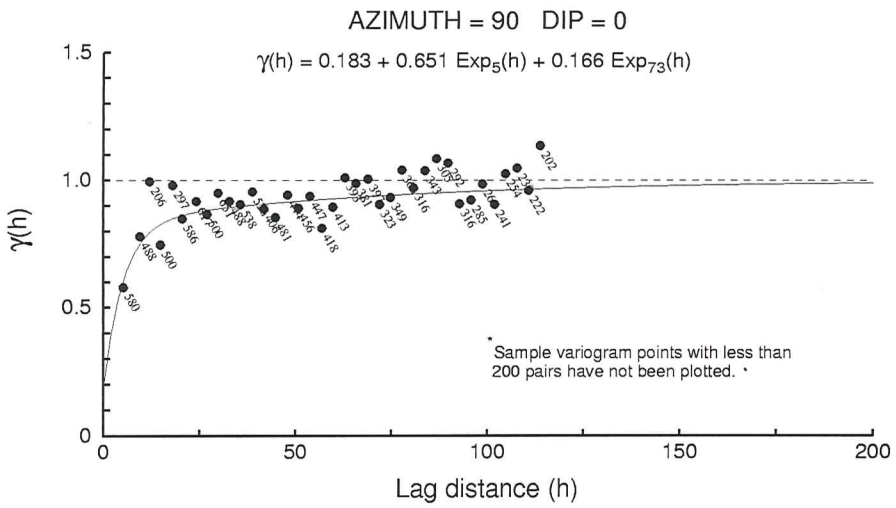
Domains 51 and 52 Run 2

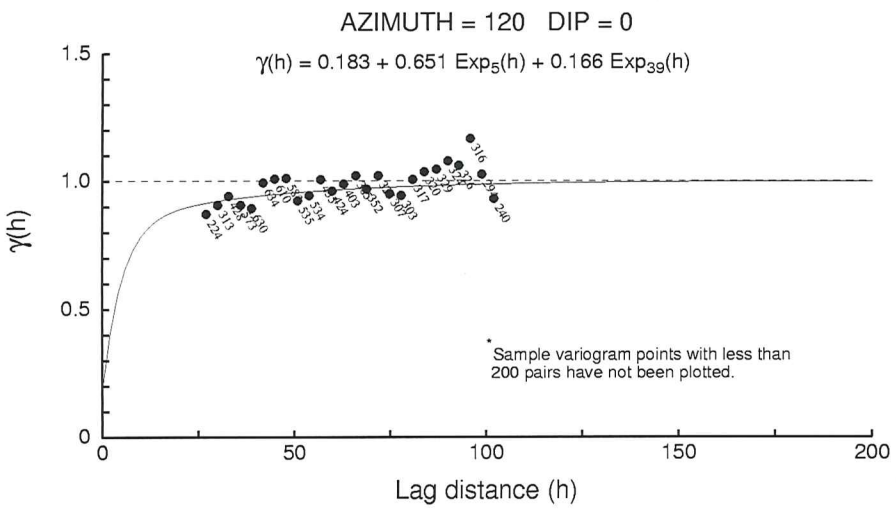


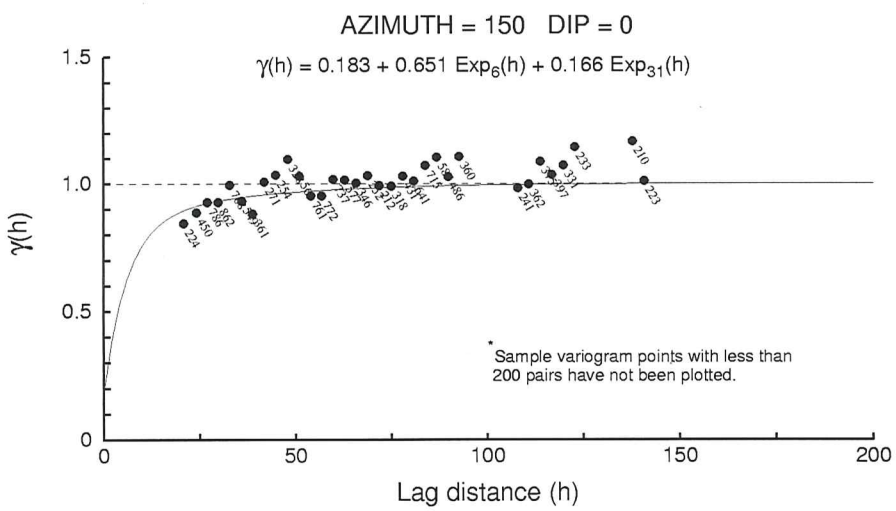




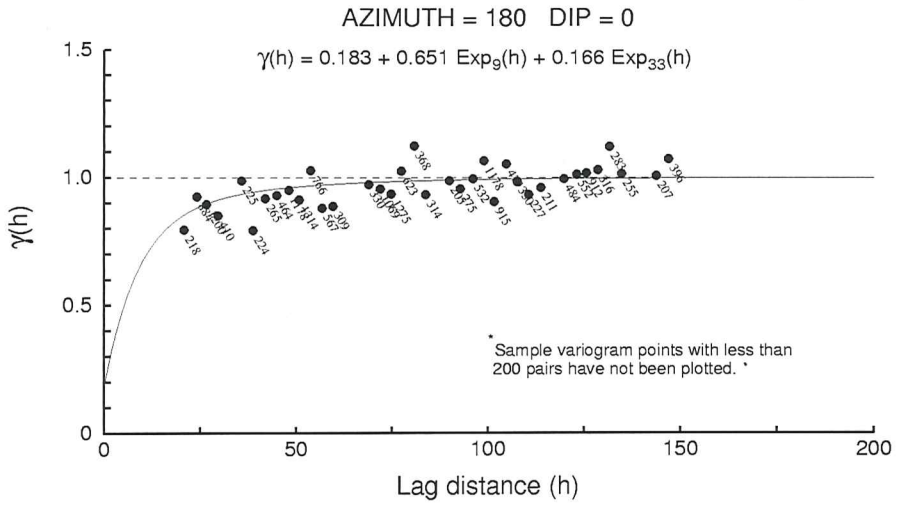
Domains 51 and 52 Run 2

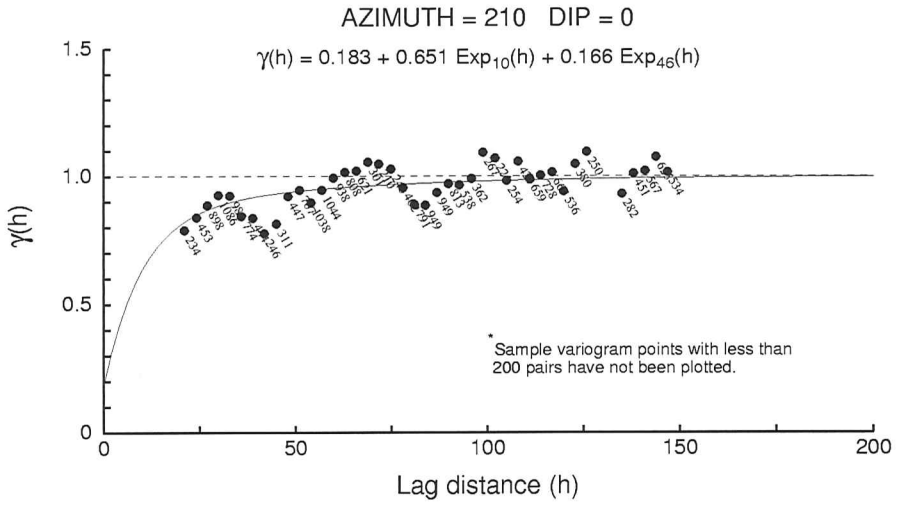


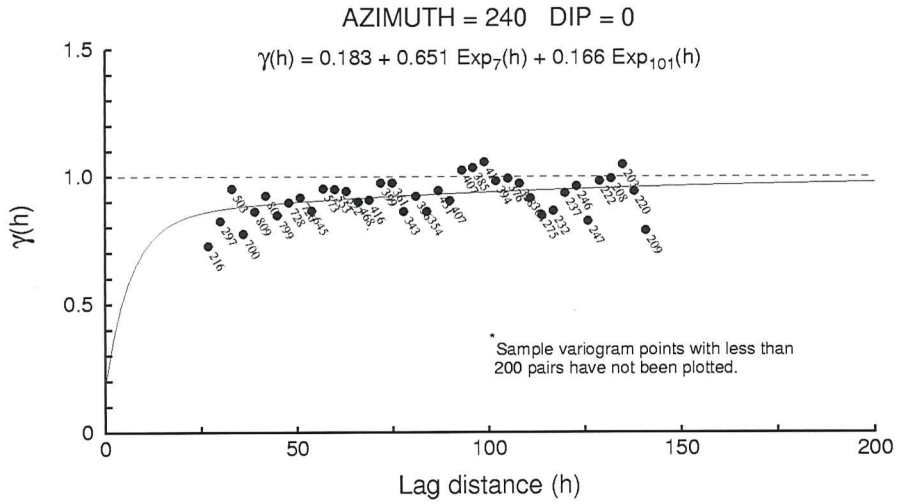




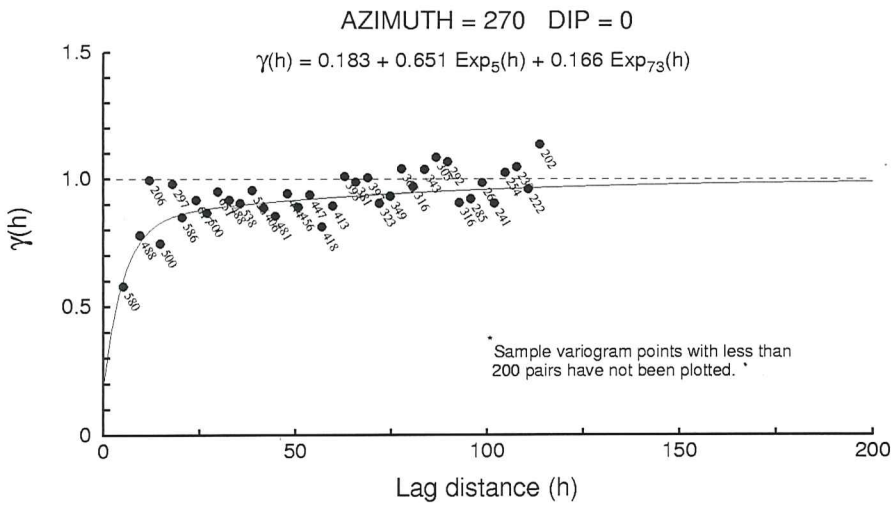
Domains 51 and 52 Run 2

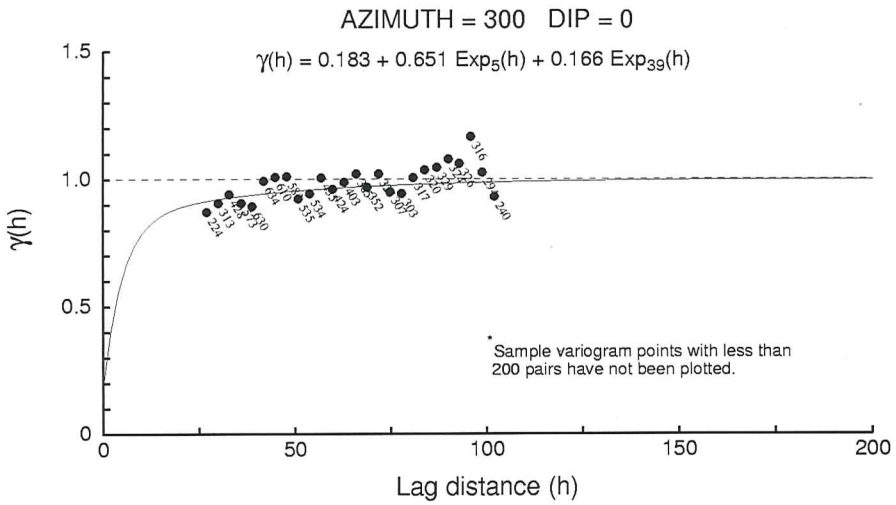


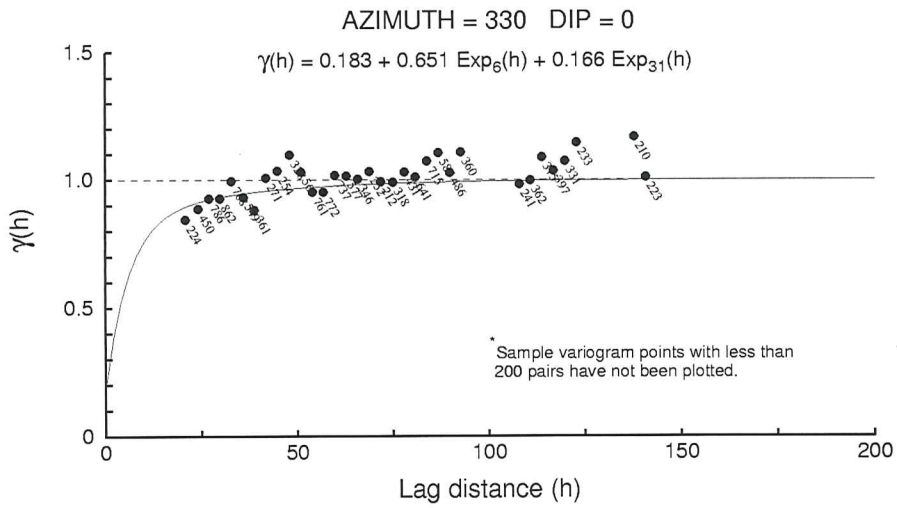




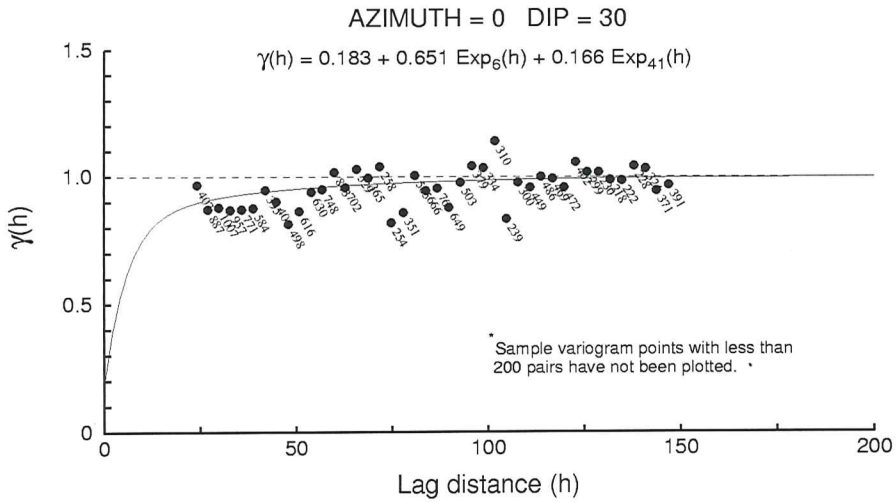
Domains 51 and 52 Run 2

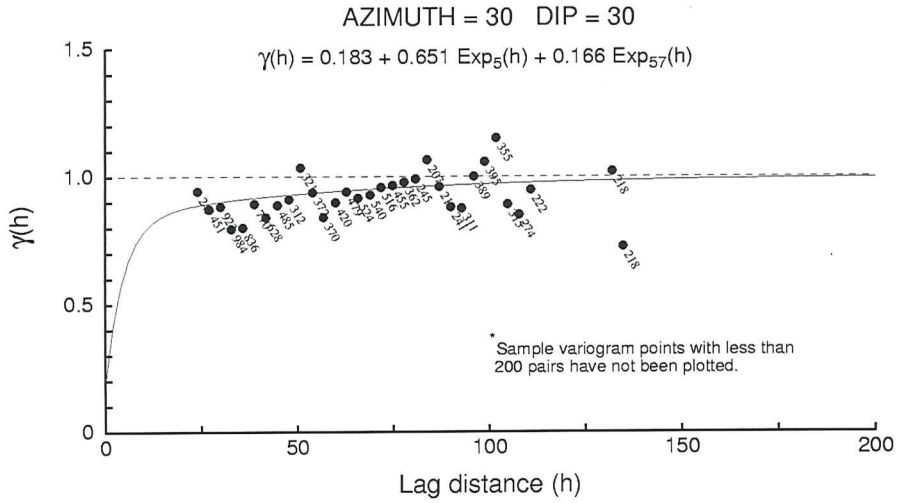


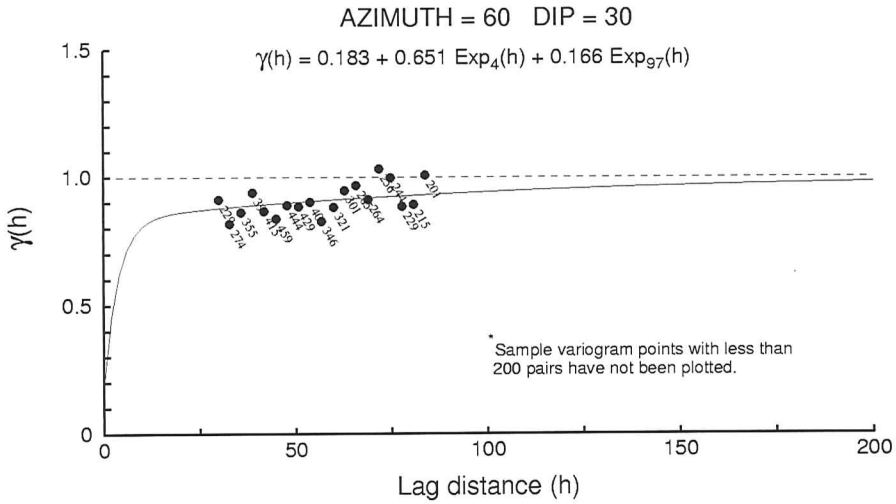




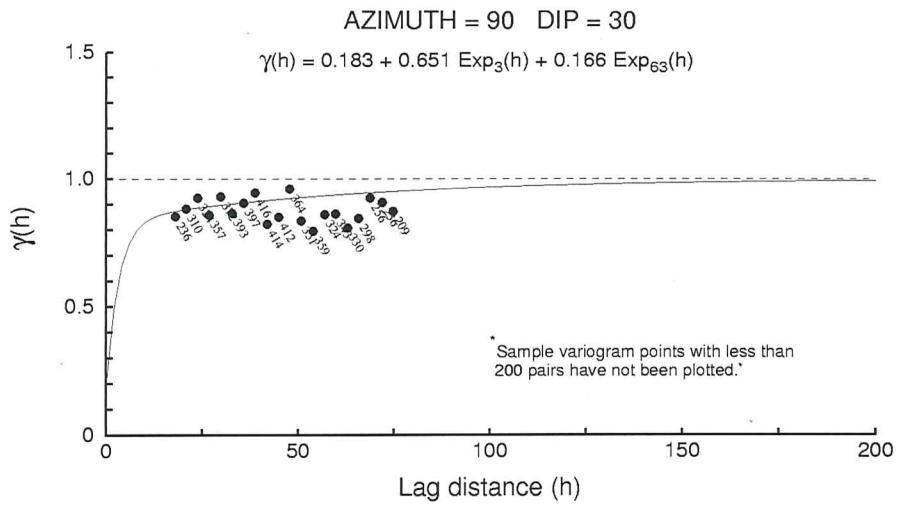
Domains 51 and 52 Run 2

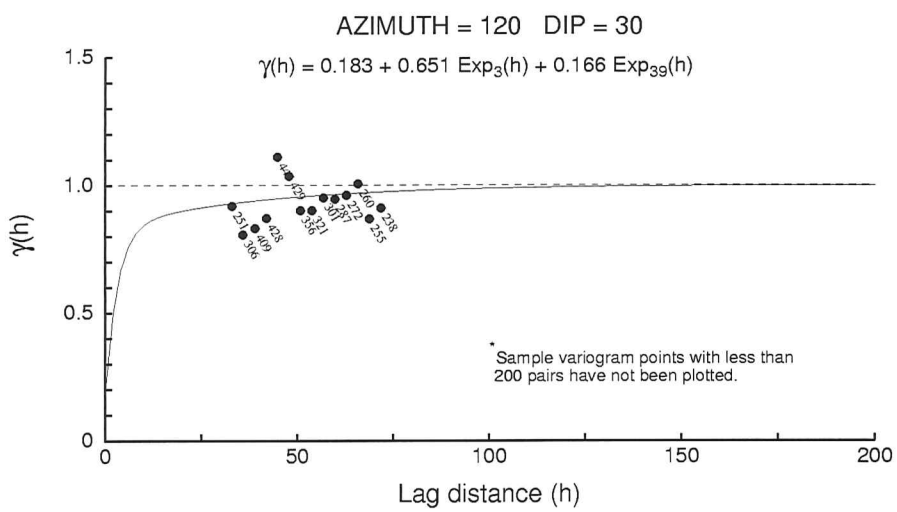


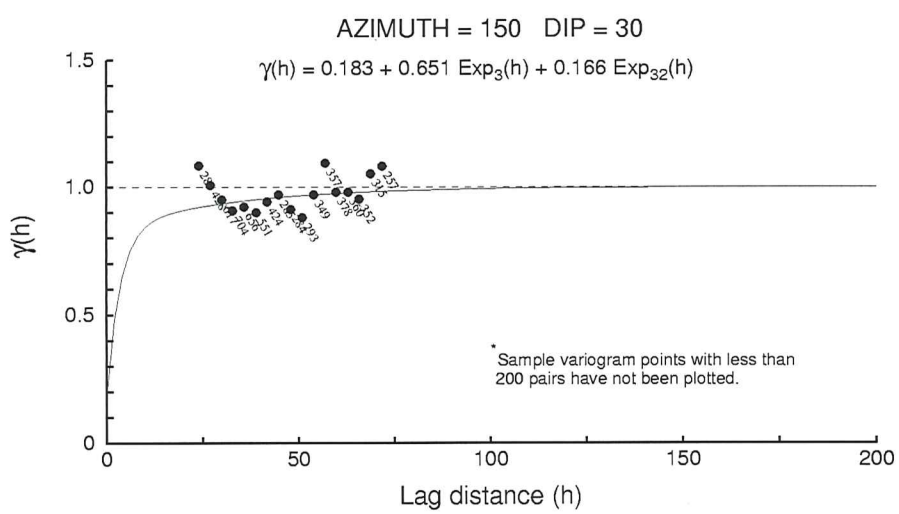




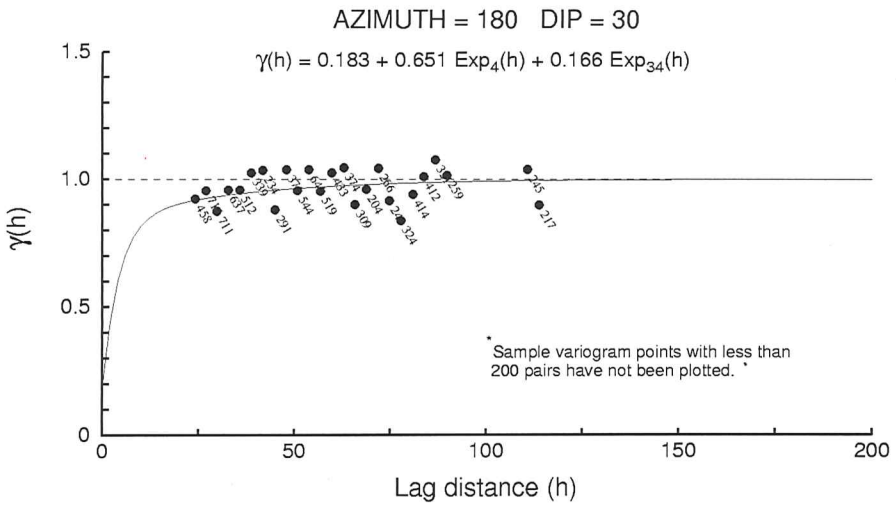
Domains 51 and 52 Run 2

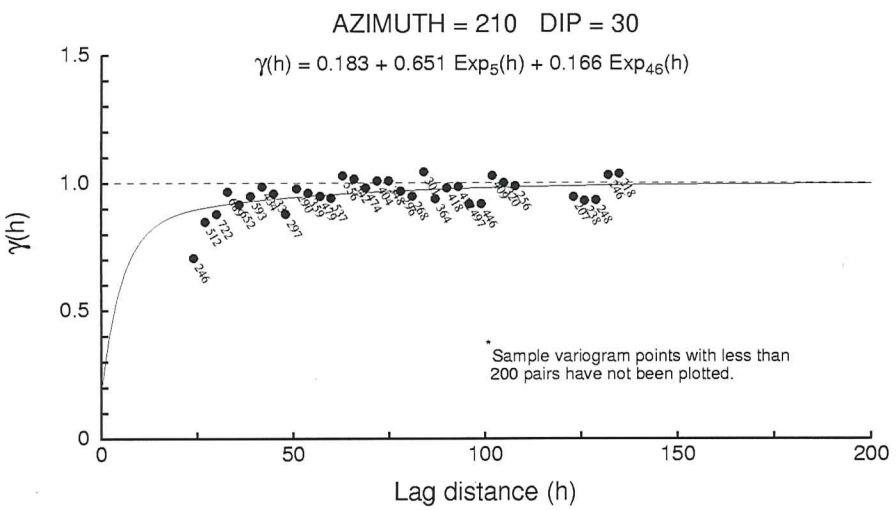


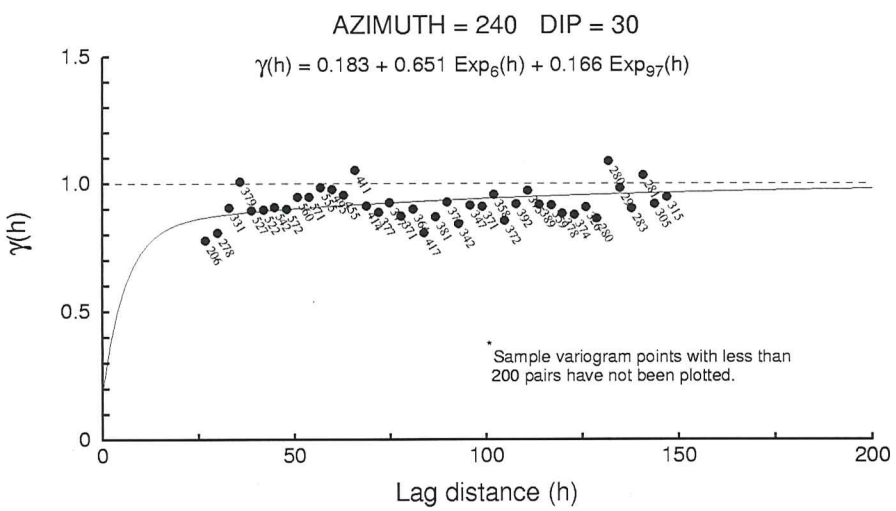




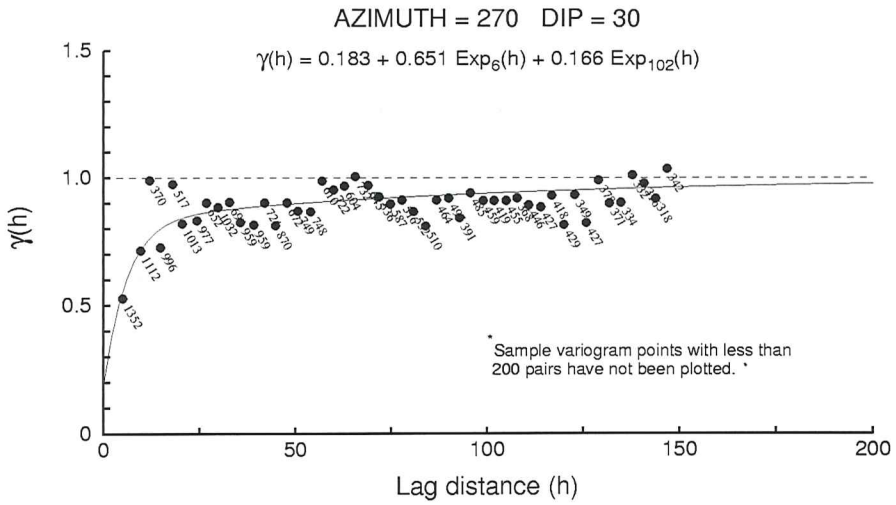
Domains 51 and 52 Run 2

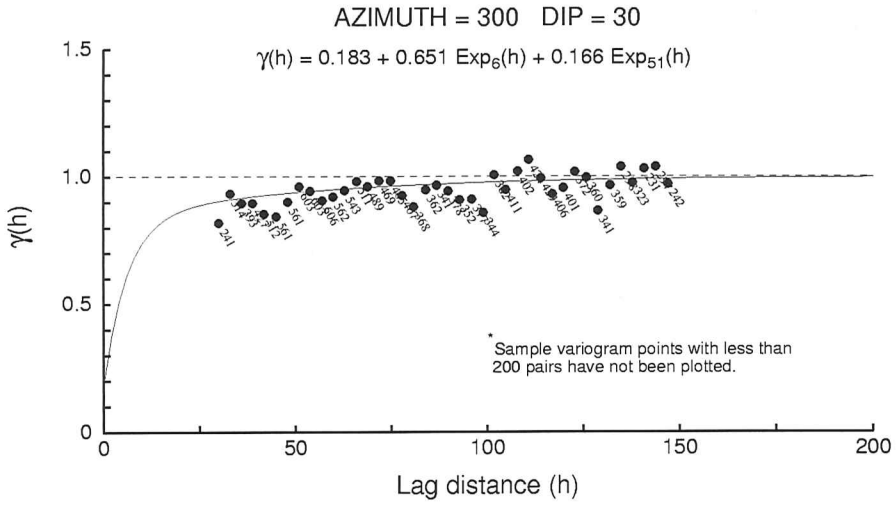


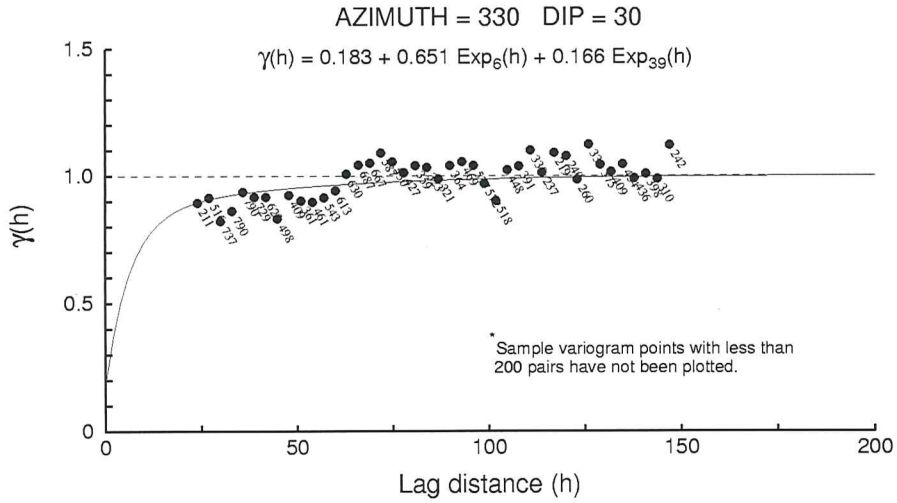




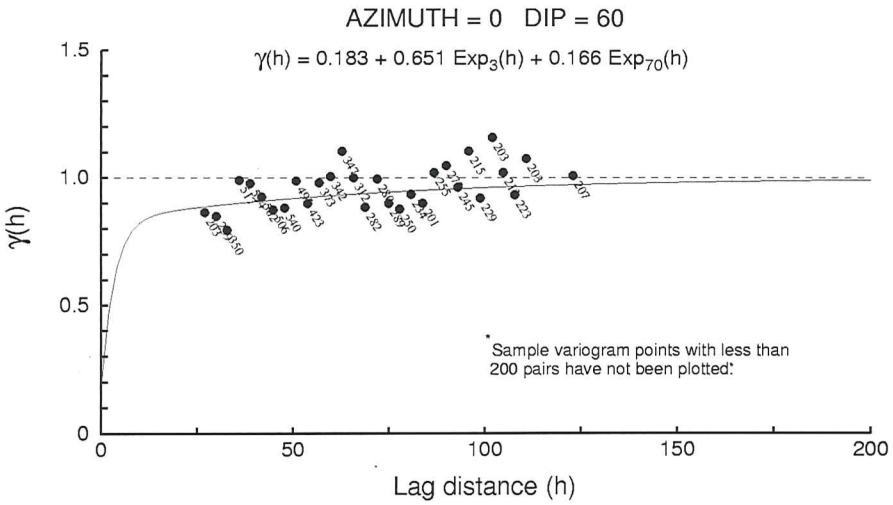
Domains 51 and 52 Run 2

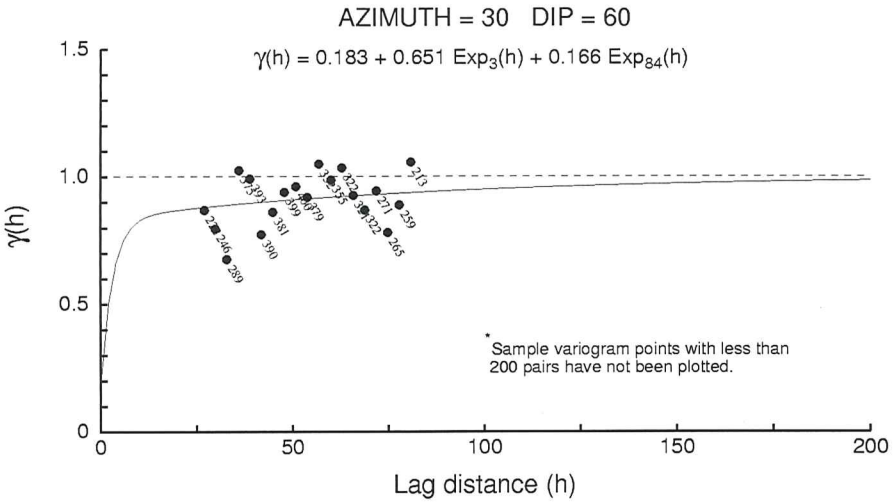


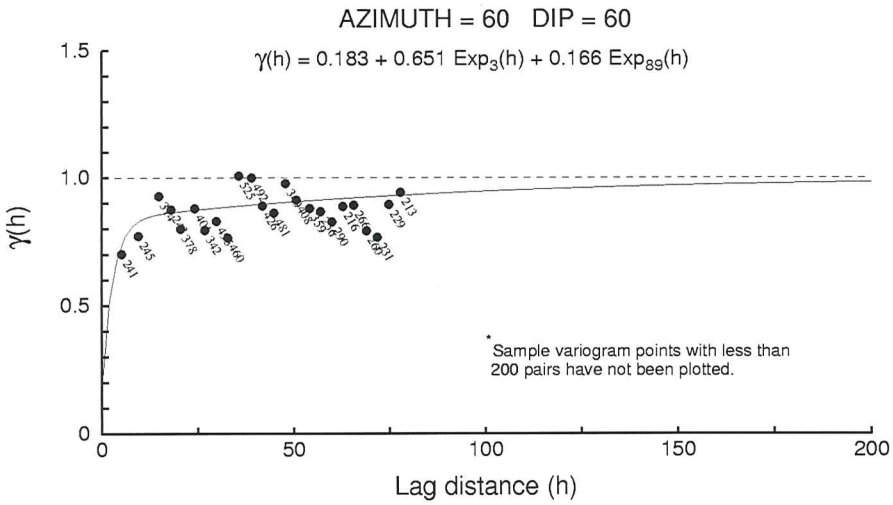




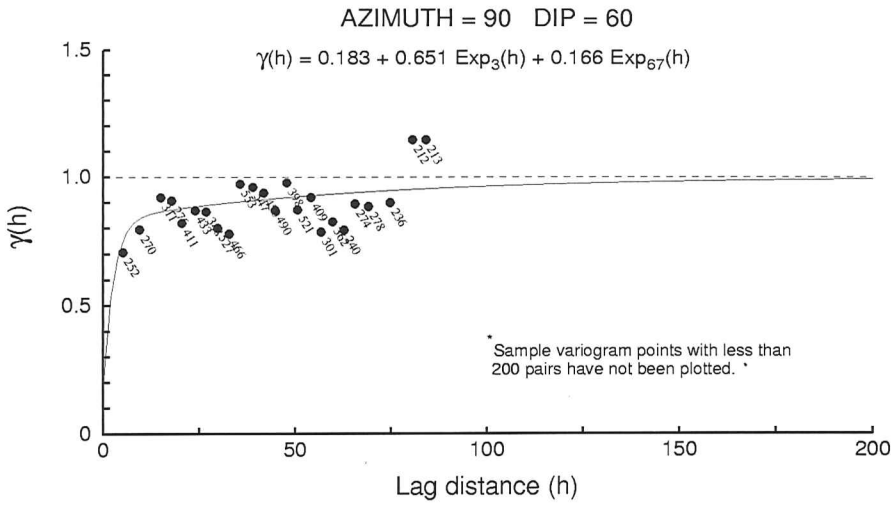
Domains 51 and 52 Run 2

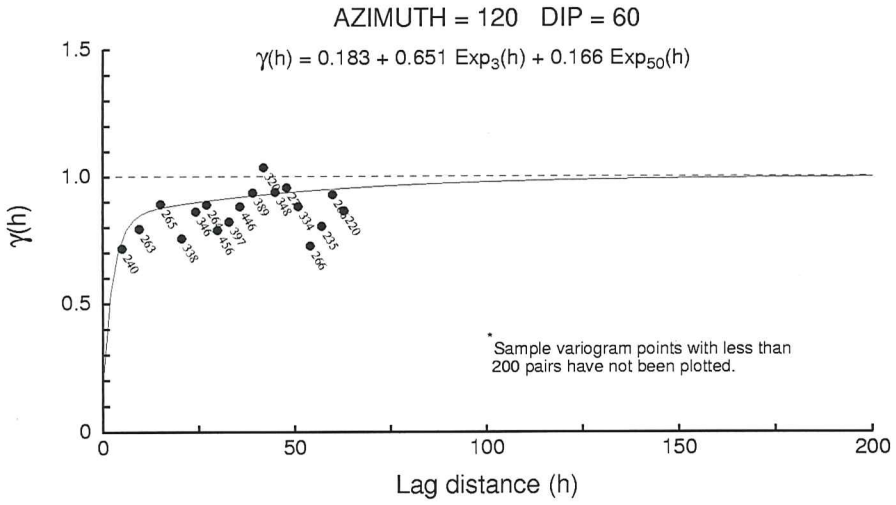


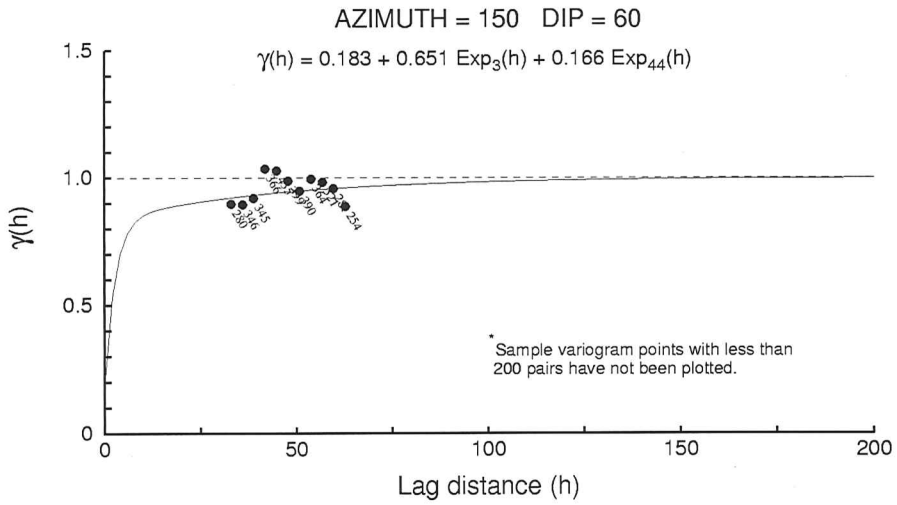




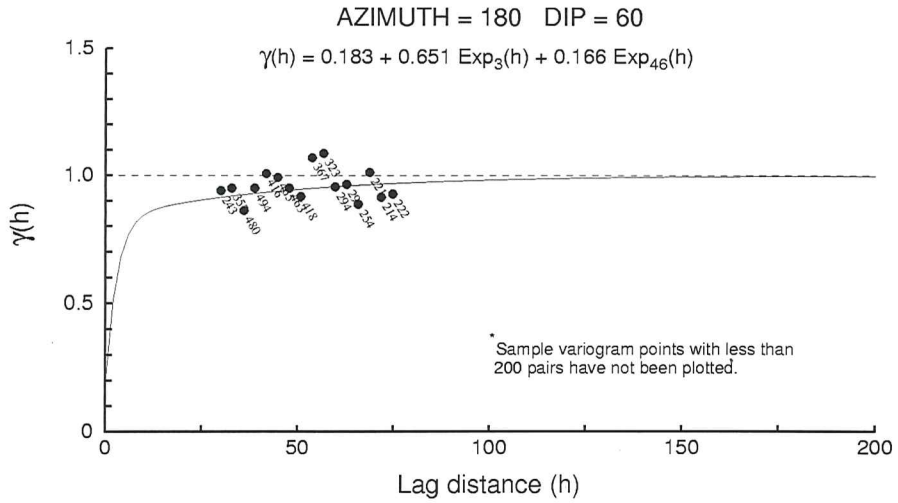
Domains 51 and 52 Run 2

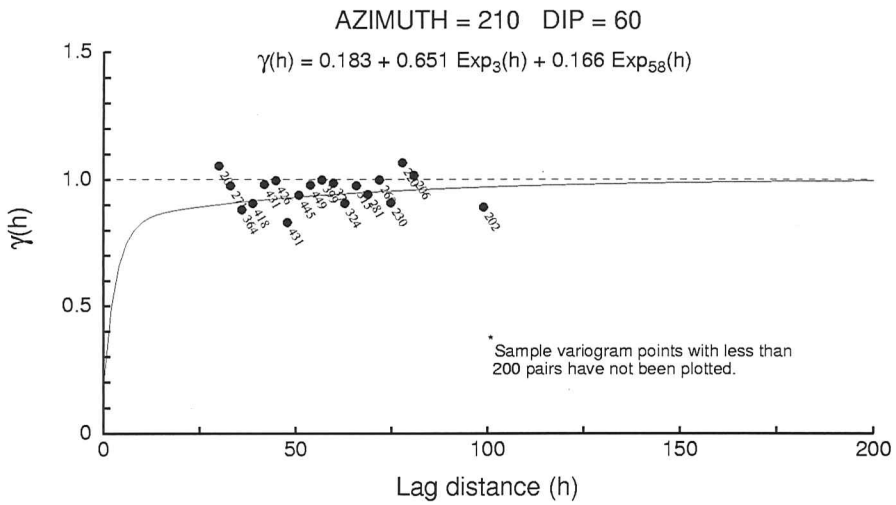


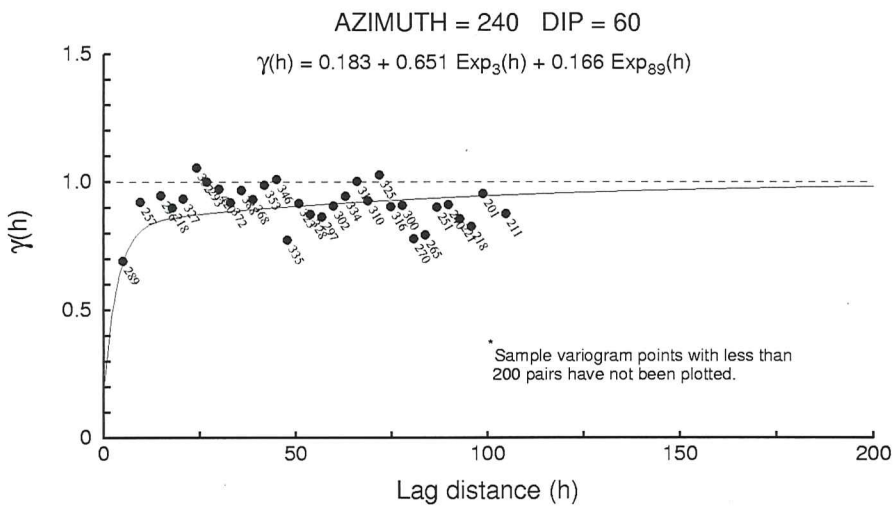




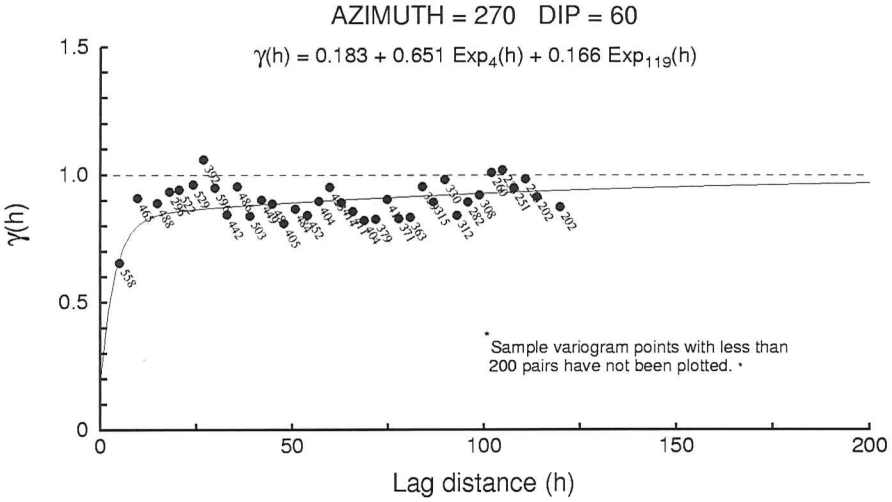
Domains 51 and 52 Run 2

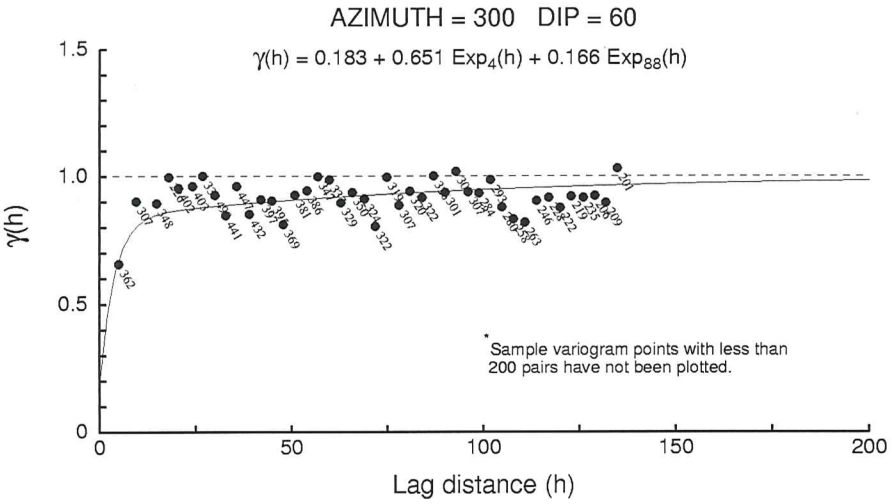


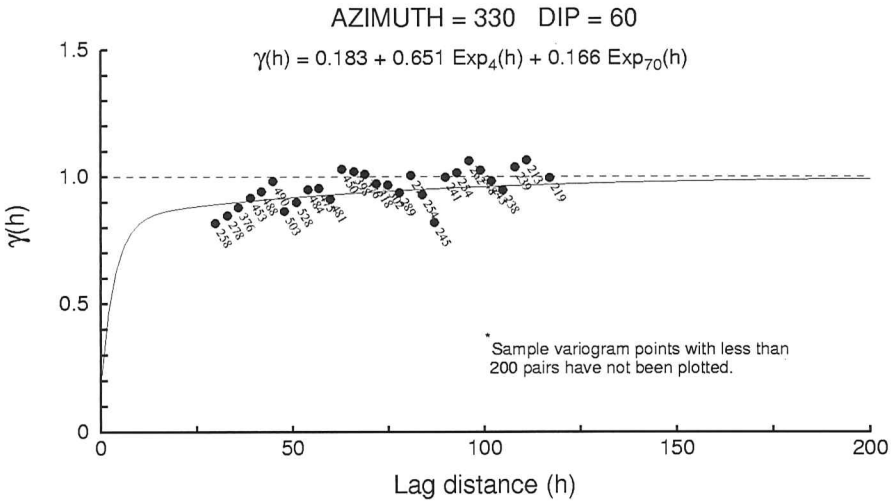




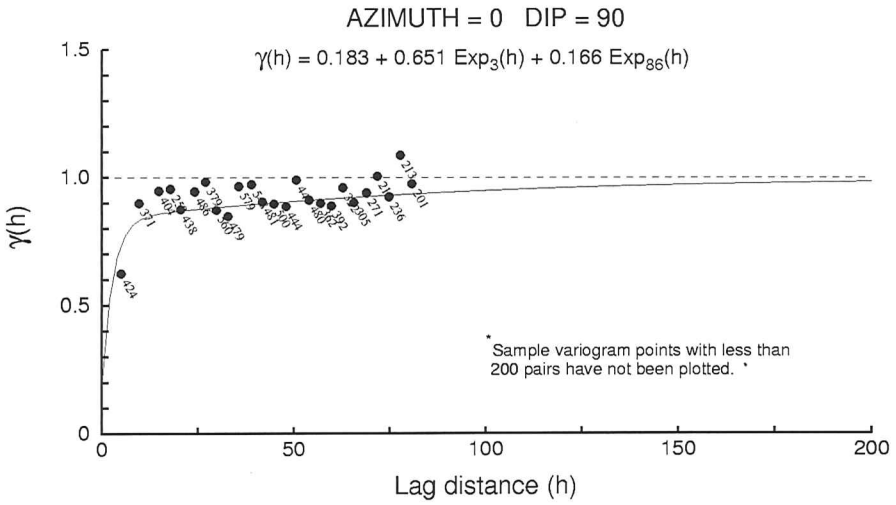
Domains 51 and 52 Run 2







Domains 51 and 52 Run 2



SURPAC THE ROSEBUD MINING COMPANY LLC 1999 North Zone
Measured & Indicated Partial Block Model (Run B)
Location : temp Final Summary

MATERIAL	TYPE	S.G.	VOLUME	TONS	gold
Zone 51					
Classes:					
0.000 - 0.100			14763171.	1085093.	0.026
0.100 - 0.180			0.	0.	
0.180 - 0.250			0.	0.	
0.250 - 0.900			0.	0.	
+ 0.900			0.	0.	
Material Total			14763171.	1085093.	0.026
Zone 52					
Classes:					
0.000 - 0.100			95797.	7041.	0.094
0.100 - 0.180			2911677.	214008.	0.139
0.180 - 0.250			28989.	2131.	0.183
0.250 - 0.900			0.	0.	
+ 0.900			0.	0.	
Material Total			3036463.	223180.	0.138

HW dominio
Stratigraphy

~~170~~ 30/75

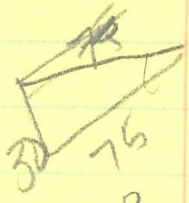
Stratigraphy N 10° E
- 35° to -45° dip
0° plunge

North Zone -

Zone 51 -

Zone 61

N10° E
FW +35 to +45
Plunge 25°



Sin x = 30/75

Zone 52

Zone 62

Zone 53

Zone 63

Zone 54 N 0° E
70°-90°

Zone 64

TC-40 S

Zone 53/54

Zone 63/64

Zone 53

Classes:

0.000 - 0.100	5853.	430.	0.014
0.100 - 0.180	3877.	285.	0.149
0.180 - 0.250	12991.	955.	0.226
0.250 - 0.900	1556484.	114402.	0.413
+ 0.900	7559.	556.	1.051
Material Total	1586763.	116627.	0.412

Zone 54

Classes:

0.000 - 0.100	244.	18.	0.030
0.100 - 0.180	0.	0.	
0.180 - 0.250	0.	0.	.
0.250 - 0.900	4189.	308.	0.766
+ 0.900	118996.	8746.	1.948
Material Total	123429.	9072.	1.904

	VARIOGRAPHY	USED
Krige 51 -	96.31	120 $60
52 -	96.31	100 $60
	used Anisotropy of 51,52+53	
53 -	30 $17	60 $35
54 -	27 $17	45 $35

NORTH ZONE RESOURCE - 1999 (MEASURED & INDICATED RUN A)

Zone	Grade Interval	Volume	Tons	Grade	Ounces
51	0.000 - 0.100	14,759,143	1,084,797	0.026	28,205
52	0.000 - 0.100	124,565	9,156	0.092	842
53	0.000 - 0.100	5,662	416	0.058	24
54	0.000 - 0.100	0	0	0.000	0
61	0.000 - 0.100	5,680,025	417,482	0.023	9,602
62	0.000 - 0.100	74,961	5,510	0.084	463
63	0.000 - 0.100	1,649	121	0.040	5
64	0.000 - 0.100	0	0	0.000	0
Total	0.000 - 0.100	20,646,005	1,517,482	0.026	39,141
51	0.100 - 0.180	1,431	105	0.115	12
52	0.100 - 0.180	2,826,213	207,727	0.139	28,874
53	0.100 - 0.180	9,711	714	0.148	106
54	0.100 - 0.180	0	0	0.000	0
61	0.100 - 0.180	0	0	0.000	0
62	0.100 - 0.180	244,173	17,947	0.143	2,566
63	0.100 - 0.180	1,263	93	0.154	14
64	0.100 - 0.180	0	0	0.000	0
Total	0.100 - 0.180	3,082,791	226,586	0.139	31,573
51	0.180 - 0.250	0	0	0.000	0
52	0.180 - 0.250	75,136	5,522	0.186	1,027
53	0.180 - 0.250	17,279	1,270	0.224	284
54	0.180 - 0.250	307	23	0.193	4
61	0.180 - 0.250	0	0	0.000	0
62	0.180 - 0.250	51,065	3,753	0.194	728
63	0.180 - 0.250	5,545	408	0.208	85
64	0.180 - 0.250	0	0	0.000	0
Total	0.180 - 0.250	149,332	10,976	0.194	2,129
51	0.250 - 0.900	0	0	0.000	0
52	0.250 - 0.900	0	0	0.000	0
53	0.250 - 0.900	1,601,668	117,723	0.414	48,737
54	0.250 - 0.900	4,142	304	0.741	225
61	0.250 - 0.900	0	0	0.000	0
62	0.250 - 0.900	0	0	0.000	0
63	0.250 - 0.900	117,955	8,670	0.394	3,416
64	0.250 - 0.900	0	0	0.000	0
Total	0.250 - 0.900	1,723,765	126,697	0.413	52,379
51	+ 0.900	0	0	0.000	0
52	+ 0.900	0	0	0.000	0
53	+ 0.900	7,680	565	0.997	563
54	+ 0.900	186,884	13,736	1.991	27,348
61	+ 0.900	0	0	0.000	0
62	+ 0.900	0	0	0.000	0
63	+ 0.900	0	0	0.000	0
64	+ 0.900	9,665	710	2.023	1,436
Total	+ 0.900	204,229	15,011	1.955	29,348
Total	+ 0.180	2,077,326	152,684	0.549	83,856

Domains 53 and 54 Run 5

used for Run B

All rotations are according to the MedSystem Conventions. These conventions are as follows:

1. First, rotate around the Z axis according to the left hand rule.
2. Second, rotate around the rotated X axis according to the right hand rule.
3. Third, rotate around the rotated Y axis according to the left hand rule.

The right and left hand rules are easy to follow. For example to rotate around the Z axis according to the left rule, imagine grabbing the Z axis with your left hand so that your thumb is pointing in the direction of of increasing Z values. Then the fingers will be pointing in the direction of a positive rotation. A negative rotation angle indicates a rotation in exactly the opposite direction. Note, the exponential ranges are accord ing to the MedSystem convention, i.e., one third of the practical range.

Nugget ==> 0.538
C1 ==> 0.462

First Structure -- Exponential

Rotation about the Z axis ==> 12
Rotation about the X axis ==> 28
Rotation about the Y axis ==> -2

Range along the Z axis	==> 15.63	Azimuth ==> 8.02 Dip ==> -62.06
Range along the X axis	==> 10.59	Azimuth ==> 101.20 Dip ==> -1.68
Range along the Y axis	==> 18.41	Azimuth ==> 192.10 Dip ==> -27.88

Major 1
Semi-major = 1.18
Minor = 1.74
Distance = 55 + 30 for Zone 53 + 27.8 + 15 for Zone 54

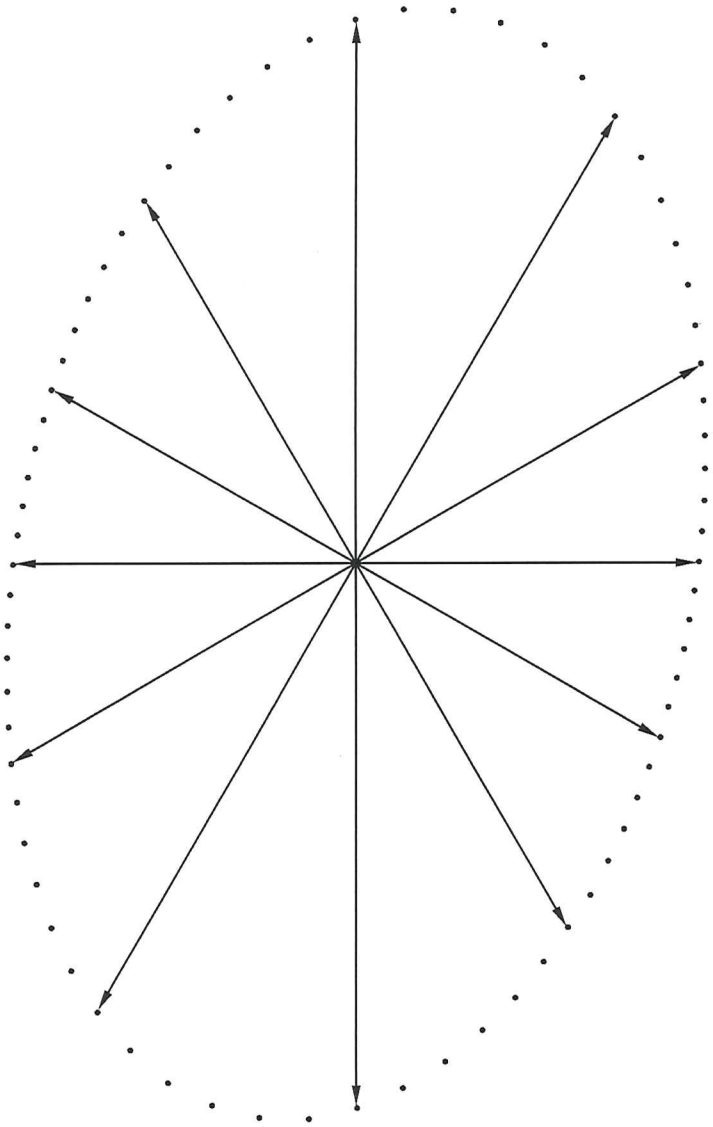
Modeling Criteria

Minimum number pairs req'd ==> 1
Sample variogram points weighted by # pairs
Max allowable drift on head and tail means ==> 0.1

Structure Number 1

Rose Diagram of Ranges Dipping 0 Degrees
Scale:

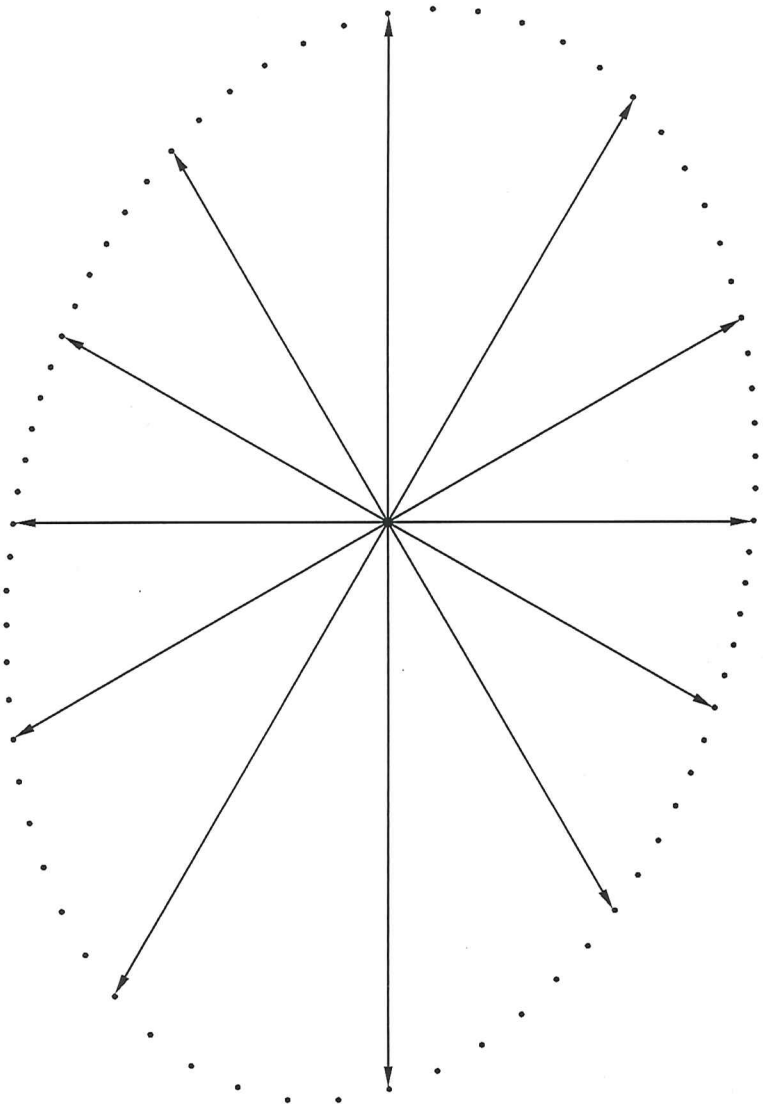
20 Units



Structure Number 1

Rose Diagram of Ranges Dipping 30 Degrees
Scale:

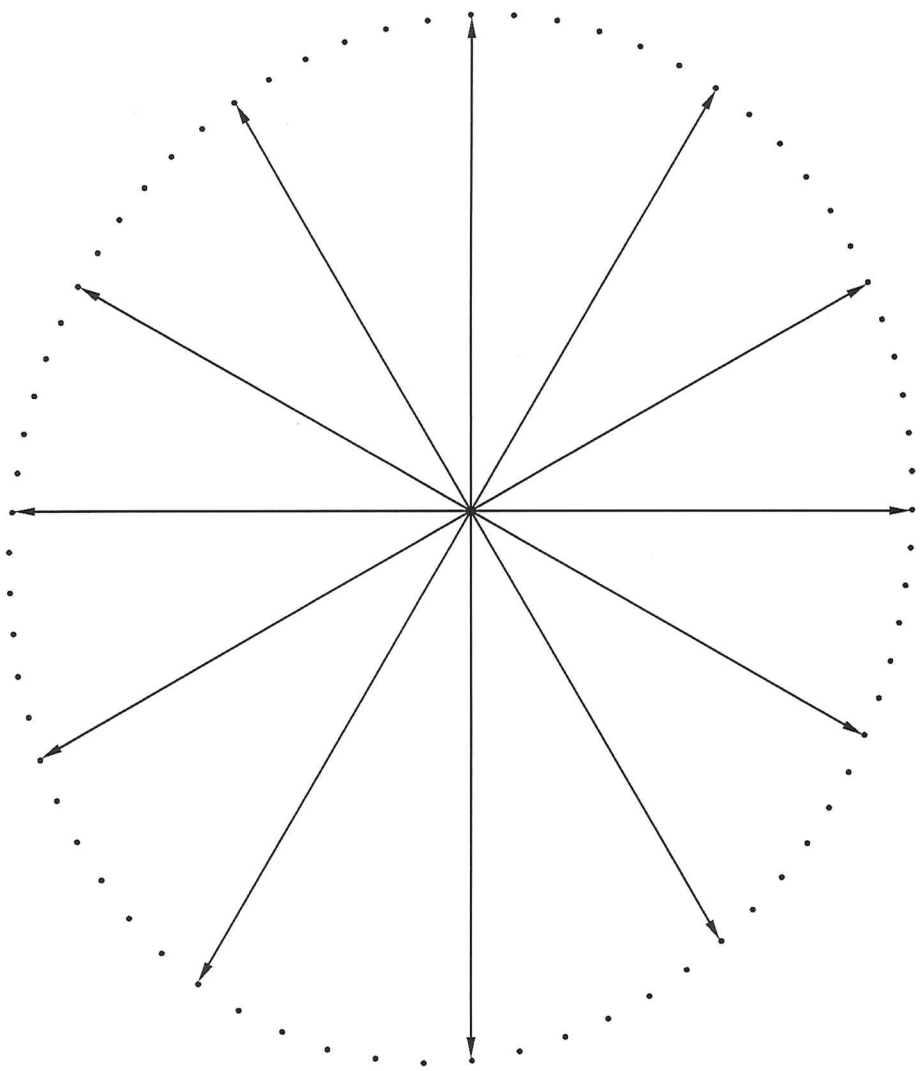
20 Units



Structure Number 1

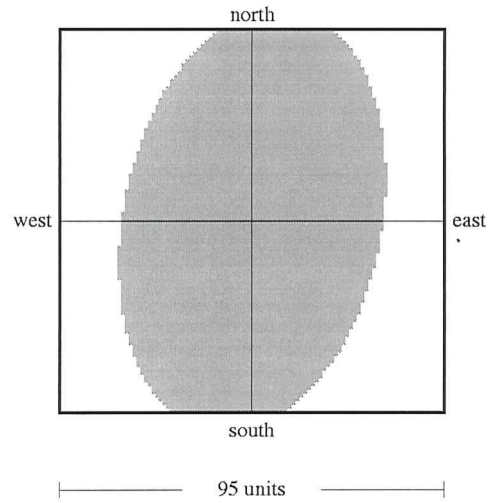
Rose Diagram of Ranges Dipping 60 Degrees
Scale:

20 Units

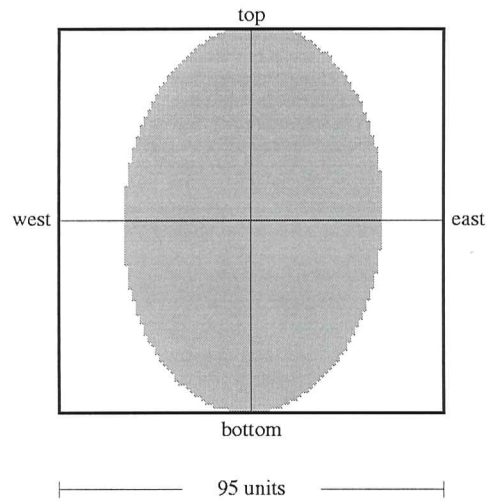


Sectional Views Through the Ellipsoids

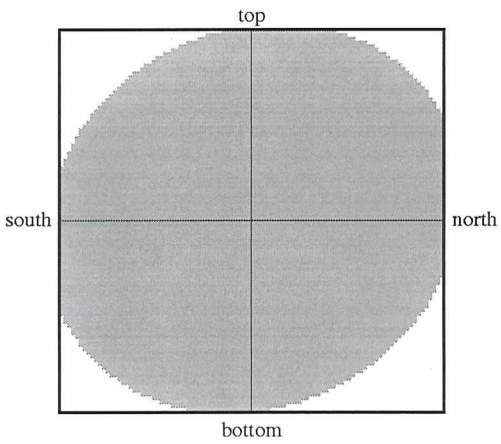
X-Y plane through origin looking down.



X-Z plane through origin looking north.

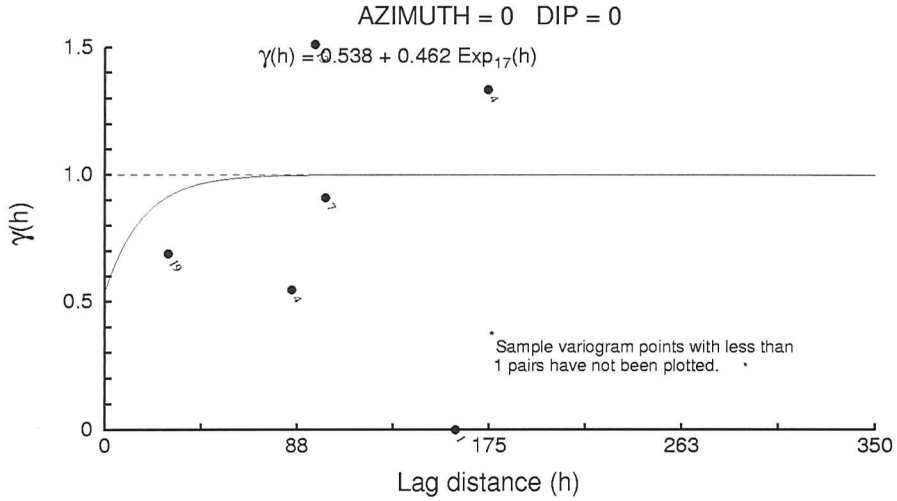


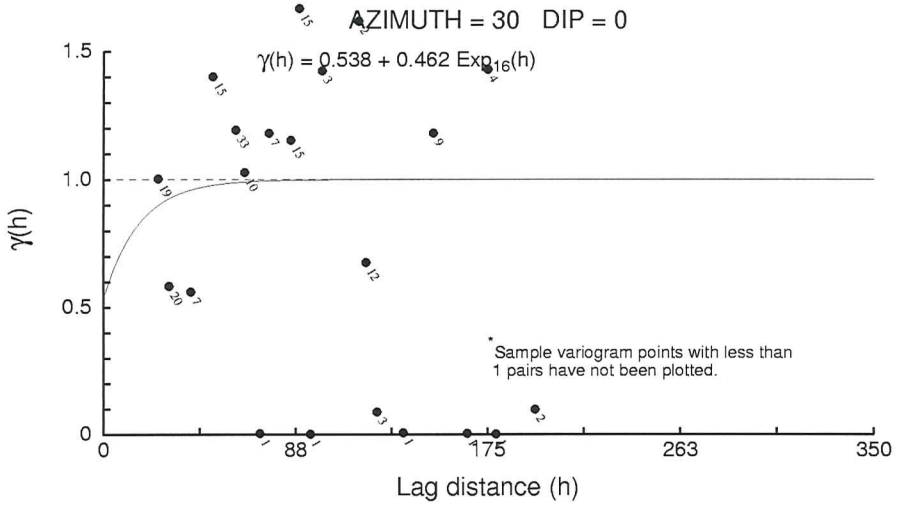
Y-Z plane through origin looking west.

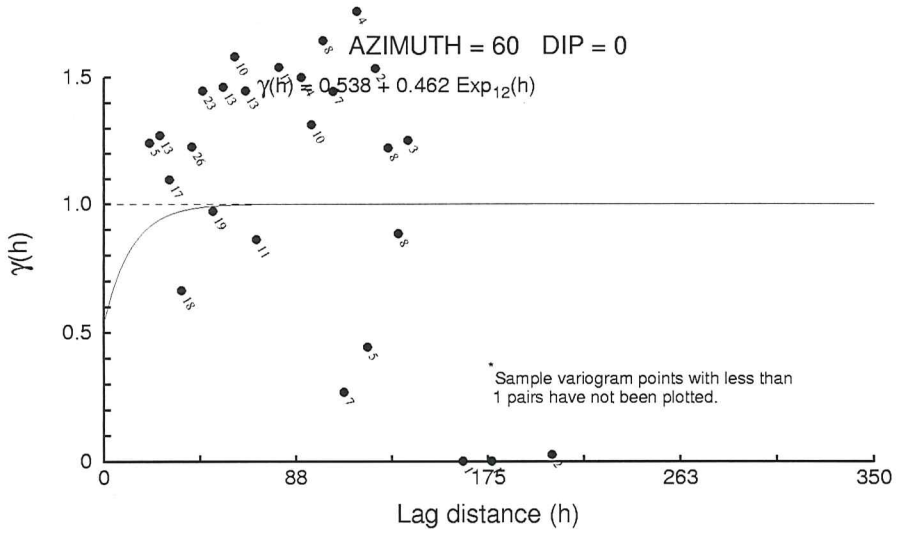


Note -- the orientation, dip and lengths of the ellipsoid axes in these figures may be "apparent" rather than "true".

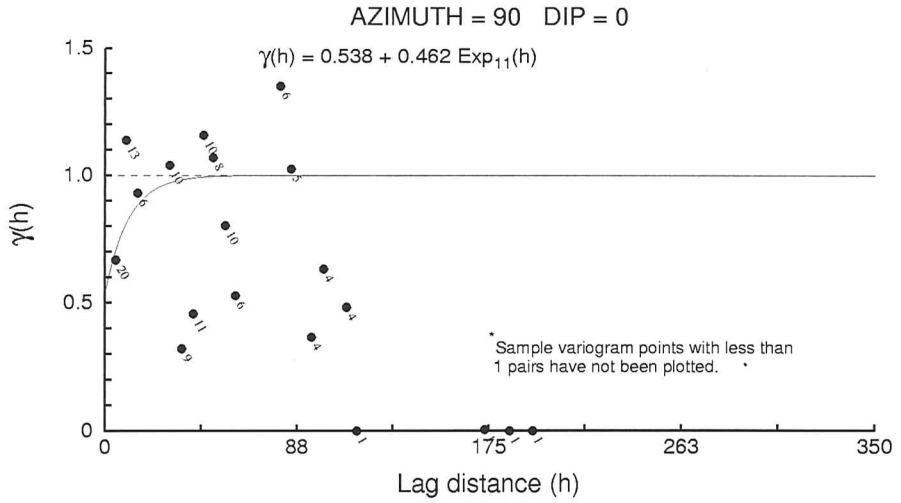
Domains 53 and 54 Run 5

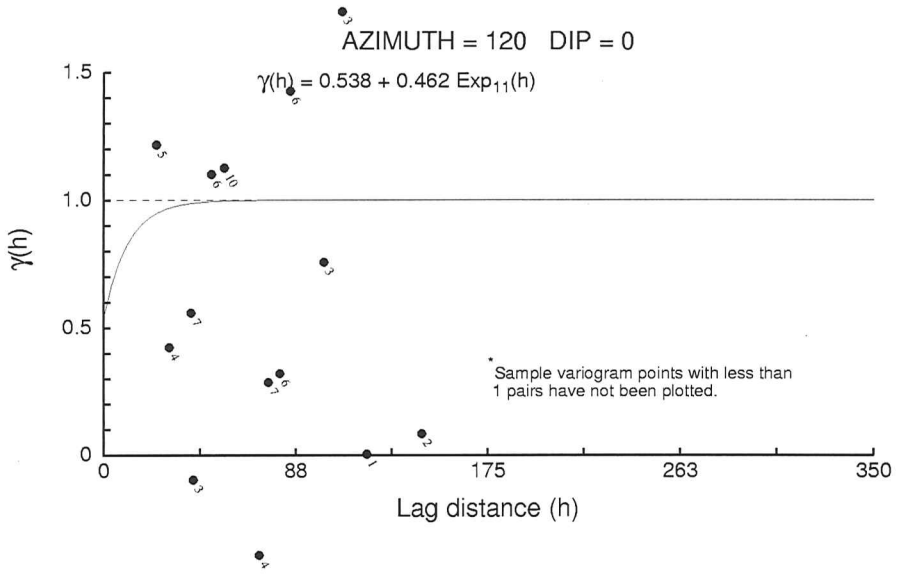


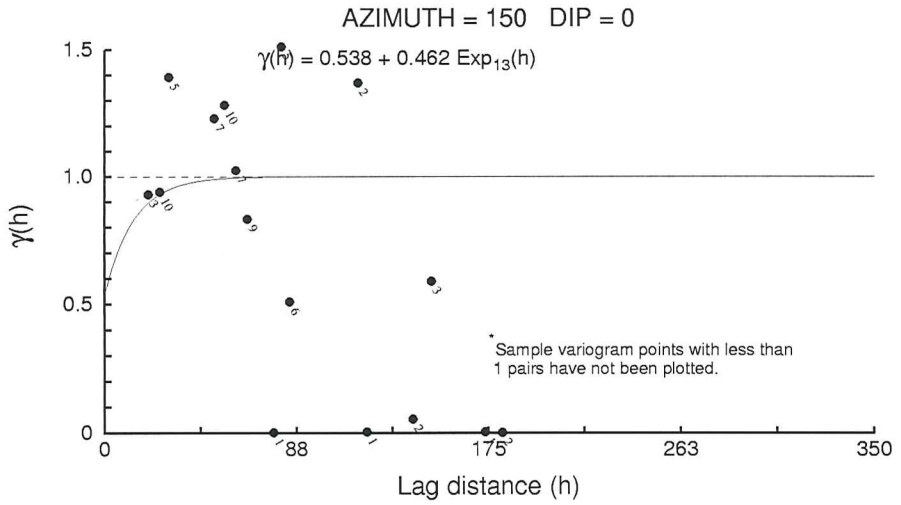




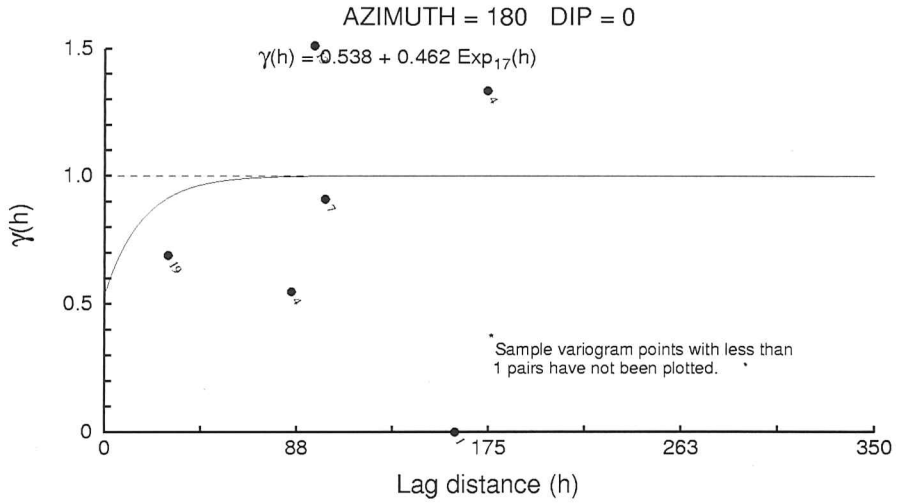
Domains 53 and 54 Run 5

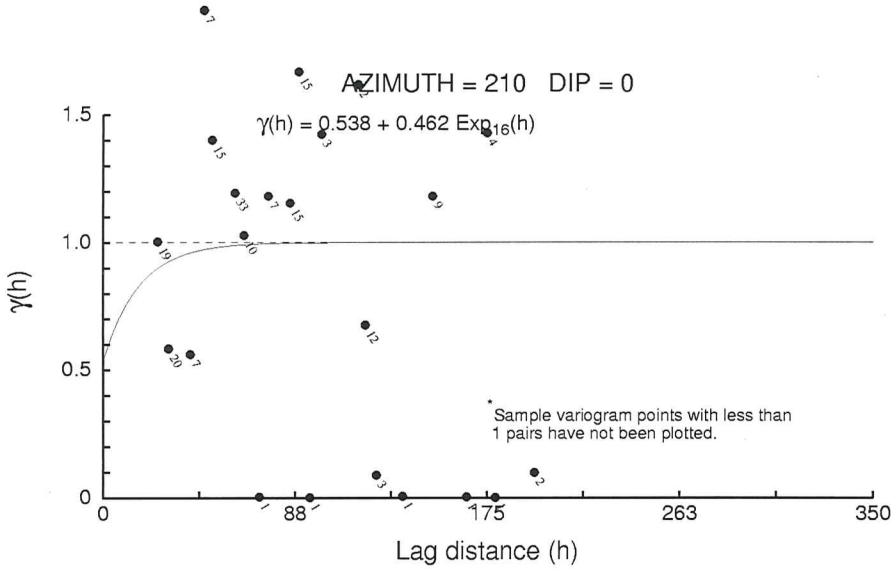


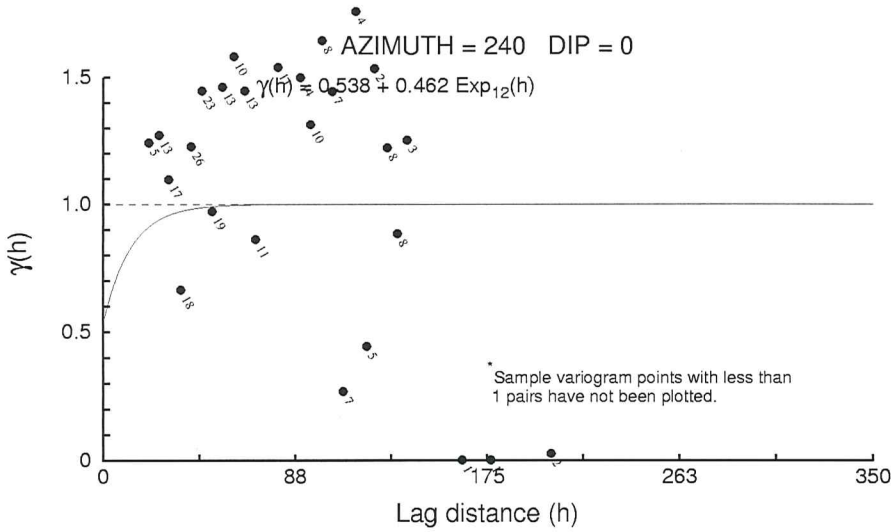




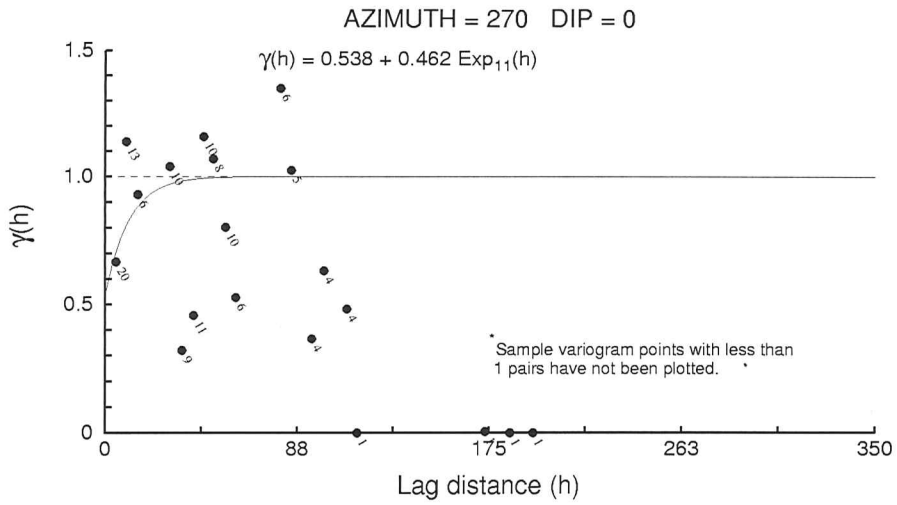
Domains 53 and 54 Run 5

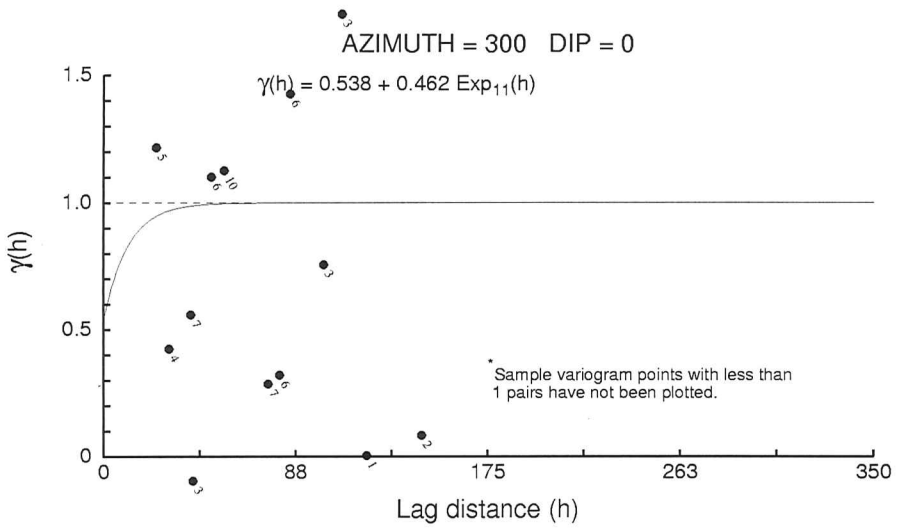


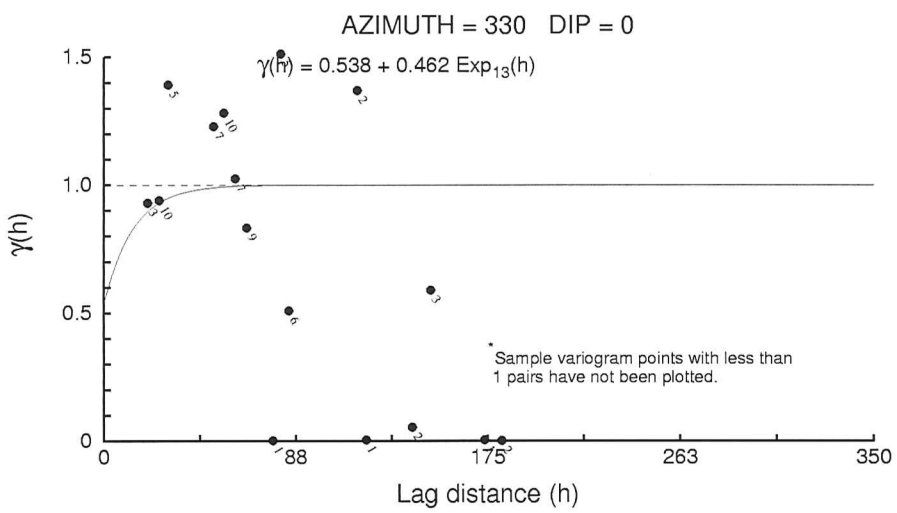




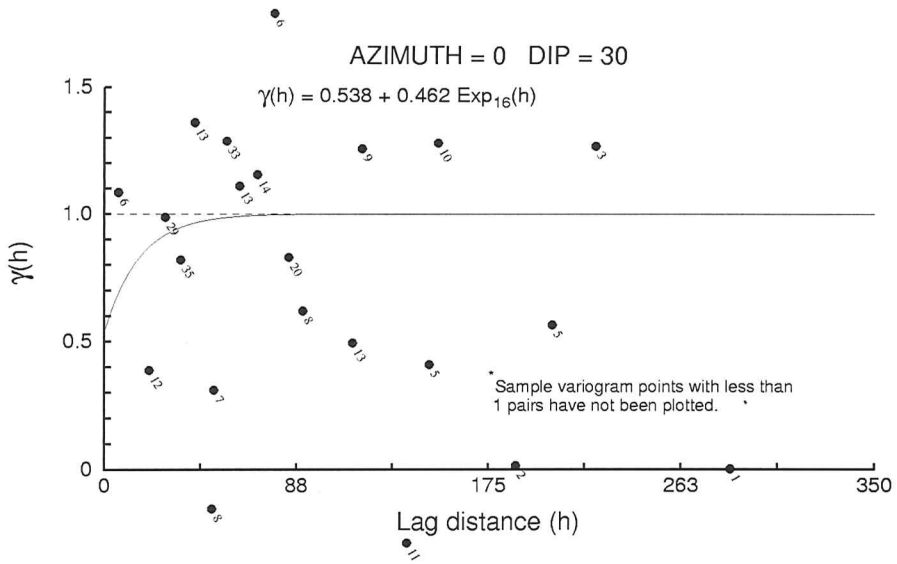
Domains 53 and 54 Run 5

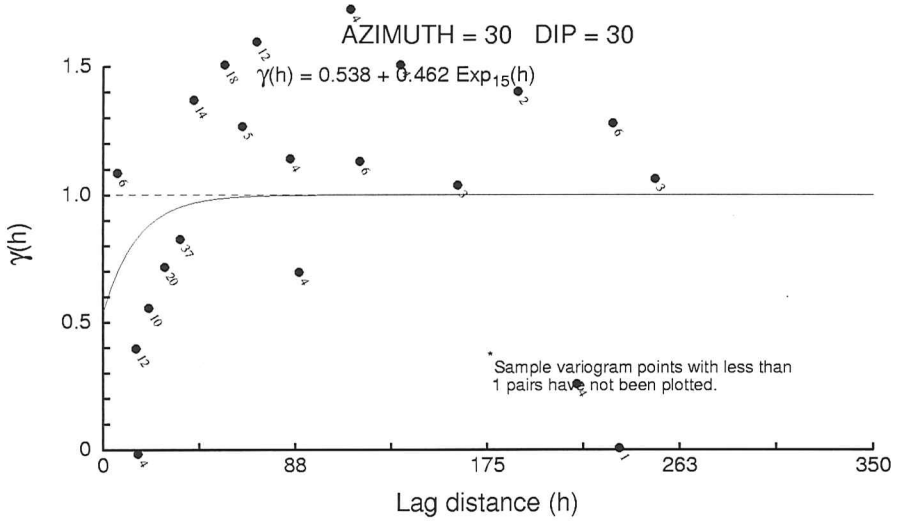


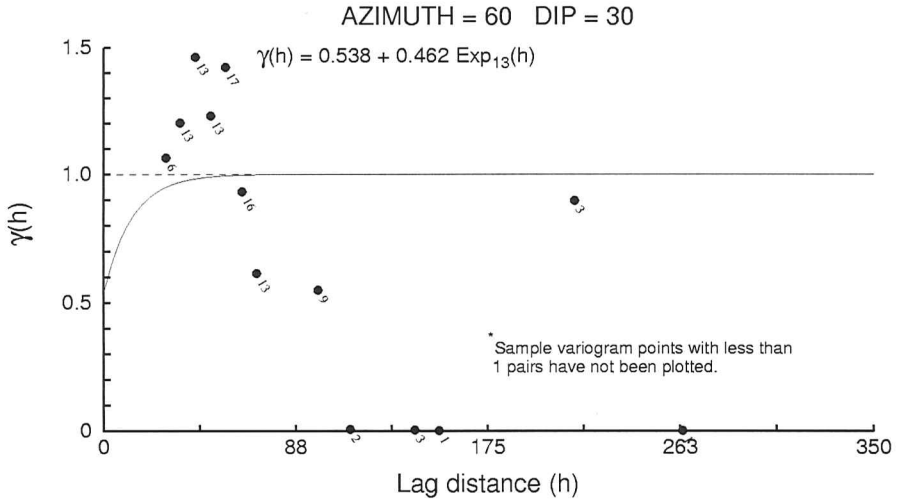




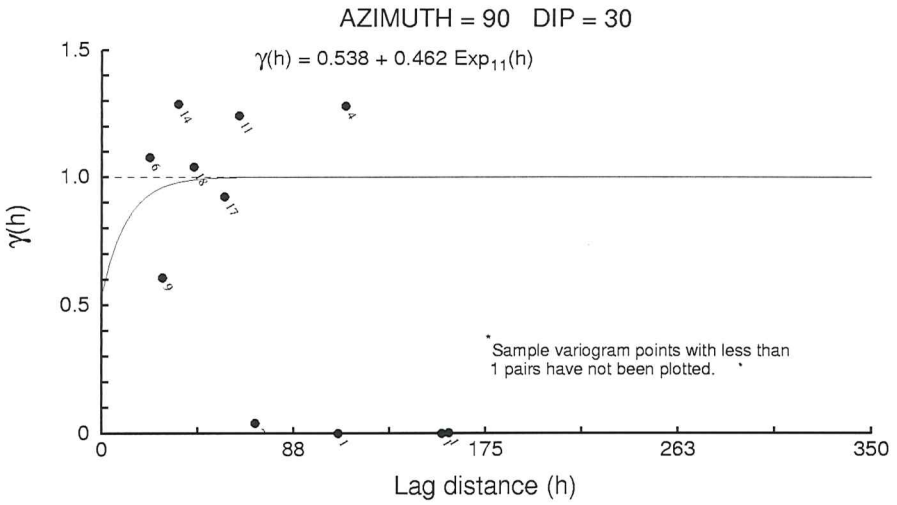
Domains 53 and 54 Run 5

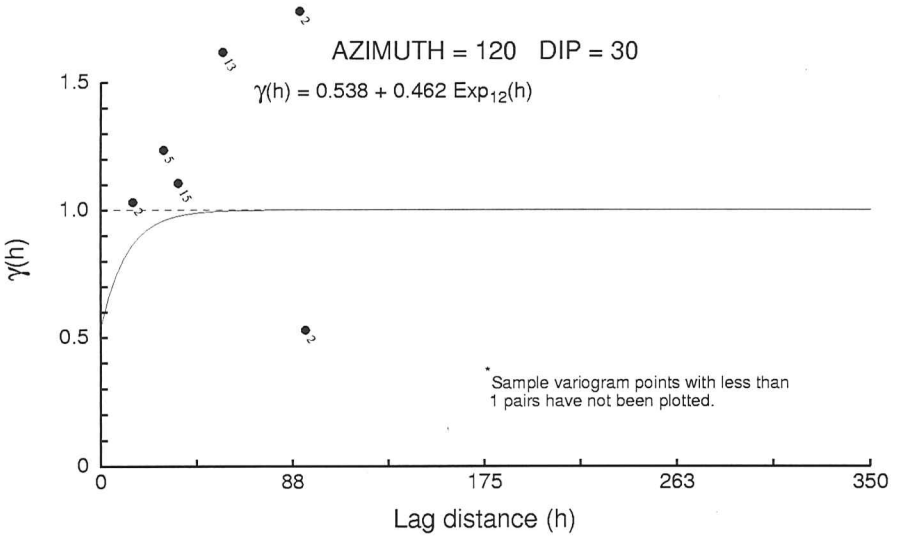


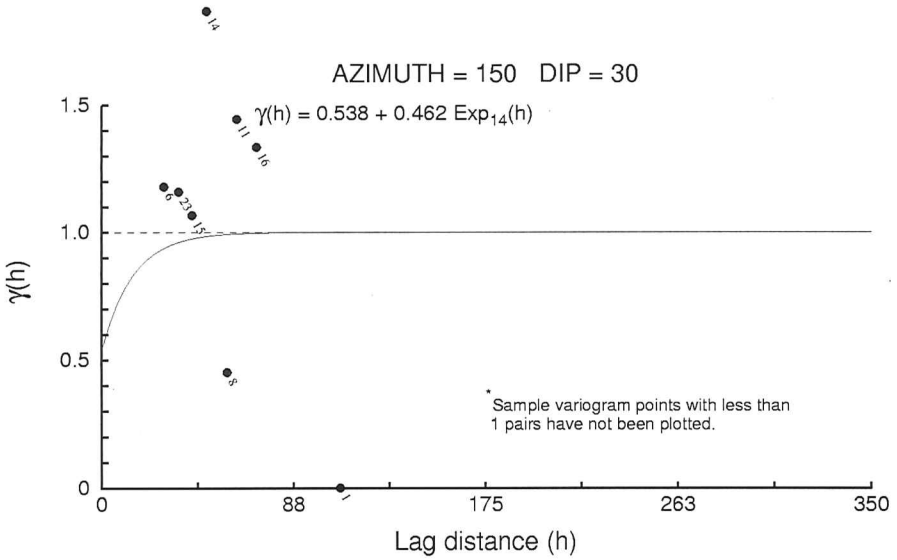




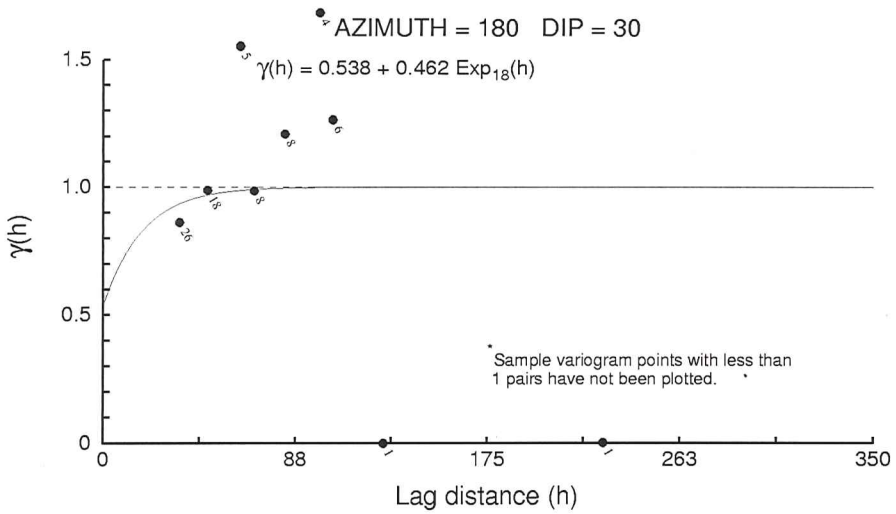
Domains 53 and 54 Run 5

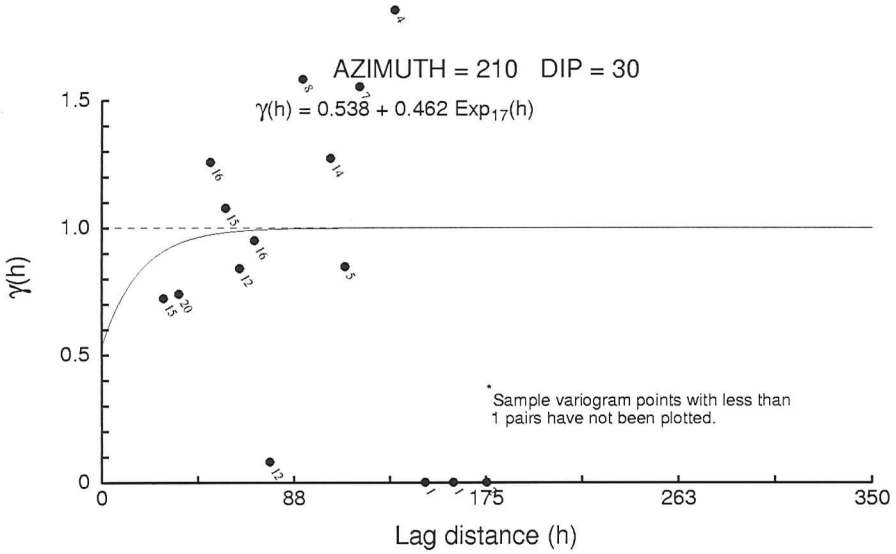


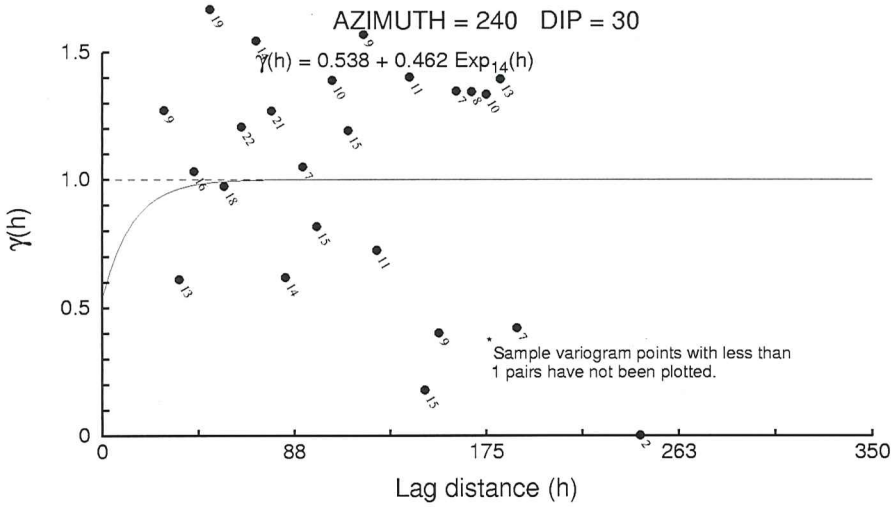




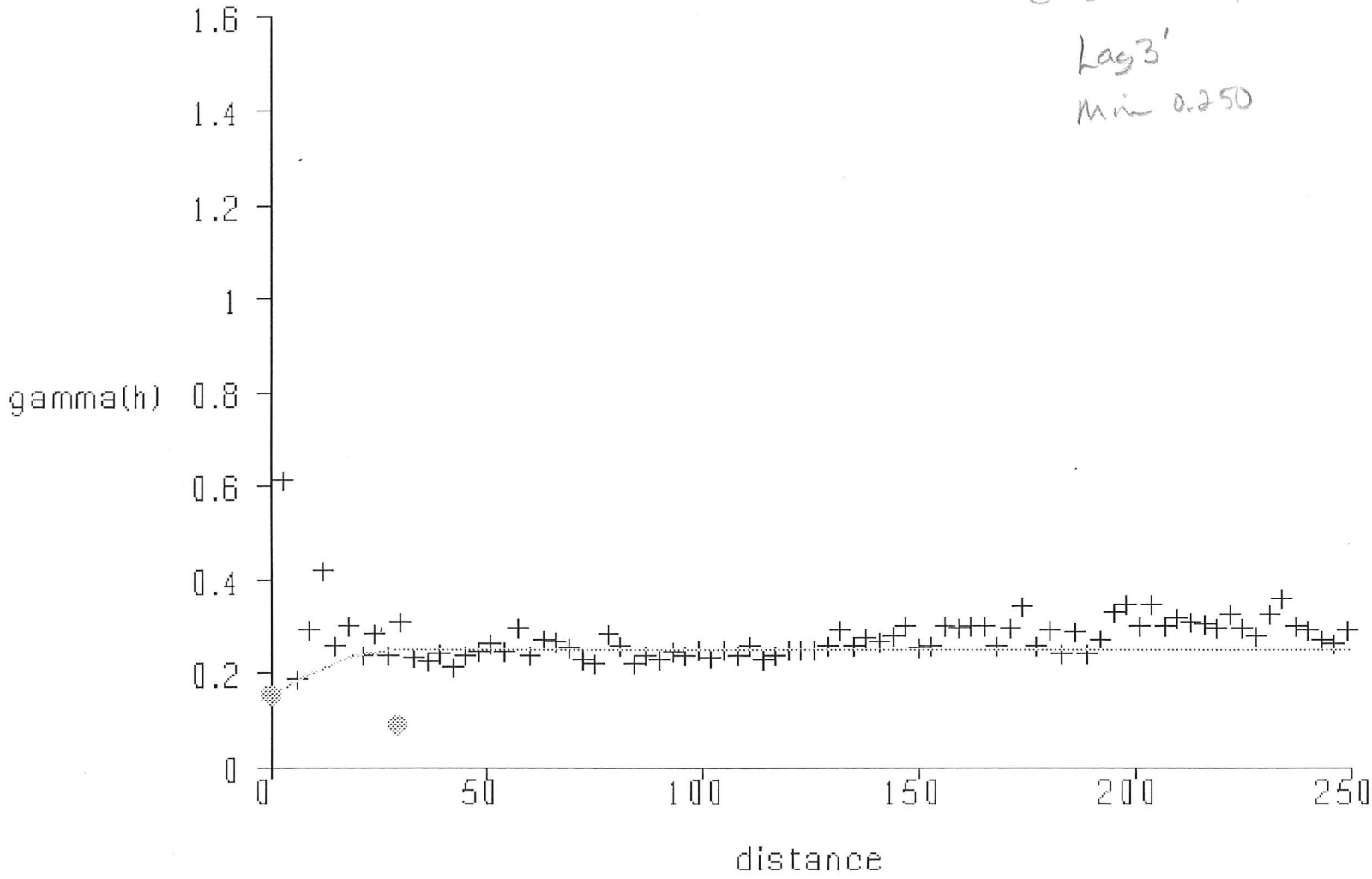
Domains 53 and 54 Run 5







Zones 53/54
Lag 3'
Min 0.250



0 -> 0 (90)

Pairwise relative variogram

```
--------------------------------------------------------------------------------
    SURPAC                    KRIGING RUN PARAMETERS                    27-Feb-99
              rot_61_comp INSIDE  bdy99
--------------------------------------------------------------------------------

RUN CONTROL PARAMETERS
         DATA listing                =   Y
         BLOCK listing               =   N
         DEBUGGING output            =   N
         SAMPLES FILE NAME           = ..\ASSAYS\rot_61_comp9999.str

VARIOGRAM  PARAMETERS
         ANGLES OF ROTATION OF THE MAJOR AXIS;
              Bearing                  10.00
              Dip angle                40.00
              Tilt angle               25.00
         ANISOTROPY FACTORS;
              Semi-major axis           1.42
              Minor axis                1.90
         TYPE OF VARIOGRAM =     SPH
         Sill                         0.0040
         Nugget effect                0.0020
         MODEL    C VALUE     RANGE
           1      0.002       36.

OTHER INTERPOLATION PARAMETERS
         Max search distance of major axis          120.
         Max vertical search distance                60.
         Max number of samples used per block         15
         Min number of samples used per block          2

DESCRETIZATION  PARAMETERS
         NDX = Number of points EASTING              2
         NDY = Number of points NORTHING             2
         NDZ = Number of points vertically           2

DESCRIPTION OF AREA TO BE KRIGED
         N of row 1                   1104.
         E of col 1                  -2320.
         Mid-bench Z                  4746.
         Rows of blocks             162
         Columns of blocks          121
         Levels of blocks            79

         Block dimensions =    7.0 x   7.0 x   7.0

BLOCK VARIANCE              0.00153
```

```
--------------------------------------------------------------------------------
    SURPAC                    KRIGING RUN PARAMETERS                    27-Feb-99
              rot_62_comp INSIDE  bdy99
--------------------------------------------------------------------------------

RUN CONTROL PARAMETERS
         DATA listing                =   Y
         BLOCK listing               =   N
         DEBUGGING output            =   N
         SAMPLES FILE NAME           = ..\ASSAYS\rot_62_comp9999.str

VARIOGRAM  PARAMETERS
         ANGLES OF ROTATION OF THE MAJOR AXIS;
              Bearing                  10.00
              Dip angle                40.00
              Tilt angle               25.00
         ANISOTROPY FACTORS;
              Semi-major axis           1.42
              Minor axis                1.90
         TYPE OF VARIOGRAM =     SPH
         Sill                         0.0040
         Nugget effect                0.0020
         MODEL   C VALUE     RANGE
           1     0.002       36.

OTHER INTERPOLATION PARAMETERS
         Max search distance of major axis          100.
         Max vertical search distance                60.
         Max number of samples used per block         15
         Min number of samples used per block          2

DESCRETIZATION  PARAMETERS
         NDX = Number of points EASTING              2
         NDY = Number of points NORTHING             2
         NDZ = Number of points vertically           2

DESCRIPTION OF AREA TO BE KRIGED
         N of row 1                   1104.
         E of col 1                  -2320.
         Mid-bench Z                  4746.
         Rows of blocks             162
         Columns of blocks          121
         Levels of blocks            79

         Block dimensions =    7.0 x   7.0 x   7.0

BLOCK VARIANCE              0.00153
```

```
--------------------------------------------------------------------------------
     SURPAC                    KRIGING RUN PARAMETERS                    27-Feb-99
               rot_63_comp INSIDE  bdy99
--------------------------------------------------------------------------------

 RUN CONTROL PARAMETERS
          DATA listing                =   Y
          BLOCK listing               =   N
          DEBUGGING output            =   N
          SAMPLES FILE NAME           = ..\assays\rot_63_comp9999.str

 VARIOGRAM  PARAMETERS
          ANGLES OF ROTATION OF THE MAJOR AXIS;
               Bearing                  10.00
               Dip angle               -40.00
               Tilt angle                0.00
          ANISOTROPY FACTORS;
               Semi-major axis           1.42
               Minor axis                1.90
          TYPE OF VARIOGRAM =     INV
Power for distance weighting =                          3.0

 OTHER INTERPOLATION PARAMETERS
          Max search distance of major axis            60.
          Max vertical search distance                 35.
          Max number of samples used per block          15
          Min number of samples used per block           1

 DESCRETIZATION  PARAMETERS
          NDX = Number of points EASTING               2
          NDY = Number of points NORTHING              2
          NDZ = Number of points vertically            2

 DESCRIPTION OF AREA TO BE KRIGED
          N of row 1                    1104.
          E of col 1                   -2320.
          Mid-bench Z                   4746.
          Rows of blocks             162
          Columns of blocks          121
          Levels of blocks            79

          Block dimensions =    7.0 x   7.0 x   7.0
```

```
--------------------------------------------------------------------------------
     SURPAC                    KRIGING RUN PARAMETERS                    27-Feb-99
               rot_64_comp INSIDE  bdy99
--------------------------------------------------------------------------------

 RUN CONTROL PARAMETERS
          DATA listing                =   Y
          BLOCK listing               =   N
          DEBUGGING output            =   N
          SAMPLES FILE NAME           = ..\assays\rot_64_comp9999.str

 VARIOGRAM  PARAMETERS
          ANGLES OF ROTATION OF THE MAJOR AXIS;
               Bearing                  10.00
               Dip angle               -40.00
               Tilt angle                0.00
          ANISOTROPY FACTORS;
               Semi-major axis           1.42
               Minor axis                1.90
          TYPE OF VARIOGRAM =     INV
Power for distance weighting =                          3.0

 OTHER INTERPOLATION PARAMETERS
          Max search distance of major axis            45.
          Max vertical search distance                 35.
          Max number of samples used per block          15
          Min number of samples used per block           1

 DESCRETIZATION  PARAMETERS
          NDX = Number of points EASTING               2
          NDY = Number of points NORTHING              2
          NDZ = Number of points vertically            2

 DESCRIPTION OF AREA TO BE KRIGED
          N of row 1                    1104.
          E of col 1                   -2320.
          Mid-bench Z                   4746.
          Rows of blocks             162
          Columns of blocks          121
          Levels of blocks            79

          Block dimensions =    7.0 x   7.0 x   7.0
```

SURPAC SOFTWARE INTERNATIONAL | SURPAC2000 STATISTICS | 24-Feb-99

Variable : Zone 51 Comps (String 1)
Transformation: x

Number of samples: 2169
Minimum : 0.000
Maximum : 0.360

Mean : 0.027
Variance : 0.001
Standard deviation : 0.025
Coefficient of variation: 0.931

Skewness: 3.103
Kurtosis: 29.270

Median : 0.019
Trimean : 0.021
Biweight: 0.021
MAD : 0.012
Alpha : 0.003
Sichel-t: 1.03

SURPAC SOFTWARE INTERNATIONAL | SURPAC2000 STATISTICS | 24-Feb-99

Variable : Zone 51 Comps (Strings 1&2)
Transformation: x

Number of samples: 2347
Minimum : 0.000
Maximum : 0.360

Mean : 0.027
Variance : 0.001
Standard deviation : 0.025
Coefficient of variation: 0.933

Skewness: 2.934
Kurtosis: 26.953

Median : 0.019
Trimean : 0.021
Biweight: 0.021
MAD : 0.012
Alpha : 0.004
Sichel-t: 1.03

SURPAC SOFTWARE INTERNATIONAL | SURPAC2000 STATISTICS | 24-Feb-99

Variable : Zone 52 Comps (String 1)
Transformation: x

Number of samples: 448
Minimum : 0.000
Maximum : 0.478

Mean : 0.133
Variance : 0.004
Standard deviation : 0.064
Coefficient of variation: 0.482

Skewness: 0.388
Kurtosis: 5.236

Median : 0.133
Trimean : 0.136
Biweight: 0.134
MAD : 0.037
Alpha : 0.000
Sichel-t: 1.15

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              24-Feb-99
INTERNATIONAL
---------------------------------------------------------------------

Variable       : Zone 52 Comps (Strings 1&2)
Transformation: x

Number of samples: 513
Minimum          :   0.000
Maximum          :   0.478

Mean                     :   0.135
Variance                 :   0.004
Standard deviation       :   0.064
Coefficient of variation:   0.474

Skewness:   0.288
Kurtosis:   4.956

Median  :   0.134
Trimean :   0.137
Biweight:   0.136
MAD     :   0.036
Alpha   :   0.000
Sichel-t:    1.15

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              24-Feb-99
INTERNATIONAL
---------------------------------------------------------------------

Variable       : Zone 53 Comps (String 1)
Transformation: x

Number of samples: 202
Minimum          :   0.007
Maximum          :   1.250

Mean                     :   0.401
Variance                 :   0.036
Standard deviation       :   0.189
Coefficient of variation:   0.472

Skewness:   1.141
Kurtosis:   5.338

Median  :   0.361
Trimean :   0.373
Biweight:   0.368
MAD     :   0.095
Alpha   :  -0.007
Sichel-t:    1.52

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              24-Feb-99
INTERNATIONAL
---------------------------------------------------------------------

Variable       : Zone 53 Comps (Strings 1&2)
Transformation: x

Number of samples: 242
Minimum          :   0.007
Maximum          :   1.250

Mean                     :   0.405
Variance                 :   0.035
Standard deviation       :   0.187
Coefficient of variation:   0.461

Skewness:   1.046
Kurtosis:   5.032

Median  :   0.363
Trimean :   0.377
Biweight:   0.375
MAD     :   0.099
Alpha   :  -0.007
Sichel-t:    1.53

---------------------------------------------------------------------
```

Variable : Zone 54 Comps (String 1)
Transformation: x

Number of samples: 45
Minimum : 0.006
Maximum : 4.491

Mean : 1.704
Variance : 1.060
Standard deviation : 1.029
Coefficient of variation: 0.604

Skewness: 1.099
Kurtosis: 3.496

Median : 1.395
Trimean : 1.448
Biweight: 1.362
MAD : 0.318
Alpha : -0.006
Sichel-t: 9.17

SURPAC SOFTWARE INTERNATIONAL | SURPAC2000 STATISTICS | 24-Feb-99

Variable : Zone 54 Comps (Strings 1&2)
Transformation: x

Number of samples: 56
Minimum : 0.006
Maximum : 4.491

Mean : 1.750
Variance : 1.035
Standard deviation : 1.018
Coefficient of variation: 0.581

Skewness: 1.088
Kurtosis: 3.501

Median : 1.402
Trimean : 1.539
Biweight: 1.487
MAD : 0.442
Alpha : -0.006
Sichel-t: 9.53

Variable : Zone 53/54 Comps (String1)
Transformation: x

Number of samples: 247
Minimum : 0.006
Maximum : 4.491

Mean : 0.639
Variance : 0.475
Standard deviation : 0.689
Coefficient of variation: 1.079

Skewness: 3.144
Kurtosis: 14.201

Median : 0.391
Trimean : 0.440
Biweight: 0.413
MAD : 0.140
Alpha : -0.006
Sichel-t: 2.4

Variable : Zone 53/54 Comps (Strings 1&2)
Transformation: x

Number of samples: 298
Minimum : 0.006
Maximum : 4.491

Mean : 0.658
Variance : 0.499
Standard deviation : 0.707
Coefficient of variation: 1.074

Skewness: 3.032
Kurtosis: 13.330

Median : 0.400
Trimean : 0.446
Biweight: 0.420
MAD : 0.145
Alpha : -0.006
Sichel-t: 2.47

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              24-Feb-99
INTERNATIONAL
---------------------------------------------------------------------

Variable       : Zone 61 Comps (String 1)
Transformation: x

Number of samples: 509
Minimum          :   0.000
Maximum          :   0.149

Mean                     :   0.022
Variance                 :   0.000
Standard deviation       :   0.020
Coefficient of variation:   0.883

Skewness:   1.991
Kurtosis:   8.521

Median  :   0.016
Trimean :   0.018
Biweight:   0.017
MAD     :   0.009
Alpha   :   0.000
Sichel-t:    1.02

---------------------------------------------------------------------
```

SURPAC SOFTWARE INTERNATIONAL | SURPAC2000 STATISTICS | 24-Feb-99

Variable : Zone 61 Comps (Strings 1&2)
Transformation: x

Number of samples: 554
Minimum : 0.000
Maximum : 0.149

Mean : 0.022
Variance : 0.000
Standard deviation : 0.020
Coefficient of variation: 0.903

Skewness: 1.959
Kurtosis: 8.203

Median : 0.015
Trimean : 0.017
Biweight: 0.017
MAD : 0.009
Alpha : 0.000
Sichel-t: 1.02

Variable : Zone 62 Comps (String 1)
Transformation: x

Number of samples: 125
Minimum : 0.003
Maximum : 0.528

Mean : 0.114
Variance : 0.005
Standard deviation : 0.070
Coefficient of variation: 0.615

Skewness: 1.731
Kurtosis: 11.234

Median : 0.107
Trimean : 0.108
Biweight: 0.108
MAD : 0.043
Alpha : 0.485
Sichel-t: 1.12

Variable : Zone 62 Comps (Strings 1&2)
Transformation: x

Number of samples: 148
Minimum : 0.003
Maximum : 0.528

Mean : 0.116
Variance : 0.005
Standard deviation : 0.074
Coefficient of variation: 0.636

Skewness: 1.455
Kurtosis: 8.498

Median : 0.109
Trimean : 0.110
Biweight: 0.109
MAD : 0.046
Alpha : 0.303
Sichel-t: 1.13

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS            24-Feb-99
INTERNATIONAL
---------------------------------------------------------------------

Variable       : Zone 63 Comps (String 1)
Transformation: x

Number of samples: 33
Minimum          :   0.055
Maximum          :   0.730

Mean                     :   0.377
Variance                 :   0.026
Standard deviation       :   0.162
Coefficient of variation:   0.431

Skewness:   0.072
Kurtosis:   2.900

Median  :   0.367
Trimean :   0.377
Biweight:   0.371
MAD     :   0.091
Alpha   :  -0.054
Sichel-t:    1.48

---------------------------------------------------------------------
```

SURPAC SOFTWARE INTERNATIONAL | SURPAC2000 STATISTICS | 24-Feb-99

Variable : Zone 63 Comps (Strings 1&2)
Transformation: x

Number of samples: 37
Minimum : 0.013
Maximum : 0.730

Mean : 0.368
Variance : 0.032
Standard deviation : 0.178
Coefficient of variation: 0.484

Skewness: -0.023
Kurtosis: 2.639

Median : 0.367
Trimean : 0.371
Biweight: 0.369
MAD : 0.101
Alpha : -0.013
Sichel-t: 1.47

SURPAC SOFTWARE INTERNATIONAL | SURPAC2000 STATISTICS | 24-Feb-99

Variable : Zone 64 Comps (Strings 1&2)
Transformation: x

Number of samples: 4
Minimum : 1.193
Maximum : 2.890

Mean : 2.010
Variance : 0.603
Standard deviation : 0.777
Coefficient of variation: 0.386

Skewness: 0.024
Kurtosis: 1.045

Median : 1.979
Trimean : 1.995
Biweight: 2.006
MAD : 0.849
Alpha : 6.285
Sichel-t: 9.27

Variable : Zone 63/64 Comps (String1)
Transformation: x

Number of samples: 36
Minimum : 0.055
Maximum : 2.675

Mean : 0.488
Variance : 0.200
Standard deviation : 0.447
Coefficient of variation: 0.915

Skewness: 3.418
Kurtosis: 16.465

Median : 0.369
Trimean : 0.395
Biweight: 0.374
MAD : 0.105
Alpha : 0.028
Sichel-t: 1.8

SURPAC SOFTWARE INTERNATIONAL | SURPAC2000 STATISTICS | 24-Feb-99

Variable : Zone 63/64 Comps (Strings1&2)
Transformation: x

Number of samples: 41
Minimum : 0.013
Maximum : 2.890

Mean : 0.529
Variance : 0.325
Standard deviation : 0.570
Coefficient of variation: 1.078

Skewness: 3.038
Kurtosis: 12.286

Median : 0.370
Trimean : 0.400
Biweight: 0.369
MAD : 0.124
Alpha : 0.683
Sichel-t: 1.99

North Zone Gold Domain Areas

Zone	1996		1999		Diff. (1999 - 1996)	
	Volume	Tons	Volume	Tons	Volume	Tons
51	30,714,054	2,258,386	12,959,713	952,920	-17,754,341	**-1,305,466**
52	3,959,636	291,150	2,570,164	188,983	-1,389,472	**-102,167**
53	392,605	28,868	1,355,324	99,656	962,719	**70,788**
54	0	0	127,703	9,390	127,703	**9,390**
61	48,525,685	3,568,065	3,601,805	264,839	-44,923,880	**-3,303,226**
62	11,225,587	825,411	344,327	25,318	-10,881,260	**-800,093**
63	2,218,593	163,132	124,874	9,182	-2,093,719	**-153,950**
64	534,045	39,268	8,507	626	-525,538	**-38,643**
Totals	97,570,205	7,174,280	21,092,417	1,550,913	-76,477,788	**-5,623,367**

1996 1250 - 1900 every 50'

1999 1275 - 1800 every 25' excluding 1775

Cell phone - (702) 843-6935
CA phone - (209) 736-4069

Dan,

Okay - here goes -

The plans that you are going to digitize are much easier (I think) than the last you did. You'll have the following string number:

51 + 61 Blue
52 + 62 Green
53 + 63 Orange
54 + 64 Red

There should be no internal shapes. If you find any - go ahead and digitize them but let me know which levels have them. When you digitize a shape, please check it off - so we know you did it. (also initial the bottom of the map when completely done).

I made a directory for you called:
D:\geology\north_au_plans
Sample is already in that directory.
Call the files -
Location north_au
ID Number (level)

The Areas Indicated on the Levels Are Exclusions within segments

Exclusions:

~~4353.5~~
~~In: Seg 51 - Lower Center~~

4395.5
In Seg 51 - Lower Left center

~~4402.5~~
~~In seg 53 - Mid center~~

4444.5
~~In Seg 52~~ Upper middle

4458.5
In Seg 51 Right side

When you digitize the shape and the boundary ~~is~~ of the shape is on a drill hole, please click right on the drill hole trace (talk to Kent about this and any other special instructions)

Only digitize from the 1250 to 1950 boundary (ask Kent).

Run C

Zone 53

Classes:

0.000 - 0.100	8125.	597.	0.015
0.100 - 0.180	8342.	613.	0.143
0.180 - 0.250	26016.	1912.	0.222
0.250 - 0.900	1232043.	90555.	0.412
+ 0.900	14492.	1065.	1.058
Material Total	1289018.	94743.	0.412

Zone 54

Classes:

0.000 - 0.100	0.	0.	.
0.100 - 0.180	0.	0.	
0.180 - 0.250	307.	23.	0.193
0.250 - 0.900	4653.	342.	0.709
+ 0.900	156986.	11538.	1.997
Material Total	161945.	11903.	1.957

Run B

Zone 53

Classes:

0.000 - 0.100	5853.	430.	0.014
0.100 - 0.180	3877.	285.	0.149
0.180 - 0.250	12991.	955.	0.226
0.250 - 0.900	1556484.	114402.	0.413
+ 0.900	7559.	556.	1.051
Material Total	1586763.	116627.	0.412

Zone 54

Classes:

0.000 - 0.100	244.	18.	0.030
0.100 - 0.180	0.	0.	
0.180 - 0.250	0.	0.	
0.250 - 0.900	4189.	308.	0.766
+ 0.900	118996.	8746.	1.948
Material Total	123429.	9072.	1.904

```
--------------------------------------------------------------------------------
    SURPAC                    KRIGING RUN PARAMETERS                    27-Feb-99
              rot_61_comp INSIDE  bdy99
--------------------------------------------------------------------------------

RUN CONTROL PARAMETERS
         DATA listing                =   Y
         BLOCK listing               =   N
         DEBUGGING output            =   N
         SAMPLES FILE NAME           = ..\ASSAYS\rot_61_comp9999.str

VARIOGRAM  PARAMETERS
         ANGLES OF ROTATION OF THE MAJOR AXIS;
              Bearing                  10.00
              Dip angle                40.00
              Tilt angle               25.00
         ANISOTROPY FACTORS;
              Semi-major axis           1.42
              Minor axis                1.90
         TYPE OF VARIOGRAM =     SPH
         Sill                         0.0040
         Nugget effect                0.0020
         MODEL    C VALUE     RANGE
           1      0.002       36.

OTHER INTERPOLATION PARAMETERS
         Max search distance of major axis          120.
         Max vertical search distance                60.
         Max number of samples used per block         15
         Min number of samples used per block          2

DESCRETIZATION  PARAMETERS
         NDX = Number of points EASTING              2
         NDY = Number of points NORTHING             2
         NDZ = Number of points vertically           2

DESCRIPTION OF AREA TO BE KRIGED
         N of row 1                   1104.
         E of col 1                  -2320.
         Mid-bench Z                  4746.
         Rows of blocks             162
         Columns of blocks          121
         Levels of blocks            79

         Block dimensions =    7.0 x   7.0 x   7.0

BLOCK VARIANCE              0.00153
```

```
--------------------------------------------------------------------------------
     SURPAC                    KRIGING RUN PARAMETERS                    27-Feb-99
               rot_63_comp INSIDE  bdy99
--------------------------------------------------------------------------------

 RUN CONTROL PARAMETERS
         DATA listing                =   Y
         BLOCK listing               =   N
         DEBUGGING output            =   N
         SAMPLES FILE NAME           = ..\assays\rot_63_comp9999.str

 VARIOGRAM  PARAMETERS
         ANGLES OF ROTATION OF THE MAJOR AXIS;
              Bearing                  10.00
              Dip angle               -40.00
              Tilt angle                0.00
         ANISOTROPY FACTORS;
              Semi-major axis           1.42
              Minor axis                1.90
         TYPE OF VARIOGRAM =     INV
Power for distance weighting =                        3.0

 OTHER INTERPOLATION PARAMETERS
         Max search distance of major axis             60.
         Max vertical search distance                  35.
         Max number of samples used per block           15
         Min number of samples used per block            1

 DESCRETIZATION  PARAMETERS
         NDX = Number of points EASTING                2
         NDY = Number of points NORTHING               2
         NDZ = Number of points vertically             2

 DESCRIPTION OF AREA TO BE KRIGED
         N of row 1                    1104.
         E of col 1                   -2320.
         Mid-bench Z                   4746.
         Rows of blocks              162
         Columns of blocks           121
         Levels of blocks             79

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```

```
--------------------------------------------------------------------------------
     SURPAC                    KRIGING RUN PARAMETERS                    27-Feb-99
               rot_64_comp INSIDE  bdy99
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 RUN CONTROL PARAMETERS
          DATA listing                =   Y
          BLOCK listing               =   N
          DEBUGGING output            =   N
          SAMPLES FILE NAME           = ..\assays\rot_64_comp9999.str

 VARIOGRAM  PARAMETERS
          ANGLES OF ROTATION OF THE MAJOR AXIS;
               Bearing                  10.00
               Dip angle               -40.00
               Tilt angle                0.00
          ANISOTROPY FACTORS;
               Semi-major axis           1.42
               Minor axis                1.90
          TYPE OF VARIOGRAM =     INV
Power for distance weighting =                          3.0

 OTHER INTERPOLATION PARAMETERS
          Max search distance of major axis             45.
          Max vertical search distance                  35.
          Max number of samples used per block           15
          Min number of samples used per block            1

 DESCRETIZATION  PARAMETERS
          NDX = Number of points EASTING                2
          NDY = Number of points NORTHING               2
          NDZ = Number of points vertically             2

 DESCRIPTION OF AREA TO BE KRIGED
          N of row 1                    1104.
          E of col 1                   -2320.
          Mid-bench Z                   4746.
          Rows of blocks              162
          Columns of blocks           121
          Levels of blocks             79

          Block dimensions =    7.0 x   7.0 x   7.0
```

Zone 53

Classes:

0.000 - 0.100	8125.	597.	0.015
0.100 - 0.180	8342.	613.	0.143
0.180 - 0.250	26016.	1912.	0.222
0.250 - 0.900	1232043.	90555.	0.412
+ 0.900	14492.	1065.	1.058
Material Total	1289018.	94743.	0.412

Zone 54

Classes:

0.000 - 0.100	0.	0.	
0.100 - 0.180	0.	0.	
0.180 - 0.250	307.	23.	0.193
0.250 - 0.900	4653.	342.	0.709
+ 0.900	156986.	11538.	1.997
Material Total	161945.	11903.	1.957

AMERICAN ASSAY LABORATORIES
1500 GLENDALE AVENUE
SPARKS, NEVADA 89431-5902
FACSIMILE TRANSMITTAL SHEET

DATE: 2/26/99 TIME:

NUMBER OF PAGES INCLUDING THIS SHEET:

TO: Cindy Moore
COMPANY: Hecla Mining

FROM: Leonard Mackedon

SUBJECT:

MESSAGE: Here are the final reports on the samples you requested re-run.

SP05 2618 55598, 55599

SP05 2594 55451, 55452

NOTE: IF ANY OF THIS FAX IS ILLEGIBLE, OR YOU DO NOT RECEIVE ALL PAGES, PLEASE CONTACT US IMMEDIATELY AT:
PHONE# 775-356-0606 OR FAX# 775-356-1413

American Assay Laboratories Inc.

AMERICAN ASSAY LABORATORIES

PROVISIONAL REPORT SP052618

PO BOX 11538
RENO NV,USA
Ph.(775) 356-0606, Fax.(775) 356-1413

HECLA MINING COMPANY

COPIES TO : KURT ALLEN
:
:
:

CLIENT REFERENCE No: 55586/605 RECEIVED : 23 FEB 1999

No. SAMPLES : 21 REPORTED : 24 FEB 1999

MAIN SAMPLE TYPE : ROCK CHIPS

NEVADA LEGISLATIVE DISCLAIMER :-
The results of this assay were based solely upon the content of the sample submitted. Any decision to invest should be made only after the potential investment value of the claim or deposit has been determined based on the results of assays of multiple samples of geological materials collected by the prospective investor or by a qualified person selected by him and based on an evaluation of all engineering data which is available concerning any proposed project.

ANALYSIS	ANALYTICAL METHOD	QUALITY PARAMETER	UNIT	DETECTION
Au(OZ.)	GRAV	15%	OPT	0.001
Au(RZ.)	GRAV	15%	OPT	0.001
Ag(OZ.)	GRAV	15%	OPT	0.05
Ag(OZ.)	GRAV	15%	OPT	0.05

SIGNATORY : Leonard E. Mackedon B.S.

AMERICAN ASSAY LABORATORIES

PROVISIONAL REPORT SP052618

CLIENT : HECLA MINING COMPANY
PROJECT : ROSEBUD PRODUCTION
REFERENCE : 55586/605

REPORTED : 24 FEB 1999

SAMPLES	Au(OZ)	Au(RZ)	Ag(OZ)	Ag(OZ)
55586	0.991		13.31	
55587	0.105		2.63	
55588	0.357		6.46	
55589	0.477		0.48	
55590	0.397		0.43	
55591	0.284		<0.05	
55592	0.773		1.42	
55593	0.714	0.629	0.72	
55594	0.945		0.85	
55595	0.147		<0.05	
55596	0.294		0.31	
55597	0.322		0.44	
55598	0.489	0.457	0.51	0.65
55599	0.489	0.539	0.54	0.72
55600	0.340		0.71	
55601	0.304	0.335	0.30	
55602	0.319		<0.05	
55603	0.749		0.65	
55604	0.213		0.32	
55605	0.002		<0.05	
51497	0.529		2.58	

AMERICAN ASSAY LABORATORIES

PROVISIONAL REPORT SP052594

PO BOX 11530
RENO NV,USA
Ph.(775) 356-0606, Fax.(775) 356-1413

HECLA MINING COMPANY

COPIES TO : KURT ALLEN

:

:

:

CLIENT REFERENCE No: 55428-55471 RECEIVED : 21 FEB 1999

No. SAMPLES : 45 REPORTED : 23 FEB 1999

MAIN SAMPLE TYPE : ROCK CHIPS

NEVADA LEGISLATIVE DISCLAIMER :-
The results of this assay were based solely upon the content of the sample submitted. Any decision to invest should be made only after the potential investment value of the claim or deposit has been determined based on the results of assays of multiple samples of geological materials collected by the prospective investor or by a qualified person selected by him and based on an evaluation of all engineering data which is available concerning any proposed project.

ANALYSIS	ANALYTICAL METHOD	QUALITY PARAMETER	UNIT	DETECTION
Au(OZ)	GRAV	15%	OPT	0.001
Au(RZ)	GRAV	15%	OPT	0.001
Au(RZ2)	GRAV	15%	OPT	0.001
Ag(OZ)	GRAV	15%	OPT	0.05
Ag(OZ)	GRAV	15%	OPT	0.05

SIGNATORY : Leonard E. Mackedon B.S.

AMERICAN ASSAY LABORATORIES

PROVISIONAL REPORT SP052594

CLIENT : HECLA MINING COMPANY
PROJECT : ROSEBUD PRODUCTION
REFERENCE : 55428-55471

REPORTED : 23 FEB 1999

SAMPLES	Au(OZ)	Au(RZ)	Au(RZ2)	Ag(OZ)	Ag(OZ)
55428	0.008		0.008	0.34	
55429	3.470		3.209	4.48	
55430	1.041		0.988	1.44	
55431	0.958	0.940	0.968	16.31	
55432	0.369		0.306	5.23	
55433	0.066		0.068	1.30	
55434	0.054		0.052	0.80	
55435	0.038		0.039	<0.05	
55436	0.017		0.013	0.26	
55437	0.038	0.041	0.038	1.57	
55438	0.027		0.020	1.16	
55439	0.683		0.639	13.89	
55440	1.153		1.082	16.11	
55441	0.427		0.455	4.09	
55442	0.758		0.759	5.51	
55443	0.737		0.805	5.00	
55444	1.009		0.990	43.97	
55445	2.765		2.723	57.24	
55446	1.051		0.994	102.08	
55447	1.582		1.654	19.52	
55448	1.489	1.493	1.555	15.04	
55449	0.692		0.724	15.04	
55450	1.007	1.036	0.976	17.93	
55451	0.115	0.106	0.100	0.54	0.39
55452	0.115	0.108	0.099	0.36	0.25

AMERICAN ASSAY LABORATORIES

PROVISIONAL REPORT SP052594

CLIENT : HECLA MINING COMPANY
PROJECT : ROSEBUD PRODUCTION
REFERENCE : 55428-55471

REPORTED : 23 FEB 1999

SAMPLES	Au(OZ)	Au(RZ)	Au(RZ2)	Ag(OZ)	Ag(OZ)
55453	1.659		1.738	2.80	
55454	0.149		0.132	0.53	
55455	0.312		0.341	1.27	
55456	0.150		0.155	1.61	
55457	0.540		0.605	3.67	
55458	0.052		0.087	<0.05	
55459	0.210		0.196	0.53	
55460	0.542	0.470	0.626	0.95	
55461	0.950		0.911	7.56	
55462	0.786		0.832	1.23	
55463	0.810		0.782	4.11	
55464	0.825	0.754	0.840	2.15	
55465	0.268		0.209	2.21	
55466	0.263		0.222	0.50	
55467	0.395		0.368	2.08	
55468	0.308		0.382	1.72	
55469	0.213		0.200	2.53	
55470	0.183		0.193	5.31	
55471	0.217		0.212	3.57	
51491	0.523		0.553	2.67	

The Rosebud Mining Company LLC
P.O. Box 2610
Winnemucca, NV 89446
Phone (702) 623-6912
Fax (702) 623-6967
Hecla Mining Company – Manager of Mining

Fax

To:	Sue King	**From:**	Cindy Moore
Fax:	(775) 356-1413	**Pages:**	1
Phone:	(775) 356-0606	**Date:**	02/25/99
Re:	Check Sample Numbers	**CC:**	

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

Sue:

Would you please check four sample values for us please, then fax them back?

The numbers are:

55598 and 55599 from job SP052618

55451 and 55452 from job SP052594

Thank you very much,

Cindy

Cindy

```
# Macro Name     : krige_51_inf.cmd
#
# Version        : surpac2000 V3.1-H
#
# Creation Date  : Tue Nov 17 14:41:21 1998
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\inferred
#
# GEOSTATISTICS MENU
#
@menu("00024")
@FUNCTION ORDINARY KRIGING,error=abort,mismatch=display
#
# ORDINARY KRIGING FORM
#
@FORM frm00148,action=apply,pause=2.000000,error=abort,mismatch=display\
  |location=..\ASSAYS\rot_51_comp\
  |id=9999\
  |field=1\
  |out_loc=51_inf\
  |debug=N\
  |bng=256\
  |dip=-30\
  |tilt=10\
  |semi_major=1.60\
  |minor=4.86\
  |min=2\
  |max=15\
  |rmax=500\
  |zlimit=100\
  |search=E
#
# VARIOGRAM MODEL FORM
#
@FORM frm00147,action=apply,pause=2.000000,error=abort,mismatch=display\
  |model=SPH\
  |nested_gh=2\
  |co=0.183\
  |c1=0.651\
  |a1=10\
  |c2=0.166\
  |a2=417\
  |c3=0\
  |a3=0\
  |c4=0\
  |a4=0\
  |c5=0\
  |a5=0
#
# BLOCK DEFINITION FORM
#
```

```
@FORM frm00144,action=apply,pause=2.000000,error=abort,mismatch=display\
  |mid_top=M\
  |ymin=1103.5\
  |xmin=-2319.5\
  |zmax=4745.5\
  |widy=7\
  |widx=7\
  |widz=7\
  |nb_row=162\
  |nb_col=121\
  |nb_lev=79\
  |ndy=2\
  |ndx=2\
  |ndz=2
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\MACROS
```

```
# Macro Name     : krige_52_inf.cmd
#
# Version        : surpac2000 V3.1-H
#
# Creation Date  : Tue Nov 17 14:41:21 1998
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\inferred
#
# GEOSTATISTICS MENU
#
@menu("00024")
@FUNCTION ORDINARY KRIGING,error=abort,mismatch=display
#
# ORDINARY KRIGING FORM
#
@FORM frm00148,action=apply,pause=2.000000,error=abort,mismatch=display\
  |location=..\ASSAYS\rot_52_comp\
  |id=9999\
  |field=1\
  |out_loc=52_inf\
  |debug=N\
  |bng=256\
  |dip=-30\
  |tilt=10\
  |semi_major=1.60\
  |minor=4.86\
  |min=2\
  |max=15\
  |rmax=500\
  |zlimit=100\
  |search=E
#
# VARIOGRAM MODEL FORM
#
@FORM frm00147,action=apply,pause=2.000000,error=abort,mismatch=display\
  |model=SPH\
  |nested_gh=2\
  |co=0.183\
  |c1=0.652\
  |a1=10\
  |c2=0.166\
  |a2=417\
  |c3=0\
  |a3=0\
  |c4=0\
  |a4=0\
  |c5=0\
  |a5=0
#
# BLOCK DEFINITION FORM
#
```

```
@FORM frm00144,action=apply,pause=2.000000,error=abort,mismatch=display\
  |mid_top=M\
  |ymin=1103.5\
  |xmin=-2319.5\
  |zmax=4745.5\
  |widy=7\
  |widx=7\
  |widz=7\
  |nb_row=162\
  |nb_col=121\
  |nb_lev=79\
  |ndy=2\
  |ndx=2\
  |ndz=2
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\MACROS
```

```
# Macro Name     : krige_53_inf.cmd
#
# Version        : surpac2000 V3.2-D
#
# Creation Date  : Sat Feb 27 09:24:45 1999
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=D:\North_Zone\inferred
#
# GEOSTATISTICS MENU
#
@menu("00024")
@FUNCTION ORDINARY KRIGING,error=abort,mismatch=display
#
# ORDINARY KRIGING FORM
#
@FORM frm00148,action=apply,pause=2.000000,error=abort,mismatch=display\
  |location=..\assays\rot_53_comp\
  |id=9999\
  |field=1\
  |out_loc=53_inf\
  |debug=N\
  |bng=192\
  |dip=-28\
  |tilt=-2\
  |semi_major=1.18\
  |minor=1.74\
  |min=1\
  |max=15\
  |rmax=100\
  |zlimit=60\
  |search=E
#
# VARIOGRAM MODEL FORM
#
@FORM frm00147,action=apply,pause=2.000000,error=abort,mismatch=display\
  |model=SPH\
  |nested_gh=1\
  |co=0.538\
  |c1=0.462\
  |a1=55.23\
  |c2=0\
  |a2=0\
  |c3=0\
  |a3=0\
  |c4=0\
  |a4=0\
  |c5=0\
  |a5=0
#
# BLOCK DEFINITION FORM
#
```

```
@FORM frm00144,action=apply,pause=2.000000,error=abort,mismatch=display\
  |mid_top=M\
  |ymin=1103.5\
  |xmin=-2319.5\
  |zmax=4745.5\
  |widy=7\
  |widx=7\
  |widz=7\
  |nb_row=162\
  |nb_col=121\
  |nb_lev=79\
  |ndy=2\
  |ndx=2\
  |ndz=2
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\macros
```

```
# Macro Name     : krige_54_inf.cmd
#
# Version        : surpac2000 V3.2-D
#
# Creation Date  : Sat Feb 27 09:24:45 1999
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=D:\North_Zone\inferred
#
# GEOSTATISTICS MENU
#
@menu("00024")
@FUNCTION ORDINARY KRIGING,error=abort,mismatch=display
#
# ORDINARY KRIGING FORM
#
@FORM frm00148,action=apply,pause=2.000000,error=abort,mismatch=display\
  |location=..\assays\rot_54_comp\
  |id=9999\
  |field=1\
  |out_loc=54_inf\
  |debug=N\
  |bng=10\
  |dip=-40\
  |tilt=0\
  |semi_major=1.12\
  |minor=1.14\
  |min=1\
  |max=15\
  |rmax=90\
  |zlimit=65\
  |search=E
#
# VARIOGRAM MODEL FORM
#
@FORM frm00147,action=apply,pause=2.000000,error=abort,mismatch=display\
  |model=INV\
  |power=3\
  |nested_gh=1\
  |co=0\
  |c1=0\
  |a1=0\
  |c2=0\
  |a2=0\
  |c3=0\
  |a3=0\
  |c4=0\
  |a4=0\
  |c5=0\
  |a5=0
#
# BLOCK DEFINITION FORM
```

```
#
@FORM frm00144,action=apply,pause=2.000000,error=abort,mismatch=display\
  |mid_top=M\
  |ymin=1103.5\
  |xmin=-2319.5\
  |zmax=4745.5\
  |widy=7\
  |widx=7\
  |widz=7\
  |nb_row=162\
  |nb_col=121\
  |nb_lev=79\
  |ndy=2\
  |ndx=2\
  |ndz=2
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\macros
```

```
# Macro Name     : krige_61_inf.cmd
#
# Version        : surpac2000 V3.1-H
#
# Creation Date  : Tue Nov 17 14:41:21 1998
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\inferred
#
# GEOSTATISTICS MENU
#
@menu("00024")
@FUNCTION ORDINARY KRIGING,error=abort,mismatch=display
#
# ORDINARY KRIGING FORM
#
@FORM frm00148,action=apply,pause=2.000000,error=abort,mismatch=display\
  |location=..\ASSAYS\rot_61_comp\
  |id=9999\
  |field=1\
  |out_loc=61_inf\
  |debug=N\
  |bng=10\
  |dip=40\
  |tilt=25\
  |semi_major=1.42\
  |minor=1.9\
  |min=2\
  |max=15\
  |rmax=240\
  |zlimit=80\
  |search=E
#
# VARIOGRAM MODEL FORM
#
@FORM frm00147,action=apply,pause=2.000000,error=abort,mismatch=display\
  |model=SPH\
  |nested_gh=1\
  |co=0.002\
  |c1=0.002\
  |a1=36.01\
  |c2=0\
  |a2=0\
  |c3=0\
  |a3=0\
  |c4=0\
  |a4=0\
  |c5=0\
  |a5=0
#
# BLOCK DEFINITION FORM
#
```

```
@FORM frm00144,action=apply,pause=2.000000,error=abort,mismatch=display\
  |mid_top=M\
  |ymin=1103.5\
  |xmin=-2319.5\
  |zmax=4745.5\
  |widy=7\
  |widx=7\
  |widz=7\
  |nb_row=162\
  |nb_col=121\
  |nb_lev=79\
  |ndy=2\
  |ndx=2\
  |ndz=2
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\MACROS
```

```
# Macro Name     : krige_62_inf.cmd
#
# Version        : surpac2000 V3.1-H
#
# Creation Date  : Tue Nov 17 14:41:21 1998
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\inferred
#
# GEOSTATISTICS MENU
#
@menu("00024")
@FUNCTION ORDINARY KRIGING,error=abort,mismatch=display
#
# ORDINARY KRIGING FORM
#
@FORM frm00148,action=apply,pause=2.000000,error=abort,mismatch=display\
  |location=..\ASSAYS\rot_62_comp\
  |id=9999\
  |field=1\
  |out_loc=62_inf\
  |debug=N\
  |bng=10\
  |dip=40\
  |tilt=25\
  |semi_major=1.42\
  |minor=1.9\
  |min=2\
  |max=15\
  |rmax=200\
  |zlimit=80\
  |search=E
#
# VARIOGRAM MODEL FORM
#
@FORM frm00147,action=apply,pause=2.000000,error=abort,mismatch=display\
  |model=SPH\
  |nested_gh=1\
  |co=0.002\
  |c1=0.002\
  |a1=36.01\
  |c2=0\
  |a2=0\
  |c3=0\
  |a3=0\
  |c4=0\
  |a4=0\
  |c5=0\
  |a5=0
#
# BLOCK DEFINITION FORM
#
```

```
@FORM frm00144,action=apply,pause=2.000000,error=abort,mismatch=display\
  |mid_top=M\
  |ymin=1103.5\
  |xmin=-2319.5\
  |zmax=4745.5\
  |widy=7\
  |widx=7\
  |widz=7\
  |nb_row=162\
  |nb_col=121\
  |nb_lev=79\
  |ndy=2\
  |ndx=2\
  |ndz=2
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\MACROS
```

```
# Macro Name     : krige_63_inf.cmd
#
# Version        : surpac2000 V3.2-D
#
# Creation Date  : Sat Feb 27 09:24:45 1999
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=D:\North_Zone\inferred
#
# GEOSTATISTICS MENU
#
@menu("00024")
@FUNCTION ORDINARY KRIGING,error=abort,mismatch=display
#
# ORDINARY KRIGING FORM
#
@FORM frm00148,action=apply,pause=2.000000,error=abort,mismatch=display\
  |location=..\assays\rot_63_comp\
  |id=9999\
  |field=1\
  |out_loc=63_inf\
  |debug=N\
  |bng=10\
  |dip=-40\
  |tilt=0\
  |semi_major=1.42\
  |minor=1.90\
  |min=1\
  |max=15\
  |rmax=120\
  |zlimit=65\
  |search=E
#
# VARIOGRAM MODEL FORM
#
@FORM frm00147,action=apply,pause=2.000000,error=abort,mismatch=display\
  |model=INV\
  |power=3\
  |nested_gh=1\
  |co=0\
  |c1=0\
  |a1=0\
  |c2=0\
  |a2=0\
  |c3=0\
  |a3=0\
  |c4=0\
  |a4=0\
  |c5=0\
  |a5=0
#
# BLOCK DEFINITION FORM
```

```
#
@FORM frm00144,action=apply,pause=2.000000,error=abort,mismatch=display\
  |mid_top=M\
  |ymin=1103.5\
  |xmin=-2319.5\
  |zmax=4745.5\
  |widy=7\
  |widx=7\
  |widz=7\
  |nb_row=162\
  |nb_col=121\
  |nb_lev=79\
  |ndy=2\
  |ndx=2\
  |ndz=2
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\macros
```

```
# Macro Name     : krige_64_inf.cmd
#
# Version        : surpac2000 V3.2-D
#
# Creation Date  : Sat Feb 27 09:24:45 1999
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=D:\North_Zone\inferred
#
# GEOSTATISTICS MENU
#
@menu("00024")
@FUNCTION ORDINARY KRIGING,error=abort,mismatch=display
#
# ORDINARY KRIGING FORM
#
@FORM frm00148,action=apply,pause=2.000000,error=abort,mismatch=display\
  |location=..\assays\rot_64_comp\
  |id=9999\
  |field=1\
  |out_loc=64_inf\
  |debug=N\
  |bng=10\
  |dip=-40\
  |tilt=0\
  |semi_major=1.42\
  |minor=1.90\
  |min=1\
  |max=15\
  |rmax=90\
  |zlimit=65\
  |search=E
#
# VARIOGRAM MODEL FORM
#
@FORM frm00147,action=apply,pause=2.000000,error=abort,mismatch=display\
  |model=INV\
  |power=3\
  |nested_gh=1\
  |co=0\
  |c1=0\
  |a1=0\
  |c2=0\
  |a2=0\
  |c3=0\
  |a3=0\
  |c4=0\
  |a4=0\
  |c5=0\
  |a5=0
#
# BLOCK DEFINITION FORM
```

```
#
@FORM frm00144,action=apply,pause=2.000000,error=abort,mismatch=display\
  |mid_top=M\
  |ymin=1103.5\
  |xmin=-2319.5\
  |zmax=4745.5\
  |widy=7\
  |widx=7\
  |widz=7\
  |nb_row=162\
  |nb_col=121\
  |nb_lev=79\
  |ndy=2\
  |ndx=2\
  |ndz=2
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\macros
```

```
#Zone 1 - Run B

# Macro Name     : krige_51.cmd
#
# Version        : surpac2000 V3.1-H
#
# Creation Date  : Tue Nov 17 14:41:21 1998
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\2dmodel
#
# GEOSTATISTICS MENU
#
@menu("00024")
@FUNCTION ORDINARY KRIGING,error=abort,mismatch=display
#
# ORDINARY KRIGING FORM
#
@FORM frm00148,action=apply,pause=2.000000,error=abort,mismatch=display\
  |location=..\ASSAYS\rot_51_comp\
  |id=9999\
  |field=1\
  |out_loc=51_krige\
  |debug=N\
  |bng=256\
  |dip=-30\
  |tilt=10\
  |semi_major=1.60\
  |minor=4.86\
  |min=2\
  |max=15\
  |rmax=417\
  |zlimit=91\
  |search=E
#
# VARIOGRAM MODEL FORM
#
@FORM frm00147,action=apply,pause=2.000000,error=abort,mismatch=display\
  |model=SPH\
  |nested_gh=2\
  |co=0.183\
  |c1=0.651\
  |a1=10\
  |c2=0.166\
  |a2=417\
  |c3=0\
  |a3=0\
  |c4=0\
  |a4=0\
  |c5=0\
  |a5=0
#
```

```
# BLOCK DEFINITION FORM
#
@FORM frm00144,action=apply,pause=2.000000,error=abort,mismatch=display\
  |mid_top=M\
  |ymin=1103.5\
  |xmin=-2319.5\
  |zmax=4745.5\
  |widy=7\
  |widx=7\
  |widz=7\
  |nb_row=162\
  |nb_col=121\
  |nb_lev=79\
  |ndy=2\
  |ndx=2\
  |ndz=2
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\MACROS
```

```
#Zone 52 - Run B

# Macro Name     : krige_52.cmd
#
# Version        : surpac2000 V3.1-H
#
# Creation Date  : Tue Nov 17 14:41:21 1998
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\2dmodel
#
# GEOSTATISTICS MENU
#
@menu("00024")
@FUNCTION ORDINARY KRIGING,error=abort,mismatch=display
#
# ORDINARY KRIGING FORM
#
@FORM frm00148,action=apply,pause=2.000000,error=abort,mismatch=display\
  |location=..\ASSAYS\rot_52_comp\
  |id=9999\
  |field=1\
  |out_loc=52_krige\
  |debug=N\
  |bng=256\
  |dip=-30\
  |tilt=10\
  |semi_major=1.60\
  |minor=4.86\
  |min=2\
  |max=15\
  |rmax=417\
  |zlimit=91\
  |search=E
#
# VARIOGRAM MODEL FORM
#
@FORM frm00147,action=apply,pause=2.000000,error=abort,mismatch=display\
  |model=SPH\
  |nested_gh=2\
  |co=0.183\
  |c1=0.651\
  |a1=10\
  |c2=0.166\
  |a2=417\
  |c3=0\
  |a3=0\
  |c4=0\
  |a4=0\
  |c5=0\
  |a5=0
#
```

```
# BLOCK DEFINITION FORM
#
@FORM frm00144,action=apply,pause=2.000000,error=abort,mismatch=display\
  |mid_top=M\
  |ymin=1103.5\
  |xmin=-2319.5\
  |zmax=4745.5\
  |widy=7\
  |widx=7\
  |widz=7\
  |nb_row=162\
  |nb_col=121\
  |nb_lev=79\
  |ndy=2\
  |ndx=2\
  |ndz=2
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\MACROS
```

```
#Zone 53 - Run B

# Macro Name     : krige_53.cmd
#
# Version        : surpac2000 V3.2-D
#
# Creation Date  : Sat Feb 27 09:24:45 1999
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=D:\North_Zone\2dmodel
#
# GEOSTATISTICS MENU
#
@menu("00024")
@FUNCTION ORDINARY KRIGING,error=abort,mismatch=display
#
# ORDINARY KRIGING FORM
#
@FORM frm00148,action=apply,pause=2.000000,error=abort,mismatch=display\
  |location=..\assays\rot_53_comp\
  |id=9999\
  |field=1\
  |out_loc=53_krige\
  |debug=N\
  |bng=192\
  |dip=-28\
  |tilt=-2\
  |semi_major=1.18\
  |minor=1.74\
  |min=1\
  |max=15\
  |rmax=55\
  |zlimit=30\
  |search=E
#
# VARIOGRAM MODEL FORM
#
@FORM frm00147,action=apply,pause=2.000000,error=abort,mismatch=display\
  |model=SPH\
  |nested_gh=1\
  |co=0.538\
  |c1=.462\
  |a1=55.23\
  |c2=0\
  |a2=0\
  |c3=0\
  |a3=0\
  |c4=0\
  |a4=0\
  |c5=0\
  |a5=0
#
```

```
# BLOCK DEFINITION FORM
#
@FORM frm00144,action=apply,pause=2.000000,error=abort,mismatch=display\
  |mid_top=M\
  |ymin=1103.5\
  |xmin=-2319.5\
  |zmax=4745.5\
  |widy=7\
  |widx=7\
  |widz=7\
  |nb_row=162\
  |nb_col=121\
  |nb_lev=79\
  |ndy=2\
  |ndx=2\
  |ndz=2
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\macros
```

```
#Zone 54 - Run C

# Macro Name     : krige_54.cmd
#
# Version        : surpac2000 V3.2-D
#
# Creation Date  : Sat Feb 27 09:24:45 1999
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=D:\North_Zone\2dmodel
#
# GEOSTATISTICS MENU
#
@menu("00024")
@FUNCTION ORDINARY KRIGING,error=abort,mismatch=display
#
# ORDINARY KRIGING FORM
#
@FORM frm00148,action=apply,pause=2.000000,error=abort,mismatch=display\
  |location=..\assays\rot_54_comp\
  |id=9999\
  |field=1\
  |out_loc=54_krige\
  |debug=N\
  |bng=10\
  |dip=-40\
  |tilt=0\
  |semi_major=1.12\
  |minor=1.14\
  |min=1\
  |max=15\
  |rmax=30\
  |zlimit=30\
  |search=E
#
# VARIOGRAM MODEL FORM
#
@FORM frm00147,action=apply,pause=2.000000,error=abort,mismatch=display\
  |model=INV\
  |power=3\
  |nested_gh=1\
  |co=0\
  |c1=0\
  |a1=0\
  |c2=0\
  |a2=0\
  |c3=0\
  |a3=0\
  |c4=0\
  |a4=0\
  |c5=0\
  |a5=0
```

```
#
# BLOCK DEFINITION FORM
#
@FORM frm00144,action=apply,pause=2.000000,error=abort,mismatch=display\
  |mid_top=M\
  |ymin=1103.5\
  |xmin=-2319.5\
  |zmax=4745.5\
  |widy=7\
  |widx=7\
  |widz=7\
  |nb_row=162\
  |nb_col=121\
  |nb_lev=79\
  |ndy=2\
  |ndx=2\
  |ndz=2
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\macros
```

```
#Zone C1 - Run A (Isaaks)

# Macro Name     : krige_61.cmd
#
# Version        : surpac2000 V3.1-H
#
# Creation Date  : Tue Nov 17 14:41:21 1998
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\2dmodel
#
# GEOSTATISTICS MENU
#
@menu("00024")
@FUNCTION ORDINARY KRIGING,error=abort,mismatch=display
#
# ORDINARY KRIGING FORM
#
@FORM frm00148,action=apply,pause=2.000000,error=abort,mismatch=display\
  |location=..\ASSAYS\rot_61_comp\
  |id=9999\
  |field=1\
  |out_loc=61_krige\
  |debug=N\
  |bng=10\
  |dip=40\
  |tilt=25\
  |semi_major=1.42\
  |minor=1.9\
  |min=2\
  |max=15\
  |rmax=120\
  |zlimit=60\
  |search=E
#
# VARIOGRAM MODEL FORM
#
@FORM frm00147,action=apply,pause=2.000000,error=abort,mismatch=display\
  |model=SPH\
  |nested_gh=1\
  |co=0.002\
  |c1=0.002\
  |a1=36.01\
  |c2=0\
  |a2=0\
  |c3=0\
  |a3=0\
  |c4=0\
  |a4=0\
  |c5=0\
  |a5=0
#
```

```
# BLOCK DEFINITION FORM
#
@FORM frm00144,action=apply,pause=2.000000,error=abort,mismatch=display\
  |mid_top=M\
  |ymin=1103.5\
  |xmin=-2319.5\
  |zmax=4745.5\
  |widy=7\
  |widx=7\
  |widz=7\
  |nb_row=162\
  |nb_col=121\
  |nb_lev=79\
  |ndy=2\
  |ndx=2\
  |ndz=2
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\MACROS
```

```
#Zone 62 - Run A (Isaaks)

# Macro Name     : krige_62.cmd
#
# Version        : surpac2000 V3.1-H
#
# Creation Date  : Tue Nov 17 14:41:21 1998
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\2dmodel
#
# GEOSTATISTICS MENU
#
@menu("00024")
@FUNCTION ORDINARY KRIGING,error=abort,mismatch=display
#
# ORDINARY KRIGING FORM
#
@FORM frm00148,action=apply,pause=2.000000,error=abort,mismatch=display\
  |location=..\ASSAYS\rot_62_comp\
  |id=9999\
  |field=1\
  |out_loc=62_krige\
  |debug=N\
  |bng=10\
  |dip=40\
  |tilt=25\
  |semi_major=1.42\
  |minor=1.9\
  |min=2\
  |max=15\
  |rmax=100\
  |zlimit=60\
  |search=E
#
# VARIOGRAM MODEL FORM
#
@FORM frm00147,action=apply,pause=2.000000,error=abort,mismatch=display\
  |model=SPH\
  |nested_gh=1\
  |co=0.002\
  |c1=0.002\
  |a1=36.01\
  |c2=0\
  |a2=0\
  |c3=0\
  |a3=0\
  |c4=0\
  |a4=0\
  |c5=0\
  |a5=0
#
```

```
# BLOCK DEFINITION FORM
#
@FORM frm00144,action=apply,pause=2.000000,error=abort,mismatch=display\
  |mid_top=M\
  |ymin=1103.5\
  |xmin=-2319.5\
  |zmax=4745.5\
  |widy=7\
  |widx=7\
  |widz=7\
  |nb_row=162\
  |nb_col=121\
  |nb_lev=79\
  |ndy=2\
  |ndx=2\
  |ndz=2
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\MACROS
```

```
#Zone 63 - Run A (Isaaks)

# Macro Name     : krige_63.cmd
#
# Version        : surpac2000 V3.2-D
#
# Creation Date : Sat Feb 27 09:24:45 1999
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=D:\North_Zone\2dmodel
#
# GEOSTATISTICS MENU
#
@menu("00024")
@FUNCTION ORDINARY KRIGING,error=abort,mismatch=display
#
# ORDINARY KRIGING FORM
#
@FORM frm00148,action=apply,pause=2.000000,error=abort,mismatch=display\
  |location=..\assays\rot_63_comp\
  |id=9999\
  |field=1\
  |out_loc=63_krige\
  |debug=N\
  |bng=10\
  |dip=-40\
  |tilt=0\
  |semi_major=1.42\
  |minor=1.90\
  |min=1\
  |max=15\
  |rmax=60\
  |zlimit=35\
  |search=E
#
# VARIOGRAM MODEL FORM
#
@FORM frm00147,action=apply,pause=2.000000,error=abort,mismatch=display\
  |model=INV\
  |power=3\
  |nested_gh=1\
  |co=0\
  |c1=0\
  |a1=0\
  |c2=0\
  |a2=0\
  |c3=0\
  |a3=0\
  |c4=0\
  |a4=0\
  |c5=0\
  |a5=0
```

```
#
# BLOCK DEFINITION FORM
#
@FORM frm00144,action=apply,pause=2.000000,error=abort,mismatch=display\
  |mid_top=M\
  |ymin=1103.5\
  |xmin=-2319.5\
  |zmax=4745.5\
  |widy=7\
  |widx=7\
  |widz=7\
  |nb_row=162\
  |nb_col=121\
  |nb_lev=79\
  |ndy=2\
  |ndx=2\
  |ndz=2
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\macros
```

```
#Zone 64 - Run A (Isaaks)

# Macro Name     : krige_64.cmd
#
# Version        : surpac2000 V3.2-D
#
# Creation Date  : Sat Feb 27 09:24:45 1999
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=D:\North_Zone\2dmodel
#
# GEOSTATISTICS MENU
#
@menu("00024")
@FUNCTION ORDINARY KRIGING,error=abort,mismatch=display
#
# ORDINARY KRIGING FORM
#
@FORM frm00148,action=apply,pause=2.000000,error=abort,mismatch=display\
  |location=..\assays\rot_64_comp\
  |id=9999\
  |field=1\
  |out_loc=64_krige\
  |debug=N\
  |bng=10\
  |dip=-40\
  |tilt=0\
  |semi_major=1.42\
  |minor=1.90\
  |min=1\
  |max=15\
  |rmax=45\
  |zlimit=35\
  |search=E
#
# VARIOGRAM MODEL FORM
#
@FORM frm00147,action=apply,pause=2.000000,error=abort,mismatch=display\
  |model=INV\
  |power=3\
  |nested_gh=1\
  |co=0\
  |c1=0\
  |a1=0\
  |c2=0\
  |a2=0\
  |c3=0\
  |a3=0\
  |c4=0\
  |a4=0\
  |c5=0\
  |a5=0
```

```
#
# BLOCK DEFINITION FORM
#
@FORM frm00144,action=apply,pause=2.000000,error=abort,mismatch=display\
  |mid_top=M\
  |ymin=1103.5\
  |xmin=-2319.5\
  |zmax=4745.5\
  |widy=7\
  |widx=7\
  |widz=7\
  |nb_row=162\
  |nb_col=121\
  |nb_lev=79\
  |ndy=2\
  |ndx=2\
  |ndz=2
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\macros
```

Zones 51, 52 + 53 Run B
Isaaks Krigu Parameters

Zone 54 Run C
ID3 - Small Search radius

Zones 61 - 64 Run A

NORTH ZONE RESOURCE - 1999 (MEASURED & INDICATED)

Zone	Grade Interval	Volume	Tons	Grade	Ounces
51	0.000 - 0.100	14,763,171	1,085,093	0.026	28,212
52	0.000 - 0.100	95,797	7,041	0.094	662
53	0.000 - 0.100	8,125	597	0.015	9
54	0.000 - 0.100	0	0	0.000	0
61	0.000 - 0.100	5,680,025	417,482	0.023	9,602
62	0.000 - 0.100	74,961	5,510	0.084	463
63	0.000 - 0.100	1,649	121	0.040	5
64	0.000 - 0.100	0	0	0.000	0
Total	0.000 - 0.100	20,623,728	1,515,844	0.026	38,953
51	0.100 - 0.180	0	0	0.115	0
52	0.100 - 0.180	2,911,677	214,008	0.139	29,747
53	0.100 - 0.180	8,342	613	0.143	88
54	0.100 - 0.180	0	0	0.000	0
61	0.100 - 0.180	0	0	0.000	0
62	0.100 - 0.180	244,173	17,947	0.143	2,566
63	0.100 - 0.180	1,263	93	0.154	14
64	0.100 - 0.180	0	0	0.000	0
Total	0.100 - 0.180	3,165,455	232,661	0.139	32,416
51	0.180 - 0.250	0	0	0.000	0
52	0.180 - 0.250	28,989	2,131	0.183	390
53	0.180 - 0.250	26,016	1,912	0.226	432
54	0.180 - 0.250	307	23	0.193	4
61	0.180 - 0.250	0	0	0.000	0
62	0.180 - 0.250	51,065	3,753	0.194	728
63	0.180 - 0.250	5,545	408	0.208	85
64	0.180 - 0.250	0	0	0.000	0
Total	0.180 - 0.250	111,922	8,227	0.199	1,639
51	0.250 - 0.900	0	0	0.000	0
52	0.250 - 0.900	0	0	0.000	0
53	0.250 - 0.900	1,232,043	90,555	0.412	37,309
54	0.250 - 0.900	4,653	342	0.709	242
61	0.250 - 0.900	0	0	0.000	0
62	0.250 - 0.900	0	0	0.000	0
63	0.250 - 0.900	117,955	8,670	0.394	3,416
64	0.250 - 0.900	0	0	0.000	0
Total	0.250 - 0.900	1,354,651	99,567	0.411	40,967
51	+ 0.900	0	0	0.000	0
52	+ 0.900	0	0	0.000	0
53	+ 0.900	14,492	1,065	1.058	1,127
54	+ 0.900	156,986	11,538	1.997	23,041
61	+ 0.900	0	0	0.000	0
62	+ 0.900	0	0	0.000	0
63	+ 0.900	0	0	0.000	0
64	+ 0.900	9,665	710	2.023	1,436
Total	+ 0.900	181,143	13,313	1.923	25,604
Total	+ 0.180	1,647,716	121,107	0.563	68,211

Zones 51-53 Isaaks Kriging Parameters
Zone 54 Inverse Distance Cubed
Zones 61-64 Surpac Kriging Parameters

North Zone Variography 1999

Zones 51, 52 + 53

V5123ag global lag 3' Window 11.25° Search 150' max2

$C_0 = 0.016$

$C_1 = 0.021$ Min 0.010

$R_1 = 17.42$ Max 1.000

$C_2 = 0.009$

$R_2 = 89.51$

V5123bg global Lag 5' Window 22.5°

$C_0 = 0.010$

$C_1 = 0.014$

$R_1 = 21.50$

$C_2 = 0.004$

$R_2 = 98.12$

V5123bst

$R_1 = 17.88$

$R_2 = 95.85$ minor

Anisotropy

Semi-major = 1.12

minor = 1.14

V5123bdip

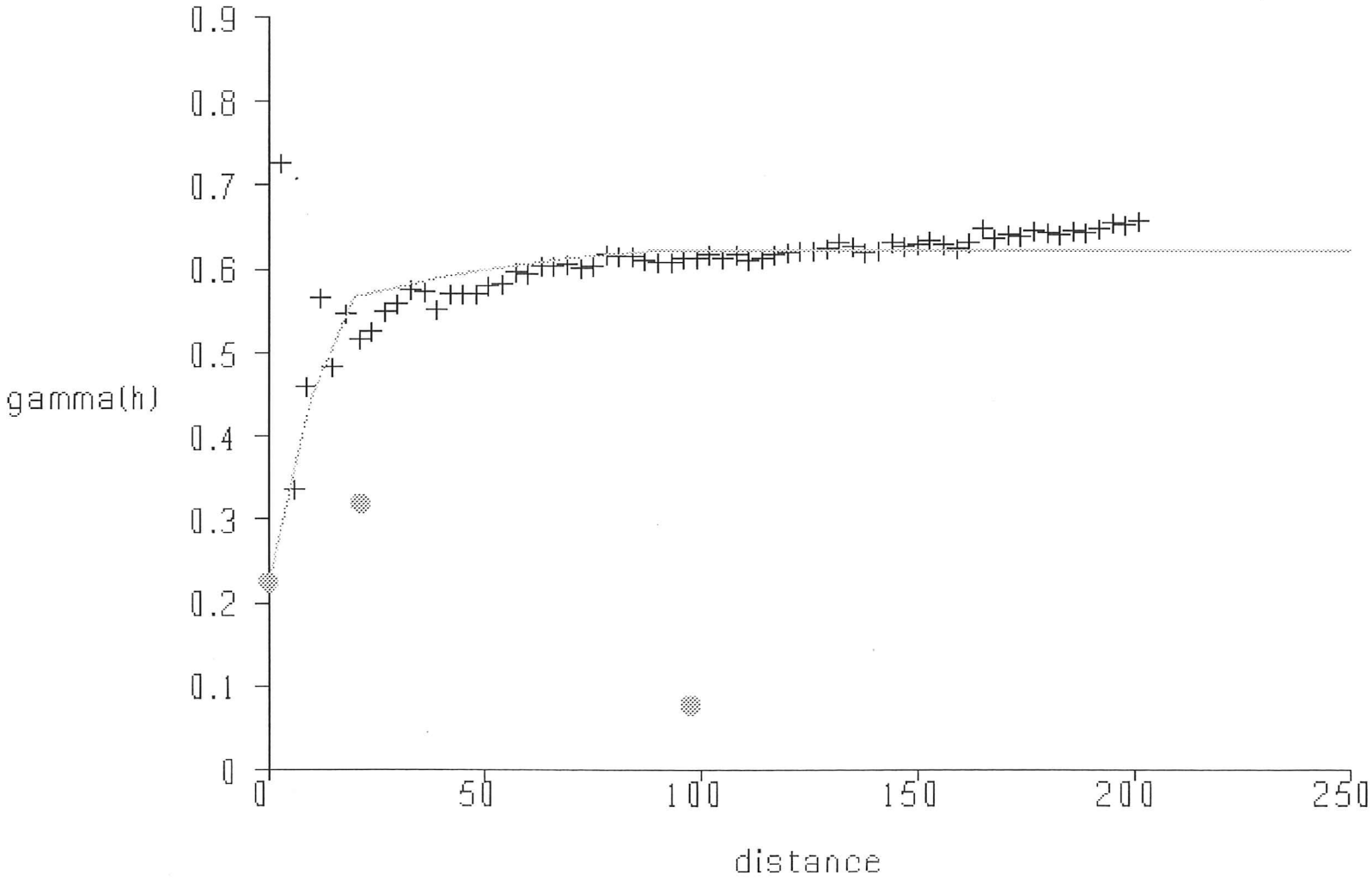
$R_1 = 25.58$

$R_2 = 111.72$ major

V5123bp

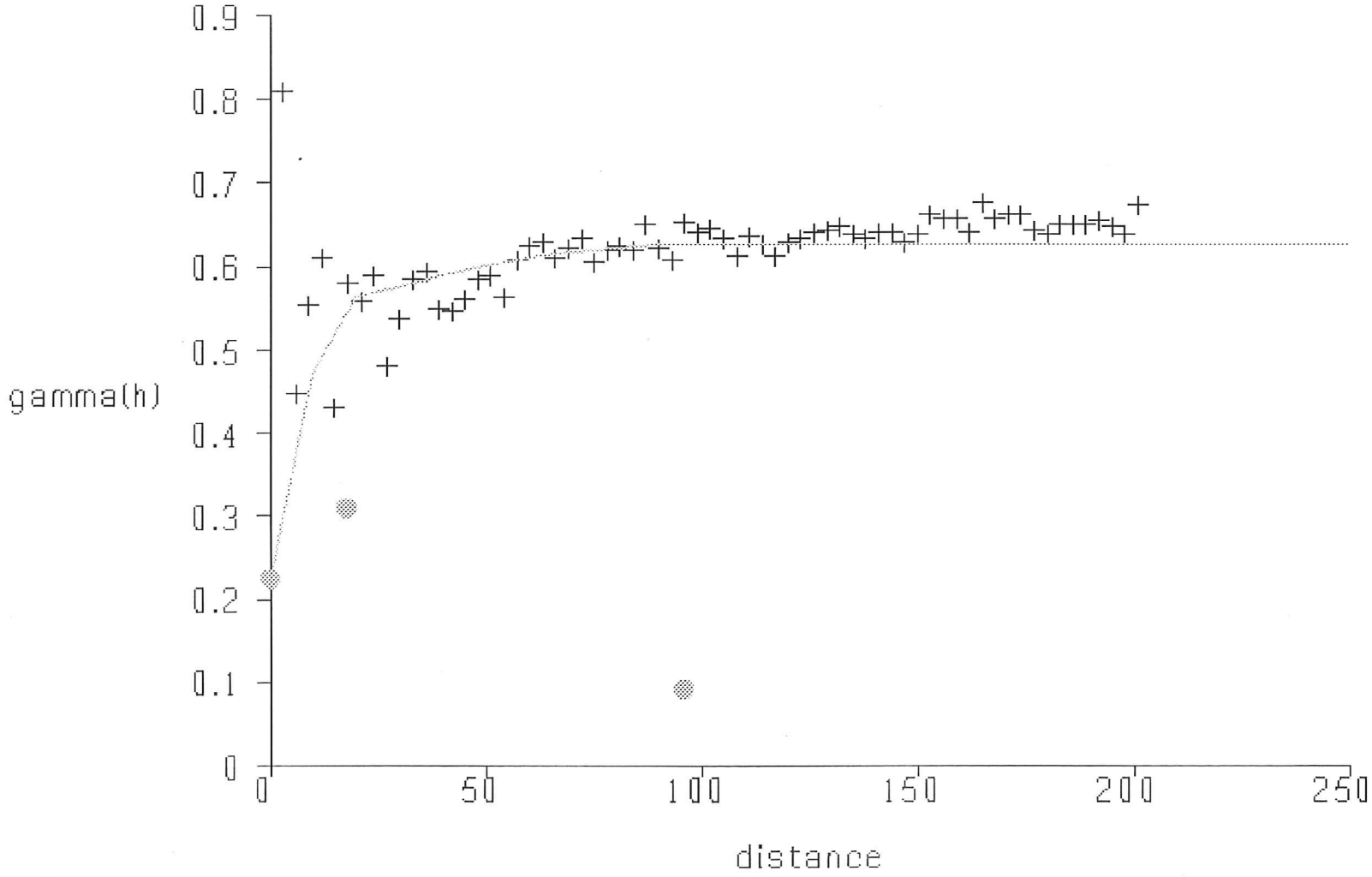
$R_1 = 21.04$ Semi-major ~~Minor~~

$R_2 = 99.93$



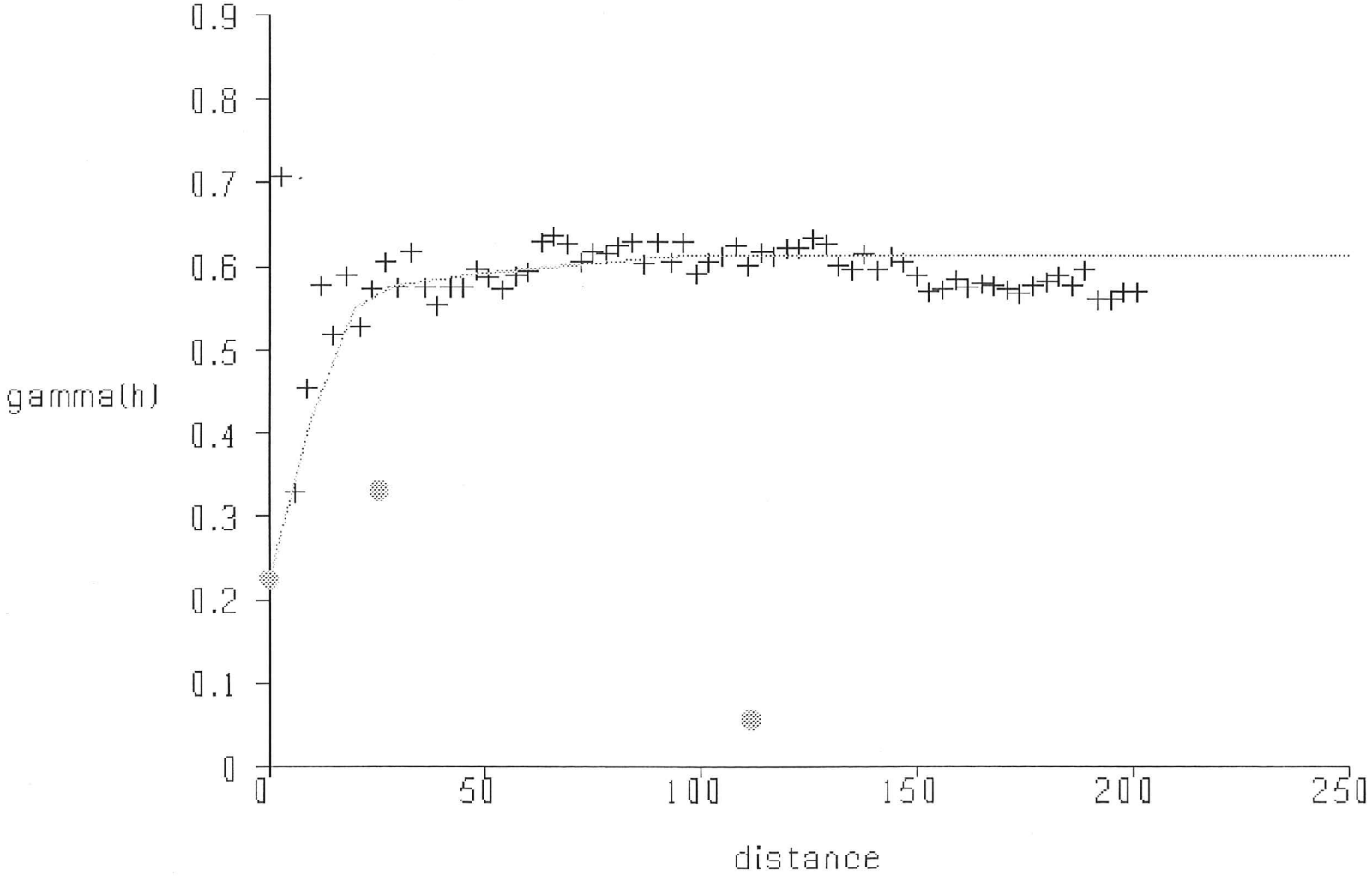
0 -> 0 (90)

Pairwise relative variogram



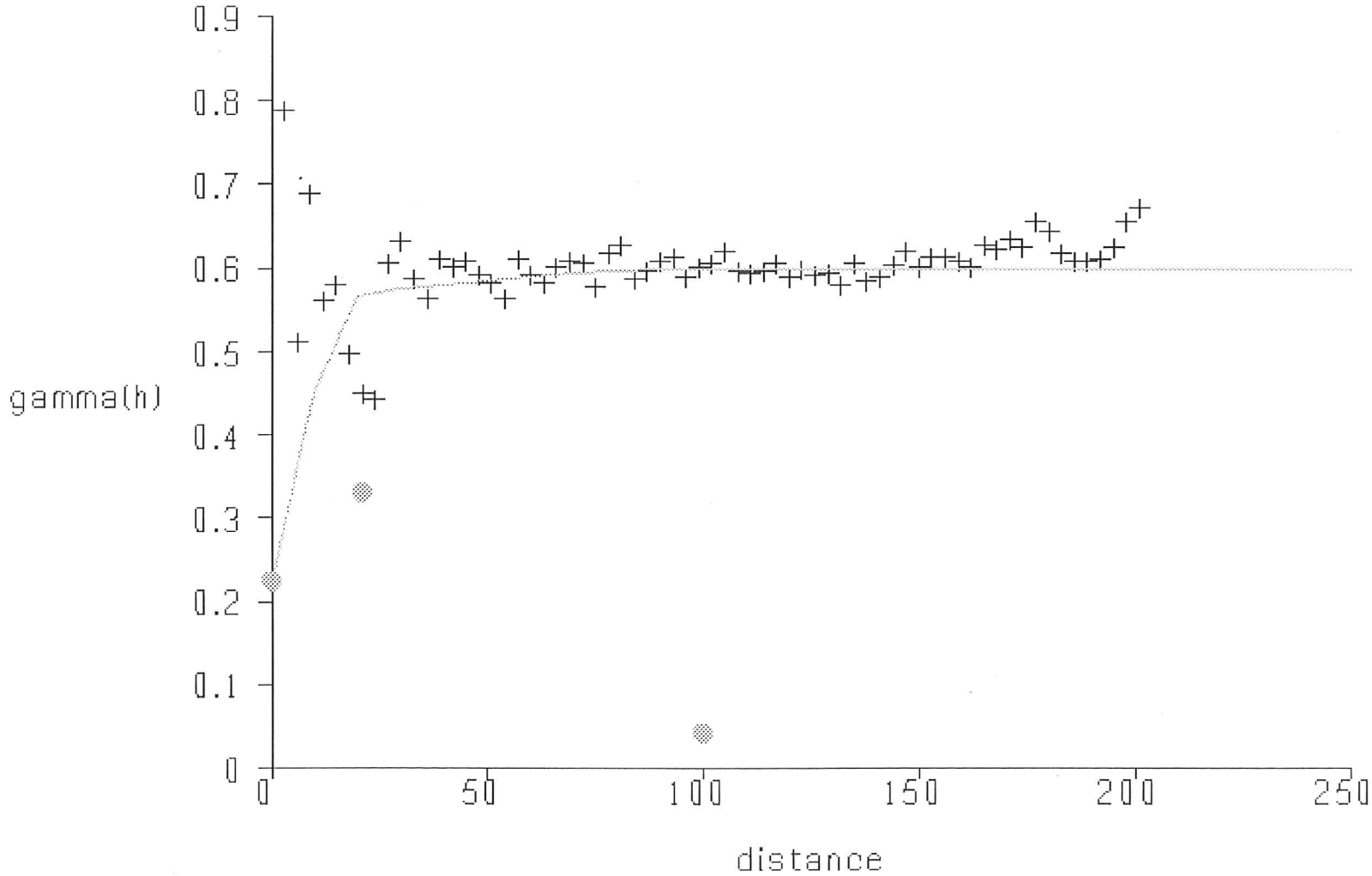
-40 -> 10 (22.5)

Pairwise relative variogram



0 -> 100 (22.5)

Pairwise relative variogram



50 -> 10 (22.5)

Pairwise relative variogram

North Zone Variography 1999

V612bg global Lag 3ft Window 45° Search 150' Max 250

$C_0 = 0.002$

$C_1 = 0.002$ Min = 0.010

$R_1 = 34.01$ Max = 0.250

V612bst

$C_0 = 0.002$ Az = 10° Plunge = 40° Strike

$C_1 = 0.002$ = 100° 25° Dip

$R_1 = 47.30$ major = 10° 50° Plunge

V612bdip

$C_0 = 0.002$

$C_1 = 0.002$

$R_1 = 33.74$ semi-major

V612bp

$C_0 = 0.002$

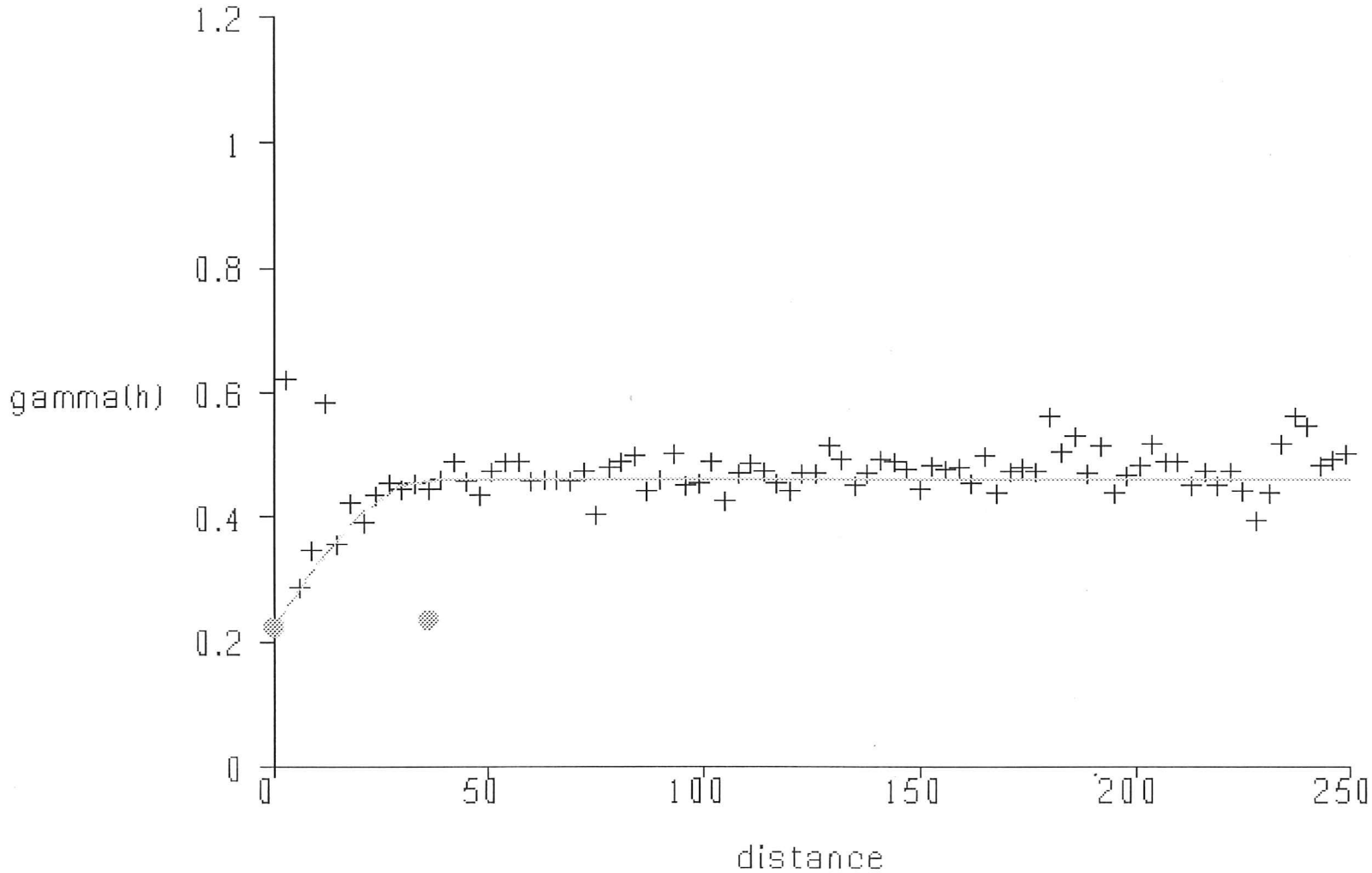
$C_1 = 0.002$

$R_1 = 25.13$ minor

Anisotropy

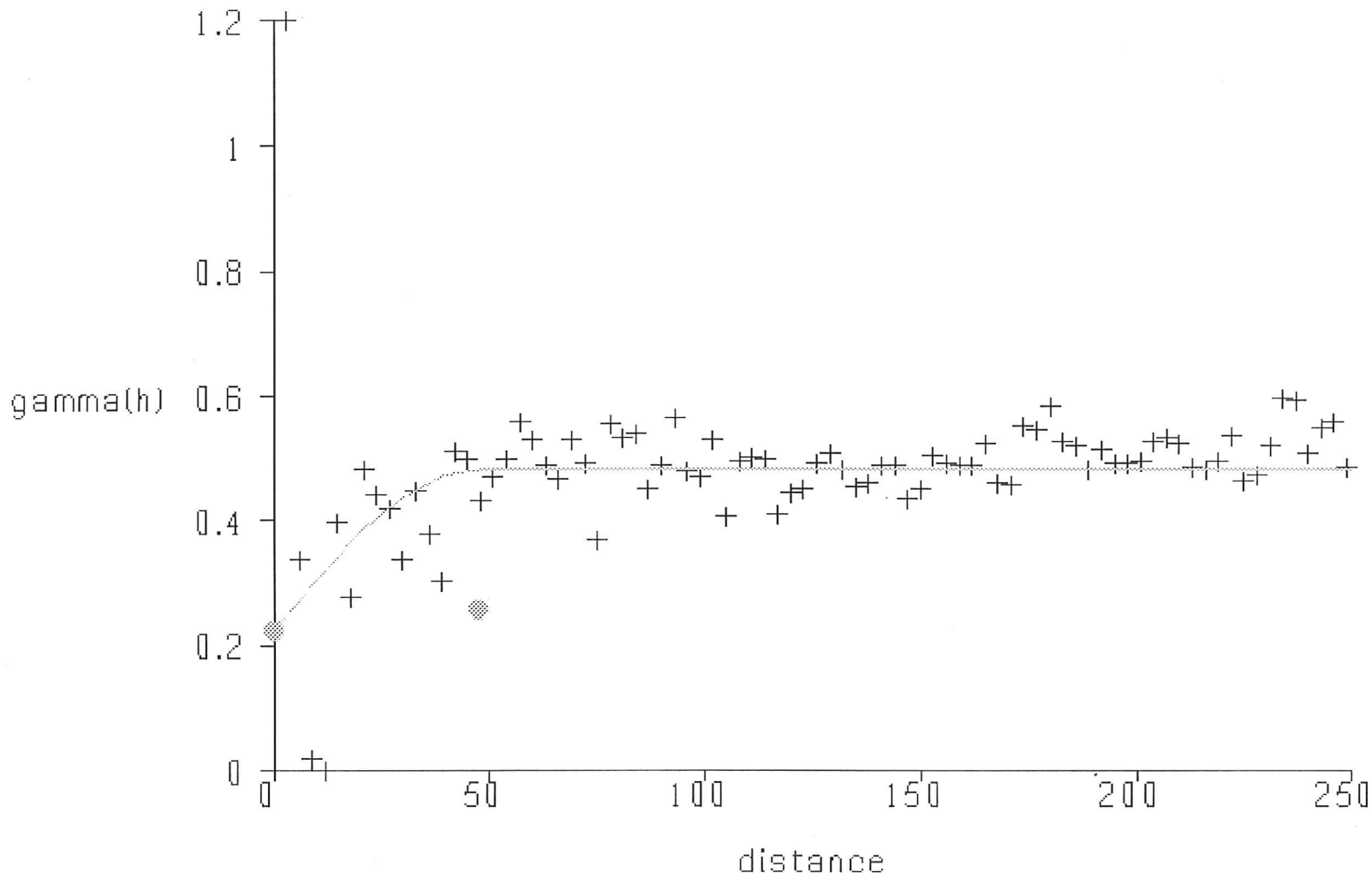
semi-major = 1.42

minor = 1.90



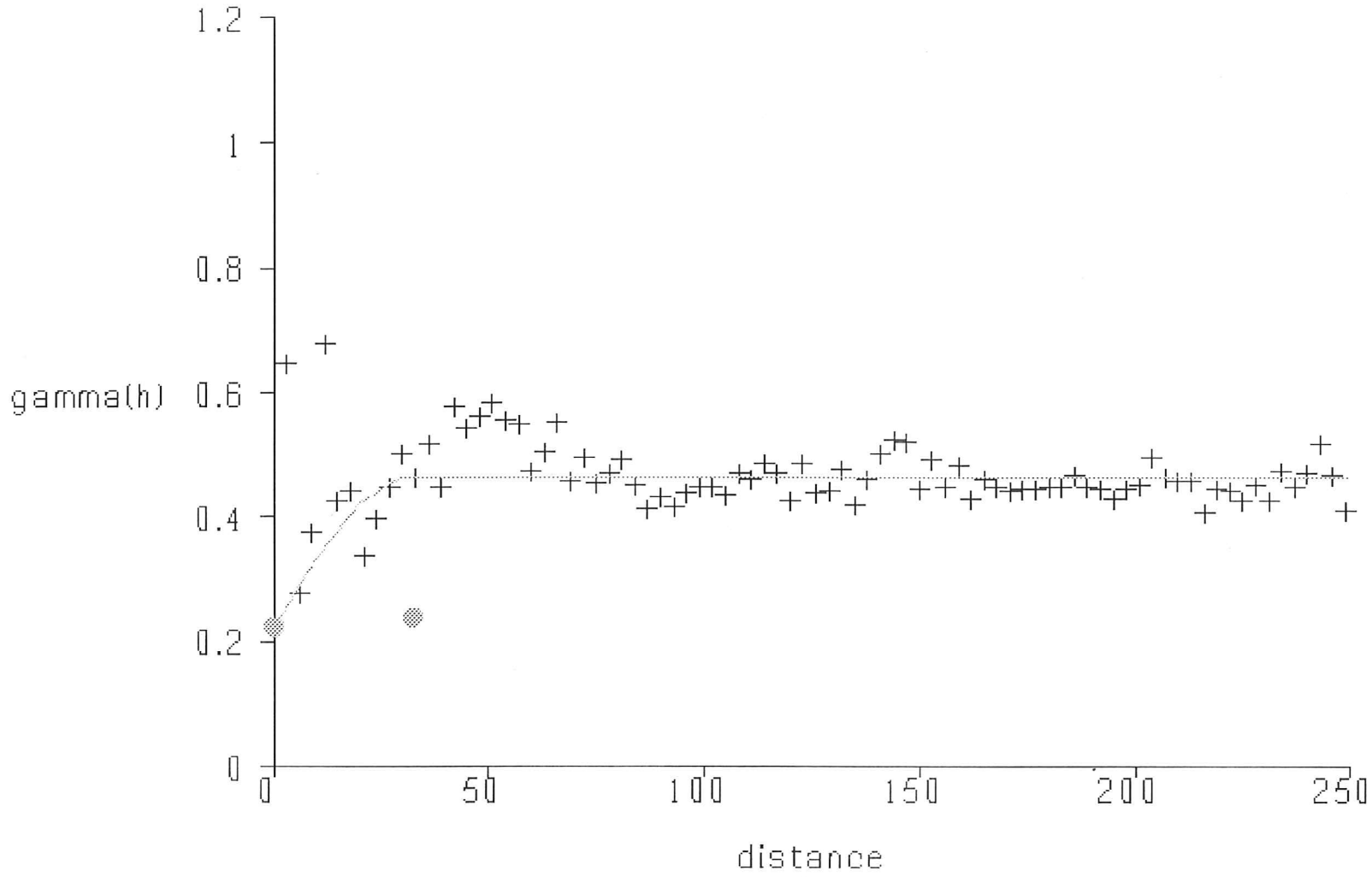
0 -> 0 (90)

Pairwise relative variogram



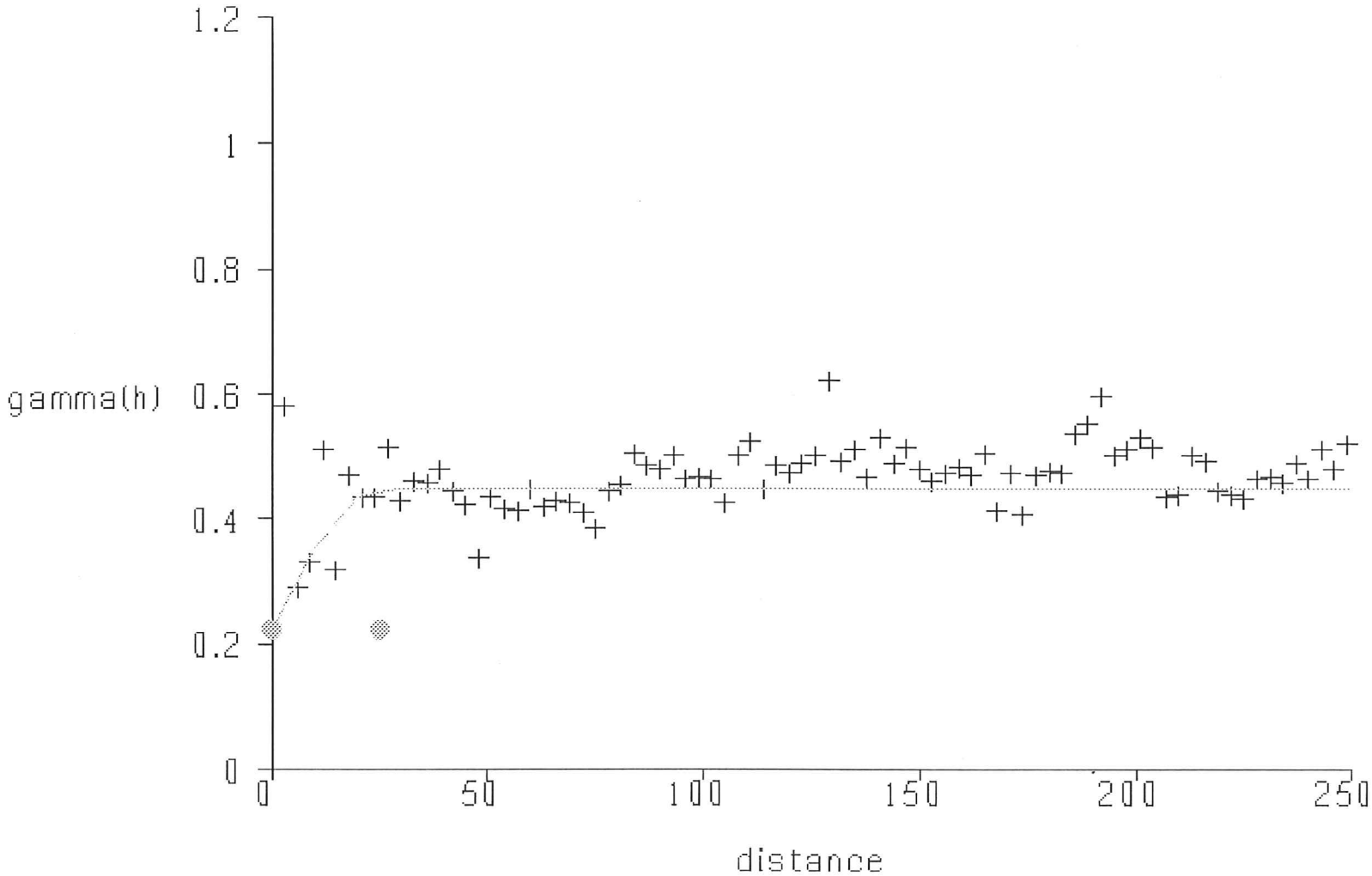
40 -> 10 (45)

Pairwise relative variogram



25 -> 100 (45)

Pairwise relative variogram



-50 -> 10 (45)

Pairwise relative variogram

North Zone Variography 1999

51+52

VS12CG - global Lag 3' Window 22.5° Search 150' Max 200'

C_0 - 0.001

C_1 - 0.001 Min 0.010

R_1 - 18.33 Max 0.250

C_2 - 0.001

R_2 - 89.96

51+52

VS12CST

C_0 - 0.001 10° Az

C_1 - 0.001 - 40° Dip

R_1 - 15.15

C_2 - 0.001

R_2 - 89.51 Semi-major

51+52

VS12CP

C_0 - 0.001

C_1 - 0.001

R_1 - 16.97

C_2 - 0.001

R_2 - 75.45 minor

51+52

VS12CDip 100' Az

C_0 - 0.001 0° Dip

C_1 - 0.001 (No plunge)

R_1 - 23.32

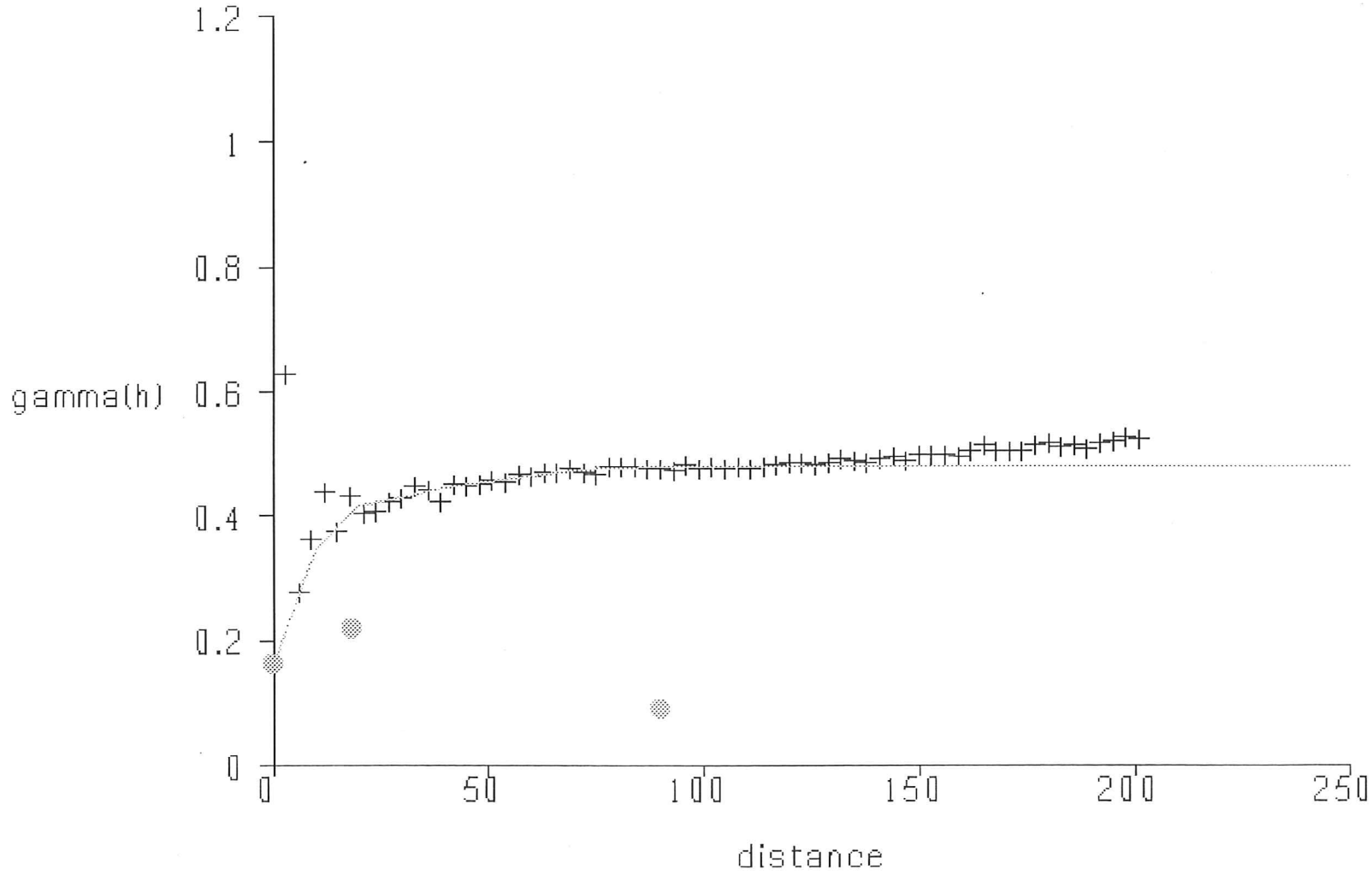
C_2 - 0.001

R_2 - 96.31 major

Anisotropy

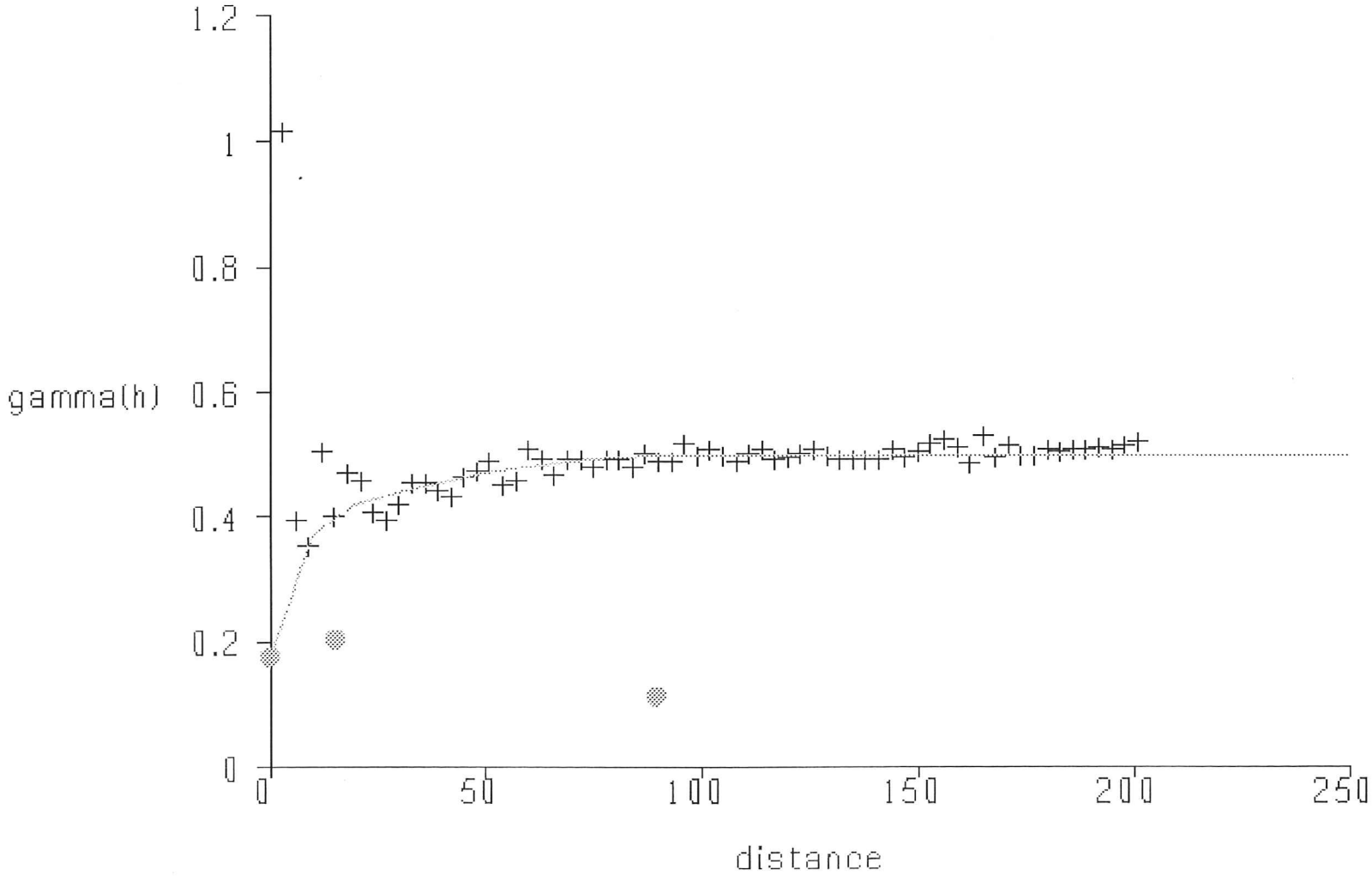
Semi-major = 1.08

Minor = 1.28



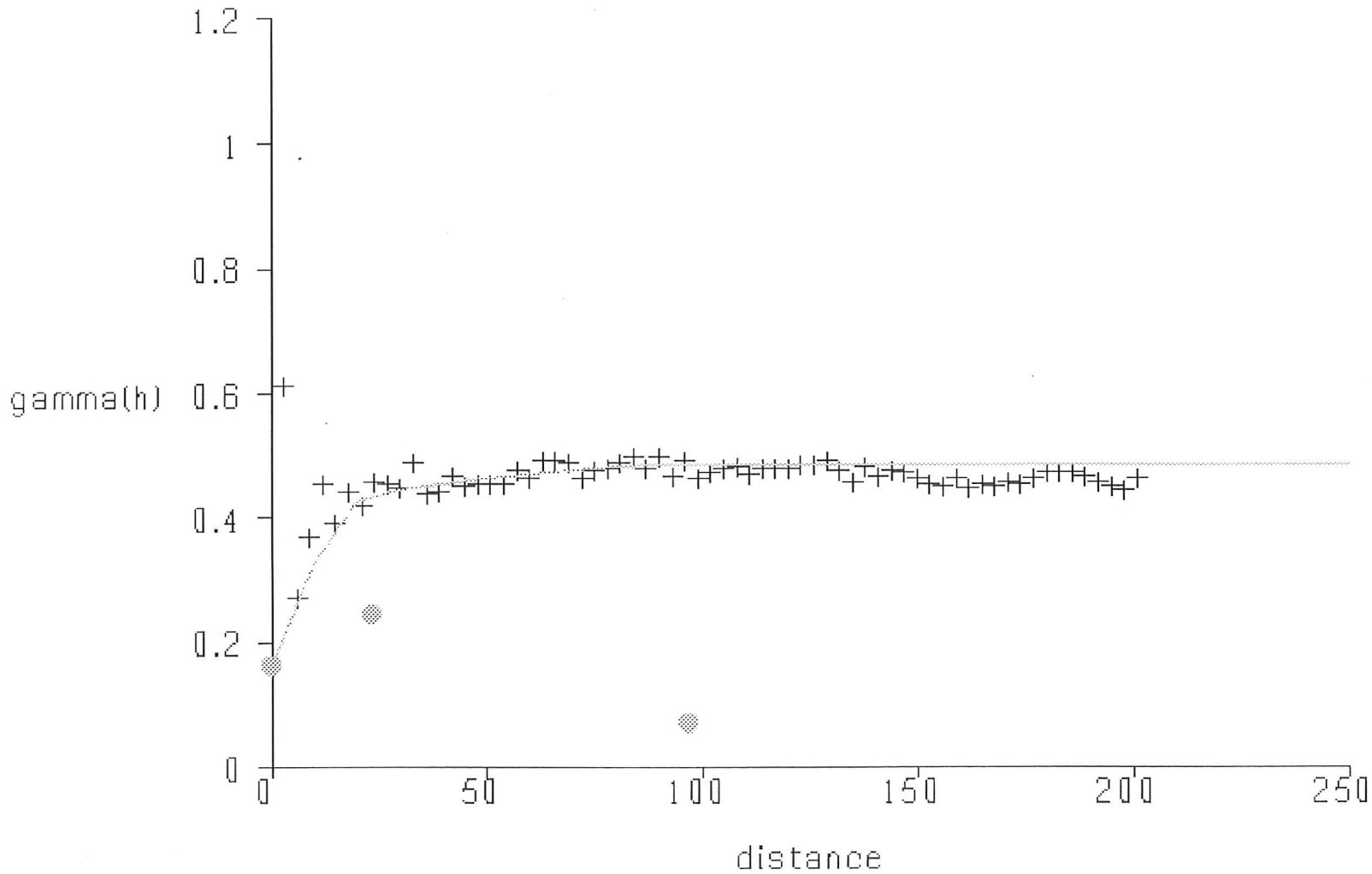
0 -> 0 (90)

Pairwise relative variogram



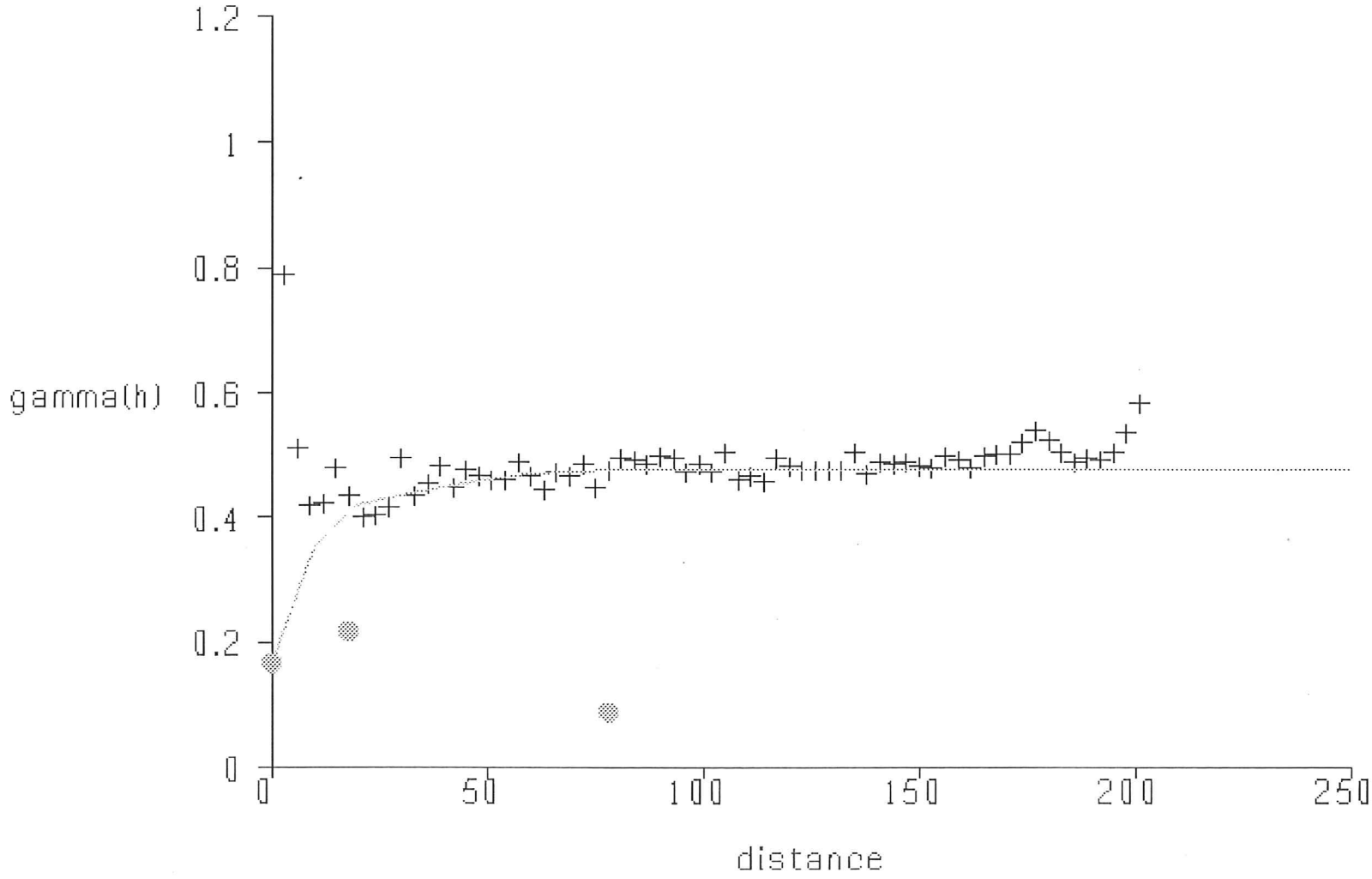
-40 -> 10 (22.5)

Pairwise relative variogram



0 -> 100 (22.5)

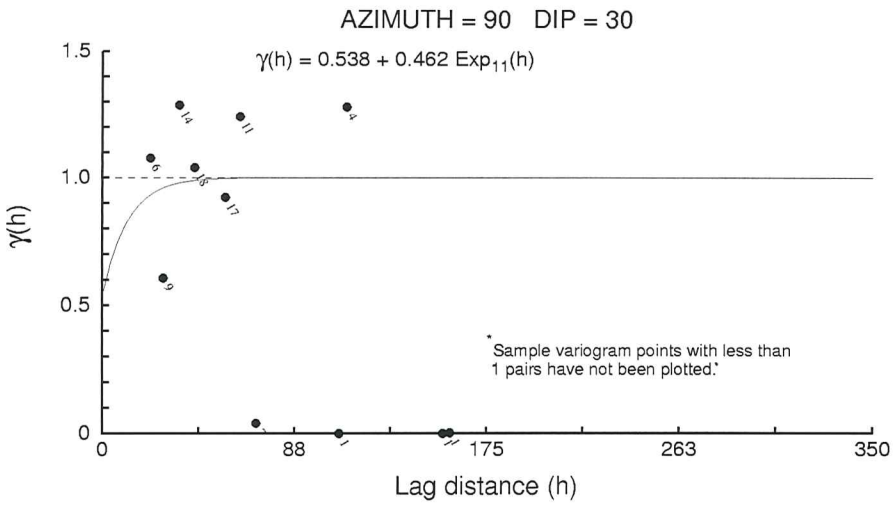
Pairwise relative variogram

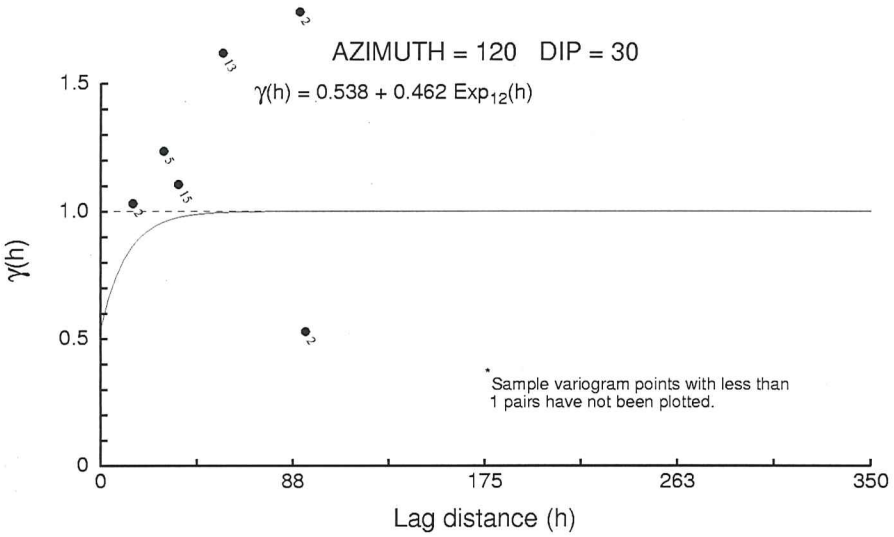


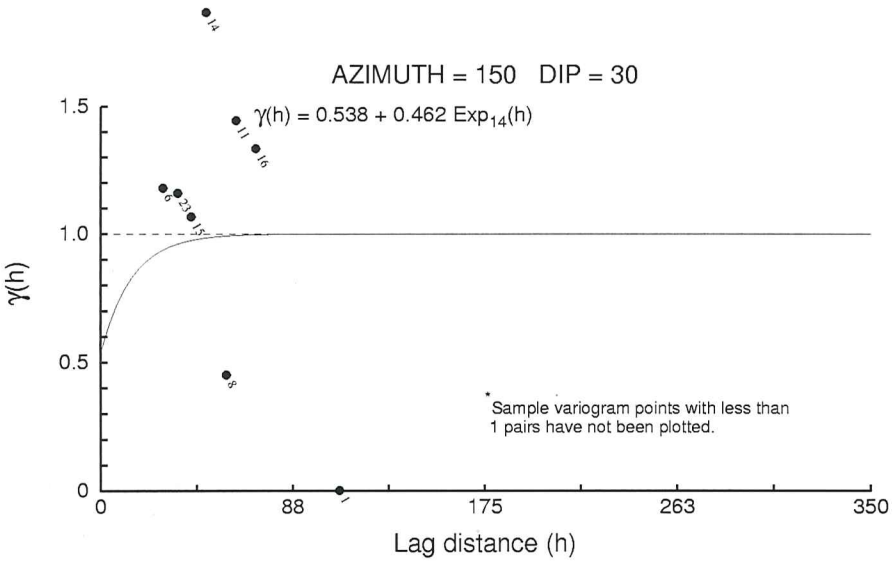
50 -> 10 (22.5)

Pairwise relative variogram

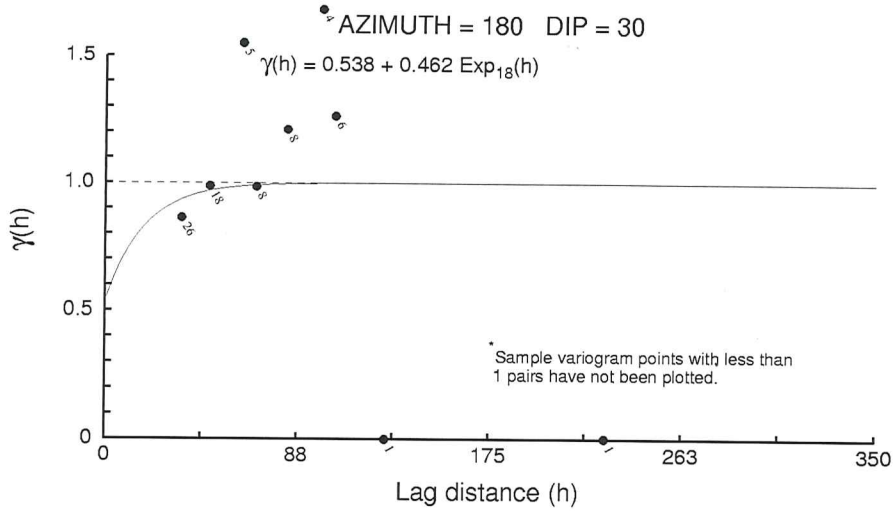
Domains 53 and 54 Run 5

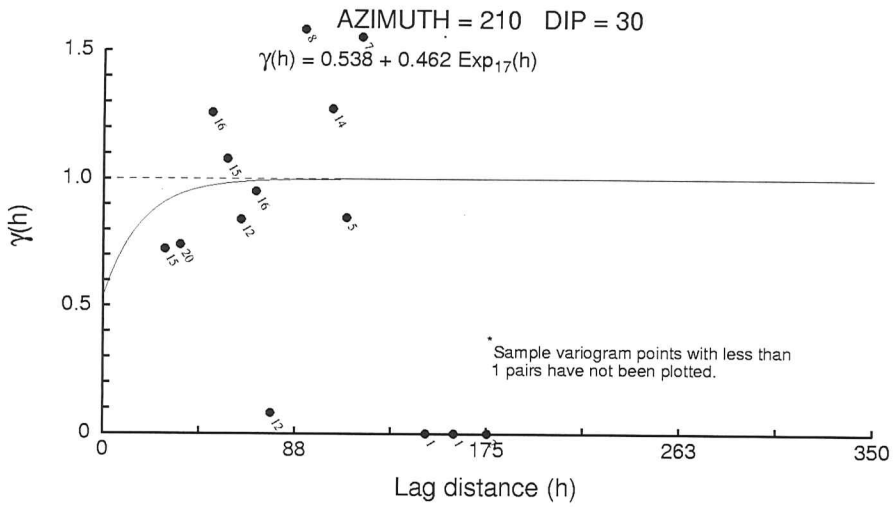


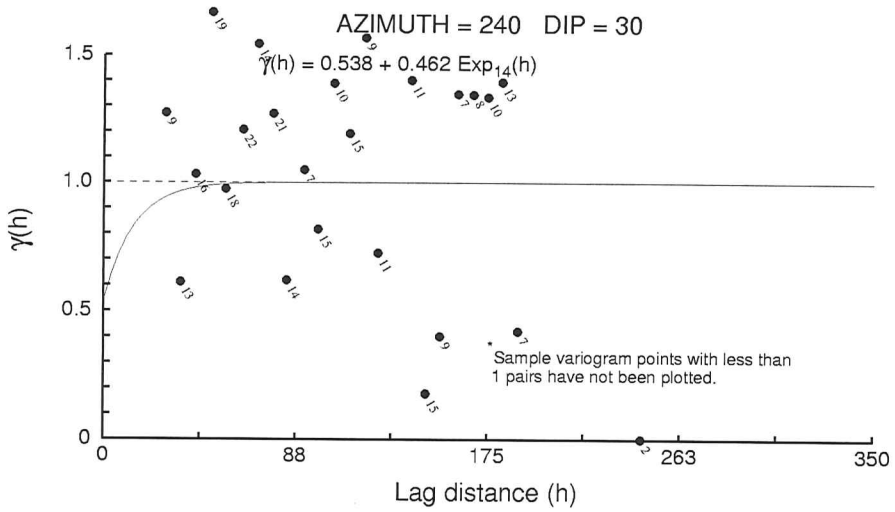




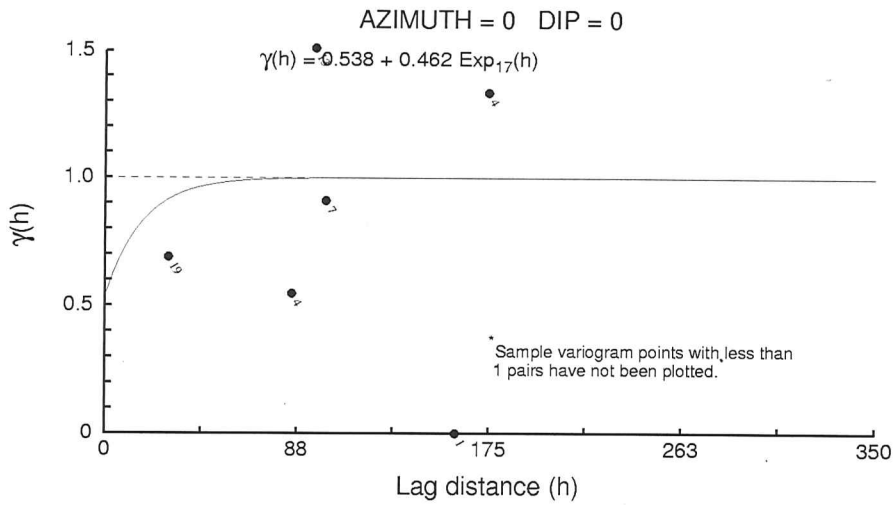
Domains 53 and 54 Run 5

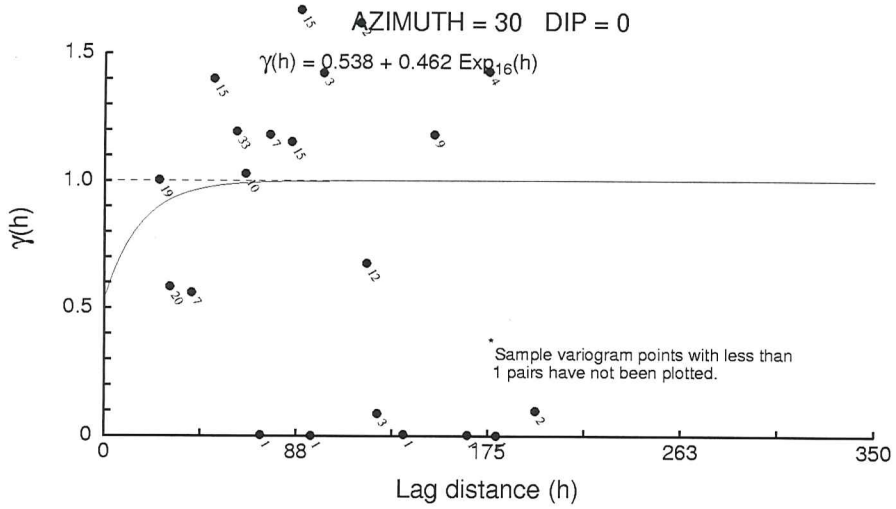


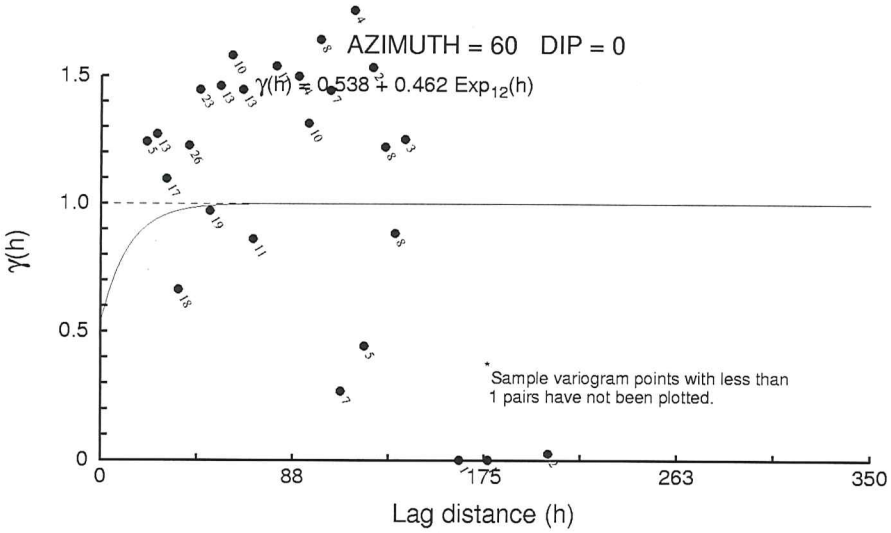




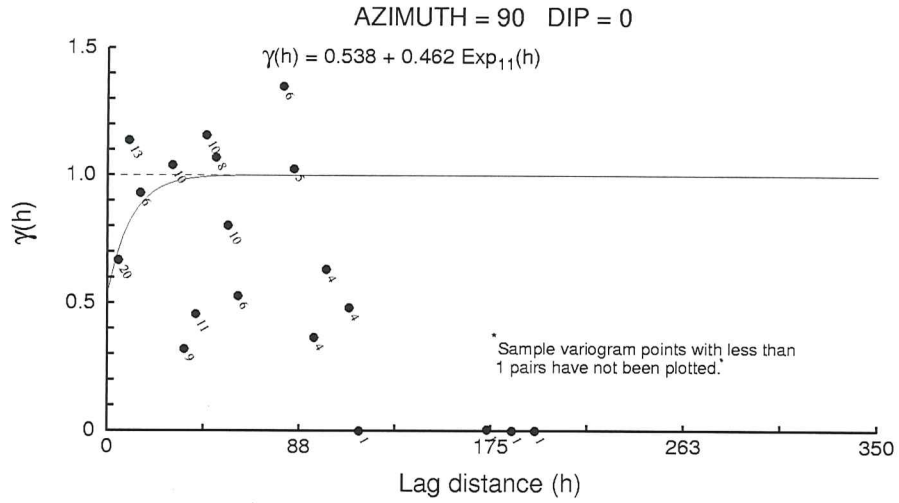
Domains 53 and 54 Run 5

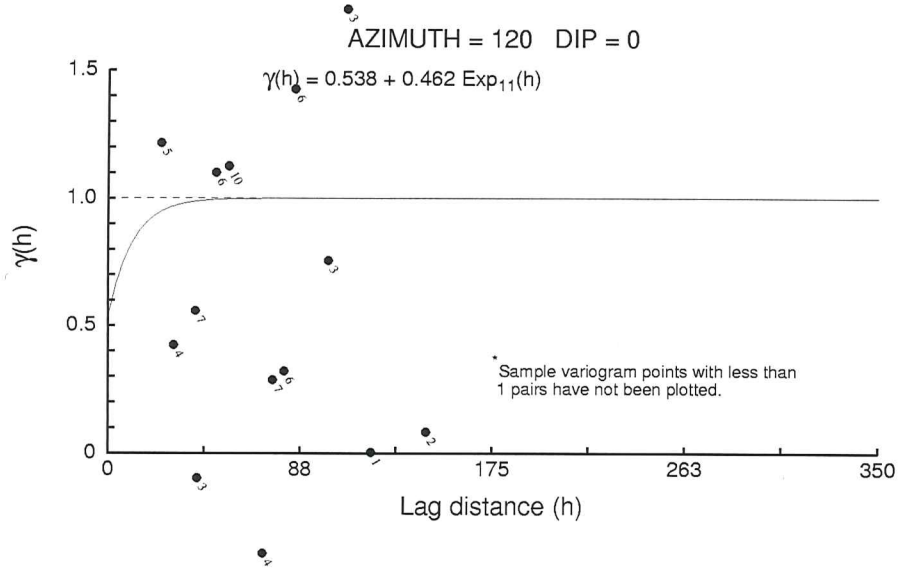


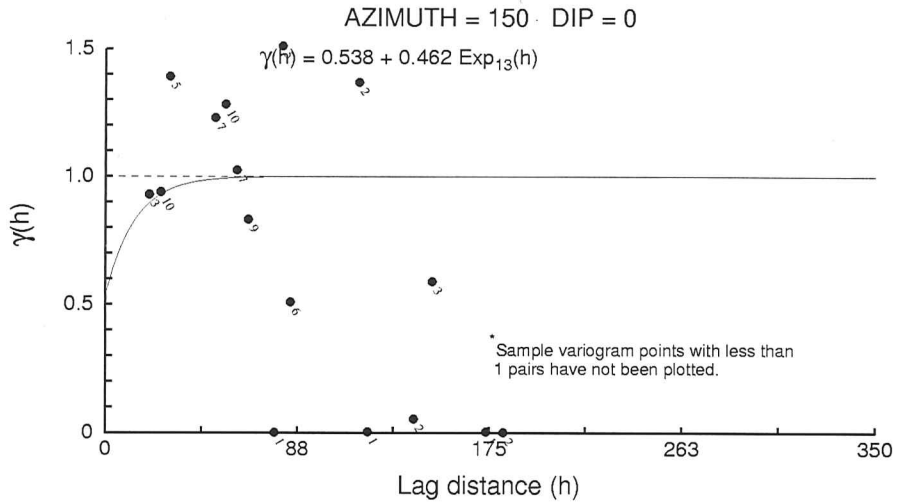




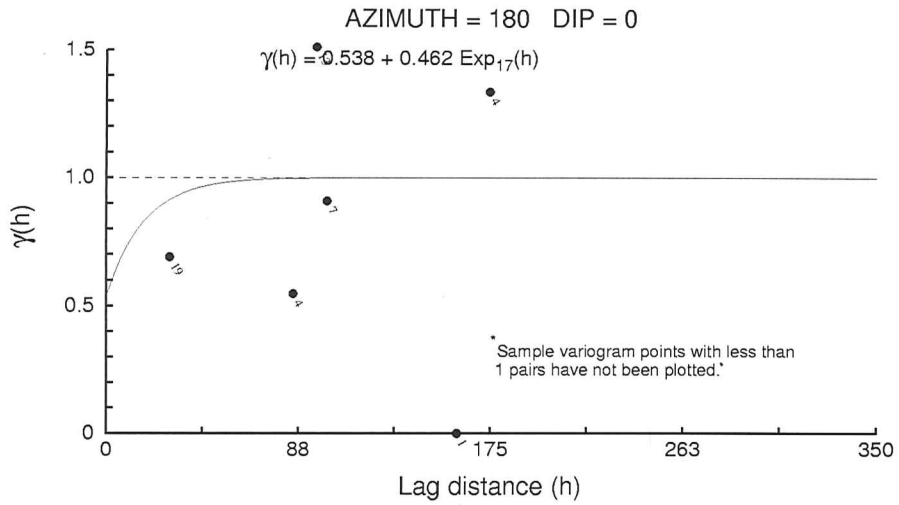
Domains 53 and 54 Run 5

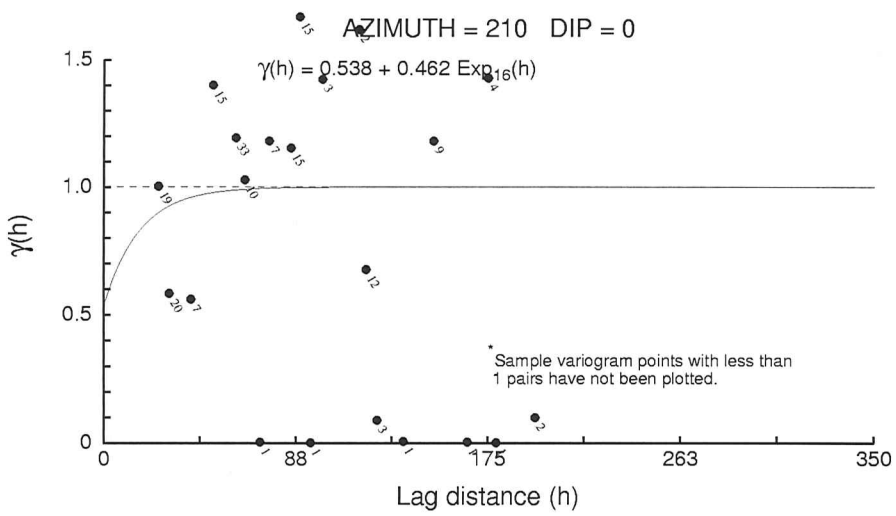


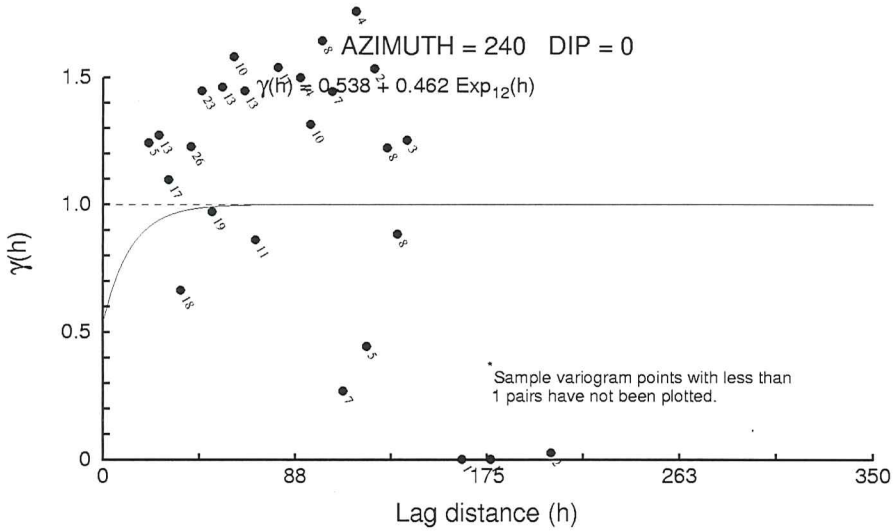




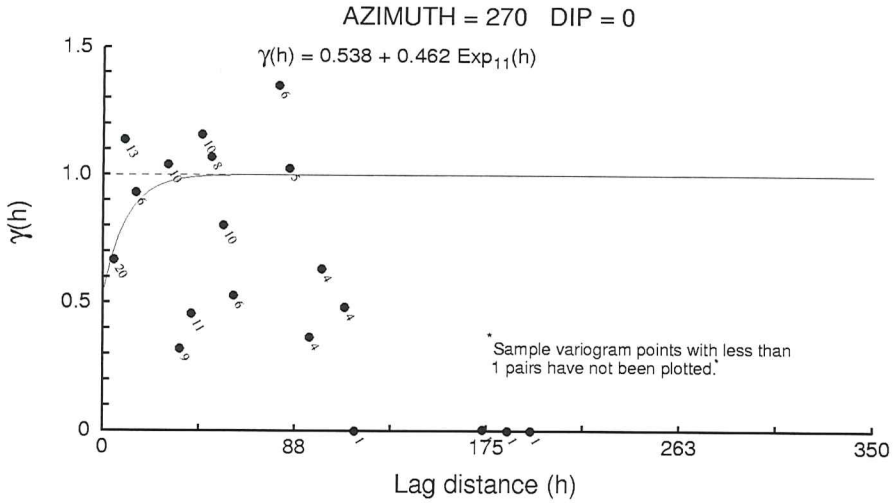
Domains 53 and 54 Run 5

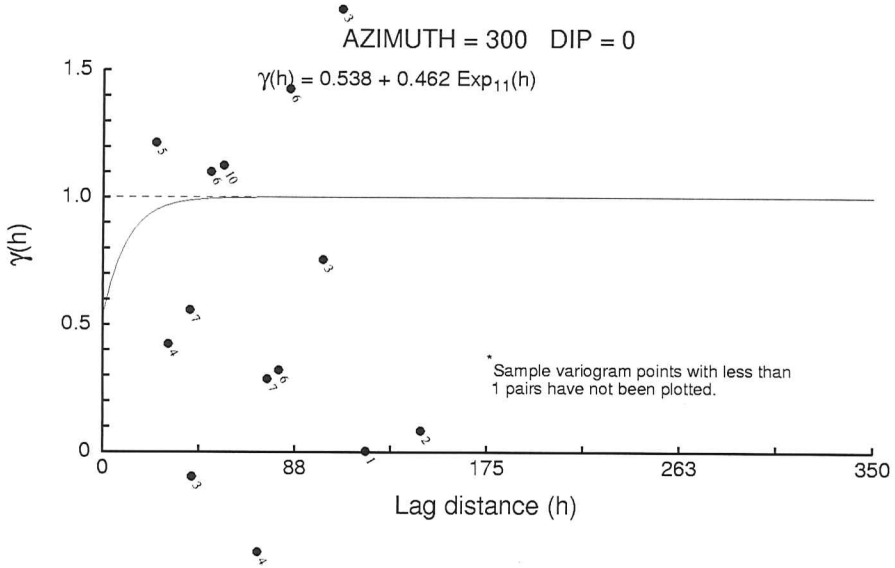


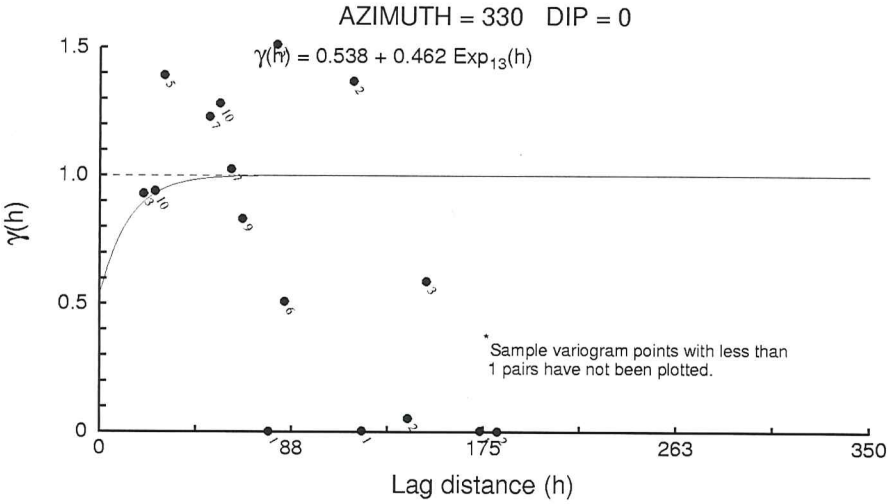




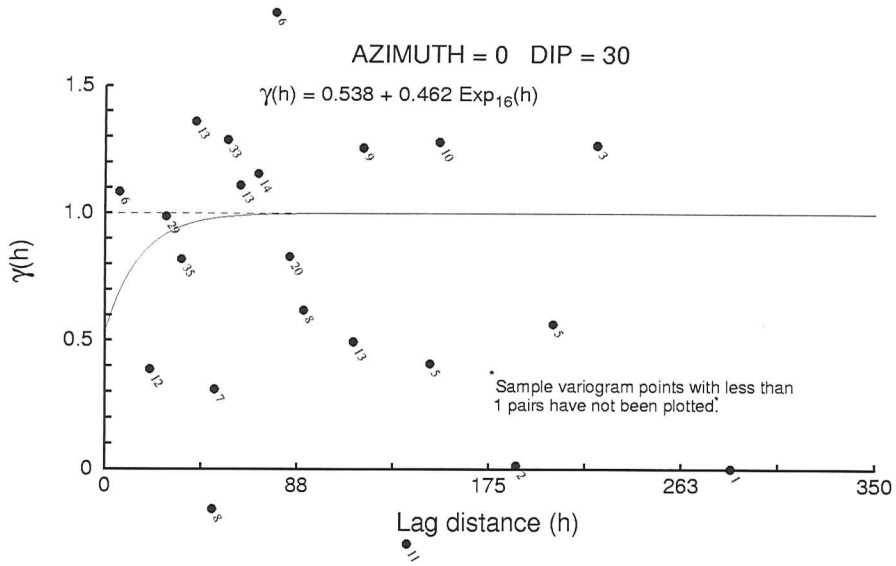
Domains 53 and 54 Run 5

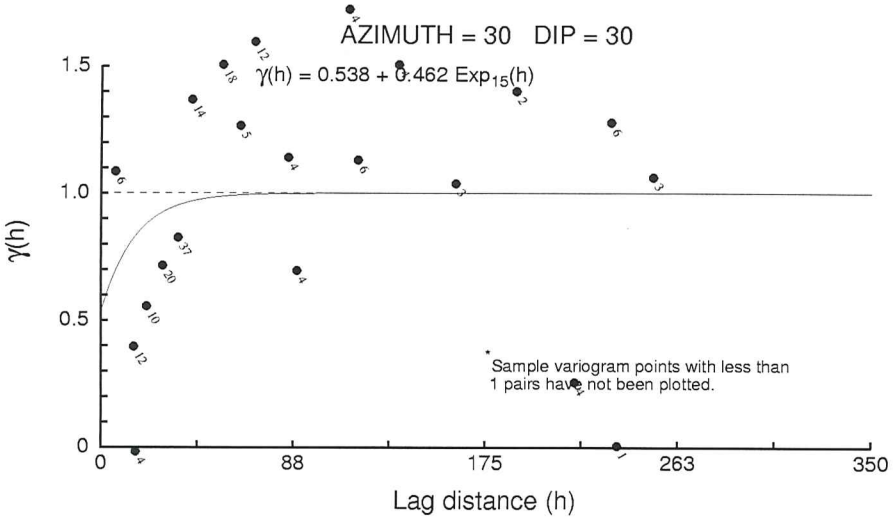


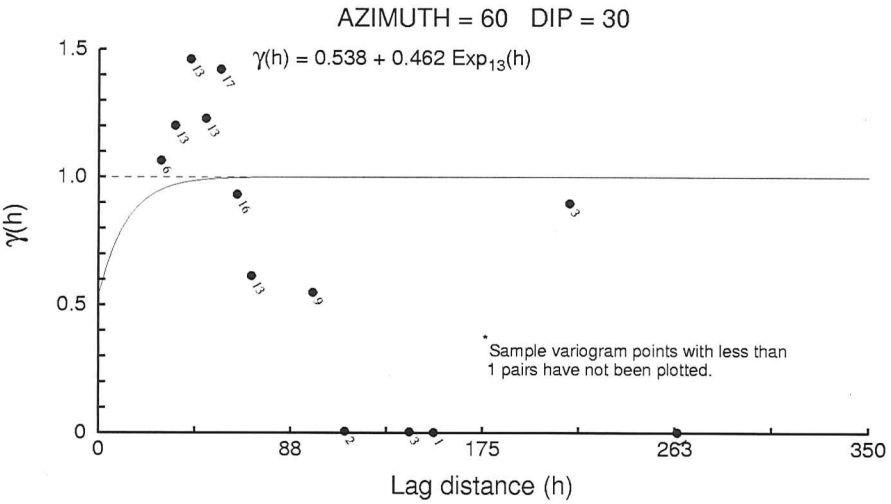




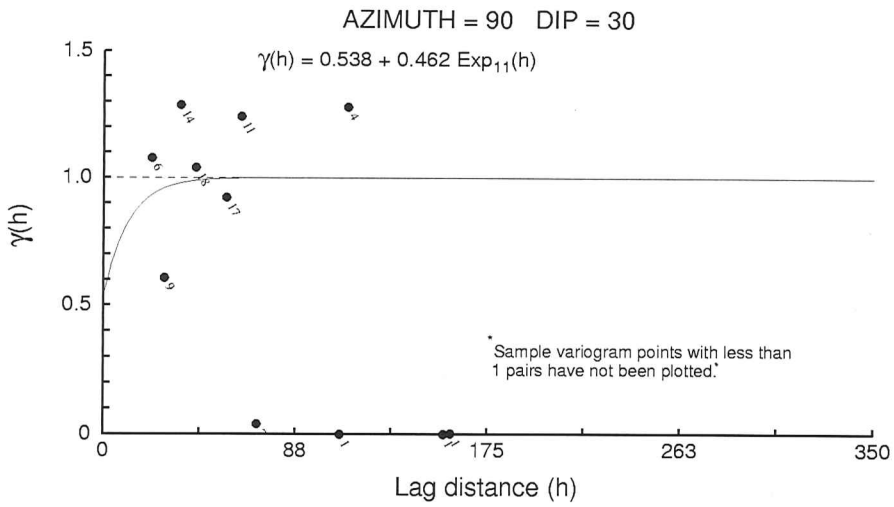
Domains 53 and 54 Run 5

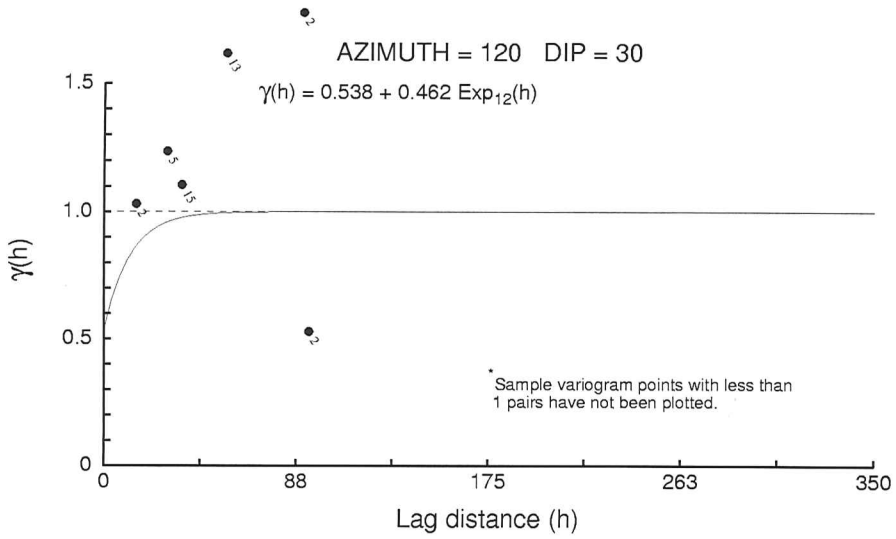


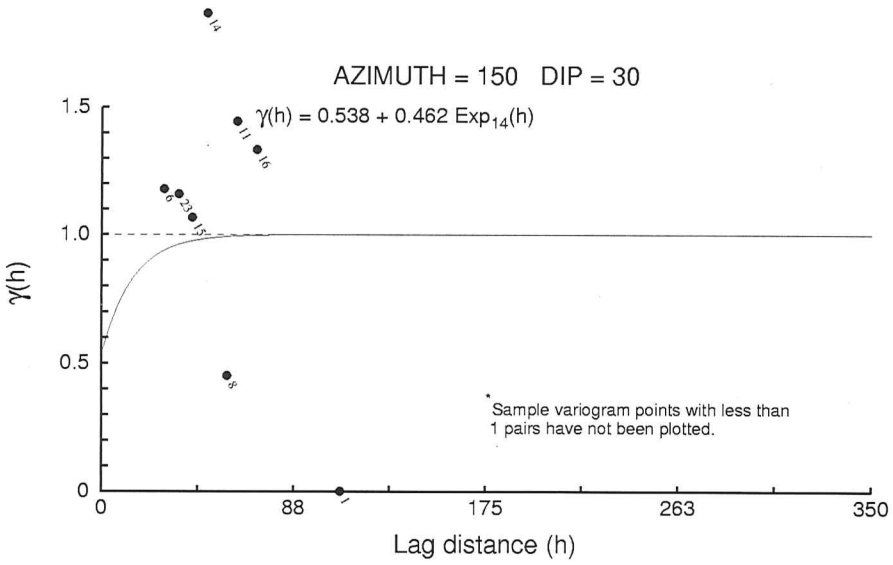




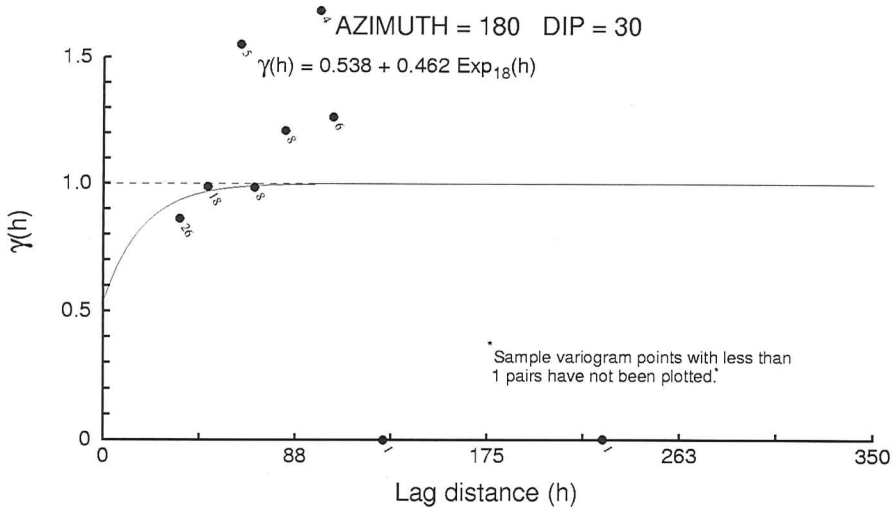
Domains 53 and 54 Run 5

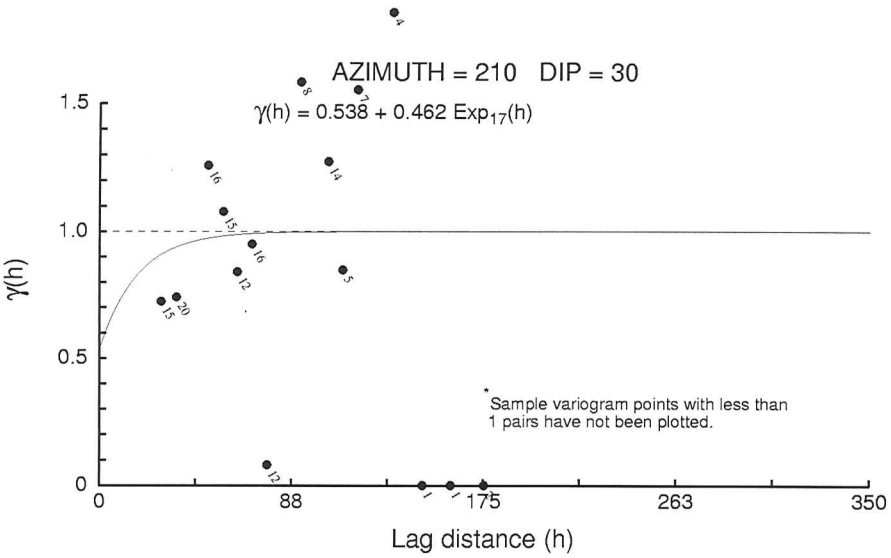


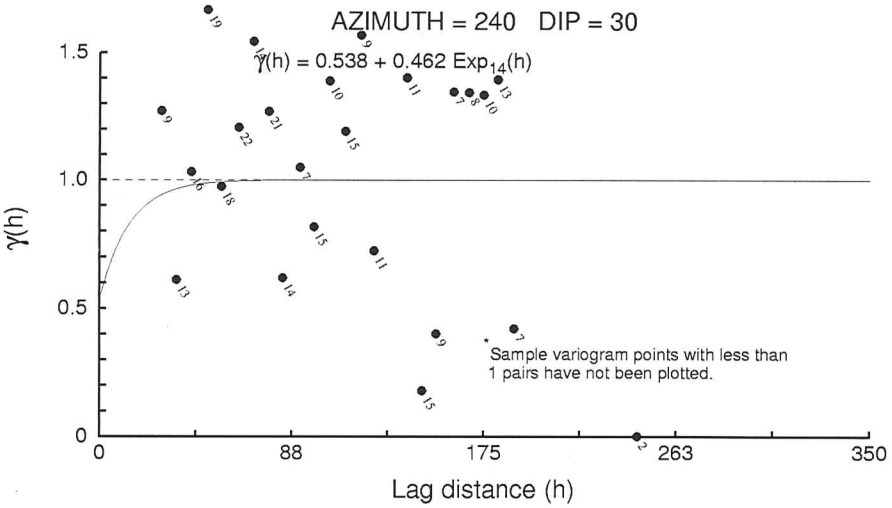




Domains 53 and 54 Run 5







```
# Macro Name     : krige_51.cmd
#
# Version        : surpac2000 V3.1-H
#
# Creation Date  : Tue Nov 17 14:41:21 1998
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\2dmodel
#
# GEOSTATISTICS MENU
#
@menu("00024")
@FUNCTION ORDINARY KRIGING,error=abort,mismatch=display
#
# ORDINARY KRIGING FORM
#
@FORM frm00148,action=apply,pause=2.000000,error=abort,mismatch=display\
  |location=..\ASSAYS\rot_51_comp\
  |id=9999\
  |field=1\
  |out_loc=51_krige\
  |debug=N\
  |bng=256\
  |dip=-30\
  |tilt=10\
  |semi_major=1.60\
  |minor=4.86\
  |min=2\
  |max=15\
  |rmax=417\
  |zlimit=91\
  |search=E
#
# VARIOGRAM MODEL FORM
#
@FORM frm00147,action=apply,pause=2.000000,error=abort,mismatch=display\
  |model=SPH\
  |nested_gh=2\
  |co=0.183\
  |c1=0.651\
  |a1=10\
  |c2=0.166\
  |a2=417\
  |c3=0\
  |a3=0\
  |c4=0\
  |a4=0\
  |c5=0\
  |a5=0
#
# BLOCK DEFINITION FORM
#
```

```
@FORM frm00144,action=apply,pause=2.000000,error=abort,mismatch=display\
  |mid_top=M\
  |ymin=1103.5\
  |xmin=-2319.5\
  |zmax=4745.5\
  |widy=7\
  |widx=7\
  |widz=7\
  |nb_row=162\
  |nb_col=121\
  |nb_lev=79\
  |ndy=2\
  |ndx=2\
  |ndz=2
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\MACROS
```

```
# Macro Name     : krige_51.cmd
#
# Version        : surpac2000 V3.1-H
#
# Creation Date : Tue Nov 17 14:41:21 1998
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\2dmodel
#
# GEOSTATISTICS MENU
#
@menu("00024")
@FUNCTION ORDINARY KRIGING,error=abort,mismatch=display
#
# ORDINARY KRIGING FORM
#
@FORM frm00148,action=apply,pause=2.000000,error=abort,mismatch=display\
  |location=..\ASSAYS\rot_52_comp\
  |id=9999\
  |field=1\
  |out_loc=52_krige\
  |debug=N\
  |bng=256\
  |dip=-30\
  |tilt=10\
  |semi_major=1.60\
  |minor=4.86\
  |min=2\
  |max=15\
  |rmax=417\
  |zlimit=91\
  |search=E
#
# VARIOGRAM MODEL FORM
#
@FORM frm00147,action=apply,pause=2.000000,error=abort,mismatch=display\
  |model=SPH\
  |nested_gh=2\
  |co=0.183\
  |c1=0.651\
  |a1=10\
  |c2=0.166\
  |a2=417\
  |c3=0\
  |a3=0\
  |c4=0\
  |a4=0\
  |c5=0\
  |a5=0
#
# BLOCK DEFINITION FORM
#
```

```
@FORM frm00144,action=apply,pause=2.000000,error=abort,mismatch=display\
  |mid_top=M\
  |ymin=1103.5\
  |xmin=-2319.5\
  |zmax=4745.5\
  |widy=7\
  |widx=7\
  |widz=7\
  |nb_row=162\
  |nb_col=121\
  |nb_lev=79\
  |ndy=2\
  |ndx=2\
  |ndz=2
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\MACROS
```

```
# Macro Name     : krige_53.cmd
#
# Version        : surpac2000 V3.2-D
#
# Creation Date  : Sat Feb 27 09:24:45 1999
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=D:\North_Zone\2dmodel
#
# GEOSTATISTICS MENU
#
@menu("00024")
@FUNCTION ORDINARY KRIGING,error=abort,mismatch=display
#
# ORDINARY KRIGING FORM
#
@FORM frm00148,action=apply,pause=2.000000,error=abort,mismatch=display\
  |location=..\assays\rot_53_comp\
  |id=9999\
  |field=1\
  |out_loc=53_krige\
  |debug=N\
  |bng=192\
  |dip=-28\
  |tilt=-2\
  |semi_major=1.18\
  |minor=1.74\
  |min=1\
  |max=15\
  |rmax=55\
  |zlimit=30\
  |search=E
#
# VARIOGRAM MODEL FORM
#
@FORM frm00147,action=apply,pause=2.000000,error=abort,mismatch=display\
  |model=SPH\
  |nested_gh=1\
  |co=0.538\
  |c1=.462\
  |a1=55.23\
  |c2=0\
  |a2=0\
  |c3=0\
  |a3=0\
  |c4=0\
  |a4=0\
  |c5=0\
  |a5=0
#
# BLOCK DEFINITION FORM
#
```

```
@FORM frm00144,action=apply,pause=2.000000,error=abort,mismatch=display\
  |mid_top=M\
  |ymin=1103.5\
  |xmin=-2319.5\
  |zmax=4745.5\
  |widy=7\
  |widx=7\
  |widz=7\
  |nb_row=162\
  |nb_col=121\
  |nb_lev=79\
  |ndy=2\
  |ndx=2\
  |ndz=2
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\macros
```

```
# Macro Name     : krige_54.cmd
#
# Version        : surpac2000 V3.2-D
#
# Creation Date  : Sat Feb 27 09:24:45 1999
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=D:\North_Zone\2dmodel
#
# GEOSTATISTICS MENU
#
@menu("00024")
@FUNCTION ORDINARY KRIGING,error=abort,mismatch=display
#
# ORDINARY KRIGING FORM
#
@FORM frm00148,action=apply,pause=2.000000,error=abort,mismatch=display\
  |location=..\assays\rot_54_comp\
  |id=9999\
  |field=1\
  |out_loc=54_krige\
  |debug=N\
  |bng=10\
  |dip=-40\
  |tilt=0\
  |semi_major=1.12\
  |minor=1.14\
  |min=1\
  |max=15\
  |rmax=30\
  |zlimit=30\
  |search=E
#
# VARIOGRAM MODEL FORM
#
@FORM frm00147,action=apply,pause=2.000000,error=abort,mismatch=display\
  |model=INV\
  |power=3\
  |nested_gh=1\
  |co=0\
  |c1=0\
  |a1=0\
  |c2=0\
  |a2=0\
  |c3=0\
  |a3=0\
  |c4=0\
  |a4=0\
  |c5=0\
  |a5=0
#
# BLOCK DEFINITION FORM
```

```
#
@FORM frm00144,action=apply,pause=2.000000,error=abort,mismatch=display\
  |mid_top=M\
  |ymin=1103.5\
  |xmin=-2319.5\
  |zmax=4745.5\
  |widy=7\
  |widx=7\
  |widz=7\
  |nb_row=162\
  |nb_col=121\
  |nb_lev=79\
  |ndy=2\
  |ndx=2\
  |ndz=2
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=d:\north_zone\macros
```