GOVERNO DO ESTADO

CEARÁ

AVANÇANDO NAS MUDANÇAS

FUNCEME

ESTUDO INTEGRADO DA BACIA DO RIO MUNDAÚ - CE

ANEXOS - TOMO II
RELATÓRIO PARCIAL

FORTALEZA- CE
JULHO DE 1995

Governo do Estado do Ceara

CEARÁ
Avançando nas Mudanças

FUNCEME

ESTUDO INTEGRADO DA BACIA DO RIO MUNDAÚ - CE

ANEXOS - TOMO II
RELATÓRIO PARCIAL

ANEXOS

ANEXO 1

ESTUDOS HIDROCLIMATOLÓGICOS

ANEXO 1

ESTUDOS HIDROCLIMATOLÓGICOS

A-1 - ANÁLISE DE FREQÜÊNCIA DOS TOTAIS ANUAIS

Estação: 2860355

SAMPLE SIZE = 23

STATISTICS OF THE OBSERVED VALUES

MEAN = 1082.93 STD DEV = 476 91 COEF OF SKEW = 1 1030

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 6 90277 STD DEV = 41503 COEF OF SKEW = 3046

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 2 99783 STD DEV = 18025 COEF OF SKEW = 3052

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
2 00	1082.93	995 03	1005 88	1011.59	935.13	998 18	974 34
2 33	1169.03	1072 45	1087 19	1105 14	1014 45	1081 36	1050 47
5 00	1492 24	1420.80	1441.50	1511 56	1444 88	1446 09	1410 68
10 00	1713 03	1721.79	1735.44	1842 58	1927 26	1746.69	1745 48
20 00	1901 84	2029 27	2026.57	2160 10	2540 66	2039 66	2110.15
50.00	2123.96	2462.00	2423 67	2571 10	3633.14	2429.58	2662.14
100.00	2279 16	2818 03	2741 25	2879 09	4749.90	2732.70	3150 29
200 00	2427 21	3205 52	3079 04	3185 95	6203 86	3046 53	3716 48
500 00	2615 60	3776 59	3564.26	3590.80	8824 15	3482 28	4617 25
1000 00	2754 48	4261 77	3966 46	3896 78	11516 35	3830.69	5444 85

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
0	00000	00	00	00	00	00	00	00
1	25000	761 26	752 08	742 97	705 84	716 66	777 78	738 96
2	50000	1082 93	995 03	1005 88	1011 59	935 13	1052 83	966 69
3	75000	1404 60	1316 46	1337 15	1399 50	1310 63	1406 86	1289 01
4	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		1 174	1 174	826	1 522	478	1 174	1 522

95% CHI-SQUARE TEST STATISTIC = 7 817

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2.00	983.44
2.33	1060.24
5.00	1415.71
10.00	1735.82
20.00	2074.95
50.00	2572.30
100.00	2998.56
200.00	3479.45
500.00	4219.33
1000.00	4876.20

WEIGHTED SKEW CHI-SQUARE VALUE: 1.522

COMPUTED SKEW (LOG10)= .3052

REGIONAL SKEW (LOG10)= .000

WEIGHTED SKEW (LOG10)= .1695

MEAN SQUARE ERROR OF LOG10 SKEW= .2416

MEAN SQUARE ERROR OF REGIONAL SKEW= .3020

Estação: 2860572

SAMPLE SIZE = 22

STATISTICS OF THE OBSERVED VALUES

MEAN = 1289 08 STD DEV = 863 40 COEF OF SKEW = 1 2757

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 6 97120 STD DEV = 62201 COEF OF SKEW = 3284

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 3 02756 STD DEV = 27014 COEF OF SKEW = 3281

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
2 00	1289 09	1065 51	1133.68	1160 42	971 18	1113 69	1029 95
2 33	1445 06	1192 22	1277.92	1330 67	1097 92	1261 68	1152 94
5 00	2030 81	1818.11	1919 60	2070 35	1870 65	1927 47	1796 98
10 00	2431 53	2426 58	2666 74	2672 80	2887 24	2492 19	2480 55
20 00	2774 78	3107 33	3020.55	3250 69	4378 13	3053.35	3310 43
50 00	3179.44	4159 06	3793 31	3998.71	7504.48	3813 72	4722.86
100 00	3462.83	5101 04	4424 58	4559.24	11238.17	4413 93	6117 65
200 00	3733.69	6200.16	5107 96	5117 73	16804 65	5042 65	7895.39
500 00	4079.16	7952 27	6109 55	5854.55	28573 30	5926 50	11054.86
1000.00	4334.44	9557 89	6956.31	6411.42	42676.58	6641 35	14293 39

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
0	00000	00	00	00	00	00	00	00
1	25000	706 73	700 41	676 32	603 95	650 43	671 87	682 86
2	50000	1289 09	1065 51	1133 68	1160 42	971 18	1133 74	1019 96
3	75000	1871 44	1620 91	1727 96	1866 40	1615 04	1759 99	1571 27
4	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		3 818	182	1 636	3 091	909	1 636	1 636

95% CHI-SQUARE TEST STATISTIC = 7 817

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2.00	1046.00
2.33	1170.86
5.00	1807.83
10.00	2457.96
20.00	3218.96
50.00	4459.04
100.00	5631.01
200.00	7066.23
500.00	9493.82
1000.00	11858.22

WEIGHTED SKEW CHI-SQUARE VALUE: .545

COMPUTED SKEW (LOG10)= .3281

REGIONAL SKEW (LOG10)= .000

WEIGHTED SKEW (LOG10)= .1785

MEAN SQUARE ERROR OF LOG10 SKEW= .2533

MEAN SQUARE ERROR OF REGIONAL SKEW= .3020

Estação: 2860736

SAMPLE SIZE = 43

STATISTICS OF THE OBSERVED VALUES

MEAN = 875 06 STD DEV = 421 74 COEF OF SKEW = 1 1442

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 6 66889 STD DEV = 46389 COEF OF SKEW = 0739

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 2 89626 STD DEV = 20148 COEF OF SKEW = 0712

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
2 00	875 07	787 52	804 99	809 38	732 63	797 53	783 04
2 33	950 79	855 92	876 14	887 30	798 19	870 37	851 18
5 00	1233.65	1168 32	1185 74	1225 81	1158 29	1189 68	1166 35
10 00	1424.18	1440 71	1439 76	1501.53	1568 65	1450 10	1446.26
20 00	1584 41	1718 38	1687 16	1766.00	2098 29	1699 79	1736 20
50 00	1768 94	2105 10	2016 52	2108 33	3057 73	2024 42	2147.35
100 00	1895 02	2418 25	2272.73	2364 86	4054 57	2270 29	2486.15
200.00	2012 94	2753 15	2538 15	2620 45	5370.85	2518.75	2853 92
500.00	2159.54	3234.90	2906 93	2957 66	7782.68	2853.64	3392.29
1000 00	2265.09	3633.16	3202 00	3212 52	10300 88	3113 29	3845 18

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
0	00000	00	00	00	00	00	00	00
1	16667	467 06	502 76	490 56	460 44	499 11	475 86	501 47
2	33333	693 41	644 89	651 65	640 16	608 20	629 40	640 44
3	50000	875 06	787 52	804 99	809 38	732 63	783 17	781 19
4	66667	1056 72	961 70	993 58	1006 39	909 90	966 47	954 91
5	83333	1283 06	1233 57	1247 77	1300 04	1256 83	1238 91	1230 03
6	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		5 698	4 023	3 465	3 744	2 628	5 140	4 023

95% CHI-SQUARE TEST STATISTIC =11 073

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2.00	784.45
2.33	852.69
5.00	1167.02
10.00	1444.58
20.00	1730.65
50.00	2134.02
100.00	2464.60
200.00	2821.76
500.00	3341.73
1000.00	3776.74

WEIGHTED SKEW CHI-SQUARE VALUE: 4.023

COMPUTED SKEW (LOG10)= .0712

REGIONAL SKEW (LOG10)= .000

WEIGHTED SKEW (LOG10)= .0505

MEAN SQUARE ERROR OF LOG10 SKEW= .1236

MEAN SQUARE ERROR OF REGIONAL SKEW= .3020

Estação: 2861329

SAMPLE SIZE = 53

STATISTICS OF THE OBSERVED VALUES

MEAN = 1149 26 STD DEV = 402 02 COEF OF SKEW = 2426

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 6 97853 STD. DEV = 39255 COEF OF SKEW = - 8433

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 3 03074 STD DEV = 17048 COEF OF SKEW = - 8428

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
2 00	1149.27	1073 34	1133.12	1086.06	1009.10	1133.04	1133.00
2 33	1221 36	1151 62	1205 39	1159 22	1083 83	1205 42	1210 20
5 00	1490 41	1497 63	1484 48	1477 05	1478 26	1484 89	1503 17
10 00	1671 10	1786 60	1680 55	1735 97	1903.43	1680 99	1697 24
20 00	1822 52	2071 28	1850 40	1984 30	2425 75	1850 63	1853.36
50 00	1996 13	2453 93	2051 61	2305.74	3320 13	2051 20	2021 02
100 00	2114 19	2753 77	2192 49	2546 61	4200 51	2191 34	2126 28
200 00	2224 15	3065 88	2326.73	2786 61	5309 76	2324.61	2216.98
500.00	2360 18	3501.39	2496 95	3103 24	7233 45	2493 23	2318 58
1000 00	2457 63	3850 95	2621 78	3342 54	9137 44	2616 58	2383 81

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
0	00000	00	00	00	00	00	00	00
1	14286	720 08	705 89	723 68	729 95	712 72	725 65	708 83
2	28571	921 74	859 51	911 79	881 87	826 70	913 65	819 52
3	42857	1076 90	1000 11	1061 63	1026 78	943 10	1063 71	932 40
4	57143	1221 63	1151 93	1205 66	1159 89	1084 53	1208 03	1066 95
5	71429	1376 78	1340 35	1364 78	1335 39	1287 26	1367 44	1252 93
6	85714	1578 44	1632 06	1579 12	1604 68	1674 42	1582 03	1584 57
7	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		2 868	8 943	1 811	7 358	13 698	1 811	9 736

95% CHI-SQUARE TEST STATISTIC =12 596

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2.00	1112.05
2.33	1190.42
5.00	1505.26
10.00	1733.28
20.00	1931.86
50.00	2164.97
100.00	2325.07
200.00	2474.19
500.00	2657.25
1000.00	2786.56

WEIGHTED SKEW CHI-SQUARE VALUE: 11.321

COMPUTED SKEW (LOG10)= -.8428

REGIONAL SKEW (LOG10)= .000

WEIGHTED SKEW (LOG10)= -.5460

MEAN SQUARE ERROR OF LOG10 SKEW= .1642

MEAN SQUARE ERROR OF REGIONAL SKEW= .3020

Estação: 2861553

SAMPLE SIZE = 12

STATISTICS OF THE OBSERVED VALUES

MEAN = 1348 56 STD DEV = 621 10 COEF OF SKEW = 1 9247

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 7 12297 STD DEV = 42491 COEF OF SKEW = 0138

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 3.09347 STD DEV = 18455 COEF OF SKEW = 0095

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
2 00	1348 56	1240 13	1204 43	1262 03	1168 85	1169 12	1238.93
2 33	1462 02	1340.23	1300.33	1395.99	1281 03	1266 53	1338.97
5 00	1892 35	1799 02	1762 80	1977 98	1907 55	1758 06	1798.60
10 00	2195 39	2213 46	2208 52	2452 01	2638 24	2236 89	2215 29
20 00	2463 99	2659 96	2713 88	2906.70	3600 90	2766 66	2665 73
50.00	2794 57	3335.00	3520 46	3495.25	5386 13	3570 49	3349.43
100 00	3036.76	3935 99	4276 01	3936.29	7283 08	4276 08	3960.67
200 00	3277.58	4640 92	5201 47	4375.72	9837 27	5083 93	4680.30
500 00	3599.29	5783.46	6779 95	4955.47	14625 97	6341 40	5852.46
1000.00	3848 31	6857 66	8341.28	5393.62	19738 16	7465 03	6960.36

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
0	00000	00	00	00	00	00	00	00
1	33333	1081 03	1032 72	1012 25	971 11	957 90	945 55	1031 84
2	66667	1616 08	1489 20	1446 55	1600 74	1473 64	1359 72	1487 91
3	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		6 500	3 500	1 500	6 500	3 500	500	3 500

95% CHI-SQUARE TEST STATISTIC = 5 995

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2.00	1239.76
2.33	1339.79
5.00	1798.99
10.00	2214.03
20.00	2661.68
50.00	3339.45
100.00	3943.51
200.00	4652.82
500.00	5804.46
1000.00	6888.64

WEIGHTED SKEW CHI-SQUARE VALUE: 3.500

COMPUTED SKEW (LOG10)= .0095

REGIONAL SKEW (LOG10)= .000

WEIGHTED SKEW (LOG10)= .0041

MEAN SQUARE ERROR OF LOG10 SKEW= .3949

MEAN SQUARE ERROR OF REGIONAL SKEW= .3020

Estação: 2861917

SAMPLE SIZE = 24

STATISTICS OF THE OBSERVED VALUES

MEAN = 1229 02 STD DEV = 542 03 COEF OF SKEW = 6476

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 7 02077 STD. DEV = 44387 COEF OF SKEW = 0236

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 3 04908 STD DEV = 19277 COEF OF SKEW = 0249

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
2 00	1229 02	1119 66	1173 27	1147 66	1047 49	1171 20	1117 70
2 33	1326 83	1213 03	1269 71	1253 46	1142 29	1268 64	1210 98
5 00	1693 83	1638 29	1665 99	1713 12	1664 38	1669 08	1637 50
10 00	1944 21	2011.12	1970 62	2087 51	2261 53	1975 32	2013 69
20 00	2158.00	2395.90	2255 20	2446 63	3036 74	2259 09	2403 98
50 00	2409.00	2942.65	2620.89	2911.48	4440.57	2619 58	2961.88
100 00	2584.03	3396.14	2897 81	3259.81	5906 39	2889 04	3427.39
200 00	2750 69	3892 75	3179 55	3606.87	7847.89	3159.88	3939 79
500 00	2962 32	4629 35	3564 58	4064 76	11418 21	3524.42	4704.58
1000.00	3117.99	5258.79	3868 71	4410 82	15159 05	3807.72	5362 25

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
0	00000	00	00	00	00	00	00	00
1	20000	772 83	770 63	768 83	727 39	742 48	758 44	771 08
2	40000	1091 69	1000 57	1043 91	1008 42	934 61	1033 64	1000 03
3	60000	1366 34	1252 92	1309 71	1299 93	1186 60	1302 18	1252 23
4	80000	1685 20	1626 76	1656 02	1713 12	1664 38	1652 43	1627 71
5	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		1 833	2 250	1 000	1 833	1 417	1 000	2 250

95% CHI-SQUARE TEST STATISTIC = 9 492

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2.00	1118.44
2.33	1211.74
5.00	1637.81
10.00	2012.73
20.00	2400.93
50.00	2954.64
100.00	3415.62
200.00	3922.08
500.00	4676.20
1000.00	5323.11

WEIGHTED SKEW CHI-SQUARE VALUE: 2.250

COMPUTED SKEW (LOG10)= .0249

REGIONAL SKEW (LOG10)= .000

WEIGHTED SKEW (LOG10)= .0147

MEAN SQUARE ERROR OF LOG10 SKEW= .2075

MEAN SQUARE ERROR OF REGIONAL SKEW= .3020

Estação: 2870049

SAMPLE SIZE = 14

STATISTICS OF THE OBSERVED VALUES

MEAN = 1139.79 STD DEV = 505.57 COEF OF SKEW = .6142

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 6.94208 STD DEV = .46708 COEF OF SKEW = -.2536

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 3.01491 STD. DEV = .20285 COEF OF SKEW = -.2537

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
2.00	1139.79	1034.93	1090.24	1067.90	968.42	1088.58	1055.52
2.33	1231.81	1126.76	1181.19	1174.11	1068.27	1180.39	1148.09
5.00	1579.71	1553.89	1556.55	1635.55	1636.16	1559.27	1559.36
10.00	1822.40	1944.43	1850.70	2011.39	2315.37	1854.65	1910.16
20.00	2035.12	2366.71	2132.82	2371.90	3230.50	2135.66	2265.95
50.00	2293.30	3004.24	2508.69	2838.54	4971.64	2505.60	2763.91
100.00	2479.71	3568.85	2804.95	3188.22	6867.57	2793.13	3171.76
200.00	2662.71	4226.23	3117.83	3536.63	9475.32	3092.67	3613.89
500.00	2903.57	5279.48	3565.69	3996.28	14488.48	3513.80	4261.77
1000.00	3087.25	6255.91	3937.11	4343.68	19971.46	3856.17	4808.14

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
0	.00000	.00	.00	.00	.00	.00	.00	.00
1	.33333	922.02	846.32	887.76	837.24	782.56	868.86	823.90
2	.66667	1357.55	1265.56	1310.93	1336.45	1241.12	1294.43	1229.52
3	1.00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		.143	.571	.143	.143	1.857	.143	1.857

95% CHI-SQUARE TEST STATISTIC = 5.995

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2.00	1044.22
2.33	1136.47
5.00	1556.86
10.00	1929.56
20.00	2321.29
50.00	2893.14
100.00	3382.34
200.00	3934.16
500.00	4783.82
1000.00	5539.04

WEIGHTED SKEW CHI-SQUARE VALUE: 1.857

COMPUTED SKEW (LOG10)= -.2537

REGIONAL SKEW (LOG10)= .000

WEIGHTED SKEW (LOG10)= -.1148

MEAN SQUARE ERROR OF LOG10 SKEW= .3652

MEAN SQUARE ERROR OF REGIONAL SKEW= .3020

Estação: 2870084

SAMPLE SIZE = 49

STATISTICS OF THE OBSERVED VALUES

MEAN = 1126 76 STD DEV = 363 38 COEF OF SKEW = 1531

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 6 96817 STD DEV = 36715 COEF OF SKEW = -1 0702

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 3 02624 STD DEV = 15946 COEF OF SKEW = -1 0724

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
2 00	1126 77	1062.28	1117.52	1069 82	1002 89	1117 50	1131 84
2 33	1191 96	1134 61	1182.88	1136.31	1072.58	1182.91	1201 50
5 00	1435 34	1450 91	1432 25	1425 18	1436 10	1432 40	1451.73
10 00	1598 95	1711.73	1604.74	1660 46	1821 48	1604 89	1604 06
20 00	1736 23	1966 40	1752 55	1886 15	2287 98	1752 61	1717 88
50 00	1893.89	2305.94	1925 84	2178 27	3073.52	1925.66	1830.26
100.00	2001 27	2570.20	2046.09	2397 18	3834 34	2045 63	1894.88
200 00	2101.42	2843.90	2159.89	2615 29	4779.63	2159.07	1946.33
500.00	2225 54	3223.88	2303.15	2903.04	6392 34	2301 75	1998 60
1000 00	2314.62	3527 49	2407 52	3120 52	7963.20	2405 58	2028 64

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
0	00000	00	00	00	00	00	00	00
1	14286	738 83	717 82	740 68	746 19	723 18	735 98	739 73
2	28571	921 11	862 98	915 19	884 26	831 44	910 42	836 53
3	42857	1061 35	994 34	1052 53	1006 86	941 09	1047 76	939 18
4	57143	1192 18	1134 86	1183 10	1136 92	1073 23	1178 35	1064 14
5	71429	1332 42	1307 61	1325 76	1296 42	1260 91	1321 02	1240 18
6	85714	1514 70	1572 04	1515 42	1541 15	1614 62	1510 65	1561 14
7	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		2 000	2 286	1 429	4 000	5 714	1 714	6 286

95% CHI-SQUARE TEST STATISTIC =12 596

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2.00	1102.83
2.33	1174.87
5.00	1457.69
10.00	1656.15
20.00	1824.74
50.00	2017.59
100.00	2146.85
200.00	2264.83
500.00	2406.38
1000.00	2504.09

WEIGHTED SKEW CHI-SQUARE VALUE: 3.429

COMPUTED SKEW (LOG10)= -1.0724

REGIONAL SKEW (LOG10)= .000

WEIGHTED SKEW (LOG10)= -.6186

MEAN SQUARE ERROR OF LOG10 SKEW= .2215

MEAN SQUARE ERROR OF REGIONAL SKEW= .3020

Estação: 2870175

SAMPLE SIZE = 42

STATISTICS OF THE OBSERVED VALUES

MEAN = 1059 91 STD DEV = 445 15 COEF OF SKEW = 5144

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 6 86766 STD DEV = 47650 COEF OF SKEW = - 8538

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 2 98259 STD DEV = 20694 COEF OF SKEW = - 8552

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
2 00	1059 91	960 70	1022 91	990 66	892.06	1022 03	1026.70
2 33	1139 85	1046 52	1102 35	1073 05	974 31	1102 02	1112 23
5 00	1438 49	1440 73	1421 39	1431 01	1429 24	1423 14	1446.68
10 00	1639 73	1787 04	1657 64	1722 56	1952 73	1660 04	1676 17
20.00	1809 03	2142 10	1870.85	2002 23	2634.23	1872 67	1865 00
50.00	2004 14	2639 62	2134 11	2364.22	3880 94	2133 29	2071 63
100 00	2137 52	3044 72	2325 62	2635 49	5188.51	2321 34	2203.18
200 00	2262 33	3479 91	2513.80	2905 76	6929.27	2504 75	2317.53
500 00	2417.59	4109 11	2760.67	3262 34	10149.71	2743.18	2446.44
1000 00	2529.46	4631 82	2967.74	3531 84	13543.66	2922 17	2529.46

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
0	00000	00	00	00	00	00	00	00
1	16667	629 26	605 88	633 94	621 68	600 99	620 04	613 39
2	33333	868 17	782 44	841 87	811 72	736 56	827 01	748 15
3	50000	1059 91	960 70	1022 90	990 66	892 06	1008 61	900 90
4	66667	1251 64	1179 56	1217 58	1198 98	1114 91	1204 29	1112 39
5	83333	1490 55	1523 30	1480 79	1509 51	1554 52	1468 48	1500 93
6	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		3 429	2 571	571	2 000	5 429	1 429	4 571

95% CHI-SQUARE TEST STATISTIC =11 073

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2.00	1000.83
2.33	1087.42
5.00	1449.43
10.00	1725.37
20.00	1974.95
50.00	2278.99
100.00	2494.80
200.00	2700.99
500.00	2961.09
1000.00	3149.52

WEIGHTED SKEW CHI-SQUARE VALUE: 4.286

COMPUTED SKEW (LOG10)= -.8552

REGIONAL SKEW (LOG10)= .000

WEIGHTED SKEW (LOG10)= -.5191

MEAN SQUARE ERROR OF LOG10 SKEW= .1955

MEAN SQUARE ERROR OF REGIONAL SKEW= .3020

Estação: 2871202

SAMPLE SIZE = 44

STATISTICS OF THE OBSERVED VALUES

MEAN = 1296 29 STD DEV = 586 81 COEF OF SKEW = 1 7113

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 7 07358 STD DEV = 44776 COEF OF SKEW = - 4219

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 3.07202 STD DEV = 19446 COEF OF SKEW = - 4228

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
2 00	1296 29	1180 37	1168 55	1204 79	1100 77	1142.17	1217 94
2 33	1401 64	1279 17	1260 32	1313.02	1195 53	1236 11	1317 51
5 00	1795 11	1727 11	1684.50	1783.20	1711 48	1684 01	1736 44
10 00	2060 05	2114 06	2059 88	2166 16	2292 34	2082.27	2060.08
20 00	2282 76	2505 64	2446 69	2533 50	3033 97	2484 77	2357 06
50.00	2539.12	3046.99	2991.15	3008.99	4360 93	3031 88	2725 37
100 00	2714 17	3482 42	3436 10	3365.30	5723.41	3460 88	2991 82
200.00	2877 80	3945 54	3915 36	3720 30	7504 10	3905.15	3250.77
500 00	3081.12	4607 68	4610.08	4188.67	10727 78	4518.59	3584.23
1000 00	3227 42	5151 87	5188.48	4542.66	14054.46	5004.18	3831 09

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
0	00000	00	00	00	00	00	00	00
1	16667	728 60	765 41	792 11	720 14	760 48	828 22	768 54
2	33333	1043 53	973 33	978 75	969 76	920 05	1004 26	953 07
3	50000	1296 29	1180 37	1168 55	1204 79	1100 77	1204 57	1147 13
4	66667	1549 04	1431 45	1403 11	1478 43	1356 36	1465 36	1396 86
5	83333	1863 98	1820 30	1774 21	1886 31	1851 57	1983 86	1815 64
6	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		8 636	1 000	455	5 091	3 727	1 818	1 000

95% CHI-SQUARE TEST STATISTIC =11 073

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2.00	1205.59
2.33	1305.14
5.00	1734.68
10.00	2079.41
20.00	2406.53
50.00	2827.62
100.00	3143.57
200.00	3460.33
500.00	3883.20
1000.00	4207.76

WEIGHTED SKEW CHI-SQUARE VALUE:	1.818
COMPUTED SKEW (LOG10)=	-.4228
REGIONAL SKEW (LOG10)=	.000
WEIGHTED SKEW (LOG10)=	-.2839
MEAN SQUARE ERROR OF LOG10 SKEW=	.1478
MEAN SQUARE ERROR OF REGIONAL SKEW=	.3020

A-2 - ANÁLISE DE FREQUÊNCIA DO MÊS MAIS CHUVOSO

Estação: 2860355

SAMPLE SIZE = 24

STATISTICS OF THE OBSERVED VALUES

MEAN = 295 20 STD DEV = 190 12 COEF OF SKEW = 5640

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 5 45370 STD. DEV = 75887 COEF OF SKEW = - 7079

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 2 36851 STD. DEV = 32957 COEF OF SKEW = - 7078

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
2 00	295 21	233 62	270 01	266 67	208 47	268.39	255 19
2 33	329.51	267 91	303 23	303 78	241 75	302 17	290 70
5 00	458.24	447 85	443 71	465 01	460 11	445.28	451 26
10 00	546 07	635.87	555 74	596 33	777.14	558 65	584 05
20 00	621 05	857 74	663.34	722.30	1284.86	666 23	709 84
50.00	709 10	1218 92	805.53	885 34	2463 17	805.91	868.08
100.00	770 49	1557 40	915.97	1007.53	4011 36	912 24	982.31
200.00	828.95	1966.67	1030 66	1129.26	6521 03	1020 60	1091.85
500.00	903.18	2644.88	1191 01	1289.87	12380 14	1168 53	1229.01
1000 00	957 78	3288.99	1320 48	1411 25	20097 43	1285.01	1326 55

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
0	00000	00	00	00	00	00	00	00
1	20000	135 19	123 35	135 09	119 25	115 75	142 10	122 38
2	40000	247 04	192 76	226 06	217 83	171 55	234 42	179 00
3	60000	343 37	283 14	317 13	320 08	258 00	328 62	260 61
4	80000	455 22	442 47	440 10	465 01	460 11	456 04	427 54
5	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		1 417	1 000	2 250	3 083	3 083	1 417	1 000

95% CHI-SQUARE TEST STATISTIC = 3 492

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2.00	244.79
2.33	280.00
5.00	451.45
10.00	610.94
20.00	779.62
50.00	1021.00
100.00	1219.67
200.00	1433.65
500.00	1741.93
1000.00	1995.65

WEIGHTED SKEW CHI-SQUARE VALUE: 1.000

COMPUTED SKEW (LOG10)= -.7078

REGIONAL SKEW (LOG10)= .000

WEIGHTED SKEW (LOG10)= -.3705

MEAN SQUARE ERROR OF LOG10 SKEW= .2749

MEAN SQUARE ERROR OF REGIONAL SKEW= .3020

Estação: 2860572

SAMPLE SIZE = 26

STATISTICS OF THE OBSERVED VALUES

MEAN = 351.42 STD DEV = 275 93 COEF OF SKEW = 1 2201

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 5 50911 STD. DEV = 99264 COEF OF SKEW = -1 3126

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 2 39258 STD. DEV = 43118 COEF OF SKEW = -1 3124

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
2.00	351 42	246 93	303 34	309 76	212.55	297 61	303 71
2 33	401 15	295 34	349.65	363 12	257 56	345 09	354.86
5 00	587 59	577 79	553 89	594.97	593 35	556.47	569.69
10.00	714 50	912 36	725.57	783.81	1170 87	733 13	719.59
20.00	822 57	1346 17	896 93	964 94	2247 34	906.44	836.39
50.00	949.02	2122 15	1132 07	1199.41	5226 23	1137.89	950.05
100.00	1036.88	2911 51	1320 86	1375.10	9836 59	1317.98	1011.11
200 00	1120.27	3930 77	1522 10	1550 16	18471.29	1504.32	1054.92
500 00	1225.76	5746 34	1811 53	1781.11	42416.33	1762.55	1091 96
1000 00	1303.07	7590 12	2051 53	1955 66	79505.06	1968.42	1107 98

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
0	00000	00	00	00	00	00	00	00
1	20000	119 27	107 07	124 07	97 78	99 10	96 37	116 69
2	40000	281 56	192 02	243 33	239 53	165 07	206 84	178 98
3	60000	421 30	317 51	369 32	386 56	280 23	331 07	289 55
4	80000	583 56	569 47	548 91	594 97	593 35	512 68	584 97
5	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		3.615	923	2 846	3 615	5 923	2 077	2 462

95% CHI-SQUARE TEST STATISTIC = 9 492

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2.00	270.15
2.33	321.21
5.00	584.54
10.00	841.18
20.00	1116.92
50.00	1511.18
100.00	1831.32
200.00	2169.28
500.00	2641.16
1000.00	3014.95

WEIGHTED SKEW CHI-SQUARE VALUE: 2.077

COMPUTED SKEW (LOG10)= -1.3124

REGIONAL SKEW (LOG10)= .000

WEIGHTED SKEW (LOG10)= -.5475

MEAN SQUARE ERROR OF LOG10 SKEW= .4219

MEAN SQUARE ERROR OF REGIONAL SKEW= .3020

Estação: 2860736

SAMPLE SIZE = 46

STATISTICS OF THE OBSERVED VALUES

MEAN = 231 30 STD DEV = 129 44 COEF OF SKEW = 1 7040

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 5 31235 STD DEV = 51346 COEF OF SKEW = 1254

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 2.30712 STD DEV = 22299 COEF OF SKEW = 1256

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
2.00	231 30	202.83	203 19	211 07	187 19	197 42	200.66
2 33	254.53	222 41	223.45	234 87	205 72	219 17	220 09
5 00	341.28	313 76	316 99	338 24	309 99	316.91	312.72
10 00	399 66	395.51	399 63	422 43	432 91	404 55	398 29
20 00	448 68	480 43	484 63	503.19	596 38	492.96	489 70
50 00	505 07	600.84	604 01	607.72	902.85	612.91	623 50
100.00	543 52	699.86	701 36	686.06	1231.87	706 79	736 96
200.00	579.44	807.02	806 00	764.11	1678.89	803 85	863 05
500.00	624.02	963.12	957.30	867 08	2525.90	937 62	1052.49
1000 00	656.06	1093 64	1082.95	944.90	3439.42	1043 32	1215.88

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
0	00000	00	00	00	00	00	00	00
1	16667	106 07	123 42	119 99	104 52	122 67	127 19	123 89
2	33333	175 54	162 58	161 26	159 40	152 50	165 86	161 88
3	50000	231 30	202 83	203 19	211 07	187 19	209 85	201 52
4	66667	287 05	253 03	254 97	271 23	237 64	267 13	251 87
5	83333	356 52	333 31	336 84	360 90	339 16	359 05	334 43
6	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		6 174	696	435	5 391	2 261	696	696

95% CHI-SQUARE TEST STATISTIC -11 073

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2.00	201.27
2.33	220.75
5.00	313.04
10.00	397.54
20.00	487.11
50.00	617.04
100.00	726.29
200.00	846.79
500.00	1026.27
1000.00	1179.73

WEIGHTED SKEW CHI-SQUARE VALUE:	.696
COMPUTED SKEW (LOG10)=	.1256
REGIONAL SKEW (LOG10)=	.000
WEIGHTED SKEW (LOG10)=	.0899
MEAN SQUARE ERROR OF LOG10 SKEW=	.1199
MEAN SQUARE ERROR OF REGIONAL SKEW=	.3020

Estação: 2861329

SAMPLE SIZE = 70

STATISTICS OF THE OBSERVED VALUES

MEAN = 277 75 STD DEV = 145 95 COEF OF SKEW = 1 0450

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 5 46802 STD DEV = 62102 COEF OF SKEW = -1 0126

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 2 37473 STD DEV. = 26970 COEF OF SKEW = -1 0120

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
2 00	277 75	236 99	255 14	254.57	214 73	253 09	262 40
2 33	303 69	264.87	279 99	280.68	239 97	278 47	290.51
5 00	401.35	400.99	386.55	394 13	388 85	387 88	402 14
10.00	466 61	529 31	472 06	486 53	576 14	475 13	478 48
20 00	521 09	667 41	553 68	575 16	840 07	557 25	539 92
50.00	583.28	869.57	659.85	689.89	1368.72	661.91	604.72
100 00	625 36	1040 07	740 55	775 86	1973 23	739.68	644 17
200 00	664 38	1227.92	822.50	861 52	2840.94	817 01	677 00
500.00	712.61	1506.35	933.71	974.53	4595.04	919.36	712 05
1000 00	746.64	1742.54	1020.60	1059.94	6608.70	997.29	733.30

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
0	00000	00	00	00	00	00	00	00
1	12500	109 85	116 00	126 05	119 29	120 76	116 81	126 24
2	25000	179 30	155 89	173 61	169 22	149 34	160 63	154 24
3	37500	231 24	194 44	214 38	211 82	179 02	199 98	184 16
4	50000	277 75	236 99	255 14	254 57	214 73	240 38	220 52
5	62500	324 26	288 85	300 37	302.41	263 20	285 87	269 68
6	75000	376 19	360 28	356 78	362 85	340 40	343 02	346 55
7	87500	445 65	484 15	443 22	457 35	508 88	430 32	506 80
8	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		3 600	10 914	5 657	4 971	20 057	6 114	18 229

95% CHI-SQUARE TEST STATISTIC =14 070

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2.00	253.48
2.33	281.94
5.00	404.20
10.00	498.91
20.00	584.36
50.00	687.00
100.00	758.34
200.00	825.00
500.00	906.70
1000.00	964.02

WEIGHTED SKEW CHI-SQUARE VALUE:	15.257
COMPUTED SKEW (LOG10)=	-1.0120
REGIONAL SKEW (LOG10)=	.000
WEIGHTED SKEW (LOG10)=	-.6576
MEAN SQUARE ERROR OF LOG10 SKEW=	.1628
MEAN SQUARE ERROR OF REGIONAL SKEW=	.3020

Estação: 2861553

SAMPLE SIZE = 20

STATISTICS OF THE OBSERVED VALUES

MEAN = 367 06 STD DEV = 244 30 COEF OF SKEW = 9225

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 5 67580 STD DEV = 72941 COEF OF SKEW = - 3023

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 2 46497 STD DEV = 31678 COEF OF SKEW = - 3023

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
2 00	367 06	291.72	332 85	330 96	261 92	330 38	302.61
2.33	411 25	332 87	375 41	379 71	302 95	373 72	344 65
5 00	577.39	546 64	557 14	591.50	570 14	559 30	550 31
10 00	691.43	768.36	704 51	763.99	954 23	708 75	744 59
20 00	789.50	1029 72	848 35	929 46	1563 87	852 68	954 23
50.00	905.68	1456.70	1042 11	1143 63	2964 21	1042 73	1262 54
100.00	987 47	1859 60	1195 60	1304 12	4786 44	1189 84	1524.03
200.00	1066 00	2350 98	1357 80	1464.03	7715.36	1341 92	1813 67
500 00	1166.71	3175 62	1589 40	1675 00	14484 71	1553 09	2245.69
1000 00	1241.53	3970 50	1780 47	1834 45	23316 00	1722 16	2618.32

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
0	00000	00	00	00	00	00	00	00
1	25000	202 28	178 36	192 60	171 63	162 77	169 77	179 32
2	50000	367 06	291 72	332 85	330 96	261 92	307 50	288 13
3	75000	531 84	477 12	503 67	533 10	478 92	479 12	478 67
4	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		1 600	400	1 600	1 600	6 400	400	400

95% CHI-SQUARE TEST STATISTIC = 7 817

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2.00	297.41
2.33	339.08
5.00	548.95
10.00	756.40
20.00	990.02
50.00	1351.45
100.00	1674.18
200.00	2048.56
500.00	2639.36
1000.00	3173.77

WEIGHTED SKEW CHI-SQUARE VALUE: .400

COMPUTED SKEW (LOG10)= -.3023

REGIONAL SKEW (LOG10)= .000

WEIGHTED SKEW (LOG10)= -.1590

MEAN SQUARE ERROR OF LOG10 SKEW= .2722

MEAN SQUARE ERROR OF REGIONAL SKEW= .3020

Estação: 2861917

SAMPLE SIZE = 25

STATISTICS OF THE OBSERVED VALUES

MEAN = 342 67 STD DEV = 144 30 COEF OF SKEW = 5289

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 5.74200 STD DEV = 46632 COEF OF SKEW = - 6921

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 2 49372 STD. DEV. = 20251 COEF OF SKEW = - 6911

FREQUENCY DISTRIBUTION

RSTURN PERIOD (YRS)	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
2 00	342 67	311.69	330 36	320 94	290 55	330 05	328.68
2.33	368 70	339 04	356 21	348 98	318.11	356 09	356 11
5 00	466 31	464 78	460 68	470 79	471 55	461 28	467.04
10 00	532.83	576 24	539.22	570.01	649 79	540 04	547 80
20 00	589 55	692 15	611 32	665 17	883 77	611 92	618.19
50.00	656.02	858.02	702 31	788 36	1315 90	701 89	700 52
100.00	702 29	996.38	770 06	880 67	1773.27	768 27	756 61
200.00	746.27	1148.55	838 06	972 64	2387 02	834.30	808 27
500.00	802 00	1375.22	929 54	1093.98	3533 08	922.20	870 53
1000.00	842.92	1569 65	1000 72	1185.69	4751 82	989.81	913 44

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
0	00000	00	00	00	00	00	00	00
1	20000	221 23	210 51	219 87	209 57	202 73	225 77	213 35
2	40000	306 11	276 96	295 39	284 05	257 89	302 10	270 36
3	60000	379 23	350 77	366 90	361 30	331 02	374 74	341 33
4	80000	464 12	461 49	458 19	470 79	471 55	467 42	463 47
5	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		800	1 200	1 200	2 400	4 400	1 600	2 400

95% CHI-SQUARE TEST STATISTIC = 9 492

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2.00	320.70
2.33	348.30
5.00	467.08
10.00	562.41
20.00	653.13
50.00	770.50
100.00	859.07
200.00	948.31
500.00	1068.12
1000.00	1160.53

WEIGHTED SKEW CHI-SQUARE VALUE: 1.200

COMPUTED SKEW (LOG10)= -.6911

REGIONAL SKEW (LOG10)= .000

WEIGHTED SKEW (LOG10)= -.3683

MEAN SQUARE ERROR OF LOG10 SKEW= .2647

MEAN SQUARE ERROR OF REGIONAL SKEW= .3020

Estação: 2870049

SAMPLE SIZE = 15

STATISTICS OF THE OBSERVED VALUES

MEAN = 373.50 STD DEV = 199 31 COEF OF SKEW = 9422

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 5 79498 STD DEV = 52195 COEF OF SKEW = 2202

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 2.51673 STD. DEV. = .22668 COEF. OF SKEW. = 2208

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
2 00	373.50	328 65	345 10	344.92	304 95	342.97	322 42
2.33	409.73	361.35	379 93	386.34	339 88	378.45	354.64
5 00	546.51	517.01	529 80	566 28	544 47	531 63	514 03
10 00	641.58	663.16	653 56	712 83	799 19	657 20	672 62
20 00	724 55	824.10	776 92	853 41	1154 87	780 57	856.90
50.00	824.70	1071.22	947 71	1035 38	1859 87	947 64	1158.65
100.00	896 60	1293 14	1087 08	1171 73	2658.04	1080 87	1448.14
200 00	966 82	1554 23	1238.46	1307 59	3793.80	1221 13	1810.14
500 00	1058 71	1977 06	1462.12	1486.83	6066.35	1422.17	2443 20
1000 00	1128 38	2372.75	1653.39	1622.30	9649 57	1587.97	3085 73

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
0	00000	00	00	00	00	00	00	00
1	33333	287 65	262 48	269 73	254 98	240 95	265 76	259 14
2	66667	459 35	411 49	430 79	449 64	401 17	430 04	405 83
3	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		1 600	1 200	400	400	1 200	400	1 200

95% CHI-SQUARE TEST STATISTIC = 5 995

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2.00	325.69
2.33	358.19
5.00	515.74
10.00	667.81
20.00	839.64
50.00	1111.70
100.00	1363.83
200.00	1669.18
500.00	2181.98
1000.00	2680.66

WEIGHTED SKEW CHI-SQUARE VALUE: 1.200

COMPUTED SKEW (LOG10)= .2208

REGIONAL SKEW (LOG10)= .000

WEIGHTED SKEW (LOG10)= .1037

MEAN SQUARE ERROR OF LOG10 SKEW= .3406

MEAN SQUARE ERROR OF REGIONAL SKEW= .3020

Estação: 2870084

SAMPLE SIZE = 53

STATISTICS OF THE OBSERVED VALUES

MEAN = 307 43 STD DEV = 127 91 COEF OF SKEW = 4696

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 5 62898 STD. DEV = 48138 COEF. OF SKEW = - 9472

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 2.44463 STD DEV = 20906 COEF. OF SKEW = - 9473

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
2 00	307 43	278.38	297 68	287 32	258 09	297 48	299 79
2 33	330 37	303 48	320 53	310 60	281.72	320 46	324 67
5.00	415 98	418 83	411 60	411 74	412.20	412 03	420 13
10 00	473 47	520 00	478 26	494 11	562.01	478 83	483 52
20 00	521 65	623 37	537 79	573 12	756 63	538 21	534 08
50 00	576 89	767 42	610 46	675 40	1111.84	610 24	587 46
100.00	614.45	883.96	662.71	752 04	1483 56	661 68	620 21
200 00	649 44	1008.35	713 55	828 40	1977 47	711 43	647 78
500 00	692.72	1186.73	779 49	929 15	2889.14	775.47	677.70
1000 00	723.73	1333.62	828 90	1005 29	3847 81	823 08	696 21

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
0	00000	00	00	00	00	00	00	00
1	14286	170 89	166 51	174 01	174 01	168 49	169 76	172 73
2	28571	235 04	211 99	229 59	222 35	202 11	225 05	205 48
3	42857	284 41	255 27	275 37	265 28	237 54	270 85	240 49
4	57143	330 46	303 58	320 61	310 81	281 94	316 23	284 07
5	71429	379 82	365 56	371 99	366 65	347 88	367 79	347 25
6	85714	443 99	469 40	443 50	452 34	480 25	439 43	467 31
7	1 00000	*INFINITY*	*INFINITY*	*INFINITY*	*INFINITY*	*INFINITY*	*INFINITY*	*INFINITY*
CHI-SQUARE VALUE		6 830	7 358	1 547	9 736	11 849	3 925	12 906

95% CHI-SQUARE TEST STATISTIC =12 596

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2.00	291.74
2.33	317.05
5.00	421.44
10.00	499.24
20.00	568.10
50.00	649.90
100.00	706.52
200.00	759.46
500.00	824.59
1000.00	870.60

WEIGHTED SKEW CHI-SQUARE VALUE: 10.792

COMPUTED SKEW (LOG10)= -.9473

REGIONAL SKEW (LOG10)= .000

WEIGHTED SKEW (LOG10)= -.5902

MEAN SQUARE ERROR OF LOG10 SKEW= .1827

MEAN SQUARE ERROR OF REGIONAL SKEW= .3020

Estação: 2870175

SAMPLE SIZE = 45

STATISTICS OF THE OBSERVED VALUES

MEAN = 281.93 STD DEV = 138 87 COEF OF SKEW = 6926

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 5 50536 STD DEV = 56762 COEF OF SKEW = - 8808

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 2 39095 STD DEV = 24651 COEF OF SKEW = - 8796

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
2.00	281 93	246 01	266 76	260 26	225 15	266 12	266 91
2 33	306 86	272.39	291 25	285 83	249 95	290 90	293 49
5 00	399.96	398 52	391 96	396 91	393 59	392.82	400 36
10.00	462 62	514.86	468.78	487 39	569 70	470 15	475 76
20 00	515 27	638 48	539 62	574 17	812.28	540.86	538 69
50 00	575.85	817 86	628.92	686 51	1285 62	628.95	608 19
100.00	617 19	968.43	695.08	770 69	1813.60	693 36	652 63
200 00	655.82	1134 06	761 01	854.56	2555 20	756.79	691.29
500.00	703.79	1379 68	848.82	965 22	4016 52	840 04	734 82
1000 00	738.28	1588.60	916 31	1048.85	5653.32	903.07	762.75

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
0	20000	00	00	00	00	00	00	00
1	.6667	147 58	142 06	150 45	145 75	141 00	155 77	139 62
2	33333	222 12	192 65	211 85	204 73	179 43	217 73	175 55
3	50000	281 93	246 01	266 76	260 26	225 15	273 80	217 91
4	66667	341 75	314 14	327 23	324 91	293 24	335 81	278 94
5	83333	416 28	426 02	411 23	421 27	434 80	421 71	397 02
6	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		14 333	3 667	2 333	1 333	4 467	5 533	5 000

95% CHI-SQUARE TEST STATISTIC =11 073

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2.00	258.83
2.33	285.65
5.00	401.41
10.00	492.80
20.00	577.27
50.00	682.02
100.00	757.37
200.00	829.98
500.00	922.29
1000.00	989.56

WEIGHTED SKEW CHI-SQUARE VALUE:	3.933
COMPUTED SKEW (LOG10)=	-.8796
REGIONAL SKEW (LOG10)=	.000
WEIGHTED SKEW (LOG10)=	-.5414
MEAN SQUARE ERROR OF LOG10 SKEW=	.1887
MEAN SQUARE ERROR OF REGIONAL SKEW=	.3020

Estação: 2871202

SAMPLE SIZE = 46

STATISTICS OF THE OBSERVED VALUES

MEAN = 334.25 STD DEV = 126 50 COEF OF SKEW = - 4059

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 5 71101 STD DEV = 50935 COEF OF SKEW = -1 5074

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 2.48026 STD. DEV. = .22121 COEF OF SKEW = -1 5076

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
2 00	334 25	302 18	342.64	314 48	279 06	342 [illegible]	340 72
2 33	356 95	331 10	319 97	337 74	306 45	364.99	367.79
5 00	441.74	465 82	230 32	438 76	460 27	443 24	459 88
10 00	498 79	586 11	165 31	521 04	641 06	491 82	509 45
20.00	546 70	710 83	107 59	599 97	880 87	530 17	541.61
50.00	601.80	887.40	37 49	702 13	1329 10	571 60	567 79
100 00	*639.39*	*1032.39*	*-12.72*	*778 69*	*1808.96*	598 27	579 61
200 00	674 49	1189 11	-61.66	854.97	2459 30	622.03	586.86
500.00	718 06	1417.10	-124.51	955.60	3687.95	650.05	591.84
1000.00	749 37	1607.51	-171 67	1031 66	5009 35	669 19	593 40

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL	2-PARAMETER LOGNORMAL	3-PARAMETER LOGNORMAL	TYPE I EXTREMAL	TYPE I LOG-EXTREMAL	PEARSON TYPE III	LOG PEARSON TYPE III
0	00000	00	00	00	00	00	CC	CC
1	16667	211 87	184 61	455 90	210 35	183 45	217 37	203 52
2	33333	279 76	242 65	394 88	263 98	227 71	278 72	242 64
3	50000	334 25	302 18	342 64	314 48	279 06	331 40	292 82
4	66667	388 74	376 31	287 30	373 28	353 59	387 23	370 22
5	83333	456 63	494 61	213 72	460 91	503 21	461 37	532 30
6	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		5 391	12 696	143 130	8 783	29 652	5 391	26 783

95% CHI-SQUARE TEST STATISTIC =11 C73

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2.00	319.84
2.33	349.01
5.00	468.70
10.00	556.78
20.00	633.71
50.00	723.54
100.00	784.58
200.00	840.69
500.00	908.29
1000.00	954.97

WEIGHTED SKEW CHI-SQUARE VALUE:	28.087
COMPUTED SKEW (LOG10)=	-1.5076
REGIONAL SKEW (LOG10)=	.000
WEIGHTED SKEW (LOG10)=	-.6779
MEAN SQUARE ERROR OF LOG10 SKEW=	.3696
MEAN SQUARE ERROR OF REGIONAL SKEW=	.3020

A-3 - ANÁLISE DE FREQUÊNCIA DOS MÁXIMOS DIÁRIOS

Estação: 2860355

SAMPLE SIZE = 24

STATISTICS OF THE OBSERVED VALUES

MEAN = 80 44 STD DEV = 35 36 COEF OF SKEW = 2 0506

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 4 31559 STD. DEV = 37052 COEF OF SKEW = 7494

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 1 87424 STD DEV = 16091 COEF OF SKEW = 7504

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL (mm)	2-PARAMETER LOGNORMAL (mm)	3-PARAMETER LOGNORMAL (mm)	TYPE I EXTRSMAL (mm)	TYPE I LOG-EXTREMAL (mm)	PEARSON TYPE III (mm)	LOG PEARSON TYPE III (mm)
2 00	80.44	74.86	71 97	75 13	70 81	69 71	71.52
2 33	86.82	80 03	77 27	82 04	76 12	75.05	76 43
5 00	110.77	102.86	102 66	112.03	104 22	102 08	100 75
10 00	127.10	122 06	126.44	136 45	134 62	127.86	124 90
20 00	141.05	141.26	152 24	159.88	172.07	155 27	152 77
50.00	157.43	167.70	190.80	190.21	236.44	194.56	197 84
100.00	168.85	189 02	224.27	212 93	300 00	226.89	240.43
200 00	179.72	211.83	262 30	235.58	380.33	261.74	292.85
500 00	193 52	244 80	321 09	265 45	520 11	312 10	382.62
1000.00	203.68	272.28	373 35	288 03	658 92	353.76	471 61

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL (mm)	2-PARAMETER LOGNORMAL (mm)	3-PARAMETER LOGNORMAL (mm)	TYPE I EXTREMAL (mm)	TYPE I LOG-EXTREMAL (mm)	PEARSON TYPE III (mm)	LOG PEARSON TYPE III (mm)
0	20000	00	00	00	00	00	00	00
1	20000	50 68	54 80	53 28	47 71	53 13	54 04	53 73
2	40000	71 48	68 15	65 39	66 05	64 38	64 48	64 41
3	60000	89 40	92 22	79 86	85 07	78 58	79 17	77 18
4	80000	110 20	102 25	101 95	112 03	104 22	104 31	98 18
5	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		11 417	3 917	3 917	5 583	3 917	3 083	3 917

95% CHI-SQUARE TEST STATISTIC = 9 492

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW (mm)
2.00	72.03
2.33	77.00
5.00	101.19
10.00	124.63
20.00	151.12
50.00	192.94
100.00	231.54
200.00	278.05
500.00	355.63
1000.00	430.49

WEIGHTED SKEW CHI-SQUARE VALUE: 3.917

COMPUTED SKEW (LOG10)= .7504

REGIONAL SKEW (LOG10)= .500

WEIGHTED SKEW (LOG10)= .6300

MEAN SQUARE ERROR OF LOG10 SKEW= .2798

MEAN SQUARE ERROR OF REGIONAL SKEW= .3020

Estação: 286 0572

SAMPLE SIZE = 25

STATISTICS OF THE OBSERVED VALUES

MEAN = 86 24 STD DEV = 33 05 COEF OF SKEW = 5605

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 4 38363 STD DEV = 40032 COEF OF SKEW = - 3309

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 1 90379 STD DEV = 17386 COEF OF SKEW = - 3304

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL (mm)	2-PARAMETER LOGNORMAL (mm)	3-PARAMETER LOGNORMAL (mm)	TYPE I EXTREMAL (mm)	TYPE I LOG-EXTREMAL (mm)	PEARSON TYPE III (mm)	LOG PEARSON TYPE III (mm)
2 00	86 24	80.13	83 26	81 26	75 44	83.18	81 91
2 33	92.20	86 13	89.17	87 69	81.54	89 14	87.94
5 00	114 56	112.92	113 16	115.59	114.33	113 31	113 37
10 00	129.80	135 80	131.30	138 31	150 55	131 51	133 31
20.00	142.79	158.94	148.02	160.11	196 04	148 15	152.02
50.00	158 01	191.13	169 21	188 32	275.91	169 12	175.92
100.00	168.61	217.31	185 06	209.47	356 45	184.61	193 80
200 00	178.68	245 51	201.00	230 53	460.05	200 06	211.71
500.00	191.45	286.56	222 54	258.32	644 18	220 67	235.63
1000 00	200 82	321 01	239.34	279.33	830 80	236.56	254 02

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL (mm)	2-PARAMETER LOGNORMAL (mm)	3-PARAMETER LOGNORMAL (mm)	TYPE I EXTREMAL (mm)	TYPE I LOG-EXTREMAL (mm)	PEARSON TYPE III (mm)	LOG PEARSON TYPE III (mm)
0	00000	00	00	00	00	00	00	00
1	20000	58 42	57 21	58 13	55 75	55 39	56 02	56 85
2	40000	77 87	72 40	75 28	72 81	68 10	73 04	70 84
3	60000	94 61	88 68	91.62	90 51	84 38	89 38	86 66
4	80000	114 06	112 23	112 59	115 59	114 33	110 38	111 10
5	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		2 800	1 200	2 400	400	2 800	1 200	2 000

95% CHI-SQUARE TEST STATISTIC = 9 492

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW (mm)
2.00	79.99
2.33	85.98
5.00	112.86
10.00	135.97
20.00	159.48
50.00	192.37
100.00	219.29
200.00	248.45
500.00	291.18
1000.00	327.27

WEIGHTED SKEW CHI-SQUARE VALUE:	1.200
COMPUTED SKEW (LOG10)=	-.3304
REGIONAL SKEW (LOG10)=	.500
WEIGHTED SKEW (LOG10)=	.0262
MEAN SQUARE ERROR OF LOG10 SKEW=	.2273
MEAN SQUARE ERROR OF REGIONAL SKEW=	.3020

Estação: 2860736

SAMPLE SIZE = 43

STATISTICS OF THE OBSERVED VALUES

MEAN = 57 18 STD DEV = 19 40 COEF OF SKEW = 8009

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 3 99274 STD DEV = 32916 COEF OF SKEW = 1756

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 1 73402 STD. DEV = 14295 COEF OF SKEW = 1761

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL (mm)	2-PARAMETER LOGNORMAL (mm)	3-PARAMETER LOGNORMAL (mm)	TYPE I EXTREMAL (mm)	TYPE I LOG-EXTREMAL (mm)	PEARSON TYPE III (mm)	LOG PEARSON TYPE III (mm)
2 00	57 18	54 20	54 77	54 16	51 49	54 64	53 68
2 33	60.67	57 50	58.17	57.75	54 72	58 08	56 96
5 00	73 68	71 71	72.32	73 32	71 27	72 46	71 49
10.00	82 44	83.20	83.31	86 00	88 38	83 57	83.72
20.00	89 81	94.29	93 61	98 16	108.65	93 86	95 91
50.00	98 30	108.90	106.77	113.91	141 92	106 82	112 58
100.00	104 09	120.16	116.65	125.70	173 38	116.40	125 89
200.00	109 52	131.74	126 61	137 46	211 66	125 90	139 99
500 00	116.26	147.71	140 03	152 97	275.38	138 47	160 10
1000 00	121.12	160 39	150 46	164 69	335.98	148 06	176 63

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL (mm)	2-PARAMETER LOGNORMAL (mm)	3-PARAMETER LOGNORMAL (mm)	TYPE I EXTREMAL (mm)	TYPE I LOG-EXTREMAL (mm)	PEARSON TYPE III (mm)	LOG PEARSON TYPE III (mm)
0	00000	00	00	00	00	00	00	00
1	16667	38 42	39 42	38 96	38 11	39 22	37 30	39 17
2	33333	48 83	47 04	47 25	46 38	45 12	45 33	46 39
3	50000	57 18	54 20	54 77	54 16	51 49	52 79	53 34
4	66667	65 54	62 46	63 18	63 22	60 05	61 20	61 55
5	83333	75 95	74 53	75 05	76 73	75 52	73 08	73 95
6	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		11.279	8 488	8 488	6 814	6 256	7 093	8 488

95% CHI-SQUARE TEST STATISTIC =11 073

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW (mm)
2.00	53.40
2.33	56.66
5.00	71.34
10.00	83.97
20.00	96.79
50.00	114.67
100.00	129.22
200.00	144.87
500.00	167.62
1000.00	186.66

WEIGHTED SKEW CHI-SQUARE VALUE:	8.488
COMPUTED SKEW (LOG10)=	.1761
REGIONAL SKEW (LOG10)=	.500
WEIGHTED SKEW (LOG10)=	.2741
MEAN SQUARE ERROR OF LOG10 SKEW=	.1311
MEAN SQUARE ERROR OF REGIONAL SKEW=	.3020

Estação: 2861329

SAMPLE SIZE = 67

STATISTICS OF THE OBSERVED VALUES

MEAN = 80 27 STD DEV = 22 90 COEF OF SKEW = 5350

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 4 34316 STD DEV = 30174 COEF OF SKEW = - 7060

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 1 88621 STD. DEV = 13104 COEF OF SKEW = - 7045

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL (mm)	2-PARAMETER LOGNORMAL (mm)	3-PARAMETER LOGNORMAL (mm)	TYPE I EXTREMAL (mm)	TYPE I LOG-EXTREMAL (mm)	PEARSON TYPE III (mm)	LOG PEARSON TYPE III (mm)
2 00	80.27	76.95	78.30	76.64	73.36	78 24	79 69
2 33	84.37	81.22	82 37	80 75	77 43	82.35	83.90
5 00	99.67	99.36	98 73	98 59	97 96	98 83	99.73
10 00	109 91	113 72	110 81	113.12	118.63	110 95	110 21
20 00	118 47	127 30	121.66	127 06	142 56	121.76	118 72
50.00	128.25	144.80	134 94	145 11	180 82	134.91	128 01
100 00	134.87	157.99	144 52	158.63	216 09	144.31	133 97
200 00	141.01	171 31	153.85	172.10	258.06	153.40	139 23
500.00	148.57	189 27	165.96	189 88	326 17	165 10	145 31
1000 00	153.97	203.21	175 03	203 31	389 33	173 76	149 36

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL (mm)	2-PARAMETER LOGNORMAL (mm)	3-PARAMETER LOGNORMAL (mm)	TYPE I EXTREMAL (mm)	TYPE I LOG-EXTREMAL (mm)	PEARSON TYPE III (mm)	LOG PEARSON TYPE III (mm)
0	00000	00	00	00	00	00	00	00
1	12500	53 93	54 38	54 98	55 36	55 42	55 00	55 27
2	25000	64 82	62 78	64 06	63 21	61 46	64 04	61 73
3	37500	72 97	69 90	71 36	69 92	67 14	71 38	67 71
4	50000	80.27	76.95	78.30	76 64	73 36	78 38	74 09
5	62500	87 57	84 72	85 63	84 16	81 00	85 79	81 66
6	75000	95 72	94 32	94 32	93 67	91 81	94 57	91 83
7	87500	106 61	108 88	106 82	108 53	111 67	107 15	109 05
8	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		10 015	10 731	9 776	9 537	9 060	9 776	6 194

95% CHI-SQUARE TEST STATISTIC =14 070

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW (mm)
2.00	78.31
2.33	82.58
5.00	99.70
10.00	112.17
20.00	123.16
50.00	136.29
100.00	145.51
200.00	154.27
500.00	165.31
1000.00	173.32

WEIGHTED SKEW CHI-SQUARE VALUE: 11.209

COMPUTED SKEW (LOG10)= -.7045

REGIONAL SKEW (LOG10)= .500

WEIGHTED SKEW (LOG10)= -.3495

MEAN SQUARE ERROR OF LOG10 SKEW= .1262

MEAN SQUARE ERROR OF REGIONAL SKEW= .3020

Estação: 2861553

SAMPLE SIZE = 18

STATISTICS OF THE OBSERVED VALUES

MEAN = 84 34 STD DEV = 29 67 COEF OF SKEW = 1944

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 4 37253 STD DEV = 37012 COEF OF SKEW = - 2241

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 1 89896 STD DEV = 16074 COEF OF SKEW = - 2235

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL (mm)	2-PARAMETER LOGNORMAL (mm)	3-PARAMETER LOGNORMAL (mm)	TYPE I EXTREMAL (mm)	TYPE I LOG-EXTREMAL (mm)	PEARSON TYPE III (mm)	LOG PEARSON TYPE III (mm)
2 00	84 34	79.24	83.38	80.00	75.07	83.38	80 35
2 33	89.71	84.74	88 77	86 00	80 91	88 77	85 86
5 00	109.95	109 08	109 64	112 08	112 02	109 66	109.37
10 00	123 90	129.81	124 56	133 32	146 01	124 55	128 30
20 00	135 95	150.87	137 83	153 70	188 27	137.84	146.57
50.00	150 31	180.48	154.11	180.07	261 62	154.08	170 84
100.00	160.49	204.92	165.96	199.84	334.78	165.87	189 75
200.00	170.32	231.65	177.65	219 53	428 01	177 50	209.41
500 00	183.01	271.38	193.12	245.50	591 85	192.84	236 87
1000 00	192.50	305 49	204.97	265.14	756.13	204.58	259.00

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL (mm)	2-PARAMETER LOGNORMAL (mm)	3-PARAMETER LOGNORMAL (mm)	TYPE I EXTREMAL (mm)	TYPE I LOG-EXTREMAL (mm)	PEARSON TYPE III (mm)	LOG PEARSON TYPE III (mm)
0	00000	00	00	00	00	00	00	00
1	25000	64 33	61 74	63 86	60 38	58 77	64 43	60 90
2	50000	84 34	79 24	83 38	80 00	75 07	83 98	77 61
3	75000	104 35	101 71	103 77	104 89	102 41	104 41	100 16
4	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		1 111	222	222	222	222	1 111	667

95% CHI-SQUARE TEST STATISTIC = 7 817

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW (mm)
2.00	78.61
2.33	84.07
5.00	108.82
10.00	130.58
20.00	153.31
50.00	186.30
100.00	214.40
200.00	246.02
500.00	294.65
1000.00	337.91

WEIGHTED SKEW CHI-SQUARE VALUE: .222

COMPUTED SKEW (LOG10)= -.2235

REGIONAL SKEW (LOG10)= .500

WEIGHTED SKEW (LOG10)= .1311

MEAN SQUARE ERROR OF LOG10 SKEW= .2902

MEAN SQUARE ERROR OF REGIONAL SKEW= .3020

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW (mm)
2.00	81.27
2.33	88.22
5.00	120.72
10.00	150.31
20.00	181.84
50.00	228.26
100.00	268.11
200.00	313.07
500.00	382.15
1000.00	443.31

WEIGHTED SKEW CHI-SQUARE VALUE: 4.400

COMPUTED SKEW (LOG10)= -.1157

REGIONAL SKEW (LOG10)= .500

WEIGHTED SKEW (LOG10)= .1351

MEAN SQUARE ERROR OF LOG10 SKEW= .2076

MEAN SQUARE ERROR OF REGIONAL SKEW= .3020

Estação: 2870049

SAMPLE SIZE = 15

STATISTICS OF THE OBSERVED VALUES

MEAN = 89 15 STD DEV = 34 55 COEF OF SKEW = 5541

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 4 41632 STD DEV. = 40827 COEF OF SKEW = - 3496

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 1 91798 STD DEV = 17731 COEF OF SKEW = - 3488

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL (mm)	2-PARAMETER LOGNORMAL (mm)	3-PARAMETER LOGNORMAL (mm)	TYPE I EXTREMAL (mm)	TYPE I LOG-EXTREMAL (mm)	PEARSON TYPE III (mm)	LOG PEARSON TYPE III (mm)
2 00	89 15	82.79	86.07	84 20	78 08	85 99	84 78
3 33	95.43	89 17	92 30	91 38	85 00	92 27	91 19
5 00	119 15	118.00	117 76	122 57	122 88	117 92	118 45
10 00	135 63	143.37	137 42	147 98	165 90	137 63	140 28
20.00	150.01	169.93	156 02	172 35	221 26	156 16	161.29
50 00	167.37	208.63	180 41	203.89	321 21	180 23	189.02
100 00	179.83	241.73	199.35	227.53	424 71	198 69	210 46
200 00	192.01	279.13	219.08	251.08	560 98	217 72	232.58
500 00	207 94	336.93	246.88	282.15	809 85	244 14	263.13
1000 00	220 01	388.61	269.55	305 63	1068 84	265.34	287.39

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL (mm)	2-PARAMETER LOGNORMAL (mm)	3-PARAMETER LOGNORMAL (mm)	TYPE I EXTREMAL (mm)	TYPE I LOG-EXTREMAL (mm)	PEARSON TYPE III (mm)	LOG PEARSON TYPE III (mm)
0	00000	00	00	00	00	00	00	00
1	33333	74 27	69 44	72 11	68 61	64 94	71 64	67 15
2	66667	104 04	98 71	101 18	102 35	96 76	100 95	95 12
3	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		400	400	400	400	400	400	400

95% CHI-SQUARE TEST STATISTIC = 5 995

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW (mm)
2.00	82.18
2.33	88.53
5.00	117.76
10.00	144.20
20.00	172.56
50.00	215.08
100.00	252.53
200.00	295.97
500.00	365.37
1000.00	429.60

WEIGHTED SKEW CHI-SQUARE VALUE:	.400
COMPUTED SKEW (LOG10)=	-.3488
REGIONAL SKEW (LOG10)=	.500
WEIGHTED SKEW (LOG10)=	.1089
MEAN SQUARE ERROR OF LOG10 SKEW=	.3535
MEAN SQUARE ERROR OF REGIONAL SKEW=	.3020

Estação: 2870084

SAMPLE SIZE = 51

STATISTICS OF THE OBSERVED VALUES

MEAN = 74 19 STD DEV = 25 59 COEF OF SKEW = 6526

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 4 24739 STD DEV = 35427 COEF OF SKEW = - 3502

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 1 84462 STD DEV = 15386 COEF OF SKEW = - 3494

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL (mm)	2-PARAMETER LOGNORMAL (mm)	3-PARAMETER LOGNORMAL (mm)	TYPE I EXTREMAL (mm)	TYPE I LOG-EXTREMAL (mm)	PEARSON TYPE III (mm)	LOG PEARSON TYPE III (mm)
2 00	74 19	69 92	71.54	70 17	66 14	71 44	71 36
2 33	78 78	74 51	76.07	74 84	70 56	76 01	75 98
5.00	95 92	94.45	94 55	95 13	93 43	94 70	94 63
10 00	107 43	110.77	108 53	111 66	117 45	108 76	108 97
20 00	117 08	126 61	121 33	127 51	146.26	121 53	121 72
50 00	128.16	147 59	137 33	148 03	194 30	137 32	137 29
100 00	135 70	163.82	149 08	163 40	240 39	148 79	148 44
200 00	142.73	180 56	160 72	178 72	297 17	160 03	159 20
500 00	151.42	203 66	176 10	198 93	393 09	174 68	172 99
1000 00	157 66	222 03	187 83	214.20	485 65	185.71	183.15

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL (mm)	2-PARAMETER LOGNORMAL (mm)	3-PARAMETER LOGNORMAL (mm)	TYPE I EXTREMAL (mm)	TYPE I LOG-EXTREMAL (mm)	PEARSON TYPE III (mm)	LOG PEARSON TYPE III (mm)
0	00000	00	00	00	00	00	00	00
1	14286	46 87	47 90	47 90	47 44	48 29	48 48	47 82
2	28571	59 71	57 22	58 34	57 16	55 22	59.94	56 10
3	42857	69 59	65 60	67 17	65 75	62 21	67 88	63 87
4	57143	78 80	74 53	76 08	74 89	70 60	76 96	72 43
5	71429	88 68	85 45	86 42	86 09	82 44	87 50	83 50
6	85714	101.51	102 06	101 18	103 28	104 59	102 51	101 32
7	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		15 020	11 451	14 471	8 706	6 784	9 529	10 627

95% CHI-SQUARE TEST STATISTIC =12 596

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW (mm)
2.00	70.34
2.33	74.94
5.00	94.60
10.00	110.30
20.00	125.23
50.00	144.58
100.00	159.24
200.00	174.07
500.00	194.14
1000.00	209.77

WEIGHTED SKEW CHI-SQUARE VALUE:	11.725
COMPUTED SKEW (LOG10)=	-.3494
REGIONAL SKEW (LOG10)=	.500
WEIGHTED SKEW (LOG10)=	-.1007
MEAN SQUARE ERROR OF LOG10 SKEW=	.1251
MEAN SQUARE ERROR OF REGIONAL SKEW=	.3020

Estação: 2870175

SAMPLE SIZE = 45

STATISTICS OF THE OBSERVED VALUES

MEAN = 75 16 STD DEV = 29 01 COEF OF SKEW = 1 0470

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 4 25030 STD DEV = 37770 COEF OF SKEW = - 0559

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 1 84588 STD DEV = 16402 COEF OF SKEW = - 0530

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL (mm)	2-PARAMETER LOGNORMAL (mm)	3-PARAMETER LOGNORMAL (mm)	TYPE I EXTREMAL (mm)	TYPE I LOG-EXTREMAL (mm)	PEARSON TYPE III (mm)	LOG PEARSON TYPE III (mm)
2 00	75 16	70 13	70 66	70.63	66 11	70 25	70 37
2 33	80 36	75 05	75.60	75.97	70 87	75 30	75 30
5 00	99 81	96.67	96 88	99.17	95 57	97 14	96 76
10 00	112.89	114.63	114.06	118 07	122 62	114 68	114 35
20 00	123.89	132.28	130.60	136 19	155 26	131.31	131 43
50.00	136.54	155.97	152 35	159.66	210.74	152 72	154.07
100 00	145.18	174 53	169 07	177.24	264 96	168.81	171 59
200 00	153 25	193 87	186 25	194 75	332.86	184.97	189.66
500 00	163.26	220 88	209 87	217 87	449 74	206.60	214 60
1000 00	170 47	242 61	228 59	235 33	564 60	223 28	234.43

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL (mm)	2-PARAMETER LOGNORMAL (mm)	3-PARAMETER LOGNORMAL (mm)	TYPE I EXTREMAL (mm)	TYPE I LOG-EXTREMAL (mm)	PEARSON TYPE III (mm)	LOG PEARSON TYPE III (mm)
0	00000	00	00	00	00	00	00	00
1	16667	47 10	48 66	48 47	46 71	48 42	46 45	48 71
2	33333	62 66	59 60	59 91	59 03	56 85	57 29	59 50
3	50000	75 16	70 13	70 66	70 63	66 11	67 93	69 97
4	66667	87 65	82 52	83 03	84 13	78 82	80 42	82 38
5	83333	103 22	101 06	101 11	104 26	102 44	98 76	101 16
6	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		4 733	6 600	3 400	4 467	6 867	7 667	4 467

95% CHI-SQUARE TEST STATISTIC =11 073

Estação: 2861917

SAMPLE SIZE = 25

STATISTICS OF THE OBSERVED VALUES

MEAN = 90 32 STD DEV = 39 46 COEF OF SKEW = 5281

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 4 40794 STD DEV = 45352 COEF OF SKEW = - 1161

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 1 91434 STD DEV = 19696 COEF OF SKEW. = - 1157

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL (mm)	2-PARAMETER LOGNORMAL (mm)	3-PARAMETER LOGNORMAL (mm)	TYPE I EXTREMAL (mm)	TYPE I LOG-EXTREMAL (mm)	PEARSON TYPE III (mm)	LOG PEARSON TYPE III (mm)
2 00	90 32	82.10	86 96	84.38	76 68	96 88	82 82
2 33	97 44	89 10	94 03	92 05	83 74	94 00	69 85
5 00	124.14	121 09	122.60	125 36	122 81	122 76	121 34
10 00	142.33	149.25	144.07	152 49	167 74	144 30	148 24
20.00	157.84	178 37	163 78	178.52	226.23	163.95	175 33
50.00	176 02	219 81	188.66	212 21	333.18	188.54	212 73
100 00	188 67	254.22	207 18	237 45	445 33	206.69	242 86
200.00	200.69	291.90	225 76	262.60	594 59	224 74	275.02
500.00	215.94	347 78	250 76	295.78	870.65	248 76	321.24
1000 00	227 13	395.52	270 21	320 86	1161.50	267.24	359.50

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL (mm)	2-PARAMETER LOGNORMAL (mm)	3-PARAMETER LOGNORMAL (mm)	TYPE I EXTREMAL (mm)	TYPE I LOG-EXTREMAL (mm)	PEARSON TYPE III (mm)	LOG PEARSON TYPE III (mm)
0	00000	00	00	00	00	00	00	00
1	20000	57 11	56 05	56 74	53 92	54 03	57 97	55 63
2	40000	80 33	73 19	77 40	74 29	68 28	78 82	72 21
3	60000	100 32	92 10	96 95	95.42	87 05	98 66	90 84
4	80000	123 54	120 26	121 92	125 36	122 81	123 97	119 25
5	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		4 000	4 400	4 000	1 200	400	4 000	4 400

95% CHI-SQUARE TEST STATISTIC = 9.492

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW (mm)
2.00	69.68
2.33	74.58
5.00	96.48
10.00	115.11
20.00	133.80
50.00	159.46
100.00	180.00
200.00	201.79
500.00	232.89
1000.00	258.44

WEIGHTED SKEW CHI-SQUARE VALUE:	3.933
COMPUTED SKEW (LOG10)=	-.0530
REGIONAL SKEW (LOG10)=	.500
WEIGHTED SKEW (LOG10)=	.1017
MEAN SQUARE ERROR OF LOG10 SKEW=	.1173
MEAN SQUARE ERROR OF REGIONAL SKEW=	.3020

Estação: 2871202

SAMPLE SIZE = 44

STATISTICS OF THE OBSERVED VALUES

MEAN = 76 12 STD DEV = 32 47 COEF OF SKEW = 2 6539

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 4 26701 STD DEV = 34747 COEF OF SKEW = 8184

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 1 85314 STD DEV = 15090 COEF OF SKEW = 8182

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL (mm)	2-PARAMETER LOGNORMAL (mm)	3-PARAMETER LOGNORMAL (mm)	TYPE I EXTREMAL (mm)	TYPE I LOG-EXTREMAL (mm)	PEARSON TYPE III (mm)	LOG PEARSON TYPE III (mm)
2 00	76.12	71 31	67 46	71 06	67 55	64 39	68 07
2 33	81.95	75 90	71 91	77 05	72 02	68 54	72 39
5 00	103 72	95 81	94.00	103.07	95 14	91 89	93 68
10 00	118 39	112.08	115 52	124.26	119 35	115 97	114 39
20 00	130.71	127 88	139.33	144.58	148 35	142 41	137 66
50 00	144.89	148 85	175.33	170 89	196 60	180 62	173 88
100 00	154.59	165 10	206 66	190 61	242 77	212 47	206 66
200 00	163.63	181.90	242.14	210 25	299 57	246 37	245 30
500.00	174.89	205 17	296 45	236 17	395 31	294 75	307 76
1000 00	182 98	223 74	344 06	255 76	487 50	334 11	365 90

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL (mm)	2-PARAMETER LOGNORMAL (mm)	3-PARAMETER LOGNORMAL (mm)	TYPE I EXTREMAL (mm)	TYPE I LOG-EXTREMAL (mm)	PEARSON TYPE III (mm)	LOG PEARSON TYPE III (mm)
0	00000	00	00	00	00	00	00	00
1	16667	44 71	50 95	50 93	44 24	55 70	5 61	51 45
2	33333	62 14	61 40	59 79	58 05	58 77	55 65	59 60
3	50000	76 12	71 31	67 48	71 06	67 55	64 45	68 31
4	66667	90 11	82 82	79 06	86 20	79 43	74 82	79 68
5	83333	107 54	99 80	98 99	108 77	101 13	92 87	99 05
6	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		14 909	2 909	6 455	11 636	4 818	12 182	4 818

95% CHI-SQUARE TEST STATISTIC =11 073

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW (mm)
2.00	68.52
2.33	72.91
5.00	94.10
10.00	114.23
20.00	136.40
50.00	170.19
100.00	200.11
200.00	234.74
500.00	289.51
1000.00	339.38

WEIGHTED SKEW CHI-SQUARE VALUE: 3.455

COMPUTED SKEW (LOG10)= .8182

REGIONAL SKEW (LOG10)= .500

WEIGHTED SKEW (LOG10)= .6973

MEAN SQUARE ERROR OF LOG10 SKEW= .1851

MEAN SQUARE ERROR OF REGIONAL SKEW= .3020

A.4 - ROTEIRO SEGUIDO PARA A GERAÇÃO DE VAZÕES MENSAIS

O trabalho foi dividido em :

- Calibração do modelo às estações fluviométricas de dados disponíveis;

- Geração das séries históricas de vazões.

O Procedimento aqui apresentado é ilustrado com a estação de São Luiss do Curu, sendo o mesmo para a outra estação utilizada.

1- Calibração:

Numa primeira aproximação, selecionou-se o posto fluviométrico de São Luís do Curu (Bacia do Curu), para a calibração do modelo. Tal deliberação foi tomada devido a maior disponibilidade de dados. O período utilizado na calibração foi de 1968 a 1985.

Foram os seguintes os dados necessários a este procedimento:

- Séries pluviométricas diárias
- Série de evapotranspiração
- Série fluviométrica

1.1- Determinação da precipitação média

Para determinação da precipitação média na bacia utilizou-se o Método de THIESSEN. No quadro A.1 estão discriminados os postos selecionados para o estudo.

1.2- Determinação da evapotranspiração

Os dados de evaporação foram obtidos a partir do Tanque Classe "A". Como esta metodologia superestima os valores de evaporação, empregou-se um coeficiente de redução de 0,75.

1.3- Série fluviométrica

Os dados utilizados foram os do posto fluviométrico de São Luís do Curu.

1.4. Resultados da obtidos na calibração

Segundo recomendação de LANNA E SCWARZBACH (1989), selecionou-se a função -objetivo do tipo 2 (função tipo soma do quadrado dos erros com fator de modulação), por ser esta a mais recomendável para uso na região semi-árida do Nordeste do Brasil. Os valores de partida dos parâmetros do modelo, adotados na busca do melhor valor da função objetivo, encontram-se na quadro A.2.

A qualidade da calibração obtida, pode-se dizer satisfatória. A figura III.2 permite uma melhor visualização da adequacidade do ajuste.

Quadro A.1- Listagem dos postos pluviométricos empregados na calibração do MODHAC.

Código do posto	Nome
2870084	Itapipoca
2870446	Irauçuba
2870386	Itapagé
2881462	Caridade
2861917	Cemoaba
2882626	Baturité
2871355	S.L. do Curu
2861329	Mundaú
2861786	Paracuru
2890078	Itatira
2871202	Uruburetama
2882415	Pacoti
2881196	Ac. Alto
2882601	Mulungu
2881838	Aç. Salão
2891168	Fz. Feijão
2870496	Iratinga
2881099	Formosa
2880116	Aç. Sta.
2872207	São Gonç. do
2881152	Paramoti
2880098	Tejuçuoca
2870889	Vertentes
2881895	Aratuba
2871549	Aç.
2871875	Irapuá
2871531	Aç. Caxitoré
2871167	Serrote
2871889	Matias
2880572	Parafuso
2881504	Salvação
2880871	Ubiraçu
2881006	Aç. Gen.

Quadro A.2 - Valores dos parâmetros do modelo obtidos durante o processo de calibração

F O	RSPX	RSSX	RSBX	RSBF	IMAX	IMIN	IDEC	ASP	ASS	ASB	PRED	CEVA
476	10,68	289 7	0,0	0,0	50,0	C 1069	3 533E-2	C,0	9,125E-4	1,0F-3	999	1,448E-9
615	46 02	293,7	0 C	0,0	55 0	6,250	C 15	2,85CE-16	1,025E-3	C,0	999	5,765E-9
500	27 85	265,1	0,C	0,0	58,62	4,029	9,283E-2	0,C	8,805E-4	0 0	999	3,564E-9
480	25 66	268 9	0,C	0 0	66 22	1 7229E-2	6,363E-2	5 448E-2	9 623E-4	0 0	999	0 0
472	6,527	300 0	C,0	0 0	38 54	1,5281E-2	3,637E-2	0,100	6,569E-4	0,C	999	0,C

F O	RSPX	RSSX	RSBX	RSBF	IMAX	IMIN	IDEC	ASP	ASS	ASB	PRED	CEVA
577	81,39	202 5	0,C	C 0	86,38	2,359	C 1371	2 6874E-12	1,017E-3	1,852E-2	999	2,222E-9
513	43,34	235 5	C,0	0,0	93 86	1,521	0,1087	2,3975E-2	9,551E-4	1,958E-2	999	3,959E-16
480	31,8C	262 3	0,0	0,0	105,3	3,9221E-3	7 3042E-2	4 0883E-2	8,435F-	3,653E-2	999	0 0
479	31,45	262,7	0,0	0,0	30 66	3,9265E-3	7,5352E-2	4,1376E-2	8,323E-4	0,688	999	0,C
479	31,54	263,1	0,0	0,0	30,80	5,2413E-3	7 0256E-2	4,0368E-2	8,463E-4	C,492	999	0 0

F O	RSPX	RSEX	RSBX	RSBF	IMAX	IMIN	IDEC	ASP	ASS	ASB	PRED	CEVA
484	25,19	265,5	0,0	0,0	39 82	6,4937E-2	5,0838E-2	0 0	8 4183E-4	1 277E-2	999	C,0
483	23,20	271,9	C,0	0,0	29,82	C 1948	C 4959E-1	0 0	8,293CE-4	0,9772E-2	999	0,2794E-

2- Geração da série de vazões

No quadro III.1 estão listados os postos pluviométricos da Bacia do Rio Mundaú, usados na geração da série de vazões.

O resultado obtido na geração das vazões com o emprego do MODHAC, mostrou-se insatisfatório (coeficientes de deflúvio bastante elevados), o que implica na necessidade de maiores estudos acerca dos parâmetros a serem adotados no processo de geração de vazões mensais.

ANEXO 2

HIDROGEOLOGIA

RELAÇÃO DO MATERIAL CARTOGRÁFICO EXISTENTE E DISPONÍVEL PARA A REGIÃO DA BACIA DO RIO MUNDAÚ

Fonte Informação Pra Gestão e Administração Territorial - Índice das Informações Cartográficas -

Região costeira do Ceará - CPRM - 1994

•Fotografia aéreas (1 25000) - CPRM (área de Trairi)

•Fotografia aéreas (1 70000) - CPRM (toda região litorânea)

•Carta topográfica da folha de Paracuru (SA 24-y-D-III) - (1 100000) - SUDENE

•Carta topográfica da folha de Itapipoca (SA 24-y-D-II) - (1.100000) - SUDENE

•Mapa do Estado do Ceará (1 500000) - IPLANCE

•Mapa de Vegetação (1 200000) - SEDURB

•Mapa de Uso da Infra-estrutura Hídrica Atual (1 600000 e 1 800000) - FUNCEME (1993)

•Mapa da Infra-estrutura Hídrica da Região Semi-árida do Nordeste (1 2000000) - DNOCS (1989)

•Principais Áreas de Irrigação da Região Semi-árida do Nordeste (1 2000000) - DNOCS (1989)

•Mapa Hidrogeológico (1 50000) - Município de Paracuru - UFC (1978) - Relatório de graduação

Entidades Contactadas:

- Prefeituras dos municípios de Itapipoca, Tururu e Uruburetama

- EMATECE de Itapipoca (local e regional) e de Uruburetama

- Secretaria da Agricultura de Itapipo

Pontos Cadastrados (poços tubulares, cacimbas e poços amazonas)

Ponto	Tipo	Coordenadas		Data	NE	Condutividade	pH	Profundidade
		Latitude	Longitude		(m)	(µs)		(m)
01	P	3° 28,65'	39° 32,27'	28/08/95	4,20	-	-	40,20
02	P	3° 32,52'	39° 31,64'	28/08/95	-	-	-	-
03	P	3° 29,99'	39° 31,31'	28/08/95	-	-	-	-
04	P	3° 33,36'	39° 28,21'	28/08/95	3,00	1520	6,40	-
05	P	3° 31,39'	39° 29,28'	28/08/95	-	-	-	-
06	P	3° 27,25'	39° 33,97'	29/08/95	-	1560	6,76	-
07	P	3° 26,54	39° 33,61	29/08/95	7,25	-	-	-
08	P	3° 23,30'	39° 22,68'	29/08/95	-	-	-	-
09	P	3° 22,55'	39° 31,00'	29/08/95	-	1700	6,54	-
10	P	3° 15,17	39° 32,01	29/08/95	-	-	-	-
11	P	3° 11,69'	39° 33,16'	29/08/95	-	190	-	38,00
12	P	3° 19,10'	39° 32,77'	29/08/95	0,50	900	-	60,00
13	P	3° 19,95'	39° 33,00'	29/08/95	-	410	-	-
14	P	3° 24,22'	39° 33,49'	29/08/95	-	-	-	-
15	P	3° 35,94'	39° 26,13'	29/08/95	-	-	-	-
16	P	3° 35,92'	39° 26,07'	29/08/95	-	-	-	-
17	P	3° 30,91'	39° 30,13'	29/08/95	-	1700	-	27,00
18	P	3° 37,37'	39° 30,20'	27/09/95	-	>2000	8,33	90 00
19	C	3° 37,59'	39° 29,49"	27/09/95	1,30	230	8,40	3,50
20	P	3° 37,58'	39° 29,83'	27/09/95	-	-	-	-
21	C	3° 37,58'	39° 31,91'	27/09/95	2,00	180	8,32	3,60
22	P	3° 36,88'	39° 30,53'	27/09/95	-	120	7,60	-
23	M	3° 39,54'	39° 27,66'	27/09/95	2,10	990	7,80	4,00
24	C	3° 37,85'	39° 29,57'	27/09/95	0,50	210	7,50	3,00
25	P	3° 33,67'	39° 24,70'	28/09/95	-	-	-	-
26	P	3° 32,75'	39° 23,65'	28/09/95	-	-	-	72,00
27	P	3° 31,69'	39° 24,09'	28/09/95	-	>2000	7,40	48,00
27a	C	3° 31,69'	39° 24,09'	28/09/95	4,50	390	8,18	6,00

28	P	3° 30,50'	39° 24,48'	28/09/95	-	-	-	70,00
28a	C	3° 30,50'	39° 24,48'	28/09/95	6,00	610	6,7	6,80
29	P	3° 29,17'	39° 25,23'	28/09/95	6,00	-	-	57,00
30	P	3° 29,14'	39° 25,37'	28/09/95	7,60	-	-	60,00
31	P	3° 28,96'	39° 25,32'	28/09/95	15,10	>2000	6,4	50,00
32	P	3° 28,72'	39° 25,05'	28/09/95	-	-	-	54,00
33	P	3° 28,99'	39° 24,68'	28/09/95	-	>2000	6,68	60,00
33a	C	3° 28,99'	39° 24,68'	28/09/95	11,00	210	7,60	17,00
34	P	3° 27,97'	39° 25,23'	28/09/95	-	-	-	60,00
35	P	3° 26,60'	39° 25,74'	28/09/95	-	-	-	51,00

Ponto	**Tipo**	**Coordenadas**		**Data**	**NE**	**Condutividade**	**pH**	**Profundidade**
		Latitude	Longitude		(m)	(µs)		(m)
36	P	3° 25,92'	39° 26,37'	28/09/95	-	-	-	72,00
37	P	3° 25,48'	39° 26,44'	28/09/95	-	-	-	52,00
38	P	3° 24,66'	39° 27,07'	28/09/95	-	-	-	55,55
39	P	3° 28,09'	39° 25,25'	28/09/95	-	-	-	-
40	P	3° 28,33'	39° 23,71'	28/09/95	-	>2000	7,30	-
41	P	3° 31,58'	39° 21,13'	28/09/95	-	-	-	-
42	P	3° 35,83'	39° 23,83'	28/09/95	-	-	-	70,00
43	P	3° 37,07'	39° 24,05'	28/09/95	-	-	-	-
44	P	3° 34,89'	39° 29,03'	28/09/95	-	-	-	50,00
45	P	3° 36,47'	39° 26,38'	28/09/95	2,00	-	-	116,00
46	P	3° 29,47'	39° 34,50'	29/09/95	-	-	-	-
47	P	3° 29,05'	39° 34,41'	29/09/95	-	-	-	-
48	P	3° 26,73'	39° 34,65'	29/09/95	8,50	>2000	8,10	-
49	P	3° 26,73'	39° 35,03'	29/09/95	6,25	>2000	7,90	42,00
50	P	3° 23,06'	39° 35,26'	29/09/95	-	-	-	-
51	P	3° 23,04'	39° 35,44'	29/09/95	-	-	-	60,00
52	P	3° 26,44'	39° 35,89'	29/09/95	-	>2000	7,60	36,00
53	C	3° 22,75'	39° 31,29'	18/10/95	3,00	910	5,15	7,50
54	C	3° 21,45'	39° 31,82'	18/10/95	8,00	480	7,00	12,00
55	C	3° 18,03'	39° 30,71'	18/10/95	3,90	330	6,81	7,20
56	C	3° 11,43'	39° 34,98'	18/10/95	2,20	490	4,80	-
57	C	3° 11,62'	39° 35,07'	19/10/95	3,50	650	5,30	-
58	C	3° 11,90'	39° 35,51'	19/10/95	3,50	810	6,69	7,00
59	C	3° 12,42'	39° 36,48'	19/10/95	2,00	310	5,20	13,00
60	C	3° 17,82'	39° 38,04'	19/10/95	5,40	390	5,00	10,00
61	C	3° 16,65'	39° 37,47'	19/10/95	6,00	450	4,23	8,00
62	C	3° 14,57'	39° 37,22'	19/10/95	4,00	18	-	-
63	C	3° 14 05'	39° 36,58'	19/10/95	10,00	1700	-	11,00
64	C	3° 12,05'	39° 34,31'	19/10/95	5,90	110	-	6,00
65	C	3° 15,37'	39° 34,58'	19/10/95	6,00	280	-	9,00
66	C	3° 17,92'	39° 28,76'	20/10/95	6,70	490	-	10 30
67	C	3° 16,74'	39° 28,88'	20/10/95	4,70	1020	-	7,00
68	C	3° 16,60'	39° 28,85'	20/10/95	6,00	1750	-	-
69	C	3° 15,28'	39° 28,76'	20/10/95	4,70	650	-	-

70	C	3° 14,35'	39° 29,83'	20/10/95	13,10	170	-	21,00
71	C	3° 14,76'	39° 28,46'	20/10/95	8,50	270	-	13,20
72	C	3° 13,47'	39° 26,86'	20/10/95	5,00	240	-	-
73	C	3° 14,26'	39° 23,13'	20/10/95	8,50	210	-	-
74	C	3° 16,23'	39° 25,16'	20/10/95	11,00	710	-	-
75	C	3° 17,98'	39° 26,53'	20/10/95	18,00	1180	-	-
76	C	3° 18,75'	39° 28,57'	21/10/95	2,10	930	-	8,20
77	C	3° 18,25'	39° 28,49'	21/10/95	6,20	620	-	8,00
78	C	3° 18,70'	39° 28,39'	21/10/95	4,40	180	-	-
79	C	3° 20,20'	39° 28,15'	21/10/90	3,50	300	-	6,50
80	C	3° 20,68'	39° 28,16'	21/10/95	4,00	110	-	5,80
81	C	3° 21,36'	39° 28,12'	21/10/95	6,50	970	-	8,90
Ponto	**Tipo**	**Coordenadas**		**Data**	**NE**	**Condutividade**	**pH**	**Profundidade**
		Latitude	Longitude		(m)	(µs)		(m)
82	C	3° 22,30'	39° 27,79'	21/10/95	5,80	770	-	9,50
83	C	3° 22,56'	39° 27,32'	21/10/95	6,20	990	-	10,50
84	C	3° 21,19'	39° 24,73'	21/10/95	8,90	1350	-	11,00
85	C	3° 19,16'	39° 24,42'	21/10/95	6,60	480	-	10,50
86	C	3° 16,73'	39° 23,86'	21/10/95	9,50	140	-	-
87	C	3° 15,96'	39° 22,32'	21/10/95	7,00	120	-	12,00
88	C	3° 23,55'	39° 22,72'	21/10/95	5,30	460	-	7,95
89	C	3°23,06'	39° 22,31'	21/11/95	2,10	470	6,83	6,80
90	C	3° 23,91'	39° 22,45'	21/11/95	-	-	-	5,80
91	C	3° 24,89'	39° 23,14'	21/11/95	5,90	970	6,80	6,00
91	C	3° 24,89'	39° 23,14'	21/11/95	6,00	320	6,80	7,00
92	C	3° 25,73'	39° 23,21'	21/11/95	7,00	670	-	9,90
93	C	3° 25,55'	39° 24,07'	21/11/95	3,00	1420	-	3,10
94	C	3° 26,93'	39° 24,70'	21/11/95	5,80	270	-	6,90
95	C	3° 28,44'	39° 23,35'	21/11/95	3,80	1500	-	7,50
96	C	3° 27,66'	39° 24,11'	21/11/95	8,80	>2000	-	12,35
96a	C	3° 27,66'	39° 24,11'	21/11/95	9,00	390	-	9,50
97	C	3° 25,16'	39° 34,91'	25/11/95	7,85	1210	-	-
98	C	3° 23,49'	39° 35,14'	25/11/95	9,75	270	-	-
98a	C	3° 23,49'	39° 35,14'	25/11/95	6,25	130	-	-
99	C	3° 22,21'	39° 35,53'	25/11/95	10,8	-	-	-
100	C	3° 20,71'	39° 36,71'	25/11/95	8,70	760	-	-

TERMOS DE REFERÊNCIA PARA PERFURAÇÃO DE POÇOS NO PROJETO MUNDAÚ

I) INTRODUÇÃO

As diretrizes a seguir apresentadas destinam-se a orientar a empresa de perfuração contratada pela FUNCEME para realizar a perfuração de quatro conjuntos poço produtor/piezômetro captando o aquífero Barreiras na região ao norte de Itapipoca.

II) CONDIÇÕES GERAIS DOS SERVIÇOS

Salvo indicação em contrário, a empreiteira deverá fornecer todos os materiais, ferramentas e equipamentos, mão de obra especializada ou não, supervisão, carga e descarga, transporte de material, tarifas, taxas, seguros, emolumentos, impostos, registros no CREA e prefeitura e tudo o mais que se fizer necessário para a completa e perfeita execução dos poços

A empreiteira deverá apresentar para análise, juntamente com a proposta de preços, uma lista completa de todos os equipamentos, pessoal qualificado e materiais a serem utilizados durante a realização dos serviços Deverá, também, descrever o tipo e capacidade de todo o equipamento para a metodologia empregada. Deverá ainda indicar um "gerente de projeto" com amplos poderes para tratar de quaisquer assuntos junto à fiscalização da FUNCEME

A locação dos poços, bem como as condições de acesso, será de responsabilidade da FUNCEME, que fornecerá à empreiteira as respectivas plantas de localização e colocará à disposição um técnico para orientar e fiscalizar o início dos trabalhos

Deverá ser aberto pela empreiteira um "diário de obra" no qual deverão ser registradas todas as informações referentes ao andamento dos serviços como serviços executados, produção diária, metragens atingidas, problemas encontrados, características da lama de perfuração, etc Este diário deve ficar permanentemente na obra, estando disponível para pareceres e instruções por parte da FUNCEME, devendo ser assinado diariamente pelos respectivos responsáveis técnicos (Empreiteira e FUNCEME)

Após a conclusão do contrato a empreiteira deverá remover todas as instalações temporárias e aterrar as escavações de tanques de lama e canaletas, devendo as áreas por ela utilizada estar nas mesmas condições encontradas no início dos serviços

O não cumprimento destas normas e/ou a não condução dos serviços de forma correta e segura bem como um comportamento técnico não adequado às condições do trabalho, poderá resultar na solicitação de remoção do canteiro de obras de todos ou de qualquer empregado da empreiteira Os fiscais da FUNCEME terão toda a autonomia para orientar e conduzir os trabalhos de forma a garantir o alto nível das informações e dados conseguidos com a execução dos serviços

III) PERFURAÇÃO

A perfuração dos poços deverá ser feita pelo método rotativo com circulação direta com uma perfuratriz com capacidade para 150 metros de profundidade

O fluído de perfuração deve ser à base de água e bentonita, devendo a empreiteira manter a lama com características de viscosidade, densidade, teor de areia e pH compatíveis com as condições litológicas encontradas, de modo a não provocar danos ao aquífero Tais características deverão ser permanentemente controladas e registradas no "diário de obra", devendo as mesmas, a qualquer momento, serem ajustadas a valores adequados, por solicitação da fiscalização A princípio pode-se admitir como ideais os seguintes valores

Densidade - Variando entre 1,04 e 1,14 g/cm^3
Viscosidade Aparente - Variando entre 35 e 45 segundos (Marsh)
Teor de Areia - Inferior a 5% em volume
pH - Variando entre 7 e 9,5

É fundamental que a lama de perfuração não permaneça sem circulação por um período superior a 12 horas, principalmente durante possíveis períodos de paralisação da perfuração

A perfuração dos poços produtores deverá ser conduzida inicialmente através de um furo guia em 8 1/2" até atravessar todo o pacote sedimentar e tocar no embasamento cristalino, sendo alargado posteriormente para 12 1/4" depois de conhecido o perfil litológico e definido o perfil construtivo da obra por parte dos técnicos da FUNCEME A profundidade estimada deve variar entre 40,0 e 80,0 metros.

A perfuração dos piezômetros deverá ser feita em 4" com profundidade final variando entre 30 e 50 metros, em função da profundidade do poço produtor. Em situação especial, definida pela fiscalização da FUNCEME, pode-se solicitar o alargamento para 6" ou 8 1/2"

Deverão ser registrados os tempos de penetração por metro perfurado em tabela própria, anotando-se ainda eventuais problemas encontrados como. perda de circulação, prisão de ferramentas, etc

A amostragem de calha deverá ser realizada a cada metro perfurado, respeitando-se o tempo de retorno e tendo-se bastante cautela na lavagem da amostra para a retirada da bentonita de forma a preservar a fração argilosa que possa existir nas litologias atravessadas As amostras devem ser condicionadas inicialmente numa caixa de madeira divididas em compartimentos que deve estar permanentemente à disposição da fiscalização, e posteriormente, após o encerramento do poço, em sacos plásticos específicos onde deve conter todas as informações pertinentes

IV) REVESTIMENTO

O material de revestimento deverá obedecer as seguintes especificações

- **Poços Produtores:**

Revestimento Tubos de PVC rígido tipo Geomecânico, diâmetro de 6"
Filtros Filtros de PVC rígido, tipo Geomecânico, diâmetro 6", abertura 0,5 mm
Tampa de Poço PVC rígido tipo Geomecânico, diâmetro 6"
Extensões estimadas para um poço de 60,0 metros 44 m de tubos e 16 m de filtros

- **Piezômetros**

Revestimento. Tubos piezométricos de PVC rígido, tipo Geomecânico, diâmetro 2"
Filtros Filtros de PVC rígido, tipo Geomecânico, diâmetro 2", abertura 0,5 mm
Tampa de Poço. PVC rígido, tipo Geomecânico, diâmetro 2"
Extensões estimadas para um poço de 40 metros 36 m de tubos e 4 m de filtros

O projeto real de cada poço será definido pela fiscalização da FUNCEME após concluída a perfuração de reconhecimento. No caso dos piezômetros pode ser solicitado, em casos especiais, a colocação, além dos tubos acima especificados, de tubos de PVC branco de 1" ou 3/4" fornecidos pela FUNCEME, de forma a não comprometer a completação do poço

V) PRÉ-FILTRO

Deverá ser utilizado cascalho selecionado, peneirado, quartzoso, de granulometria variando de 1,0 a 3,0 mm. A colocação do material de pré-filtro deve ser feita paulatinamente, de modo a formar um anel cilíndrico contínuo entre a parede da perfuração e a coluna de revestimento, sendo o mesmo injetado para dentro do poço por bombeamento de água, numa operação contínua e cuidadosa Não deve ser colocado por gravidade a partir da boca do poço

Nos poços produtores está previsto (para um poço de 60 metros) a colocação de cascalho no intervalo 30 - 60 metros Nos piezômetros a colocação de cascalho fica na dependência da decisão da fiscalização, quando da elaboração do projeto do poço

VI) CIMENTAÇÃO

O intervalo do espaço anelar entre a boca do poço e o topo do pré-filtro deve ser cimentado através da injeção sobre pressão de uma pasta de cimento e água na proporção de 1 saco de cimento (50 Kg) para 40 litros de água Na superfície do terreno, essa operação deve ser completada com a construção de uma sapata com altura de 10 cm e área de 1 m^2 , com declividade do centro para a periferia, em cujo centro deve ficar a boca do poço.

VII) LIMPEZA E DESENVOLVIMENTO

Deve constar das seguintes etapas

- a) Retirada da lama mediante a injeção de água limpa no fundo do poço
- b) Jateamento sobre pressão, utilizando água limpa, em toda a extensão de filtros
- c) Aplicação de desfloculante (Hexametafosfato de sódio) na proporção de 38 Kg por m^3 de água existente no poço Em seguida provocar turbilhonamento da água dentro do poço e deixar em repouso por 12 horas
- d) Realização de bombeamentos intermitentes com compressor de ar, com duração de 25 minutos de bombeamento com 5 minutos de paralização, no mínimo por 6 horas ou pelo tempo definido pela fiscalização
- e) Bombeamento contínuo com a máxima vazão possível durante 6 horas ou pelo tempo definido pela fiscalização

Pode ser solicitado a utilização de plungeamento, caso os técnicos da FUNCEME achem necessário O poço será considerado desenvolvido à critério da fiscalização

VIII)TESTES DE BOMBEAMENTO

O equipamento de bombeamento deverá ser uma bomba submersa com capacidade de 5,0 m^3/h A empreiteira ficará responsável apenas pela parte operacional dos testes (montagem e desmontagem de equipamentos, manutenção e operação dos equipamentos, etc) A FUNCEME ficará encarregada do planejamento do teste e da realização das medições de nível e fornecerá um dispositivo para a medição de vazão (Escoador de orifício circular) o qual deve ser conectado ao tubo de descarga da bomba. A empreiteira deve ter disponível 60 metros de tubulação de 3/4" para a medição dos níveis no poço produtor A duração de cada teste será definida ao longo de sua execução, tendo-se previsto inicialmente 72 horas de bombeamento e 24 horas de observação da recuperação

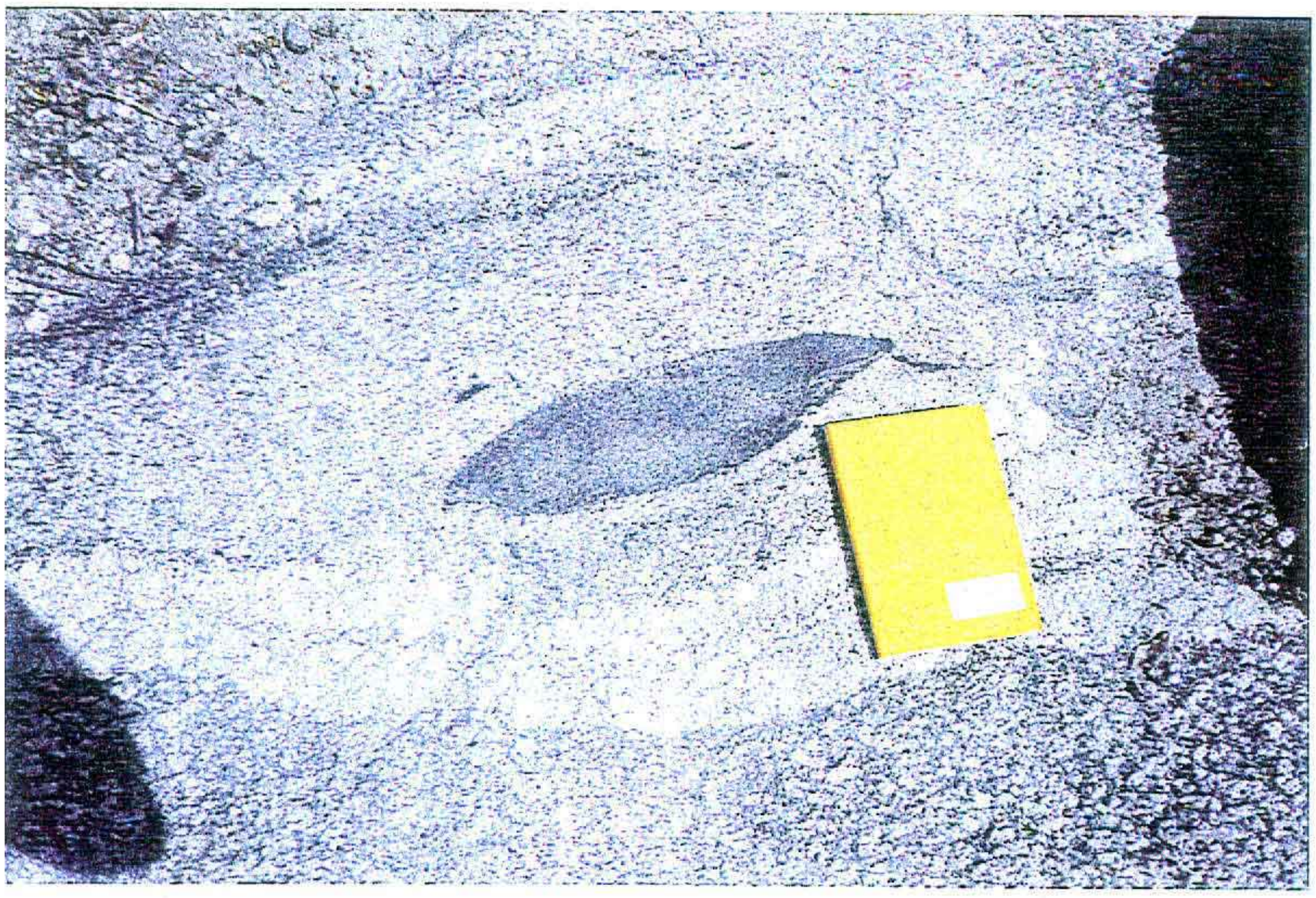


Figura 04 - Estrutura em "augem" no migmatito

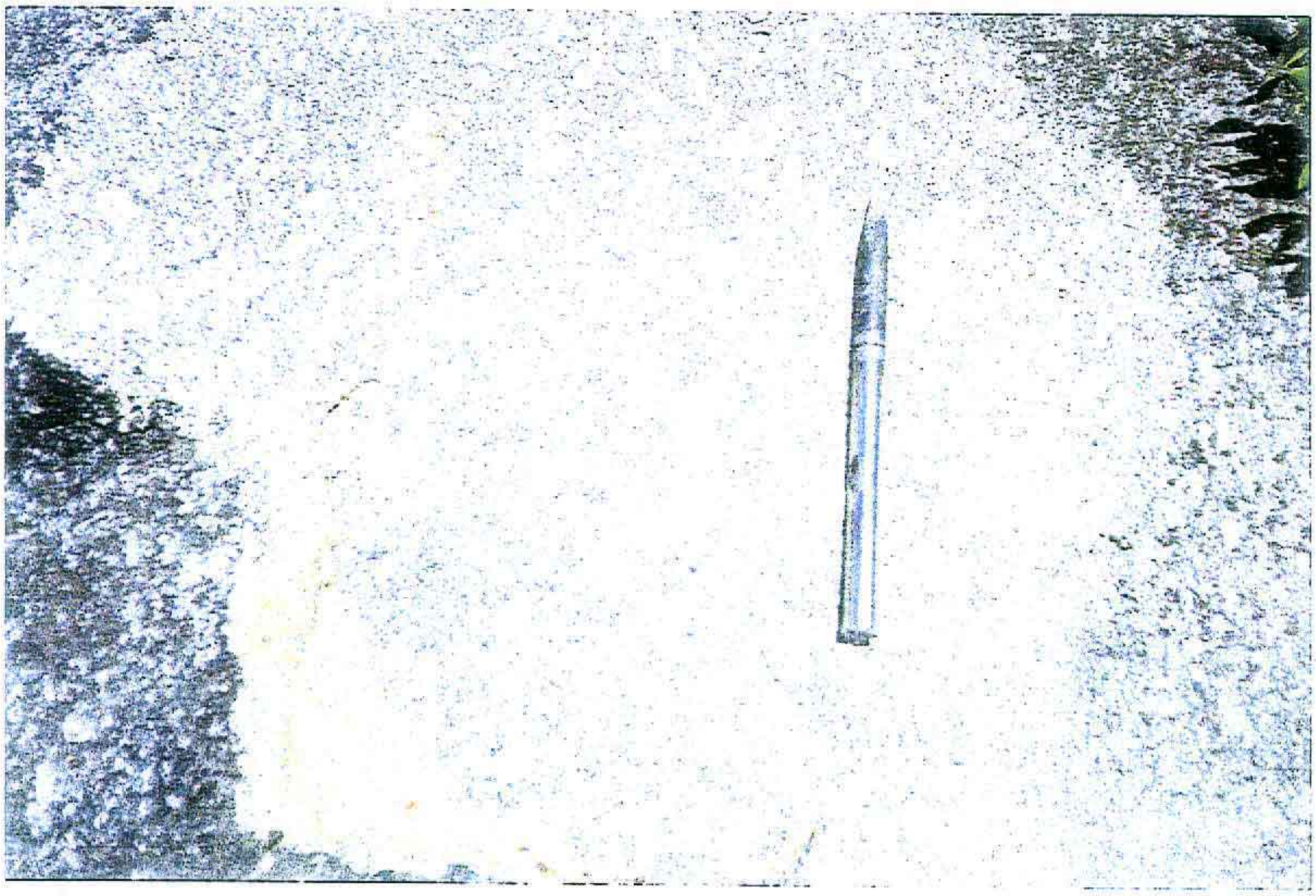


Figura 05 - Textura porfiróide característica dos granitóideds

Figura 06 - Grupo Barreiras - textura fina

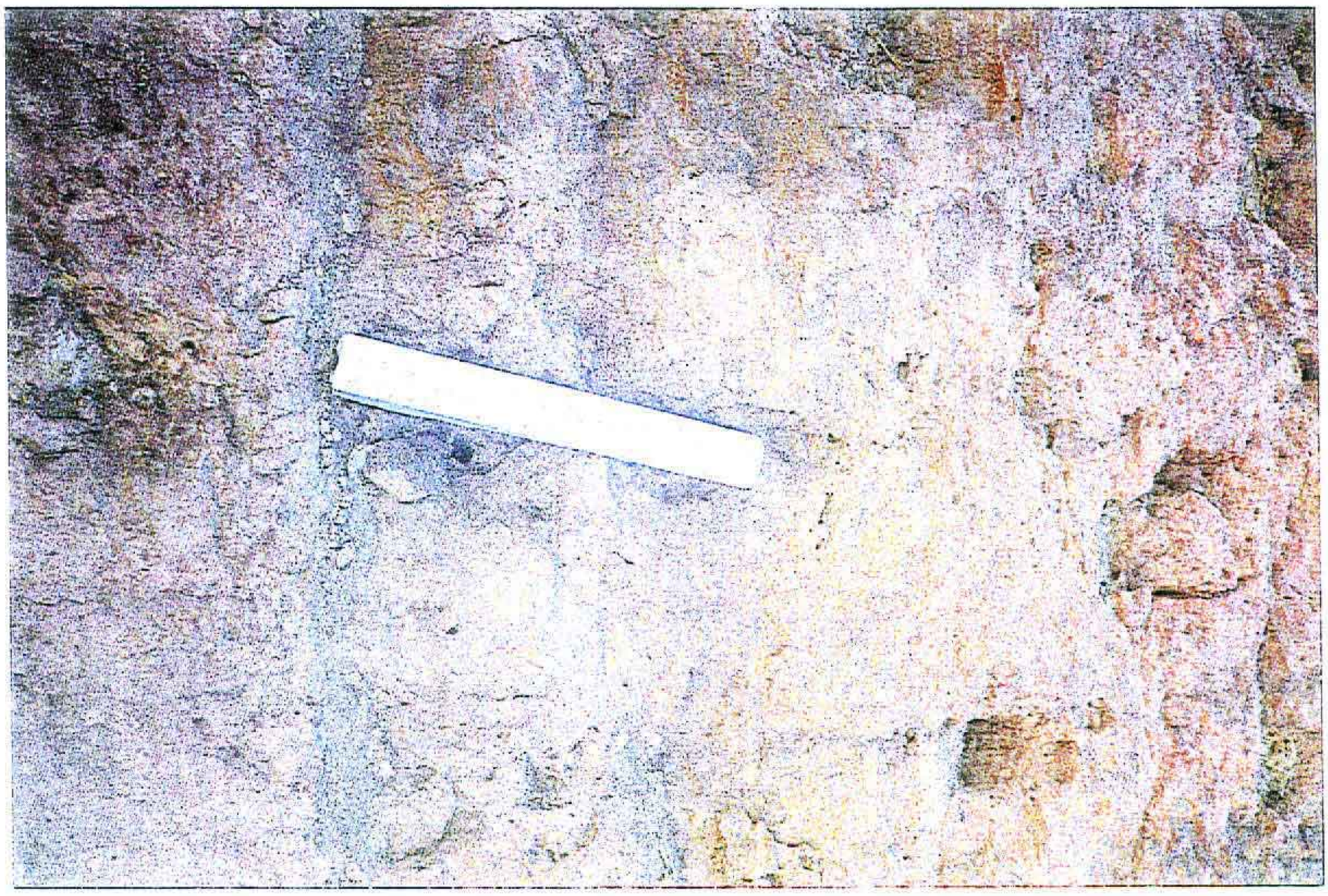


Figura 07 - Grupo Barreiras - textura média

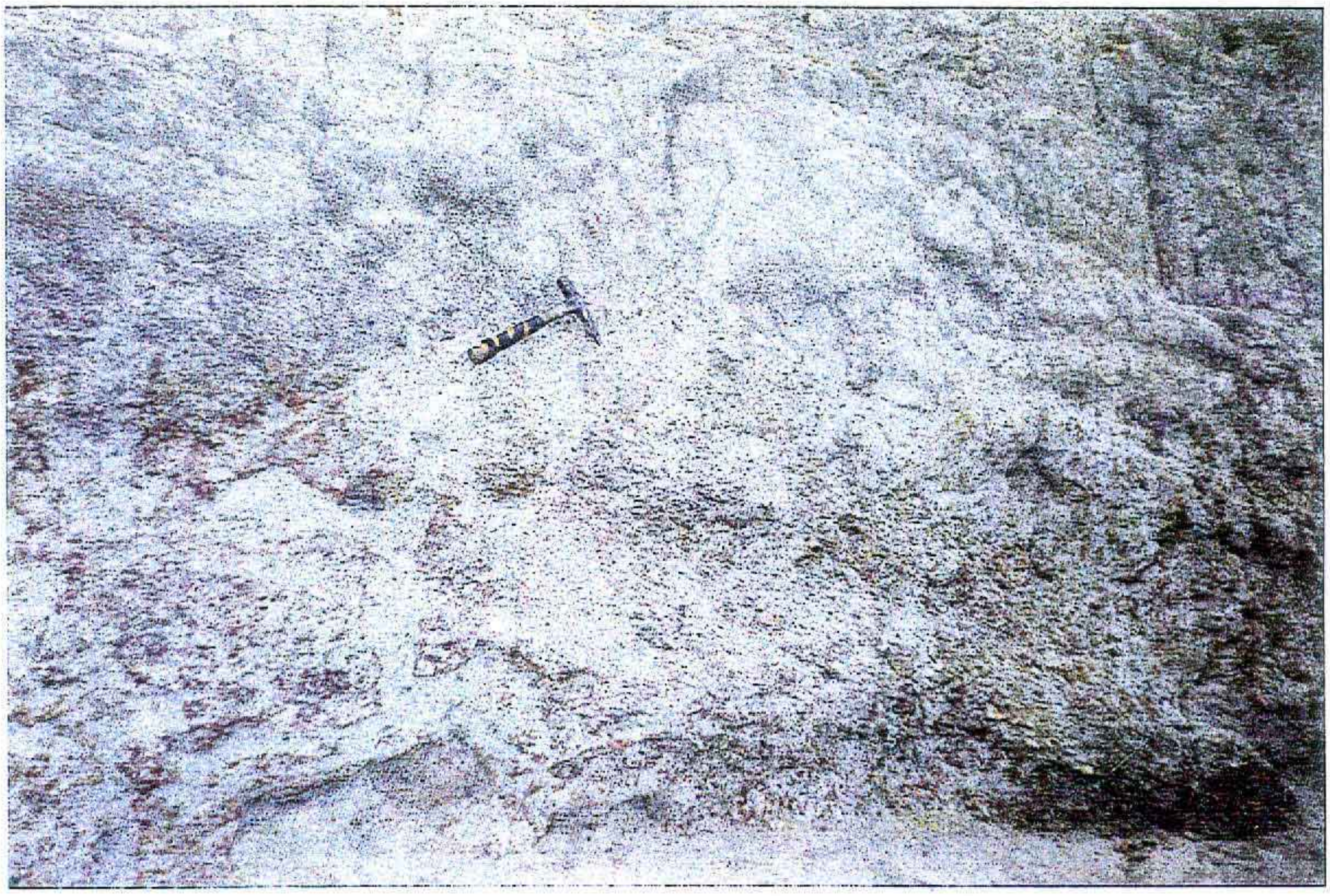


Figura 08 - Conglomerados do Grupo Barreiras

Figura 09 - Contato nítido entre rocha cristalina e sedimentos do Grupo Barreiras

Figura 02 - Estrutura tipo Schlieren no migmatito

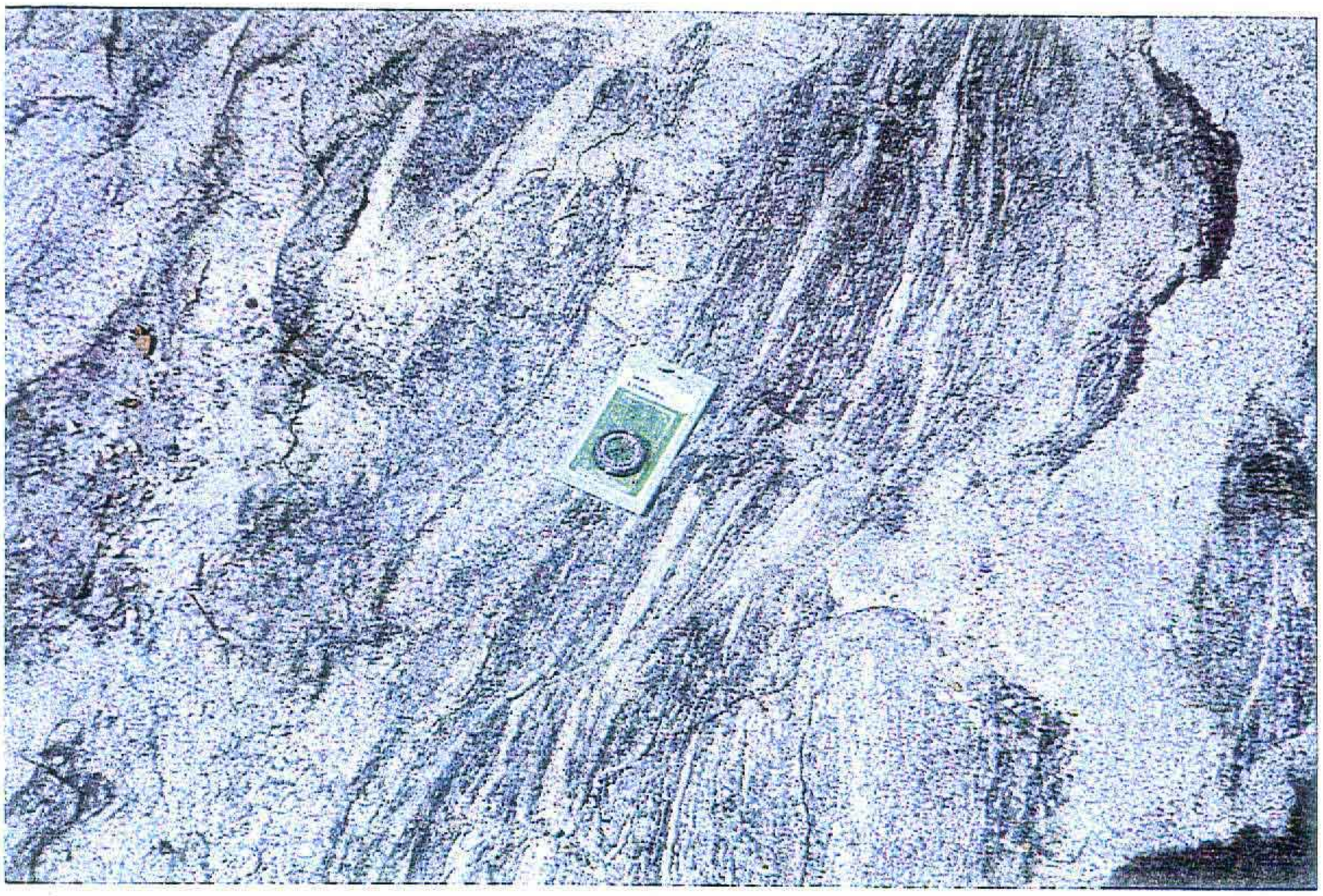


Figura 03 - Estrutura tipo Flebítica no migmatito

ANEXO 3

LEVANTAMENTO GEOFÍSICO DE ELETRORESISTIVIDADE

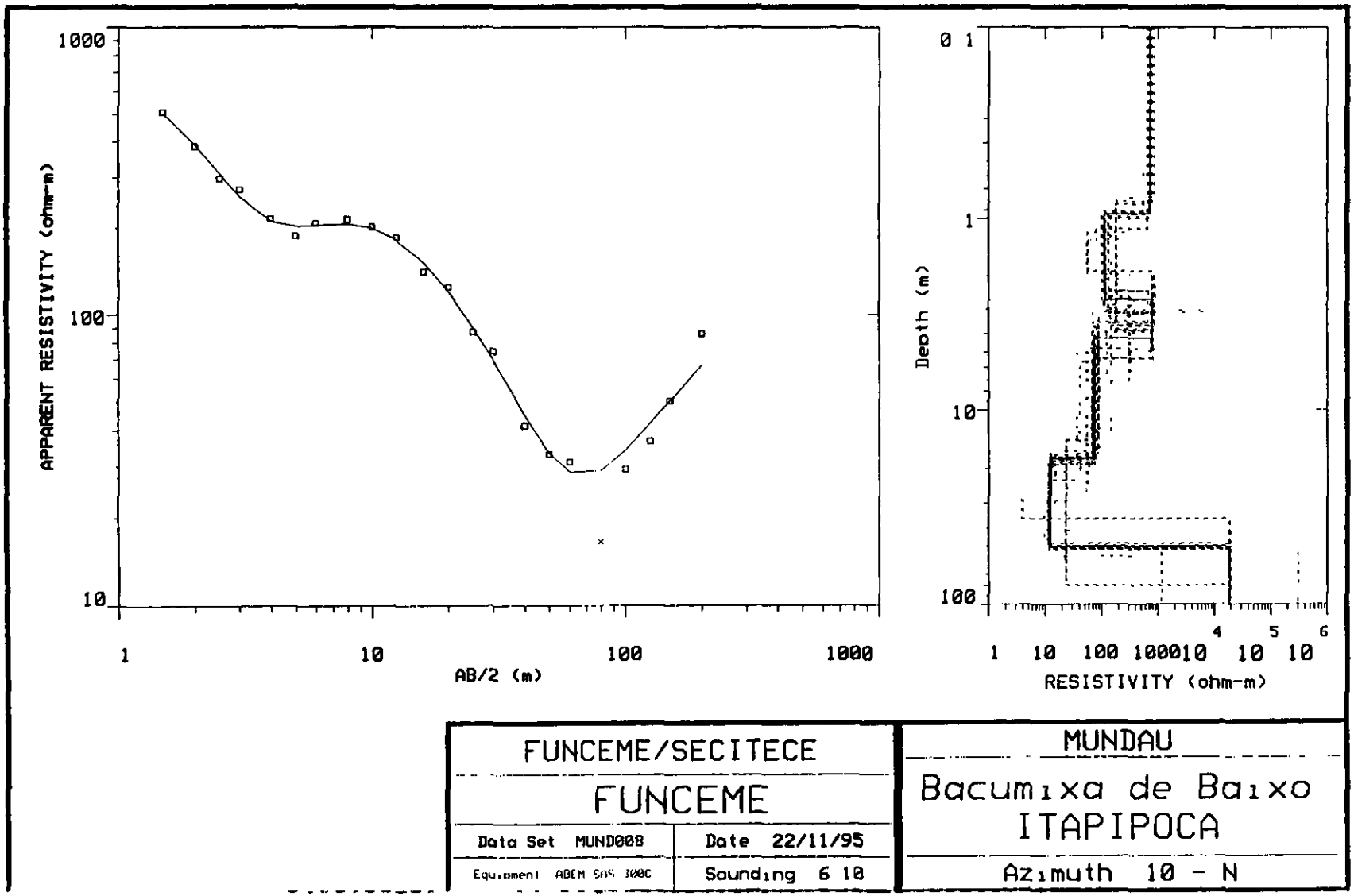

1000
100
10
APPARENT RESISTIVITY (ohm-m)
1
10
100
1000
AB/2 (m)
0 1
1
10
100
Depth (m)
1 10 100 100010 10 10
4 5 6
RESISTIVITY (ohm-m)
FUNCEME/SECITECE
FUNCEME
Data Set MUND008
Date 22/11/95
Equipment ABEM SAS 300C
Sounding 6 10
MUNDAU
Bacumixa de Baixo
ITAPIPOCA
Azimuth 10 - N

FIG. A-01

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	710.8	0.948	-0.948	0.00133	674.2
2	112.5	1.72	-2.67	0.0153	193.7
3	782.7	1.57	-4.24	0.00201	1230.8
4	72.71	13.50	-17.74	0.185	981.7
5	11.72	32.26	-50.01	2.75	378.4
6	18655.7				

ALL PARAMETERS ARE FREE

PARAMETER BOUNDS FROM EQUIVALENCE ANALYSIS

	LAYER	MINIMUM	BEST	MAXIMUM
RHO	1	550.234	710.846	841.360
	2	54.992	112.506	181.840
	3	297.334	782.742	6598.333
	4	36.433	72.718	146.625
	5	3.807	11.728	23.457
	6	1165.983	18655.727	298491.625
THICK	1	0.775	0.949	1.291
	2	0.754	1.722	3.041
	3	0.167	1.572	4.502
	4	8.597	13.500	24.167
	5	9.861	32.268	68.024
DEPTH	1	0.775	0.949	1.291
	2	1.881	2.671	3.883
	3	3.035	4.243	7.059
	4	12.466	17.744	28.962
	5	35.996	50.012	80.490

* FUNCEME *

FIG. A-02

EQUIVALENT MODELS:

FITTING ERROR: 10.178 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	841.3	0.774	-0.774	9.206E-04	651.6
2	180.2	2.85	-3.63	0.0158	514.8
3	726.4	1.55	-5.18	0.00214	1129.3
4	76.01	12.85	-18.04	0.169	977.4
5	12.19	33.73	-51.77	2.76	411.4
6	18687.8				

ALL PARAMETERS ARE FREE

FITTING ERROR: 10.216 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	550.2	1.29	-1.29	0.00235	710.1
2	54.99	0.798	-2.08	0.0145	43.90
3	876.6	1.60	-3.68	0.00183	1402.7
4	67.97	14.53	-18.22	0.213	988.2
5	11.04	30.16	-48.39	2.73	333.2
6	18606.9				

ALL PARAMETERS ARE FREE

*- FUNCEME *-

FIG. A-03

FITTING ERROR: 10.490 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	747.6	0.835	-0.835	0.00112	624.8
2	180.2	3.01	-3.85	0.0167	544.1
3	751.1	1.58	-5.43	0.00210	1187.4
4	67.74	13.51	-18.94	0.199	915.6
5	11.38	31.15	-50.10	2.73	354.5
6	18626.3				

ALL PARAMETERS ARE FREE

FITTING ERROR: 10.194 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	661.0	1.13	-1.13	0.00172	752.2
2	57.12	0.769	-1.90	0.0134	43.94
3	830.4	1.56	-3.46	0.00188	1295.9
4	80.50	13.47	-16.94	0.167	1085.1
5	12.24	33.93	-50.88	2.77	415.5
6	18698.0				

ALL PARAMETERS ARE FREE

FIG. A-04

FITTING ERROR: 10.265 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	692.3	0.996	-0.996	0.00144	689.8
2	98.23	1.85	-2.85	0.0189	182.4
3	6598.3	0.181	-3.03	2.748E-05	1196.4
4	70.19	14.46	-17.49	0.206	1015.2
5	11.69	32.10	-49.60	2.74	375.5
6	18758.2				

ALL PARAMETERS ARE FREE

FITTING ERROR: 9.694 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	718.7	0.929	-0.929	0.00129	667.9
2	119.0	1.66	-2.59	0.0140	198.7
3	320.9	3.88	-6.47	0.0120	1245.4
4	73.80	13.11	-19.59	0.177	968.0
5	11.74	32.33	-51.93	2.75	379.6
6	18613.0				

ALL PARAMETERS ARE FREE

FIG. A-05

FITTING ERROR: 10.476 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	726.2	0.978	-0.978	0.00135	710.4
2	81.71	0.986	-1.96	0.0120	80.61
3	745.7	1.19	-3.15	0.00160	888.8
4	146.6	9.95	-13.10	0.0678	1459.1
5	14.97	43.40	-56.51	2.89	649.9
6	18251.5				

ALL PARAMETERS ARE FREE

FITTING ERROR: 10.476 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	698.4	0.924	-0.924	0.00132	645.9
2	146.2	2.72	-3.64	0.0186	398.2
3	814.5	1.97	-5.62	0.00242	1608.0
4	40.87	17.34	-22.96	0.424	708.9
5	9.59	25.29	-48.25	2.63	242.7
6	18994.3				

ALL PARAMETERS ARE FREE

FITTING ERROR: 10.389 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	719.9	0.951	-0.951	0.00132	684.9
2	102.7	1.47	-2.42	0.0143	151.4
3	780.9	1.52	-3.95	0.00196	1193.2
4	85.64	10.36	-14.31	0.120	887.5
5	22.86	64.89	-79.20	2.83	1483.5
6	18590.3				

ALL PARAMETERS ARE FREE

FITTING ERROR: 10.194 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	696.6	0.944	-0.944	0.00136	657.7
2	129.8	2.20	-3.14	0.0169	286.0
3	785.6	1.64	-4.79	0.00209	1292.5
4	56.14	20.50	-25.29	0.365	1151.2
5	4.08	10.70	-35.99	2.61	43.71
6	18759.4				

ALL PARAMETERS ARE FREE

FIG. A-07

FITTING ERROR: 8.816 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	711.1	0.948	-0.948	0.00133	674.6
2	112.1	1.71	-2.66	0.0152	192.2
3	785.4	1.57	-4.23	0.00201	1237.6
4	71.99	13.60	-17.84	0.188	979.5
5	11.69	32.38	-50.22	2.76	378.8
6	298491.6				

ALL PARAMETERS ARE FREE

FITTING ERROR: 9.038 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	710.5	0.948	-0.948	0.00133	673.9
2	112.8	1.73	-2.67	0.0153	195.3
3	780.0	1.56	-4.24	0.00201	1224.0
4	73.45	13.39	-17.64	0.182	983.9
5	11.75	32.15	-49.79	2.73	377.9
6	1165.9				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. A-08

FITTING ERROR: 10.247 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	630.9	1.18	-1.18	0.00188	747.3
2	56.14	0.778	-1.96	0.0138	43.73
3	849.4	1.57	-3.53	0.00185	1337.5
4	75.48	13.87	-17.41	0.183	1047.1
5	11.79	32.49	-49.90	2.75	383.1
6	18664.9				

ALL PARAMETERS ARE FREE

FITTING ERROR: 10.461 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	771.8	0.813	-0.813	0.00105	628.0
2	181.8	2.98	-3.79	0.0163	541.9
3	739.7	1.57	-5.36	0.00212	1162.0
4	70.86	13.24	-18.61	0.186	938.8
5	11.68	32.11	-50.72	2.74	375.2
6	18649.3				

ALL PARAMETERS ARE FREE

FIG. A-9

FITTING ERROR: 10.421 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	743.2	0.842	-0.842	0.00113	626.0
2	178.4	3.04	-3.88	0.0170	542.7
3	797.6	1.51	-5.39	0.00190	1206.7
4	65.70	13.70	-19.10	0.208	900.5
5	11.24	30.69	-49.80	2.73	345.1
6	18619.6				

ALL PARAMETERS ARE FREE

FITTING ERROR: 10.246 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	666.2	1.12	-1.12	0.00169	751.2
2	57.51	0.753	-1.88	0.0131	43.35
3	761.6	1.66	-3.54	0.00218	1266.6
4	84.27	13.20	-16.74	0.156	1112.8
5	12.47	34.69	-51.44	2.78	432.6
6	18708.2				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. A-10

FITTING ERROR: 10.376 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	709.5	0.948	-0.948	0.00134	673.3
2	113.3	1.60	-2.55	0.0141	182.2
3	297.3	4.50	-7.05	0.0151	1338.7
4	66.42	13.67	-20.72	0.205	908.1
5	11.56	31.61	-52.34	2.73	365.6
6	18683.8				

ALL PARAMETERS ARE FREE

FITTING ERROR: 10.251 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	713.5	0.947	-0.947	0.00133	676.3
2	110.6	1.99	-2.94	0.0180	220.8
3	6148.0	0.167	-3.11	2.723E-05	1029.1
4	88.16	13.14	-16.25	0.149	1158.7
5	12.08	33.69	-49.94	2.78	407.0
6	18595.9				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG.A-11

FITTING ERROR: 10.305 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	673.8	0.997	-0.997	0.00148	672.4
2	113.7	2.08	-3.07	0.0182	236.8
3	969.8	1.71	-4.79	0.00177	1664.3
4	36.43	24.16	-28.96	0.663	880.4
5	4.79	12.32	-41.28	2.57	59.09
6	19388.1				

ALL PARAMETERS ARE FREE

FITTING ERROR: 10.314 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	740.9	0.912	-0.912	0.00123	675.7
2	111.5	1.48	-2.39	0.0133	165.8
3	662.9	1.46	-3.86	0.00222	974.1
4	124.2	8.59	-12.46	0.0692	1068.1
5	23.45	68.02	-80.48	2.89	1595.6
6	18107.2				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. A-12.

FITTING ERROR: 10.389 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	720.7	0.952	-0.952	0.00132	686.2
2	101.6	1.44	-2.39	0.0142	146.8
3	779.3	1.51	-3.90	0.00194	1177.5
4	87.96	10.28	-14.18	0.116	904.2
5	22.89	65.29	-79.48	2.85	1495.0
6	18749.3				

ALL PARAMETERS ARE FREE

FITTING ERROR: 10.250 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	694.5	0.942	-0.942	0.00136	654.7
2	133.5	2.31	-3.25	0.0173	309.0
3	788.5	1.68	-4.93	0.00213	1325.9
4	52.79	21.34	-26.28	0.404	1127.1
5	3.80	9.86	-36.14	2.59	37.53
6	18499.3				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. A-13

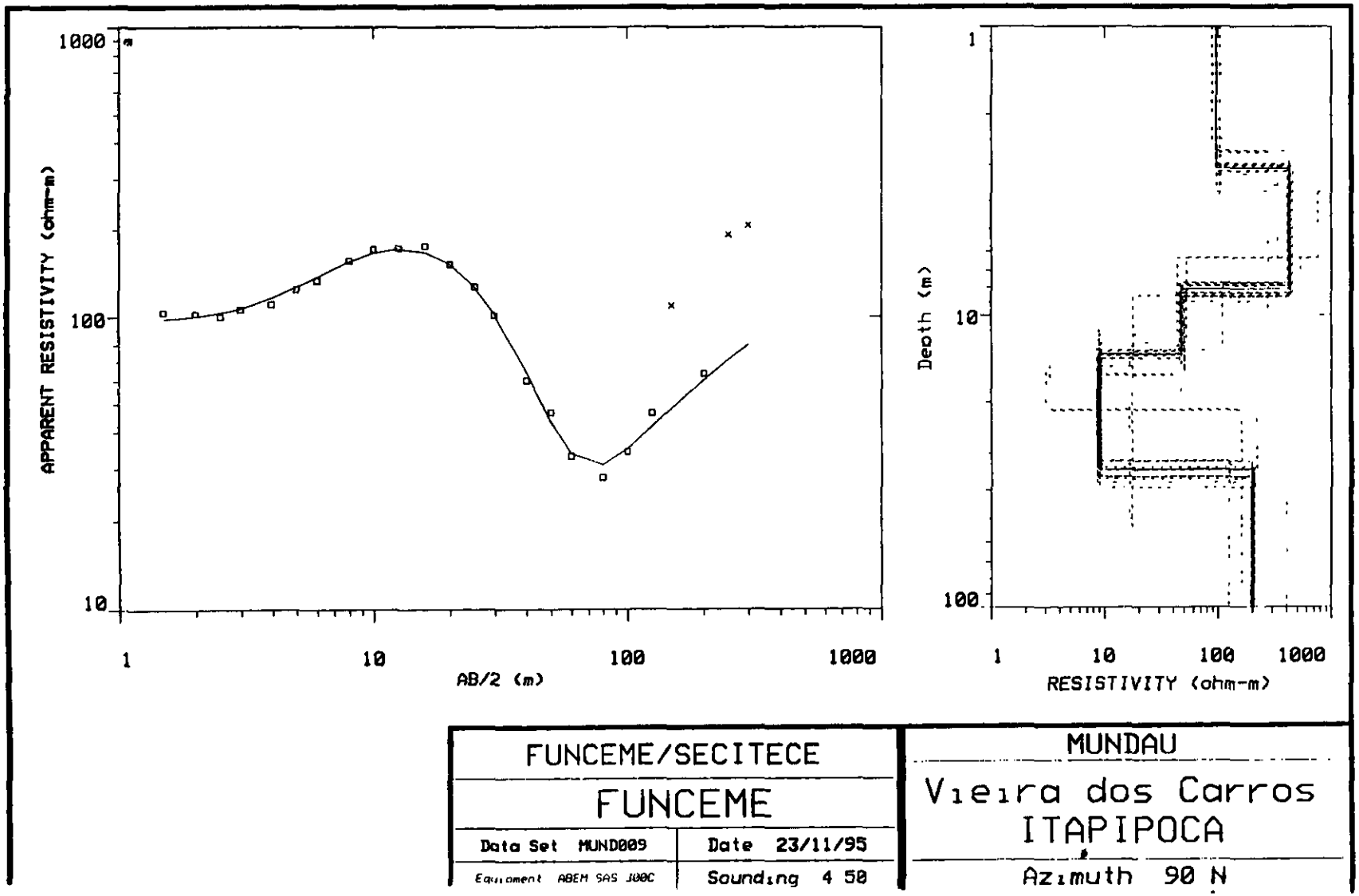

1000
100
10
APPARENT RESISTIVITY (ohm-m)
1
10
100
1000
AB/2 (m)
1
10
100
Depth (m)
1
10
100
1
10
100
1000
RESISTIVITY (ohm-m)
FUNCEME/SECITECE
FUNCEME
Data Set MUND009
Date 23/11/95
Equipment ABEM SAS 300C
Sounding 4 50
MUNDAU
Vieira dos Carros
ITAPIPOCA
Azimuth 90 N

FIG B-01

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	96.79	3.08	-3.08	0.0319	298.9
2	423.6	5.02	-8.11	0.0118	2130.8
3	47.63	5.55	-13.67	0.116	264.6
4	8.92	20.48	-34.15	2.29	182.7
5	203.0				

ALL PARAMETERS ARE FREE

PARAMETER BOUNDS FROM EQUIVALENCE ANALYSIS

	LAYER	MINIMUM	BEST	MAXIMUM
RHO	1	88.423	96.798	105.672
	2	274.968	423.689	810.245
	3	17.824	47.630	109.238
	4	3.028	8.924	17.453
	5	124.125	203.054	400.854
THICK	1	2.453	3.088	3.828
	2	2.617	5.029	8.138
	3	1.996	5.557	11.693
	4	6.864	20.482	42.374
DEPTH	1	2.453	3.088	3.828
	2	6.327	8.118	10.838
	3	10.687	13.675	19.419
	4	21.304	34.157	55.565

* FUNCEME *

FIG. B-02

EQUIVALENT MODELS:

FITTING ERROR: 5.351 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	377.0	1.17	-1.17	0.00312	443.7
2	2242.8	0.531	-1.70	2.369E-04	1191.7
3	109.8	14.68	-16.39	0.133	1613.1
4	27.12	9.87	-26.27	0.364	268.0
5	18127.0				

ALL PARAMETERS ARE FREE

FITTING ERROR: 5.281 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	167.1	0.426	-0.426	0.00255	71.28
2	2302.0	0.589	-1.01	2.561E-04	1357.1
3	123.6	13.15	-14.17	0.106	1626.7
4	26.22	10.20	-24.37	0.389	267.5
5	18303.8				

ALL PARAMETERS ARE FREE

FITTING ERROR: 5.342 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	281.1	0.920	-0.920	0.00327	258.7
2	12343.0	0.0974	-1.01	7.895E-06	1202.8
3	115.9	14.07	-15.09	0.121	1632.9
4	26.69	10.01	-25.11	0.375	267.3
5	18225.8				

ALL PARAMETERS ARE FREE

FITTING ERROR: 5.087 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	284.8	0.781	-0.781	0.00274	222.5
2	969.2	1.31	-2.09	0.00135	1270.0
3	113.7	14.15	-16.24	0.124	1610.4
4	26.86	9.98	-26.22	0.371	268.1
5	18170.1				

ALL PARAMETERS ARE FREE

*- FUNCEME *-

FIG.C-04

FITTING ERROR: 5.326 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	217.0	0.570	-0.570	0.00263	123.8
2	2466.3	0.494	-1.06	2.004E-04	1219.0
3	134.5	11.33	-12.40	0.0842	1525.5
4	26.83	11.05	-23.46	0.411	296.7
5	16722.3				

ALL PARAMETERS ARE FREE

FITTING ERROR: 5.352 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	354.9	1.12	-1.12	0.00317	398.8
2	2106.0	0.603	-1.72	2.866E-04	1271.3
3	100.0	16.99	-18.72	0.169	1699.6
4	26.78	9.17	-27.89	0.342	245.7
5	19516.8				

ALL PARAMETERS ARE FREE

*- FUNCEME *-

FIG. C-05

FITTING ERROR: 5.318 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	285.2	0.831	-0.831	0.00291	237.1
2	2258.6	0.551	-1.38	2.443E-04	1246.3
3	114.5	12.36	-13.74	0.107	1415.5
4	61.57	23.51	-37.25	0.381	1447.8
5	18076.4				

ALL PARAMETERS ARE FREE

FITTING ERROR: 5.303 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	280.7	0.814	-0.814	0.00290	228.5
2	2271.6	0.549	-1.36	2.420E-04	1248.8
3	114.4	17.88	-19.24	0.156	2047.4
4	6.19	2.21	-21.45	0.357	13.68
5	18388.3				

ALL PARAMETERS ARE FREE

*- FUNCEME *

FIG. C-06

EQUIVALENT MODELS:

FITTING ERROR: 5.811 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	105.6	3.54	-3.54	0.0335	374.1
2	430.1	4.85	-8.39	0.0113	2089.8
3	47.19	5.41	-13.81	0.114	255.6
4	8.76	20.30	-34.12	2.31	178.0
5	206.4				

ALL PARAMETERS ARE FREE

FITTING ERROR: 5.833 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	88.42	2.68	-2.68	0.0303	237.1
2	417.1	5.21	-7.89	0.0124	2173.9
3	48.08	5.70	-13.59	0.118	274.3
4	9.08	20.66	-34.26	2.27	187.8
5	199.5				

ALL PARAMETERS ARE FREE

FITTING ERROR: 5.832 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	97.34	3.71	-3.71	0.0382	362.0
2	810.2	2.61	-6.33	0.00323	2120.6
3	43.79	5.33	-11.66	0.121	233.4
4	8.97	20.41	-32.08	2.27	183.1
5	198.8				

ALL PARAMETERS ARE FREE

FITTING ERROR: 5.764 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	96.43	2.73	-2.73	0.0283	263.3
2	276.0	7.74	-10.47	0.0280	2137.6
3	50.34	5.71	-16.18	0.113	287.5
4	8.89	20.52	-36.70	2.30	182.5
5	205.8				

ALL PARAMETERS ARE FREE

* FUNCEME

FIG. B-04

FITTING ERROR: 5.686 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	96.60	3.01	-3.01	0.0312	291.5
2	403.6	4.73	-7.75	0.0117	1911.2
3	109.2	5.50	-13.25	0.0503	601.0
4	8.71	20.82	-34.08	2.39	181.4
5	202.4				

ALL PARAMETERS ARE FREE

FITTING ERROR: 5.782 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	97.02	3.17	-3.17	0.0327	307.9
2	448.7	5.40	-8.57	0.0120	2423.8
3	17.82	5.62	-14.19	0.315	100.2
4	9.18	20.08	-34.28	2.18	184.3
5	203.7				

ALL PARAMETERS ARE FREE

FITTING ERROR: 5.714 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	96.25	3.00	-3.00	0.0311	288.8
2	425.6	4.83	-7.83	0.0113	2056.4
3	45.98	5.57	-13.40	0.121	256.3
4	16.42	36.65	-50.06	2.23	602.2
5	194.4				

ALL PARAMETERS ARE FREE

FITTING ERROR: 5.772 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	97.76	3.24	-3.24	0.0332	317.6
2	420.3	5.39	-8.64	0.0128	2269.3
3	50.68	5.52	-14.17	0.109	280.1
4	3.02	7.30	-21.48	2.41	22.12
5	219.1				

ALL PARAMETERS ARE FREE

*- FUNCEME *-

FIG. B-06

FITTING ERROR: 5.816 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	97.34	3.15	-3.15	0.0324	307.1
2	415.8	5.20	-8.36	0.0125	2165.4
3	47.41	5.75	-14.11	0.121	272.8
4	8.52	23.61	-37.73	2.76	201.2
5	400.8				

ALL PARAMETERS ARE FREE

FITTING ERROR: 5.738 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	96.40	3.04	-3.04	0.0315	293.1
2	429.4	4.90	-7.94	0.0114	2106.1
3	47.78	5.41	-13.36	0.113	258.9
4	9.22	18.47	-31.84	2.00	170.4
5	124.1				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. B-07

FITTING ERROR: 5.780 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	103.0	3.82	-3.82	0.0371	394.3
2	531.2	3.92	-7.75	0.00739	2086.5
3	45.36	5.12	-12.88	0.113	232.5
4	8.56	19.99	-32.88	2.33	171.2
5	209.0				

ALL PARAMETERS ARE FREE

FITTING ERROR: 5.685 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	90.55	2.45	-2.45	0.0270	222.1
2	332.4	6.55	-9.00	0.0197	2179.4
3	50.18	6.05	-15.06	0.120	304.0
4	9.32	21.01	-36.08	2.25	195.9
5	196.8				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. B -08

FITTING ERROR: 5.820 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	95.97	2.69	-2.69	0.0281	259.0
2	274.9	8.13	-10.83	0.0296	2237.7
3	44.45	5.16	-16.00	0.116	229.5
4	8.64	20.06	-36.06	2.31	173.5
5	208.3				

ALL PARAMETERS ARE FREE

FITTING ERROR: 5.710 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	97.92	3.70	-3.70	0.0378	362.8
2	760.5	2.62	-6.32	0.00345	1994.2
3	52.29	6.13	-12.46	0.117	320.9
4	9.30	21.06	-33.52	2.26	196.1
5	196.1				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. B-09

FITTING ERROR: 5.727 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	96.31	2.98	-2.98	0.0309	287.2
2	414.5	4.74	-7.72	0.0114	1966.2
3	47.19	11.69	-19.41	0.247	551.9
4	8.94	19.93	-39.34	2.22	178.1
5	207.2				

ALL PARAMETERS ARE FREE

FITTING ERROR: 5.679 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	97.46	3.24	-3.24	0.0332	315.8
2	436.6	5.45	-8.69	0.0124	2380.2
3	48.23	1.99	-10.68	0.0413	96.24
4	8.90	21.26	-31.95	2.38	189.2
5	197.3				

ALL PARAMETERS ARE FREE

*- FUNCEME *-

FIG. B-10

FITTING ERROR: 5.790 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	96.49	3.02	-3.02	0.0313	292.3
2	422.4	4.87	-7.90	0.0115	2060.3
3	48.99	5.28	-13.19	0.107	258.8
4	17.45	42.37	-55.56	2.42	739.5
5	236.9				

ALL PARAMETERS ARE FREE

FITTING ERROR: 5.742 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	97.25	3.17	-3.17	0.0326	309.1
2	425.6	5.26	-8.44	0.0123	2241.3
3	45.65	5.99	-14.44	0.131	273.7
4	3.25	6.86	-21.30	2.10	22.33
5	161.0				

ALL PARAMETERS ARE FREE

*- FUNCEME *-

FIG. B-11

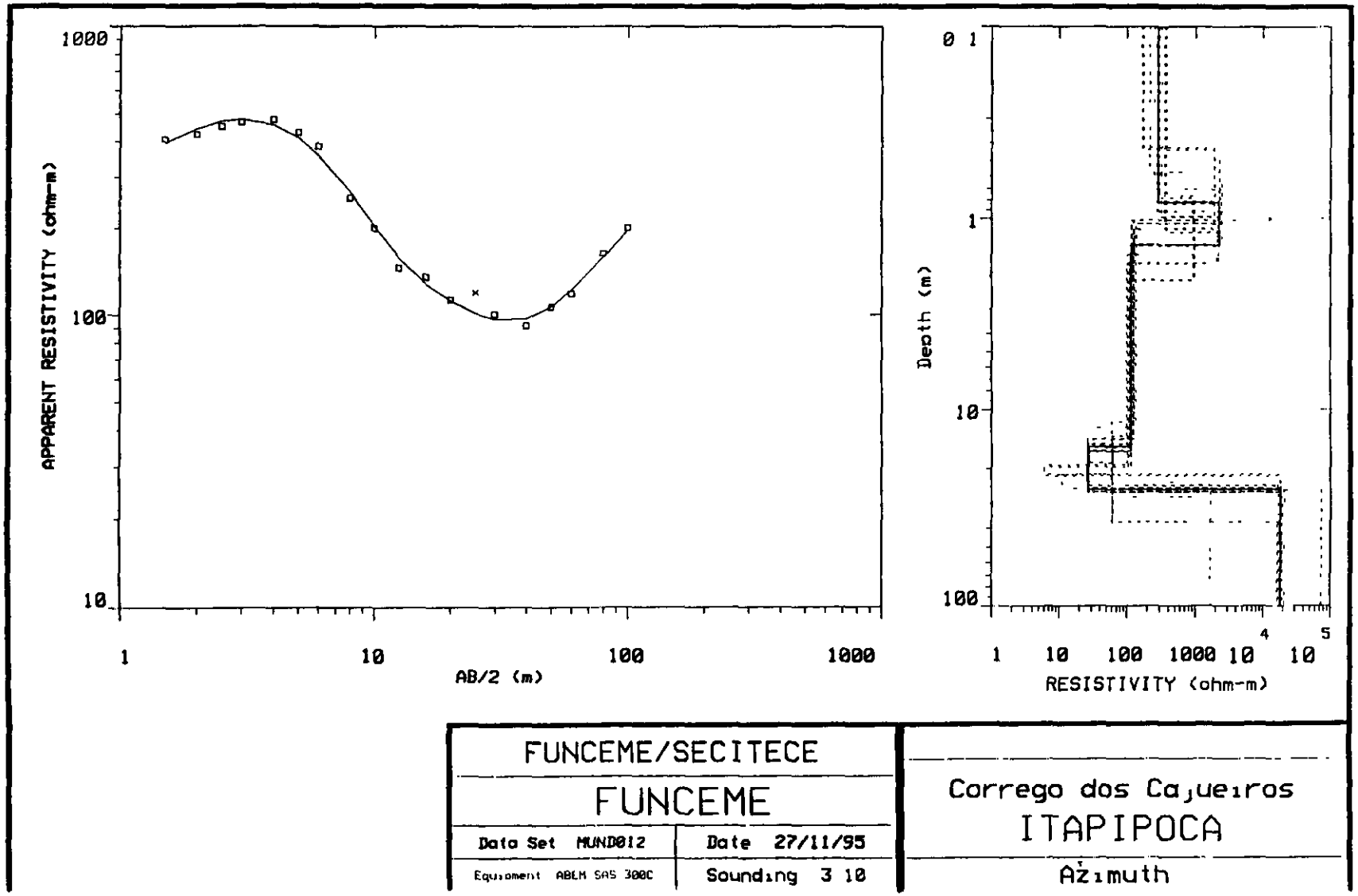

1000
100
10
APPARENT RESISTIVITY (ohm-m)
1
10
100
1000
AB/2 (m)
0 1
1
10
100
Depth (m)
1
10
100
1000
10
4
10
5
RESISTIVITY (ohm-m)
FUNCEME/SECITECE
FUNCEME
Data Set MUND012
Date 27/11/95
Equipment ABEM SAS 300C
Sounding 3 10
Corrego dos Cajueiros
ITAPIPOCA
Azimuth

FIG. C-01

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	283.6	0.825	-0.825	0.00291	234.0
2	2263.3	0.551	-1.37	2.435E-04	1247.2
3	114.5	14.13	-15.50	0.123	1617.9
4	26.80	9.99	-25.49	0.372	267.8
5	18188.7				

ALL PARAMETERS ARE FREE

PARAMETER BOUNDS FROM EQUIVALENCE ANALYSIS

	LAYER	MINIMUM	BEST	MAXIMUM
RHO	1	167.130	283.630	377.064
	2	945.975	2263.353	12956.788
	3	100.019	114.500	134.537
	4	5.986	26.808	61.576
	5	1683.214	18188.709	72754.836
THICK	1	0.427	0.825	1.188
	2	0.091	0.551	1.353
	3	10.322	14.130	19.873
	4	2.112	9.991	24.620
DEPTH	1	0.427	0.825	1.188
	2	1.016	1.376	2.113
	3	11.557	15.506	21.427
	4	21.458	25.497	37.259

FITTING ERROR: 4.405 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	283.2	0.824	-0.824	0.00291	233.6
2	2265.1	0.551	-1.37	2.437E-04	1250.2
3	113.9	14.34	-15.72	0.125	1634.1
4	26.67	10.03	-25.75	0.376	267.6
5	72754.8				

ALL PARAMETERS ARE FREE

FITTING ERROR: 5.260 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	284.2	0.825	-0.825	0.00290	234.6
2	2260.1	0.549	-1.37	2.431E-04	1242.0
3	115.4	13.77	-15.14	0.119	1590.4
4	27.03	9.91	-25.06	0.366	268.2
5	1683.2				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. C-07

FITTING ERROR: 5.333 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	376.1	1.18	-1.18	0.00316	446.9
2	2476.1	0.481	-1.66	1.944E-04	1192.1
3	109.4	14.76	-16.43	0.134	1615.5
4	27.14	9.86	-26.29	0.363	267.7
5	18180.1				

ALL PARAMETERS ARE FREE

FITTING ERROR: 5.211 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	173.2	0.436	-0.436	0.00252	75.66
2	1934.9	0.697	-1.13	3.605E-04	1349.6
3	123.9	13.09	-14.22	0.105	1622.1
4	26.22	10.21	-24.44	0.389	267.9
5	18203.7				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. C-08

FITTING ERROR: 5.216 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	278.6	0.759	-0.759	0.00273	211.6
2	945.9	1.35	-2.11	0.00143	1280.0
3	113.5	14.20	-16.32	0.125	1613.6
4	26.84	9.96	-26.28	0.371	267.3
5	18225.5				

ALL PARAMETERS ARE FREE

FITTING ERROR: 5.362 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	293.8	0.973	-0.973	0.00331	286.0
2	12956.7	0.0913	-1.06	7.054E-06	1184.1
3	116.3	13.97	-15.03	0.120	1626.5
4	26.73	10.05	-25.09	0.376	268.7
5	18115.2				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. C-09

FITTING ERROR: 5.337 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	320.5	0.983	-0.983	0.00307	315.1
2	2236.7	0.571	-1.55	2.554E-04	1277.9
3	102.7	19.87	-21.42	0.193	2041.8
4	11.07	3.75	-25.17	0.338	41.56
5	20585.5				

ALL PARAMETERS ARE FREE

FITTING ERROR: 5.224 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	253.4	0.702	-0.702	0.00277	177.8
2	2288.1	0.533	-1.23	2.329E-04	1219.6
3	126.5	10.32	-11.55	0.0815	1305.8
4	60.49	24.61	-36.17	0.406	1489.3
5	16229.0				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. C-10

FITTING ERROR: 5.260 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	282.1	0.818	-0.818	0.00290	231.0
2	2265.7	0.549	-1.36	2.425E-04	1244.8
3	115.3	12.26	-13.62	0.106	1413.9
4	60.88	23.38	-37.00	0.384	1423.4
5	18279.6				

ALL PARAMETERS ARE FREE

FITTING ERROR: 5.318 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	286.3	0.836	-0.836	0.00292	239.5
2	2259.0	0.554	-1.39	2.452E-04	1251.5
3	112.9	18.31	-19.70	0.162	2069.7
4	5.98	2.11	-21.81	0.352	12.64
5	18023.6				

ALL PARAMETERS ARE FREE

FIG. C - 11

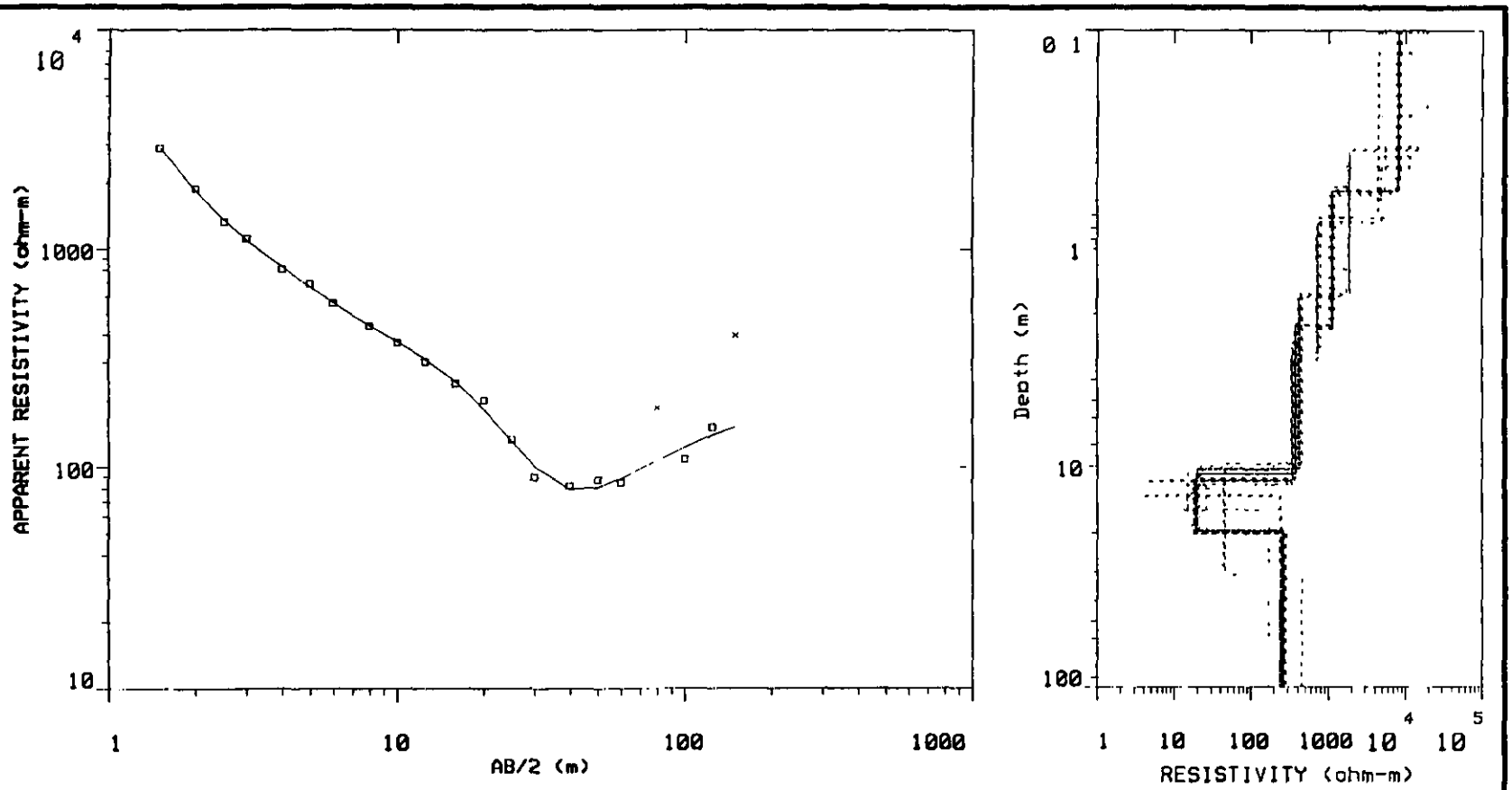


FIG. D - 01

FUNCEME/SECITECE	MUNDAU
FUNCEME	Bastioes ITAPIPOCA
Data Set MUND013	Date 27/11/95
Equipment ABEM SAS 300C	Sounding 4 15
	Azimuth 0 N

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	8152.8	0.539	-0.539	6.619E-05	4399.2
2	1139.3	1.73	-2.27	0.00152	1979.4
3	375.5	8.59	-10.87	0.0229	3229.7
4	19.11	8.83	-19.71	0.462	168.9
5	257.3				

ALL PARAMETERS ARE FREE

PARAMETER BOUNDS FROM EQUIVALENCE ANALYSIS

	LAYER	MINIMUM	BEST	MAXIMUM
RHO	1	4477.836	8152.852	18878.117
	2	725.839	1139.305	1919.321
	3	292.253	375.575	458.579
	4	4.270	19.116	45.994
	5	168.588	257.320	451.820
THICK	1	0.346	0.540	0.760
	2	1.181	1.737	2.733
	3	7.642	8.599	9.808
	4	1.934	8.837	20.630
DEPTH	1	0.346	0.540	0.760
	2	1.588	2.277	3.443
	3	9.768	10.876	12.681
	4	13.596	19.714	31.094

* FUNCEME *

FIG. D-02

FITTING ERROR: 6.780 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	8206.7	0.536	-0.536	6.540E-05	4404.7
2	1150.9	1.71	-2.24	0.00149	1968.6
3	380.6	8.21	-10.46	0.0215	3127.4
4	43.98	20.63	-31.09	0.469	907.3
5	271.5				

ALL PARAMETERS ARE FREE

FITTING ERROR: 6.819 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	8057.2	0.544	-0.544	6.761E-05	4389.4
2	1118.7	1.78	-2.33	0.00160	1999.0
3	366.6	9.33	-11.66	0.0254	3421.4
4	4.29	1.93	-13.59	0.450	8.30
5	233.7				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. D-03

FITTING ERROR: 6.739 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	8781.5	0.520	-0.520	5.928E-05	4571.7
2	1161.4	1.89	-2.41	0.00163	2199.0
3	337.9	9.80	-12.22	0.0290	3314.9
4	7.18	3.61	-15.83	0.502	25.96
5	281.0				

ALL PARAMETERS ARE FREE

FITTING ERROR: 6.906 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	7627.0	0.557	-0.557	7.306E-05	4250.0
2	1119.8	1.60	-2.16	0.00144	1801.1
3	412.8	7.64	-9.80	0.0185	3155.0
4	45.99	19.71	-29.52	0.428	906.8
5	237.7				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. D-04

FITTING ERROR: 6.766 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	5464.8	0.717	-0.717	1.313E-04	3922.6
2	725.8	2.63	-3.35	0.00364	1915.1
3	311.3	8.80	-12.16	0.0282	2743.1
4	16.91	8.10	-20.27	0.479	137.1
5	272.6				

ALL PARAMETERS ARE FREE

FITTING ERROR: 6.800 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	11797.0	0.414	-0.414	3.514E-05	4890.8
2	1727.7	1.18	-1.59	6.836E-04	2040.7
3	446.5	8.40	-10.00	0.0188	3755.4
4	21.39	9.57	-19.57	0.447	204.8
5	243.9				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. D-05

FITTING ERROR: 6.718 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	4547.3	0.759	-0.759	1.670E-04	3454.0
2	750.5	2.24	-3.00	0.00299	1685.1
3	339.2	8.52	-11.52	0.0251	2891.2
4	18.39	8.60	-20.13	0.467	158.3
5	263.0				

ALL PARAMETERS ARE FREE

FITTING ERROR: 6.808 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	16911.2	0.351	-0.351	2.081E-05	5952.0
2	1919.3	1.26	-1.61	6.571E-04	2420.6
3	426.4	8.69	-10.31	0.0203	3708.9
4	20.05	9.13	-19.44	0.455	183.2
5	250.2				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. D-06

FITTING ERROR: 6.887 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	7601.2	0.568	-0.568	7.478E-05	4320.4
2	1041.7	1.96	-2.53	0.00188	2043.6
3	343.7	9.05	-11.58	0.0263	3114.5
4	26.44	16.48	-28.07	0.623	436.0
5	451.8				

ALL PARAMETERS ARE FREE

FITTING ERROR: 6.834 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	8593.3	0.518	-0.518	6.039E-05	4459.4
2	1218.5	1.58	-2.10	0.00130	1932.5
3	401.3	8.26	-10.37	0.0206	3319.0
4	14.98	5.53	-15.90	0.369	82.86
5	168.5				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. D-07

FITTING ERROR: 6.782 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	8232.2	0.535	-0.535	6.504E-05	4408.0
2	1155.8	1.69	-2.23	0.00147	1964.5
3	382.5	8.18	-10.41	0.0213	3130.4
4	43.85	20.23	-30.65	0.461	887.5
5	264.5				

ALL PARAMETERS ARE FREE

FITTING ERROR: 6.822 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	8011.4	0.547	-0.547	6.830E-05	4383.4
2	1110.0	1.80	-2.35	0.00163	2006.7
3	363.3	9.40	-11.75	0.0258	3417.0
4	4.27	1.98	-13.73	0.463	8.45
5	244.7				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. D-08

FITTING ERROR: 6.717 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	11113.5	0.434	-0.434	3.906E-05	4823.7
2	1609.3	1.21	-1.64	7.527E-04	1949.4
3	458.5	8.12	-9.76	0.0177	3724.7
4	23.24	10.18	-19.95	0.438	236.8
5	237.3				

ALL PARAMETERS ARE FREE

FITTING ERROR: 6.820 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	5524.5	0.709	-0.709	1.284E-04	3918.6
2	738.2	2.73	-3.44	0.00370	2017.7
3	292.2	9.23	-12.68	0.0316	2699.9
4	14.94	7.39	-20.07	0.494	110.5
5	284.8				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. D-09

FITTING ERROR: 6.795 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	14514.9	0.373	-0.373	2.572E-05	5418.1
2	1890.4	1.21	-1.58	6.427E-04	2297.0
3	433.0	8.63	-10.22	0.0199	3740.0
4	20.36	9.23	-19.46	0.453	188.2
5	248.7				

ALL PARAMETERS ARE FREE

FITTING ERROR: 6.740 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	4900.9	0.746	-0.746	1.524E-04	3660.6
2	728.7	2.38	-3.12	0.00327	1735.9
3	331.2	8.56	-11.69	0.0258	2837.5
4	18.07	8.49	-20.19	0.470	153.5
5	265.0				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. D-10

EQUIVALENT MODELS:

FITTING ERROR: 6.705 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	18878.1	0.345	-0.345	1.832E-05	6527.4
2	1874.6	1.32	-1.66	7.047E-04	2476.5
3	419.3	8.72	-10.39	0.0208	3658.2
4	19.83	9.06	-19.45	0.456	179.7
5	251.5				

ALL PARAMETERS ARE FREE

FITTING ERROR: 6.739 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	4477.8	0.741	-0.741	1.656E-04	3319.5
2	798.5	2.11	-2.85	0.00265	1686.9
3	347.1	8.51	-11.36	0.0245	2954.9
4	18.61	8.68	-20.04	0.466	161.6
5	261.5				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. D-11

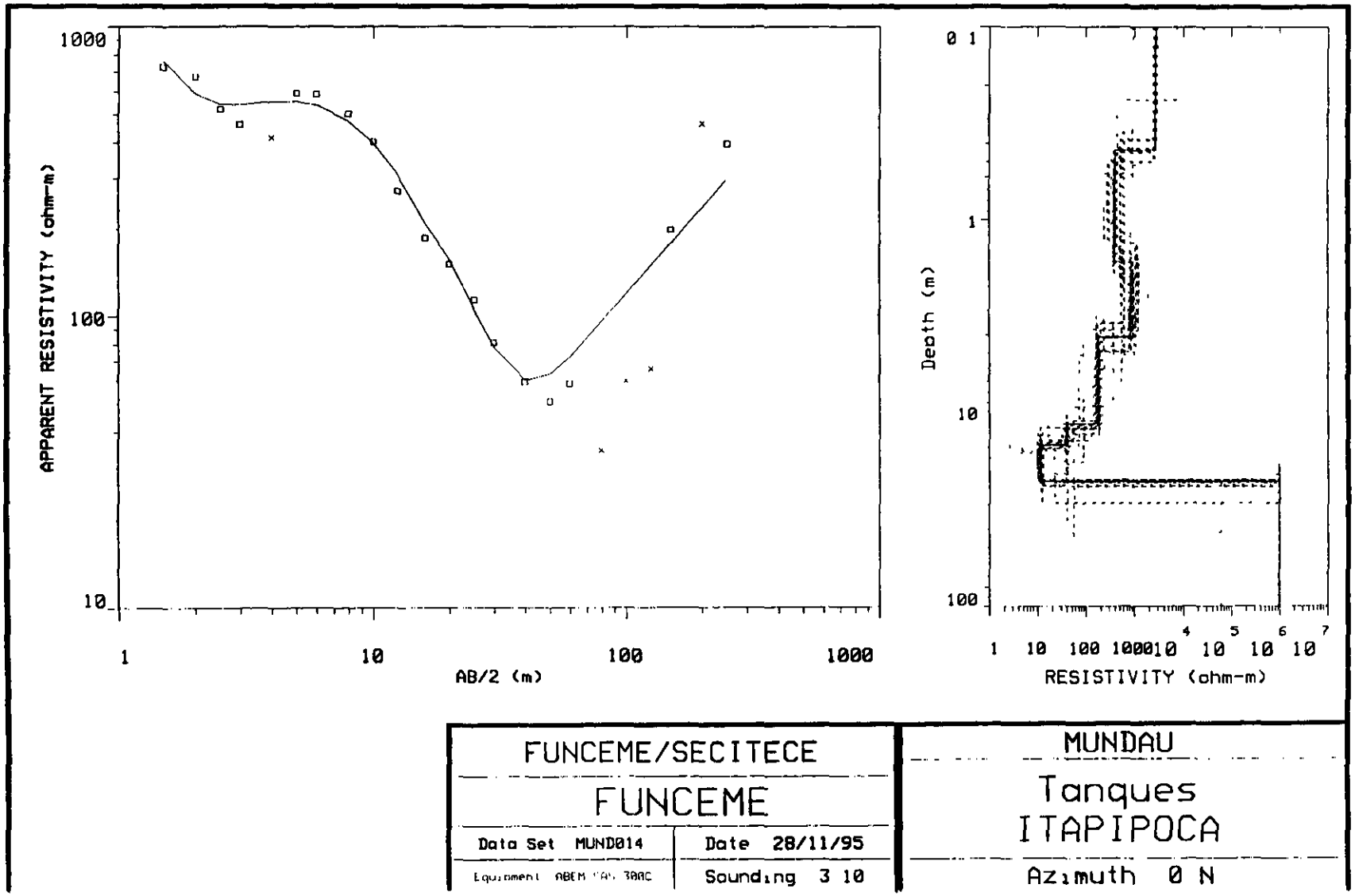

1000
100
10
APPARENT RESISTIVITY (ohm-m)
1
10
100
1000
AB/2 (m)
0 1
1
10
100
Depth (m)
1 10 100 1000 10 10 10 10
RESISTIVITY (ohm-m)
FUNCEME/SECITECE
FUNCEME
Data Set MUND014
Date 28/11/95
Equipment ABEM
Sounding 3 10
MUNDAU
Tanques
ITAPIPOCA
Azimuth 0 N

FIG. E-01

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2705.6	0.434	-0.434	1.608E-04	1176.8
2	391.3	1.24	-1.68	0.00319	487.9
3	944.6	2.41	-4.09	0.00256	2281.4
4	177.5	7.48	-11.58	0.0421	1328.5
5	39.83	3.27	-14.85	0.0821	130.3
6	11.41	8.01	-22.87	0.702	91.50
7	969827.3				

ALL PARAMETERS ARE FREE

PARAMETER BOUNDS FROM EQUIVALENCE ANALYSIS

	LAYER	MINIMUM	BEST	MAXIMUM
RHO	1	910.634	2705.685	26779.730
	2	232.230	391.313	628.098
	3	555.771	944.611	1907.710
	4	71.113	177.533	537.470
	5	11.341	39.831	182.211
	6	2.660	11.411	55.990
	7	60614.207	969827.312	6912046.500
THICK	1	0.238	0.435	0.838
	2	0.548	1.247	2.583
	3	1.130	2.415	4.604
	4	2.628	7.484	14.530
	5	0.351	3.272	13.087
	6	2.253	8.019	32.080
DEPTH	1	0.238	0.435	0.838
	2	1.045	1.682	2.969
	3	3.122	4.097	6.042
	4	7.396	11.581	18.283
	5	12.126	14.852	23.905
	6	16.379	22.871	48.064

* FUNCEME *

FIG. E-02

EQUIVALENT MODELS:

FITTING ERROR: 16.130 PERCENT

#	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	26779.7	0.237	-0.237	8.886E-06	6372.5
2	443.4	1.32	-1.56	0.00299	588.8
3	885.8	2.55	-4.12	0.00289	2265.0
4	192.5	7.64	-11.76	0.0396	1471.8
5	37.60	3.26	-15.02	0.0867	122.5
6	11.01	7.73	-22.76	0.702	85.24
7	969969.6				

ALL PARAMETERS ARE FREE

FITTING ERROR: 15.536 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	913.5	0.578	-0.578	6.335E-04	528.7
2	368.7	1.21	-1.78	0.00328	446.3
3	973.7	2.35	-4.14	0.00241	2289.2
4	170.8	7.40	-11.54	0.0433	1265.6
5	40.93	3.27	-14.82	0.0800	134.1
6	11.60	8.15	-22.98	0.702	94.62
7	969759.8				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. E - 03

FITTING ERROR: 15.953 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2974.0	0.350	-0.350	1.177E-04	1040.9
2	587.1	2.05	-2.40	0.00350	1205.8
3	797.7	2.54	-4.94	0.00319	2028.3
4	176.4	7.34	-12.28	0.0416	1295.5
5	31.14	3.21	-15.50	0.103	100.1
6	10.03	6.88	-22.38	0.685	69.07
7	970377.2				

ALL PARAMETERS ARE FREE

FITTING ERROR: 16.338 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2395.8	0.575	-0.575	2.400E-04	1377.9
2	232.2	0.656	-1.23	0.00283	152.4
3	1173.9	2.26	-3.49	0.00193	2653.9
4	178.9	7.66	-11.16	0.0428	1372.3
5	54.64	3.34	-14.50	0.0612	182.9
6	13.46	9.75	-24.26	0.724	131.3
7	969120.5				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. E-04

FITTING ERROR: 15.957 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2579.5	0.479	-0.479	1.857E-04	1235.9
2	331.3	1.51	-1.99	0.00456	501.0
3	1907.7	1.13	-3.12	5.925E-04	2156.1
4	163.3	8.82	-11.95	0.0540	1442.6
5	44.62	3.33	-15.29	0.0748	149.0
6	12.11	8.50	-23.79	0.702	103.0
7	969768.2				

ALL PARAMETERS ARE FREE

FITTING ERROR: 16.402 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2804.8	0.404	-0.404	1.442E-04	1134.1
2	443.6	1.07	-1.48	0.00243	478.2
3	555.7	4.28	-5.76	0.00771	2380.8
4	189.0	6.60	-12.37	0.0349	1248.5
5	36.55	3.22	-15.59	0.0881	117.7
6	10.90	7.66	-23.26	0.703	83.66
7	969871.8				

ALL PARAMETERS ARE FREE

FIG. E - 05

FITTING ERROR: 16.417 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2789.3	0.427	-0.427	1.531E-04	1191.3
2	390.1	1.08	-1.51	0.00279	425.0
3	905.9	1.96	-3.47	0.00216	1775.8
4	363.1	6.00	-9.48	0.0165	2180.2
5	39.29	3.23	-12.71	0.0823	127.0
6	11.17	8.29	-21.00	0.741	92.68
7	969395.6				

ALL PARAMETERS ARE FREE

FITTING ERROR: 16.085 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2602.3	0.445	-0.445	1.711E-04	1158.5
2	392.8	1.48	-1.92	0.00377	582.1
3	996.4	3.15	-5.08	0.00316	3142.5
4	71.11	9.91	-14.99	0.139	705.3
5	40.53	3.32	-18.32	0.0819	134.5
6	11.71	7.68	-26.00	0.655	90.01
7	970379.2				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. E-06

FITTING ERROR: 16.291 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2543.2	0.517	-0.517	2.035E-04	1316.3
2	275.8	0.765	-1.28	0.00277	211.0
3	1113.4	2.15	-3.44	0.00194	2403.8
4	170.7	7.60	-11.04	0.0445	1298.5
5	182.2	3.04	-14.09	0.0167	554.6
6	4.76	4.07	-18.16	0.854	19.41
7	972681.1				

ALL PARAMETERS ARE FREE

FITTING ERROR: 16.240 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2838.4	0.380	-0.380	1.339E-04	1079.1
2	512.8	1.81	-2.19	0.00355	932.9
3	831.7	2.63	-4.83	0.00317	2191.0
4	182.9	7.39	-12.22	0.0403	1352.3
5	12.28	3.45	-15.68	0.281	42.50
6	22.41	13.54	-29.22	0.604	303.6
7	967625.4				

ALL PARAMETERS ARE FREE

FIG. E-07

FITTING ERROR: 16.313 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2562.1	0.498	-0.498	1.945E-04	1276.9
2	300.7	0.885	-1.38	0.00294	266.3
3	1069.5	2.31	-3.70	0.00217	2478.6
4	163.0	8.42	-12.12	0.0517	1373.5
5	11.34	3.85	-15.98	0.339	43.73
6	55.99	32.07	-48.06	0.572	1796.1
7	965673.8				

ALL PARAMETERS ARE FREE

FITTING ERROR: 16.010 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2844.1	0.383	-0.383	1.350E-04	1092.0
2	497.9	1.70	-2.08	0.00343	849.3
3	843.0	2.50	-4.59	0.00298	2114.7
4	191.9	6.71	-11.31	0.0349	1288.7
5	125.8	2.81	-14.12	0.0223	354.1
6	2.65	2.25	-16.37	0.847	5.99
7	973645.7				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. E-08

FITTING ERROR: 17.268 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2705.9	0.434	-0.434	1.607E-04	1176.6
2	391.5	1.24	-1.68	0.00319	488.6
3	944.5	2.41	-4.09	0.00256	2281.7
4	177.3	7.47	-11.57	0.0421	1326.5
5	39.91	3.27	-14.85	0.0820	130.6
6	11.38	8.05	-22.90	0.707	91.76
7	6.912E+06				

ALL PARAMETERS ARE FREE

FITTING ERROR: 14.624 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2705.2	0.435	-0.435	1.608E-04	1177.1
2	391.0	1.24	-1.68	0.00319	486.9
3	944.6	2.41	-4.09	0.00256	2281.0
4	177.7	7.49	-11.58	0.0421	1331.5
5	39.71	3.26	-14.85	0.0823	129.8
6	11.44	7.96	-22.81	0.695	91.14
7	60614.2				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. E-09

FITTING ERROR: 16.186 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	910.6	0.837	-0.837	9.199E-04	762.8
2	232.8	0.780	-1.61	0.00335	181.6
3	1194.7	2.17	-3.79	0.00182	2597.9
4	162.6	7.42	-11.21	0.0456	1207.1
5	53.35	3.33	-14.55	0.0625	178.1
6	13.37	9.61	-24.16	0.718	128.6
7	969137.6				

ALL PARAMETERS ARE FREE

FITTING ERROR: 16.229 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	7300.2	0.239	-0.239	3.278E-05	1747.0
2	628.0	1.91	-2.15	0.00304	1200.8
3	762.5	2.65	-4.80	0.00349	2026.7
4	192.3	7.53	-12.34	0.0392	1449.8
5	30.51	3.21	-15.55	0.105	97.99
6	9.87	6.79	-22.35	0.688	67.09
7	970456.3				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. E-10

FITTING ERROR: 16.442 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2783.8	0.386	-0.386	1.389E-04	1076.3
2	527.8	2.58	-2.96	0.00489	1363.3
3	1062.4	1.92	-4.89	0.00182	2049.9
4	150.7	7.51	-12.41	0.0498	1132.3
5	32.41	3.23	-15.64	0.0997	104.8
6	10.32	7.01	-22.66	0.680	72.45
7	970372.9				

ALL PARAMETERS ARE FREE

FITTING ERROR: 16.301 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2620.0	0.496	-0.496	1.896E-04	1301.5
2	279.1	0.548	-1.04	0.00196	152.9
3	827.1	3.11	-4.15	0.00376	2574.3
4	213.5	7.45	-11.60	0.0349	1591.2
5	50.25	3.31	-14.92	0.0659	166.5
6	12.77	9.31	-24.24	0.729	119.0
7	969211.7				

ALL PARAMETERS ARE FREE

FIG. E-11

FITTING ERROR: 16.191 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2770.8	0.424	-0.424	1.532E-04	1176.2
2	402.5	1.01	-1.43	0.00252	408.2
3	616.7	4.60	-6.04	0.00746	2839.0
4	140.6	7.07	-13.12	0.0503	995.7
5	38.13	3.25	-16.37	0.0853	124.0
6	11.28	7.77	-24.15	0.689	87.76
7	969923.7				

ALL PARAMETERS ARE FREE

FITTING ERROR: 16.335 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2632.2	0.447	-0.447	1.699E-04	1177.4
2	378.6	1.58	-2.03	0.00418	599.7
3	1546.5	1.14	-3.17	7.408E-04	1771.7
4	232.3	7.98	-11.15	0.0343	1854.4
5	41.88	3.29	-14.45	0.0786	137.9
6	11.55	8.30	-22.75	0.718	96.03
7	969715.8				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. E-12

FITTING ERROR: 16.213 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2774.1	0.432	-0.432	1.560E-04	1200.2
2	379.7	1.25	-1.69	0.00332	478.3
3	1231.4	2.06	-3.75	0.00167	2538.0
4	87.96	14.53	-18.28	0.165	1278.1
5	40.55	2.58	-20.87	0.0638	105.0
6	12.50	8.63	-29.50	0.690	107.9
7	968731.5				

ALL PARAMETERS ARE FREE

FITTING ERROR: 15.990 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2601.1	0.438	-0.438	1.686E-04	1140.8
2	410.1	1.22	-1.66	0.00299	503.5
3	621.6	3.10	-4.76	0.00499	1928.4
4	537.4	2.62	-7.39	0.00489	1412.2
5	38.71	4.73	-12.12	0.122	183.1
6	9.87	7.13	-19.26	0.722	70.46
7	971558.4				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. E -13

FITTING ERROR: 16.123 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2700.6	0.437	-0.437	1.620E-04	1181.5
2	386.5	1.23	-1.66	0.00318	475.7
3	958.2	2.39	-4.06	0.00250	2297.7
4	174.6	6.75	-10.81	0.0386	1179.3
5	38.45	13.08	-23.90	0.340	503.1
6	12.06	7.24	-31.14	0.600	87.36
7	970172.5				

ALL PARAMETERS ARE FREE

FITTING ERROR: 16.109 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2713.7	0.430	-0.430	1.588E-04	1169.1
2	399.1	1.27	-1.70	0.00319	508.3
3	923.0	2.44	-4.14	0.00265	2255.4
4	182.2	8.83	-12.98	0.0484	1609.6
5	42.15	0.350	-13.33	0.00832	14.78
6	10.43	9.45	-22.78	0.906	98.59
7	969271.5				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. E-14

FITTING ERROR: 16.263 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2571.8	0.501	-0.501	1.952E-04	1290.9
2	293.3	0.820	-1.32	0.00280	240.6
3	1057.8	2.17	-3.49	0.00206	2301.1
4	201.6	8.17	-11.67	0.0405	1649.4
5	16.20	2.47	-14.15	0.153	40.17
6	40.97	27.46	-41.61	0.670	1125.4
7	979035.0				

ALL PARAMETERS ARE FREE

FITTING ERROR: 16.037 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2835.9	0.380	-0.380	1.343E-04	1080.0
2	511.1	1.83	-2.21	0.00360	939.8
3	850.4	2.66	-4.88	0.00313	2263.3
4	157.7	6.89	-11.77	0.0437	1087.1
5	91.70	4.23	-16.00	0.0461	387.9
6	3.48	2.56	-18.56	0.734	8.93
7	961366.8				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. E-15

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	679.4	0.664	-0.664	9.777E-04	451.3
2	169.3	1.21	-1.87	0.00717	205.6
3	469.2	0.902	-2.78	0.00192	423.3
4	193.1	18.00	-20.79	0.0932	3478.5
5	20.09	45.14	-65.93	2.24	907.3
6	22691.2				

ALL PARAMETERS ARE FREE

PARAMETER BOUNDS FROM EQUIVALENCE ANALYSIS

	LAYER	MINIMUM	BEST	MAXIMUM
RHO	1	447.015	679.468	930.379
	2	110.986	169.316	231.117
	3	272.196	469.259	997.591
	4	170.127	193.157	219.096
	5	11.752	20.100	30.887
	6	8193.788	22691.201	77654.984
THICK	1	0.488	0.664	1.002
	2	0.689	1.215	1.864
	3	0.278	0.902	1.864
	4	16.018	18.009	20.385
	5	25.989	45.141	70.292
DEPTH	1	0.488	0.664	1.002
	2	1.416	1.879	2.564
	3	2.073	2.781	3.806
	4	18.520	20.790	23.539
	5	49.257	65.931	89.293

* FUNCEME *

FIG. F-02

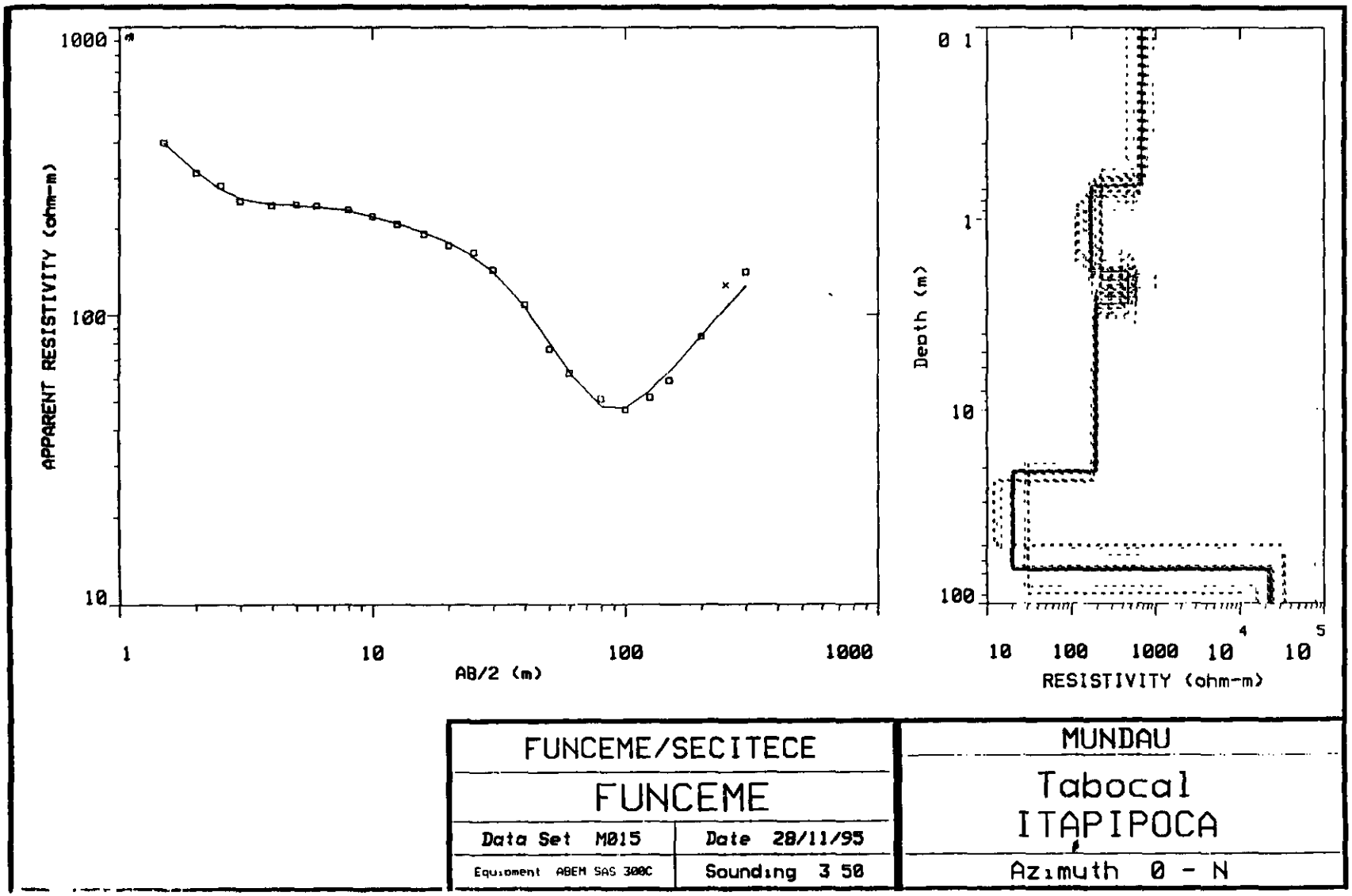

1000
100
10
APPARENT RESISTIVITY (ohm-m)
1
10
100
1000
AB/2 (m)
0 1
1
10
100
Depth (m)
10
100
1000
10
4
10
5
RESISTIVITY (ohm-m)
FUNCEME/SECITECE
FUNCEME
Data Set M015
Date 28/11/95
Equipment ABEM SAS 300C
Sounding 3 50
MUNDAU
Tabocal
ITAPIPOCA
Azimuth 0 - N

FIG. F-01

FITTING ERROR: 4.469 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	733.8	0.576	-0.576	7.861E-04	423.3
2	220.8	1.76	-2.34	0.00799	389.8
3	426.1	0.900	-3.24	0.00211	383.9
4	192.8	17.81	-21.05	0.0923	3435.3
5	20.16	45.28	-66.34	2.24	913.2
6	22359.1				

ALL PARAMETERS ARE FREE

FITTING ERROR: 4.485 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	610.0	0.809	-0.809	0.00133	493.7
2	116.6	0.719	-1.52	0.00617	83.93
3	537.0	0.904	-2.43	0.00168	485.5
4	193.6	18.28	-20.71	0.0944	3540.1
5	20.00	44.93	-65.65	2.24	899.0
6	23164.8				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. F-03

EQUIVALENT MODELS:

FITTING ERROR: 4.458 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	930.3	0.487	-0.487	5.245E-04	453.9
2	231.1	1.60	-2.09	0.00696	371.8
3	397.3	0.863	-2.96	0.00217	343.1
4	197.2	17.81	-20.77	0.0903	3513.1
5	20.76	46.67	-67.45	2.24	969.1
6	21432.3				

ALL PARAMETERS ARE FREE

FITTING ERROR: 4.478 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	447.0	1.00	-1.00	0.00224	447.9
2	111.8	0.835	-1.83	0.00747	93.41
3	585.7	0.956	-2.79	0.00163	560.1
4	187.8	18.27	-21.06	0.0972	3433.0
5	19.25	43.17	-64.23	2.24	831.0
6	24483.9				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. F-04

FITTING ERROR: 4.432 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	628.0	0.750	-0.750	0.00119	471.0
2	140.8	1.20	-1.95	0.00859	170.3
3	997.5	0.398	-2.35	3.996E-04	397.6
4	189.6	18.69	-21.05	0.0985	3545.8
5	19.06	42.78	-63.84	2.24	815.9
6	25047.3				

ALL PARAMETERS ARE FREE

FITTING ERROR: 4.498 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	719.2	0.608	-0.608	8.461E-04	437.6
2	193.4	1.21	-1.82	0.00630	235.6
3	272.1	1.62	-3.45	0.00598	442.9
4	195.7	17.53	-20.98	0.0895	3430.8
5	20.87	46.91	-67.90	2.24	979.6
6	21128.7				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. F - 05

FITTING ERROR: 4.487 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	752.5	0.613	-0.613	8.153E-04	461.8
2	163.7	0.802	-1.41	0.00490	131.4
3	388.2	0.656	-2.07	0.00169	255.1
4	219.0	16.44	-18.52	0.0750	3603.5
5	27.65	62.64	-81.16	2.26	1732.4
6	15487.7				

ALL PARAMETERS ARE FREE

FITTING ERROR: 4.443 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	612.9	0.719	-0.719	0.00117	441.0
2	175.1	1.84	-2.56	0.0105	322.9
3	567.9	1.24	-3.80	0.00219	705.3
4	170.1	19.73	-23.53	0.115	3357.1
5	14.57	32.44	-55.98	2.22	472.8
6	33341.2				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. F-06

FITTING ERROR: 4.504 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	693.4	0.650	-0.650	9.387E-04	451.3
2	170.7	1.13	-1.79	0.00667	194.5
3	437.5	0.857	-2.64	0.00196	375.1
4	201.1	16.35	-19.00	0.0813	3289.8
5	30.84	70.08	-89.08	2.27	2161.5
6	16243.9				

ALL PARAMETERS ARE FREE

FITTING ERROR: 4.506 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	662.3	0.681	-0.681	0.00103	451.3
2	167.5	1.31	-1.99	0.00786	220.4
3	512.2	0.961	-2.95	0.00188	492.5
4	183.5	20.32	-23.28	0.110	3730.5
5	11.75	26.00	-49.28	2.21	305.6
6	34499.6				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. F-07

FITTING ERROR: 4.402 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	643.9	0.708	-0.708	0.00110	456.5
2	160.0	1.38	-2.09	0.00864	221.5
3	571.0	1.04	-3.13	0.00183	597.4
4	179.6	20.18	-23.32	0.112	3626.0
5	12.18	27.01	-50.34	2.21	329.1
6	77654.9				

ALL PARAMETERS ARE FREE

FITTING ERROR: 4.453 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	710.3	0.629	-0.629	8.862E-04	447.1
2	177.3	1.09	-1.71	0.00615	193.3
3	398.8	0.798	-2.51	0.00200	318.3
4	205.1	16.38	-18.90	0.0798	3361.0
5	30.41	69.05	-87.95	2.26	2100.4
6	8193.7				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. F - 08

FITTING ERROR: 4.403 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	540.6	0.896	-0.896	0.00166	484.8
2	110.9	0.742	-1.63	0.00669	82.40
3	567.5	0.929	-2.56	0.00164	527.2
4	190.8	18.31	-20.88	0.0959	3495.1
5	19.62	44.04	-64.92	2.24	864.2
6	23883.3				

ALL PARAMETERS ARE FREE

FITTING ERROR: 4.385 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	788.1	0.546	-0.546	6.936E-04	430.8
2	222.7	1.67	-2.21	0.00751	372.5
3	414.7	0.885	-3.10	0.00213	367.1
4	194.6	17.81	-20.91	0.0915	3467.8
5	20.41	45.86	-66.78	2.24	936.4
6	21948.7				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. F-09

FITTING ERROR: 4.376 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	711.1	0.596	-0.596	8.387E-04	424.1
2	216.3	1.86	-2.46	0.00862	403.1
3	468.5	0.860	-3.32	0.00184	403.2
4	190.5	17.91	-21.23	0.0940	3412.8
5	19.77	44.36	-65.59	2.24	877.1
6	23207.4				

ALL PARAMETERS ARE FREE

FITTING ERROR: 4.385 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	639.6	0.766	-0.766	0.00120	490.1
2	122.3	0.688	-1.45	0.00563	84.26
3	470.1	0.960	-2.41	0.00204	451.5
4	196.6	18.14	-20.55	0.0922	3567.7
5	20.54	46.18	-66.74	2.24	948.8
6	22024.5				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. F-10

FITTING ERROR: 4.424 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	671.5	0.671	-0.671	9.997E-04	450.8
2	169.0	1.12	-1.79	0.00665	189.9
3	295.8	1.86	-3.65	0.00630	551.2
4	189.8	17.87	-21.53	0.0941	3394.6
5	19.66	44.12	-65.66	2.24	867.9
6	23666.7				

ALL PARAMETERS ARE FREE

FITTING ERROR: 4.425 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	692.4	0.653	-0.653	9.431E-04	452.1
2	169.7	1.37	-2.03	0.00812	233.9
3	992.2	0.277	-2.30	2.802E-04	275.8
4	198.6	18.22	-20.53	0.0917	3619.1
5	20.81	46.83	-67.36	2.24	975.0
6	21192.8				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. F-11

FITTING ERROR: 4.427 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	658.7	0.708	-0.708	0.00108	466.7
2	149.3	1.10	-1.81	0.00738	164.7
3	588.0	0.834	-2.64	0.00142	490.9
4	183.2	20.38	-23.03	0.111	3735.6
5	12.95	28.80	-51.83	2.22	373.0
6	32133.2				

ALL PARAMETERS ARE FREE

FITTING ERROR: 4.381 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	699.6	0.625	-0.625	8.933E-04	437.3
2	190.6	1.33	-1.95	0.00698	253.6
3	379.0	0.970	-2.92	0.00256	368.0
4	203.0	16.01	-18.94	0.0789	3251.7
5	30.45	69.04	-87.98	2.26	2102.6
6	16329.5				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. F-12

FITTING ERROR: 4.505 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	693.5	0.650	-0.650	9.385E-04	451.4
2	170.6	1.13	-1.78	0.00667	194.1
3	437.8	0.856	-2.64	0.00196	374.9
4	201.1	16.35	-19.00	0.0813	3290.5
5	30.88	70.29	-89.29	2.27	2171.1
6	16233.8				

ALL PARAMETERS ARE FREE

FITTING ERROR: 4.509 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	662.2	0.681	-0.681	0.00103	451.2
2	167.6	1.31	-1.99	0.00786	220.9
3	511.6	0.962	-2.96	0.00188	492.5
4	183.5	20.30	-23.26	0.110	3728.0
5	11.76	25.98	-49.25	2.20	305.7
6	34448.1				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. F-13

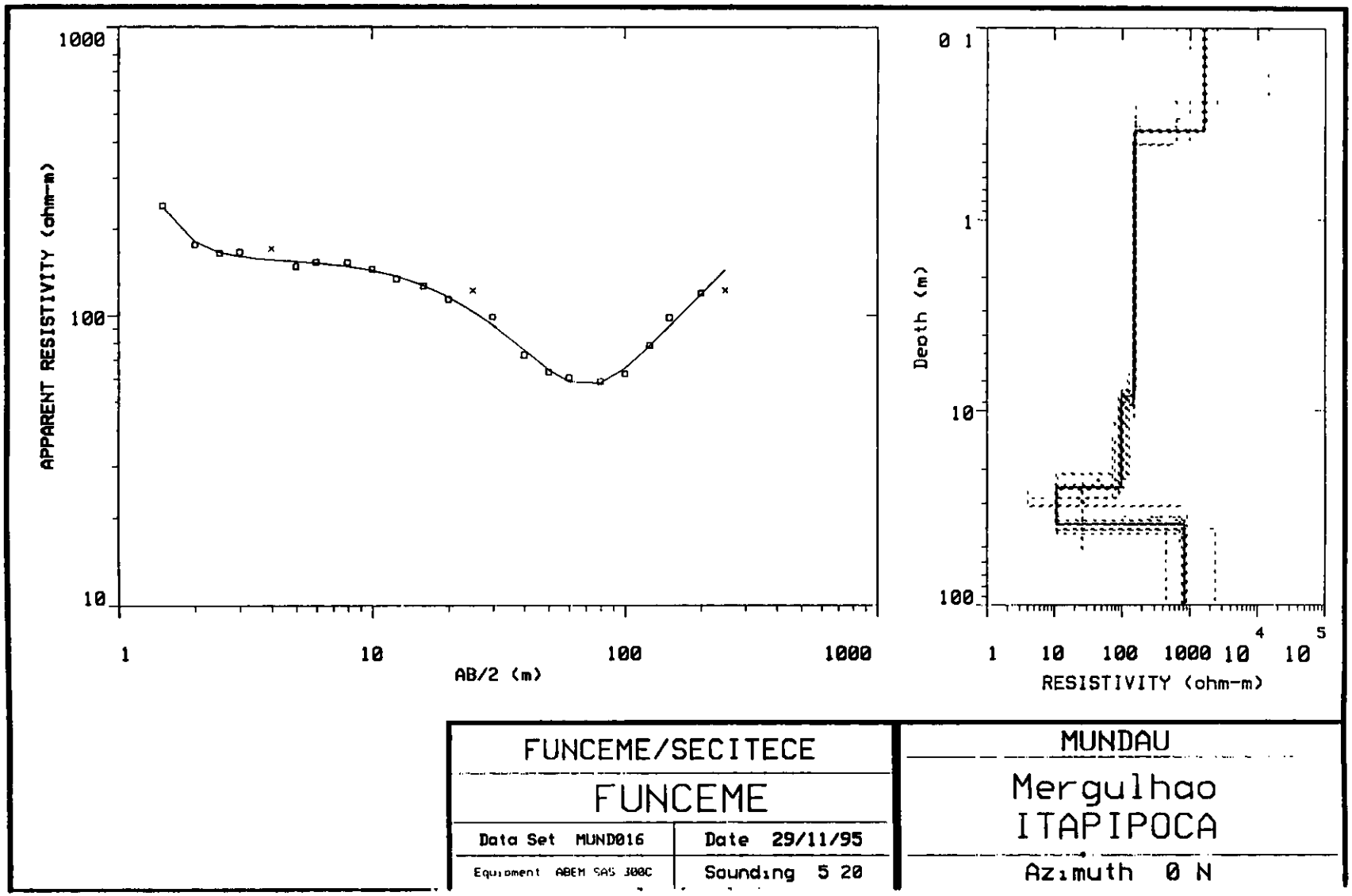

1000
100
10
APPARENT RESISTIVITY (ohm-m)
1
10
100
1000
AB/2 (m)
0 1
1
10
100
Depth (m)
1
10
100
1000
4
10
5
10
RESISTIVITY (ohm-m)
FUNCEME/SECITECE
FUNCEME
Data Set MUND016
Date 29/11/95
Equipment ABEM SAS 300C
Sounding 5 20
MUNDAU
Mergulhao
ITAPIPOCA
Azimuth 0 N

FIG. G-01

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1627.6	0.342	-0.342	2.105E-04	557.7
2	153.1	8.03	-8.37	0.0524	1230.2
3	97.50	16.40	-24.77	0.168	1599.3
4	10.74	13.37	-38.15	1.24	143.6
5	831.6				

ALL PARAMETERS ARE FREE

PARAMETER BOUNDS FROM EQUIVALENCE ANALYSIS

	LAYER	MINIMUM	BEST	MAXIMUM
RHO	1	633.193	1627.668	14373.135
	2	146.126	153.122	160.445
	3	71.348	97.505	127.817
	4	2.444	10.742	26.175
	5	444.694	831.653	2387.835
THICK	1	0.240	0.343	0.406
	2	5.753	8.035	11.372
	3	12.470	16.403	19.849
	4	2.908	13.374	33.487
DEPTH	1	0.240	0.343	0.406
	2	6.092	8.377	11.719
	3	21.069	24.780	29.822
	4	30.638	38.154	56.465

* FUNCEME *

FIG. G-02

EQUIVALENT MODELS:

FITTING ERROR: 3.845 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	14373.1	0.239	-0.239	1.669E-05	3448.3
2	158.3	7.54	-7.78	0.0476	1194.2
3	97.99	17.17	-24.95	0.175	1682.9
4	10.76	13.39	-38.34	1.24	144.0
5	832.0				

ALL PARAMETERS ARE FREE

FITTING ERROR: 3.826 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	633.1	0.399	-0.399	6.316E-04	253.2
2	150.9	8.25	-8.65	0.0547	1246.2
3	97.29	16.07	-24.73	0.165	1564.3
4	10.73	13.36	-38.10	1.24	143.4
5	831.4				

ALL PARAMETERS ARE FREE

FITTING ERROR: 3.825 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1740.7	0.326	-0.326	1.873E-04	567.7
2	160.4	7.17	-7.49	0.0446	1150.5
3	98.31	17.61	-25.11	0.179	1731.9
4	10.77	13.40	-38.52	1.24	144.4
5	833.8				

ALL PARAMETERS ARE FREE

FITTING ERROR: 3.872 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1521.8	0.360	-0.360	2.366E-04	547.9
2	146.1	9.00	-9.36	0.0616	1315.6
3	96.69	15.27	-24.63	0.157	1476.7
4	10.70	13.33	-37.97	1.24	142.8
5	829.4				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. G-04

FITTING ERROR: 3.809 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1630.2	0.342	-0.342	2.100E-04	558.0
2	153.3	6.00	-6.34	0.0391	920.3
3	127.8	14.96	-21.31	0.117	1913.0
4	10.48	13.67	-34.98	1.30	143.2
5	813.6				

ALL PARAMETERS ARE FREE

FITTING ERROR: 3.850 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1624.6	0.343	-0.343	2.112E-04	557.4
2	152.8	11.24	-11.59	0.0735	1719.7
3	71.34	18.23	-29.82	0.255	1300.7
4	11.05	13.03	-42.86	1.17	144.1
5	852.9				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. G-05

FITTING ERROR: 3.808 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1629.6	0.342	-0.342	2.101E-04	557.8
2	153.2	8.47	-8.81	0.0552	1298.4
3	92.34	15.46	-24.27	0.167	1427.9
4	25.13	30.20	-54.47	1.20	759.1
5	776.4				

ALL PARAMETERS ARE FREE

FITTING ERROR: 3.803 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1625.3	0.343	-0.343	2.111E-04	557.5
2	152.9	7.55	-7.89	0.0494	1155.3
3	103.8	17.56	-25.46	0.169	1825.3
4	3.98	5.17	-30.63	1.29	20.60
5	901.0				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. G-06

FITTING ERROR: 3.870 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1628.0	0.342	-0.342	2.103E-04	557.4
2	153.2	8.14	-8.48	0.0531	1247.7
3	94.32	17.71	-26.20	0.187	1671.4
4	10.24	14.20	-40.40	1.38	145.5
5	2387.8				

ALL PARAMETERS ARE FREE

FITTING ERROR: 3.771 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1627.4	0.342	-0.342	2.106E-04	557.8
2	153.0	7.97	-8.31	0.0520	1220.0
3	99.44	15.66	-23.98	0.157	1558.0
4	11.04	12.90	-36.88	1.16	142.5
5	444.6				

ALL PARAMETERS ARE FREE

FIG. G-07

FITTING ERROR: 3.811 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	983.4	0.406	-0.406	4.130E-04	399.4
2	147.8	8.67	-9.08	0.0586	1283.5
3	97.03	15.58	-24.67	0.160	1512.6
4	10.72	13.35	-38.02	1.24	143.1
5	830.0				

ALL PARAMETERS ARE FREE

FITTING ERROR: 3.834 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	2510.5	0.296	-0.296	1.179E-04	743.1
2	157.7	7.51	-7.81	0.0476	1186.2
3	97.91	17.13	-24.95	0.175	1677.8
4	10.76	13.39	-38.34	1.24	144.0
5	832.9				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. G - 08

FITTING ERROR: 3.894 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1603.0	0.347	-0.347	2.166E-04	556.5
2	151.0	11.37	-11.71	0.0752	1717.6
3	78.15	16.20	-27.92	0.207	1266.7
4	10.93	13.12	-41.04	1.19	143.5
5	837.2				

ALL PARAMETERS ARE FREE

FITTING ERROR: 3.775 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1651.7	0.338	-0.338	2.048E-04	558.8
2	155.1	5.75	-6.09	0.0370	892.5
3	120.6	16.59	-22.68	0.137	2001.1
4	10.55	13.61	-36.30	1.29	143.7
5	826.2				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. G-09

FITTING ERROR: 3.792 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1655.7	0.338	-0.338	2.042E-04	559.7
2	155.1	7.88	-8.22	0.0508	1223.9
3	87.60	19.84	-28.07	0.226	1738.9
4	10.41	12.83	-40.91	1.23	133.6
5	882.7				

ALL PARAMETERS ARE FREE

FITTING ERROR: 3.770 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1588.1	0.349	-0.349	2.199E-04	554.7
2	150.2	8.25	-8.59	0.0549	1239.5
3	113.7	12.46	-21.06	0.109	1418.0
4	11.23	14.18	-35.25	1.26	159.4
5	763.4				

ALL PARAMETERS ARE FREE

FIG.G-10

FITTING ERROR: 3.778 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1629.1	0.342	-0.342	2.102E-04	557.8
2	153.2	7.56	-7.90	0.0493	1159.6
3	102.7	15.06	-22.97	0.146	1549.0
4	26.17	33.48	-56.46	1.27	876.4
5	914.7				

ALL PARAMETERS ARE FREE

FITTING ERROR: 3.863 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1625.1	0.343	-0.343	2.111E-04	557.5
2	152.8	8.87	-9.22	0.0580	1357.3
3	89.30	18.88	-28.10	0.211	1686.4
4	2.44	2.90	-31.01	1.18	7.10
5	709.8				

ALL PARAMETERS ARE FREE

FIG. G-11

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1371.5	0.104	-0.104	7.583E-05	142.6
2	462.1	8.04	-8.14	0.0174	3716.6
3	23.55	13.39	-21.54	0.568	315.5
4	5.41	17.35	-38.89	3.20	94.00
5	2768.0				

ALL PARAMETERS ARE FREE

PARAMETER BOUNDS FROM EQUIVALENCE ANALYSIS

	LAYER	MINIMUM	BEST	MAXIMUM
RHO	1	117.926	1371.512	21944.195
	2	432.474	462.150	495.597
	3	13.578	23.556	49.849
	4	1.022	5.416	12.999
	5	204.494	2768.071	44289.129
THICK	1	0.044	0.104	0.401
	2	7.482	8.042	8.613
	3	8.217	13.397	23.459
	4	2.936	17.355	42.552
DEPTH	1	0.044	0.104	0.401
	2	7.526	8.146	8.846
	3	16.022	21.543	31.657
	4	30.127	38.898	61.047

* FUNCEME *

FIG. H-02

EQUIVALENT MODELS:

FITTING ERROR: 6.972 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	21944.1	0.0996	-0.0996	4.543E-06	2187.6
2	461.0	8.16	-8.26	0.0177	3766.1
3	22.90	13.40	-21.67	0.585	306.9
4	5.46	17.40	-39.07	3.18	95.02
5	2765.1				

ALL PARAMETERS ARE FREE

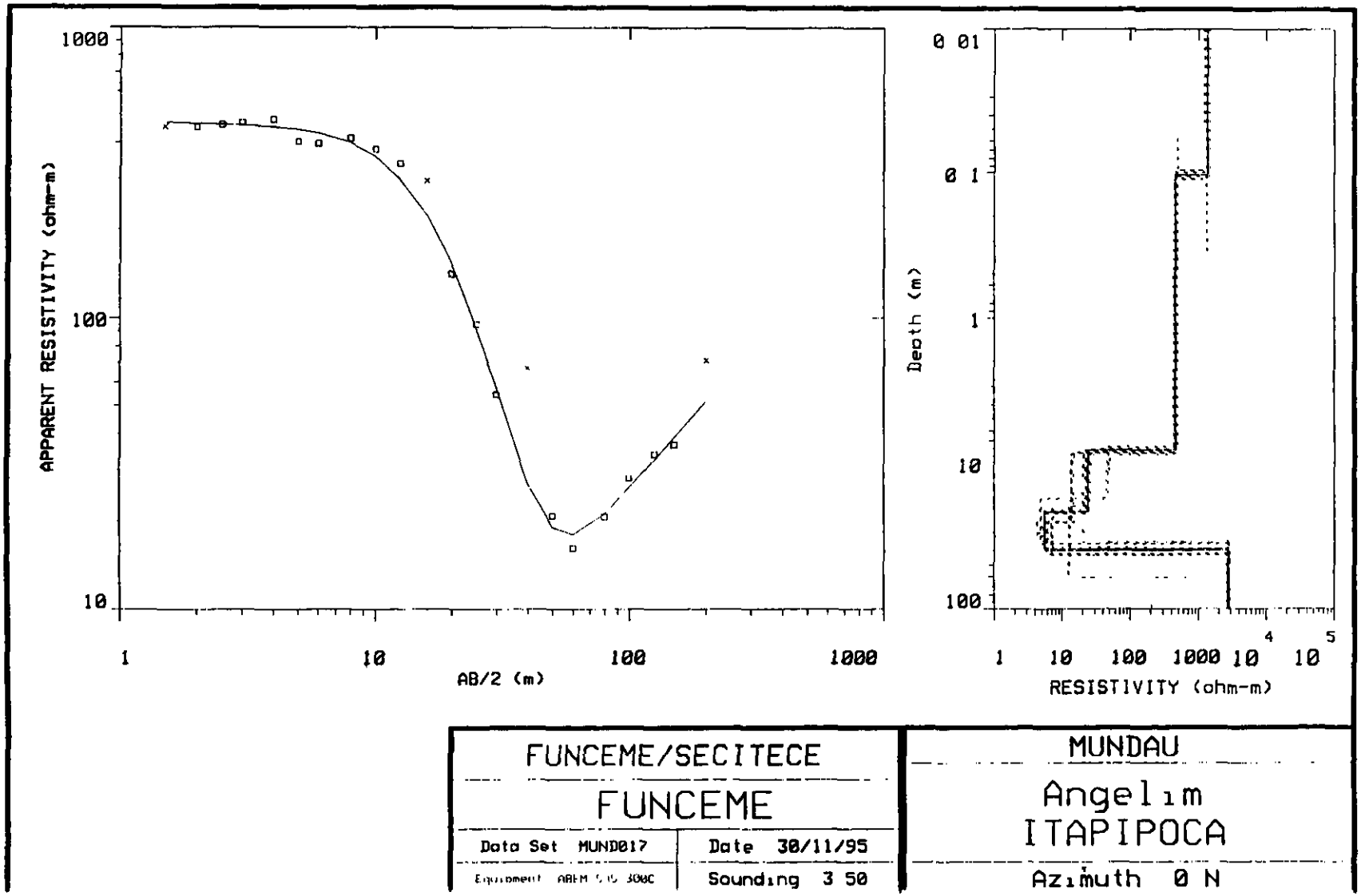
FITTING ERROR: 8.347 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	117.9	0.107	-0.107	9.155E-04	12.73
2	463.1	7.93	-8.03	0.0171	3673.3
3	24.14	13.39	-21.43	0.554	323.4
4	5.37	17.31	-38.74	3.21	93.11
5	2770.6				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. H-03


APPARENT RESISTIVITY (ohm-m)
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100
10
1
10
100
1000
AB/2 (m)
Depth (m)
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0 1
1
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100
1
10
100
1000
10
4
10
5
RESISTIVITY (ohm-m)
FUNCEME/SECITECE
FUNCEME
Data Set MUND017
Date 30/11/95
Sounding 3 50
MUNDAU
Angelim
ITAPIPOCA
Azimuth 0 N

FIG. H-01

FITTING ERROR: 8.287 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1257.2	0.0444	-0.0444	3.535E-05	55.87
2	495.5	7.48	-7.52	0.0151	3707.9
3	40.20	12.25	-19.78	0.304	492.7
4	4.26	15.26	-35.04	3.58	65.06
5	2803.7				

ALL PARAMETERS ARE FREE

FITTING ERROR: 8.251 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1489.5	0.233	-0.233	1.565E-04	347.3
2	432.4	8.61	-8.84	0.0199	3724.8
3	14.17	14.58	-23.42	1.02	206.7
4	6.80	19.60	-43.03	2.88	133.3
5	2734.5				

ALL PARAMETERS ARE FREE

FIG. H-04

FITTING ERROR: 8.212 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1349.5	0.0954	-0.0954	7.071E-05	128.7
2	466.1	7.59	-7.69	0.0163	3541.5
3	47.51	9.64	-17.33	0.202	458.3
4	4.87	18.58	-35.92	3.81	90.60
5	2698.1				

ALL PARAMETERS ARE FREE

FITTING ERROR: 8.316 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1388.8	0.111	-0.111	8.008E-05	154.4
2	459.0	8.40	-8.51	0.0183	3859.2
3	13.62	17.31	-25.83	1.27	235.8
4	5.88	16.45	-42.28	2.79	96.74
5	2823.9				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. H-05

FITTING ERROR: 8.375 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1379.7	0.109	-0.109	7.918E-05	150.7
2	459.8	8.15	-8.26	0.0177	3749.2
3	20.57	11.24	-19.50	0.546	231.3
4	12.99	41.53	-61.04	3.19	539.9
5	2771.5				

ALL PARAMETERS ARE FREE

FITTING ERROR: 8.166 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1359.5	0.0967	-0.0967	7.117E-05	131.5
2	465.5	7.88	-7.97	0.0169	3669.3
3	28.71	17.30	-25.28	0.602	497.0
4	1.50	4.83	-30.12	3.21	7.28
5	2762.9				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. H-06

FITTING ERROR: 7.167 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1370.0	0.103	-0.103	7.573E-05	142.1
2	462.3	8.05	-8.15	0.0174	3723.9
3	22.51	14.15	-22.31	0.628	318.8
4	5.42	17.73	-40.04	3.26	96.22
5	44289.1				

ALL PARAMETERS ARE FREE

FITTING ERROR: 8.292 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1372.8	0.104	-0.104	7.592E-05	143.0
2	461.9	8.02	-8.13	0.0173	3709.7
3	24.57	12.71	-20.85	0.517	312.5
4	5.40	17.00	-37.86	3.14	91.96
5	204.4				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. H-07

FITTING ERROR: 8.266 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1339.2	0.400	-0.400	2.993E-04	536.9
2	456.0	8.08	-8.49	0.0177	3688.9
3	21.65	13.61	-22.10	0.628	294.8
4	5.62	17.69	-39.80	3.14	99.53
5	2764.4				

ALL PARAMETERS ARE FREE

FITTING ERROR: 7.933 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1340.7	0.376	-0.376	2.807E-04	504.6
2	456.2	8.08	-8.46	0.0177	3690.2
3	21.73	13.60	-22.06	0.625	295.7
4	5.61	17.68	-39.75	3.14	99.26
5	2764.6				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. H-08

FITTING ERROR: 8.188 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1496.5	0.110	-0.110	7.367E-05	164.9
2	456.9	8.47	-8.58	0.0185	3873.8
3	13.57	16.57	-25.16	1.22	225.0
4	6.00	16.88	-42.04	2.81	101.3
5	2792.6				

ALL PARAMETERS ARE FREE

FITTING ERROR: 8.190 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1218.0	0.0960	-0.0960	7.887E-05	117.0
2	469.2	7.48	-7.58	0.0159	3512.8
3	49.84	10.02	-17.61	0.201	499.9
4	4.70	18.02	-35.63	3.82	84.82
5	2734.9				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. H-09

FITTING ERROR: 8.261 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1371.9	0.106	-0.106	7.760E-05	146.0
2	461.2	8.29	-8.40	0.0179	3825.7
3	14.81	19.06	-27.46	1.28	282.4
4	4.46	12.57	-40.04	2.81	56.22
5	2893.3				

ALL PARAMETERS ARE FREE

FITTING ERROR: 8.368 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1370.9	0.100	-0.100	7.343E-05	138.0
2	463.4	7.70	-7.80	0.0166	3570.5
3	44.77	8.21	-16.02	0.183	367.9
4	7.06	27.10	-43.12	3.83	191.6
5	2603.3				

ALL PARAMETERS ARE FREE

* FUNCEME *

FIG. H-10

FITTING ERROR: 8.194 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1374.1	0.106	-0.106	7.759E-05	146.4
2	460.9	8.01	-8.12	0.0173	3694.0
3	25.64	10.09	-18.21	0.393	258.9
4	12.57	42.55	-60.76	3.38	534.8
5	2810.4				

ALL PARAMETERS ARE FREE

FITTING ERROR: 8.206 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES. (Ohm-m^2)
			0.0		
1	1366.3	0.0990	-0.0990	7.246E-05	135.2
2	464.4	8.09	-8.19	0.0174	3761.7
3	19.90	23.45	-31.65	1.17	467.0
4	1.02	2.93	-34.59	2.87	3.00
5	2685.9				

ALL PARAMETERS ARE FREE

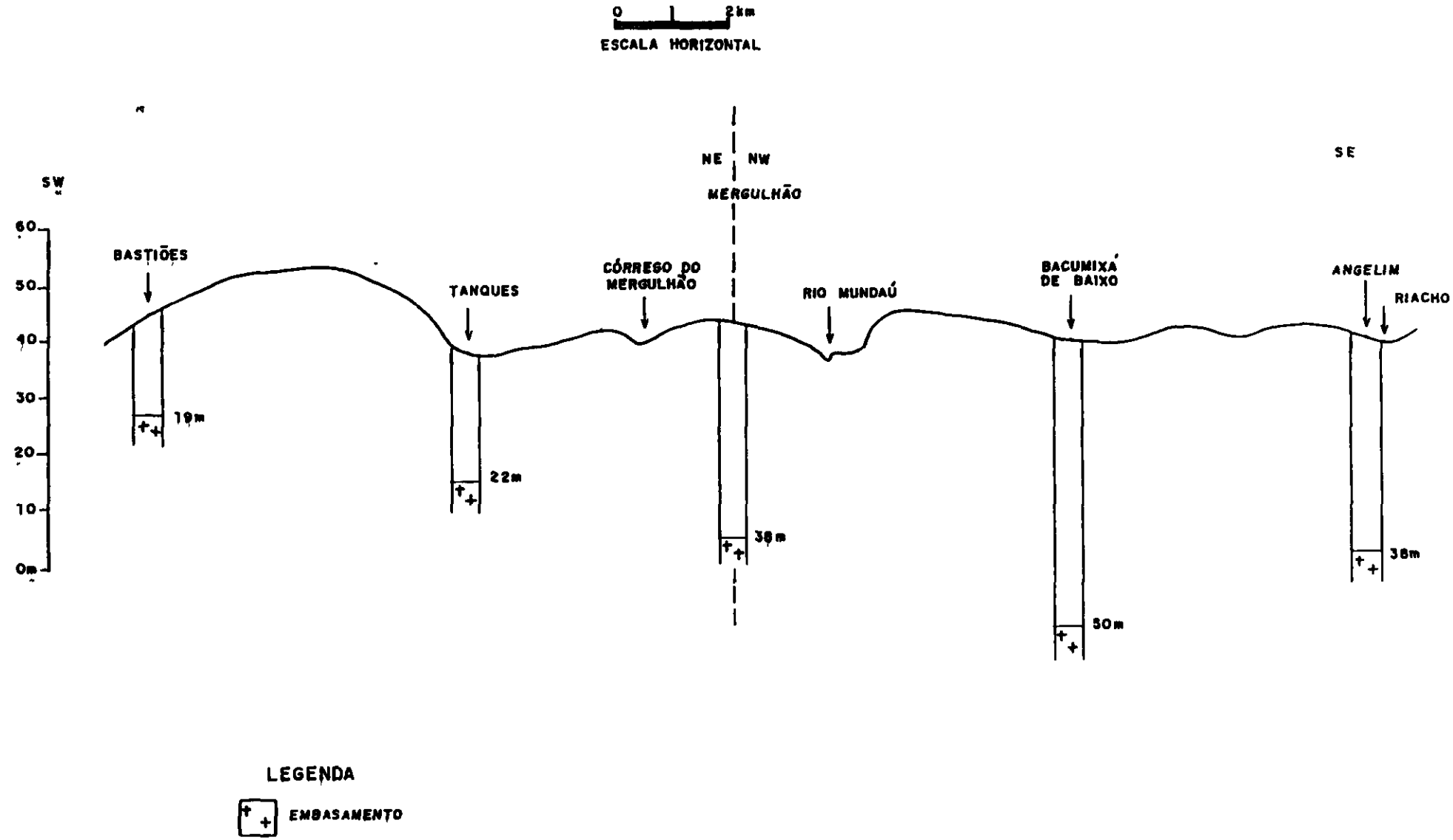
* FUNCEME *

FIG. H - 11

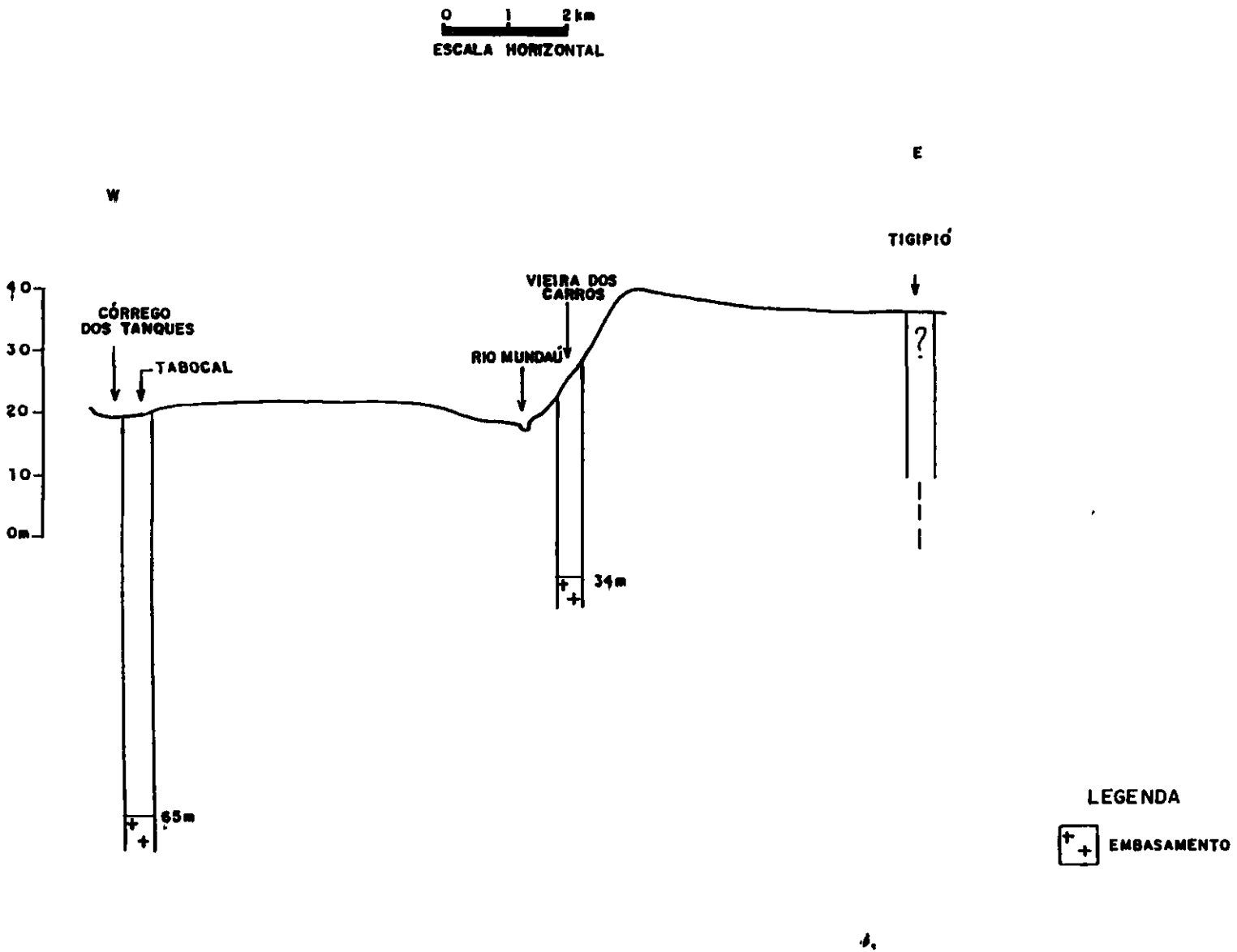
ANEXO II

(PERFIS)

PERFIL 01 - SECÇÕES TRANSVERSAIS REPRESENTATIVAS DA PROFUNDIDADE DO EMBASAMENTO

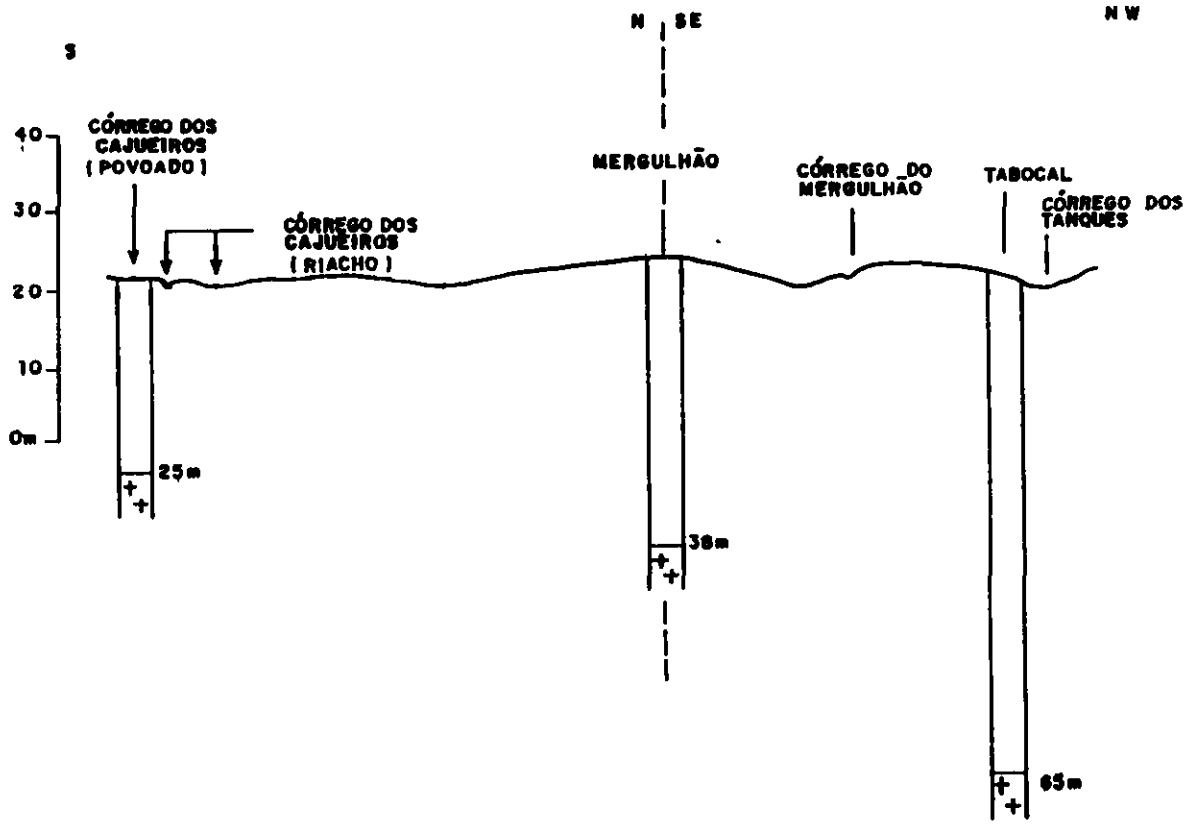


PERFIL 02 - SECÇÕES TRANSVERSAIS REPRESENTATIVAS DA PROFUNDIDADE DO EMBASAMENTO



PERFIL 03 - SECÇÕES TRANSVERSAIS REPRESENTATIVAS DA PROFUNDIDADE DO EMBASAMENTO

0 1 2km
ESCALA HORIZONTAL

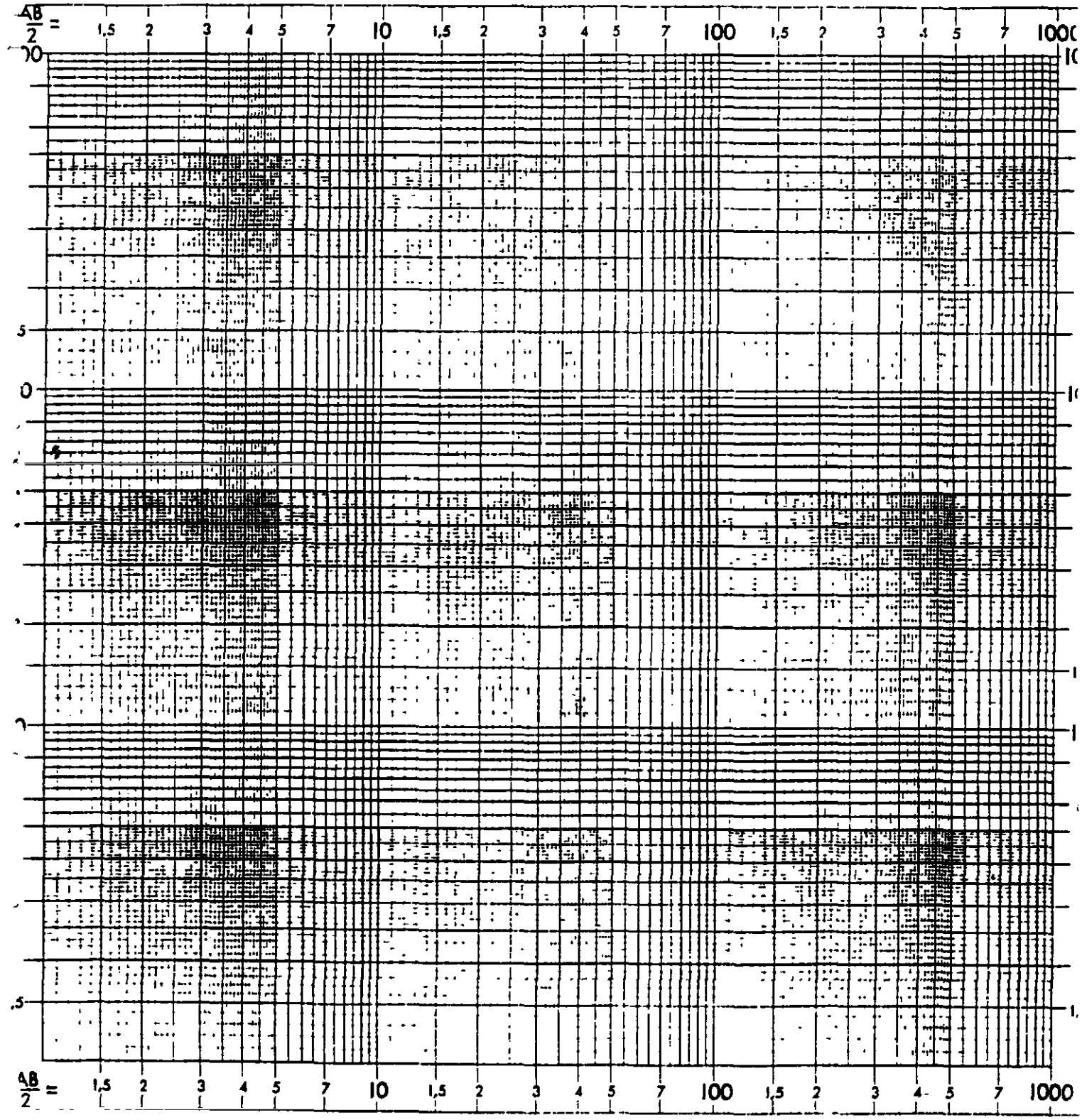


LEGENDA

EMBASAMENTO

SONDAGENS ELÉTRICAS VERTICAIS - FICHA DE CAMPO

Data		Obs.
Local		
Coordenada		
Início		
Fim		
Direção		



ANEXO 4

AVALIAÇÃO DA QUALIDADE DA ÁGUA

FOTOGRAFIAS DOS PONTOS DE COLETA DE AMOSTRA DA ÁGUA DO RIO MUNDAÚ E PONTOS DE POLUIÇÃO

Figura 1 - Ponto de coleta de coleta RM1, entrada do açude Mundaú
(lat.: 03° 37' 51" lon.: 39° 32' 15")

Figura 2 - Ponto de coleta de coleta RM2, saída do açude Mundaú
(lat.: 03° 38' 51" lon.: 39° 30' 53")

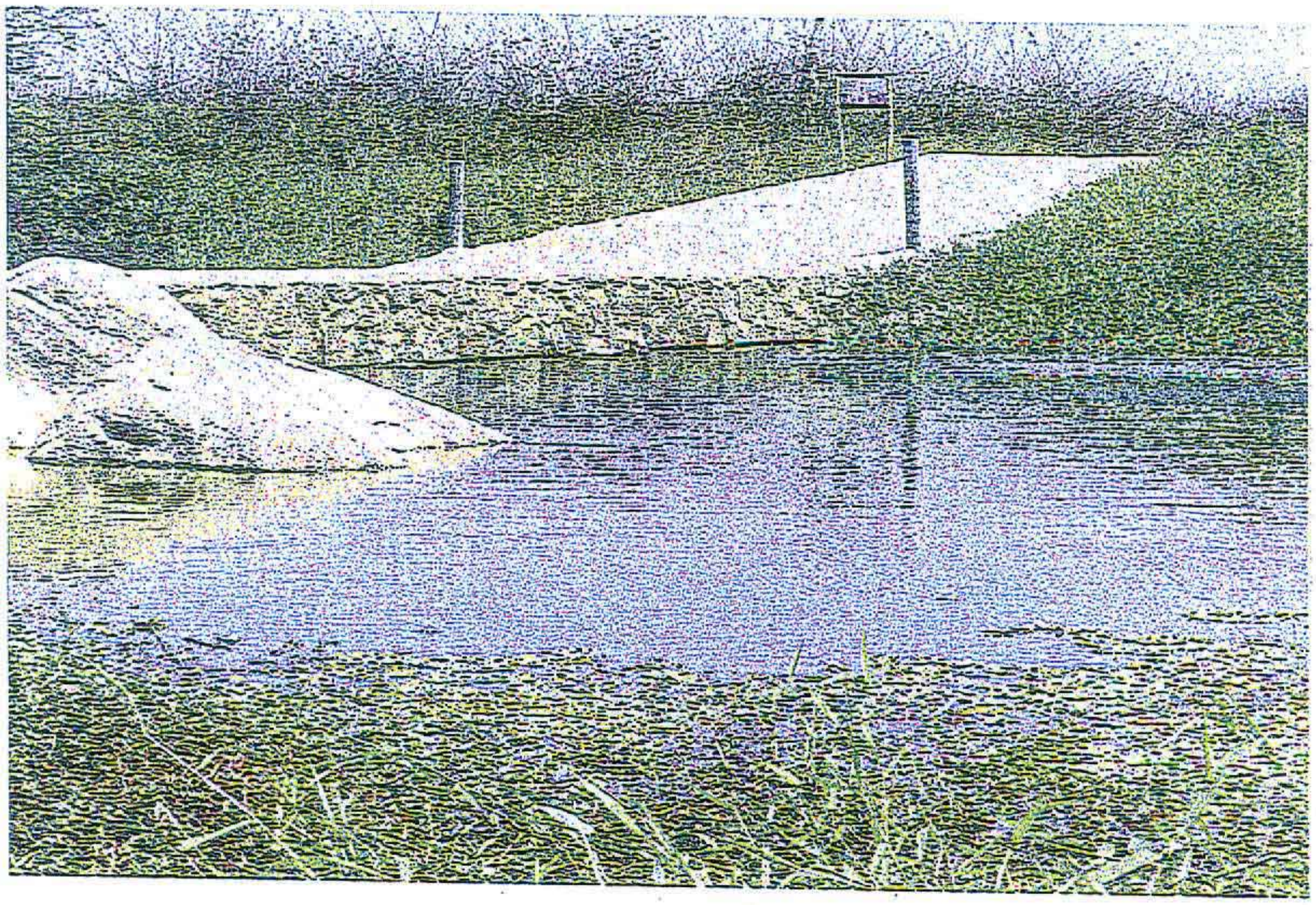


Figura 5 - Ponto de coleta RM5, associação Mulungu
(lat.: 03° 33' 41" lon.: 39° 25' 32")

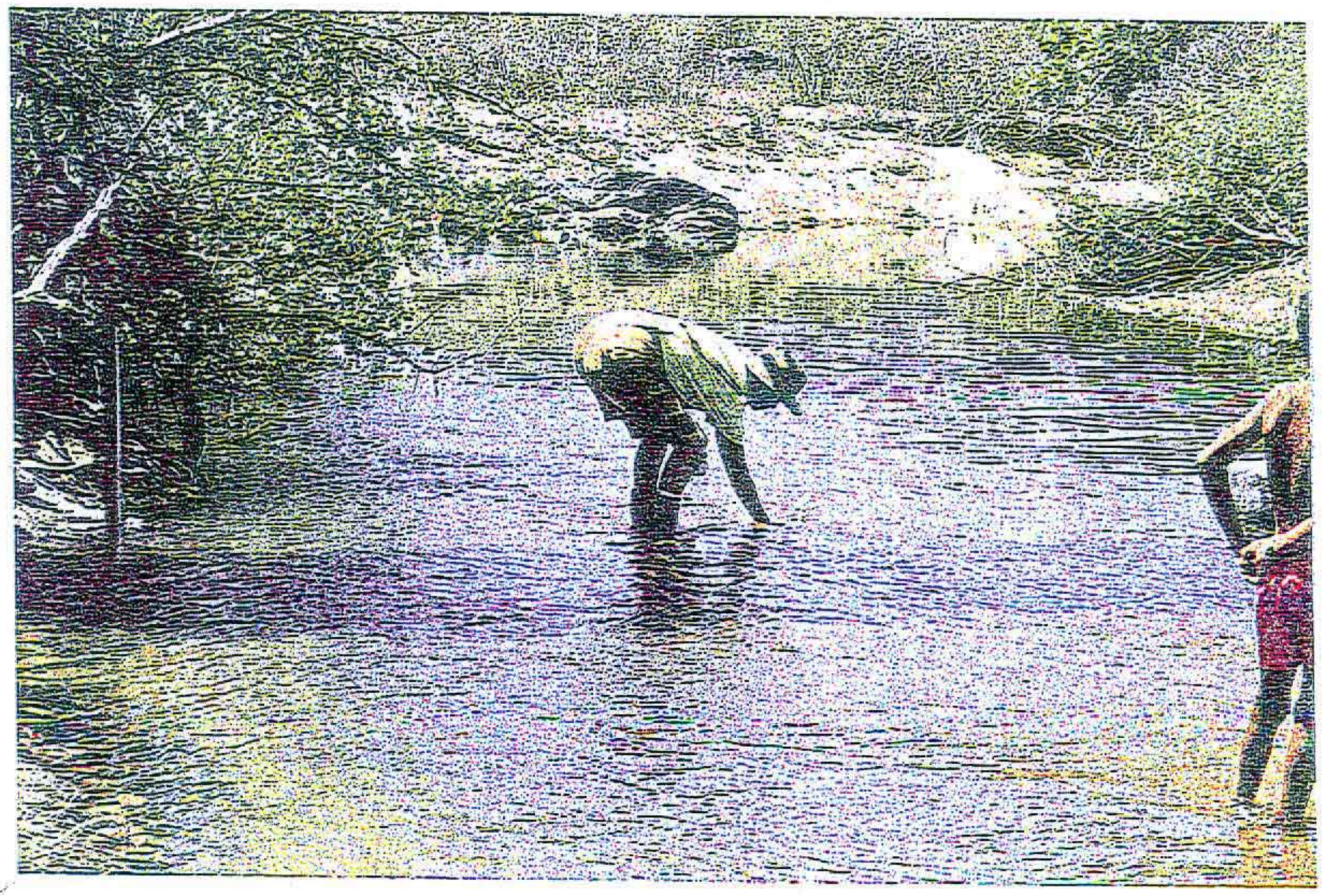


Figura 6 - Ponto de coleta RM6, fazenda Conceição
(lat.: 03° 30' 56" lon.: 39° 25' 02")

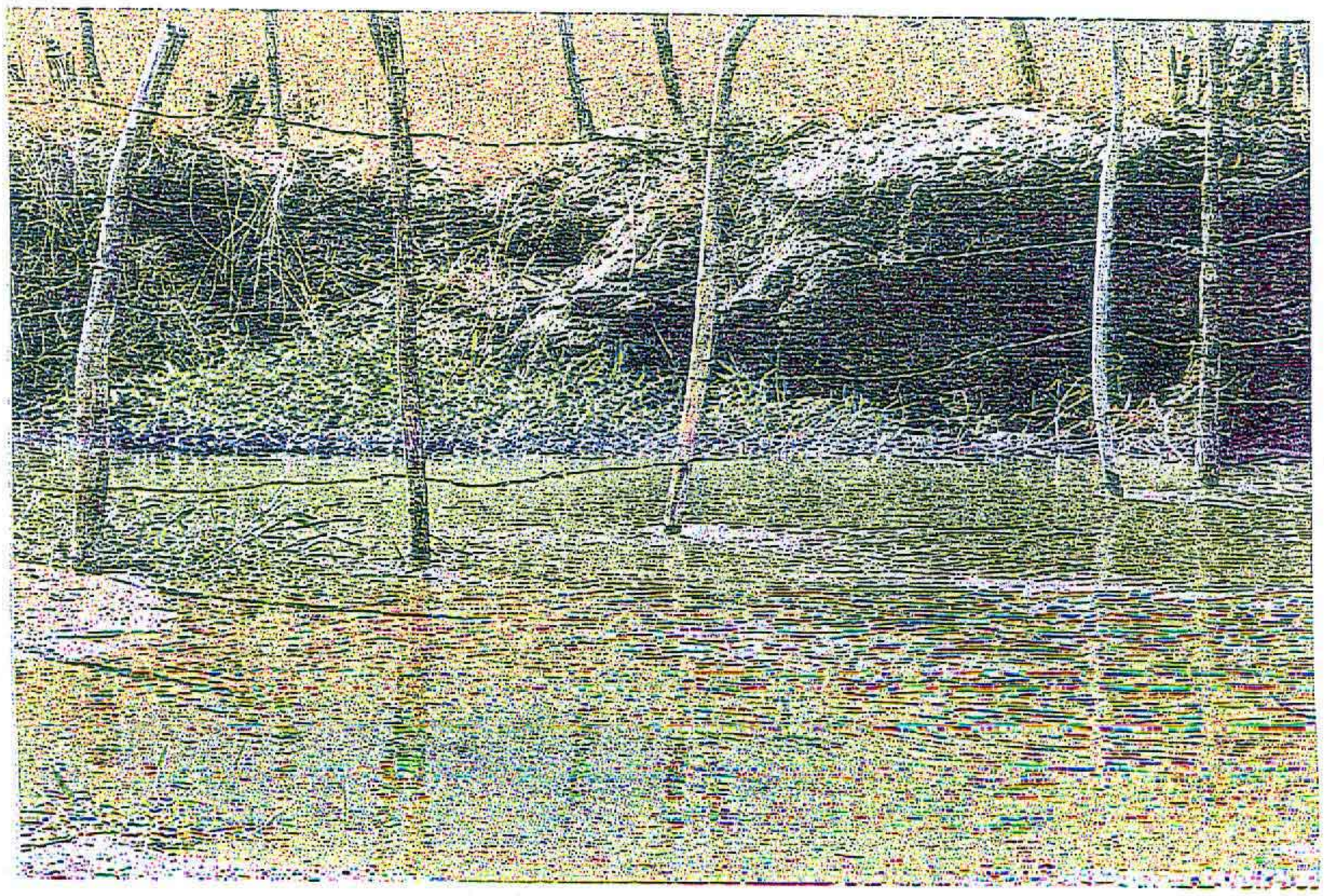


Figura3 - Ponto de coleta RM3, na estrada entre Tururu-Ururuburetama
(lat.: 03° 37' 9" lon.: 39° 28' 16")

Figura 4 - Ponto de coleta RM4, saída do município de Tururu
(lat.: 03° 35' 41" lon.: 39° 26' 17")

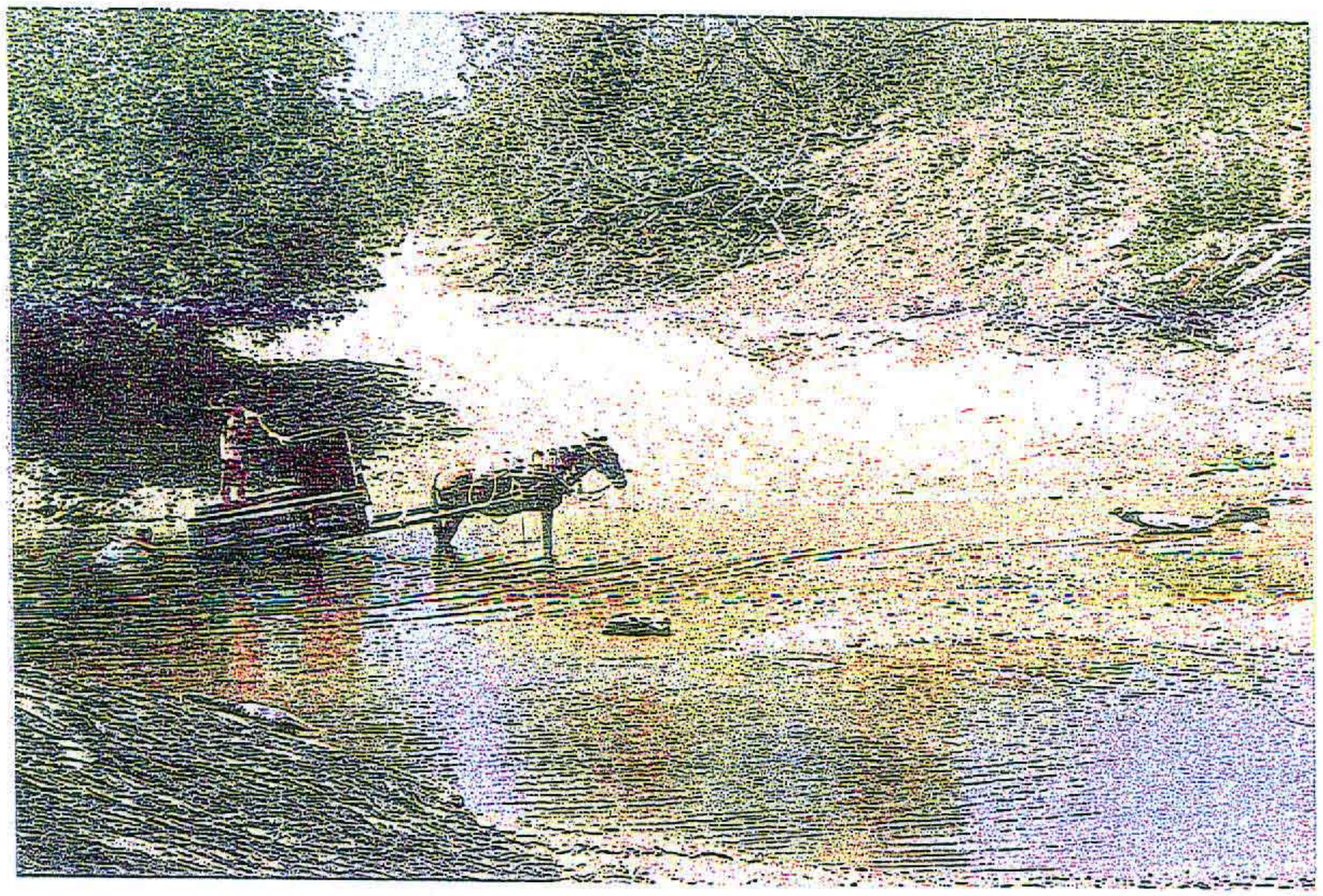


Figura 7 - Ponto de coleta RM7, distrito de Cemoaba
(lat.: 03° 28' 10" lon.: 39° 25' 38")

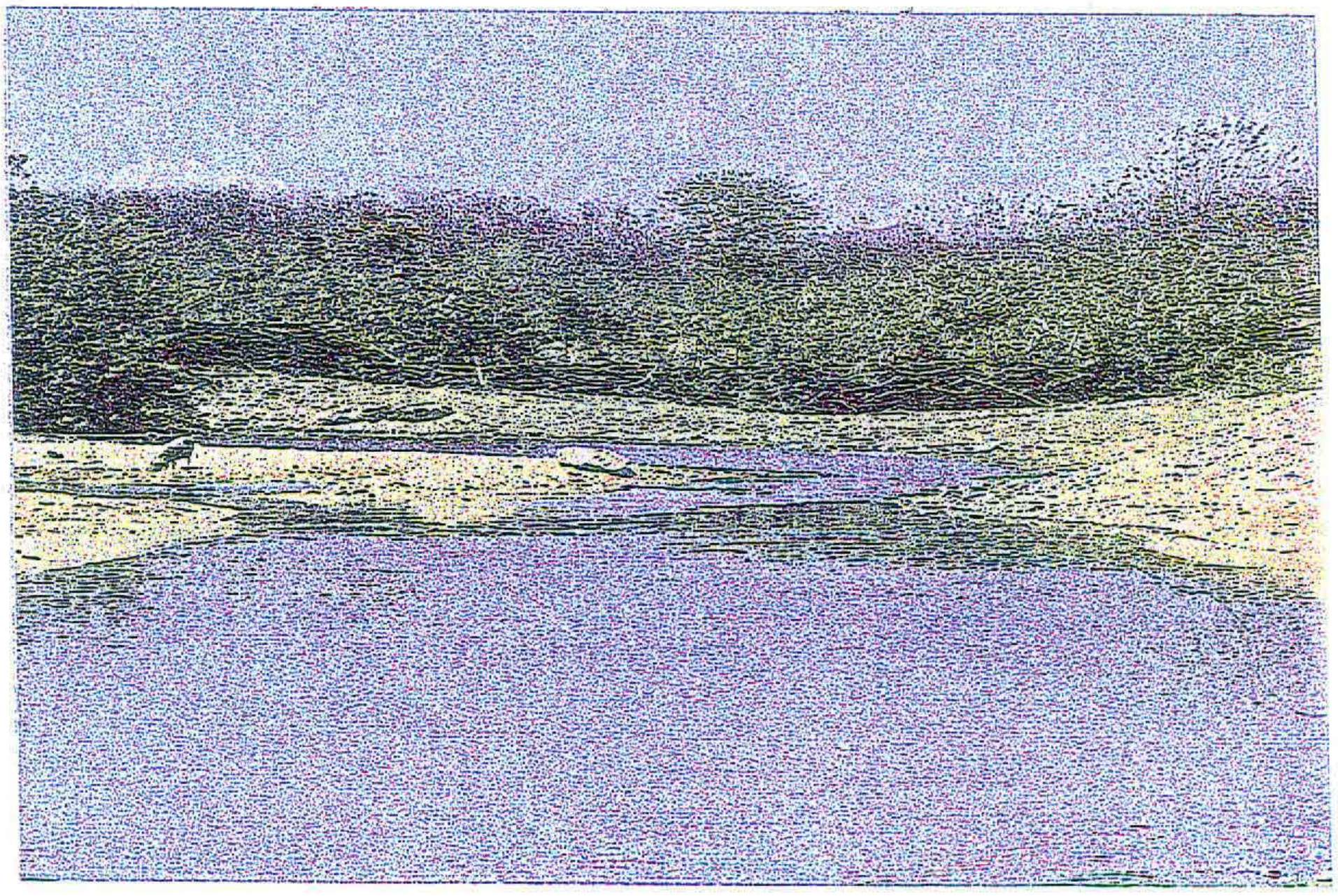


Figura 8 - Ponto de coleta RM8, fazenda Mala
(lat.: 03° 23' 20" lon.: 39° 28' 55")

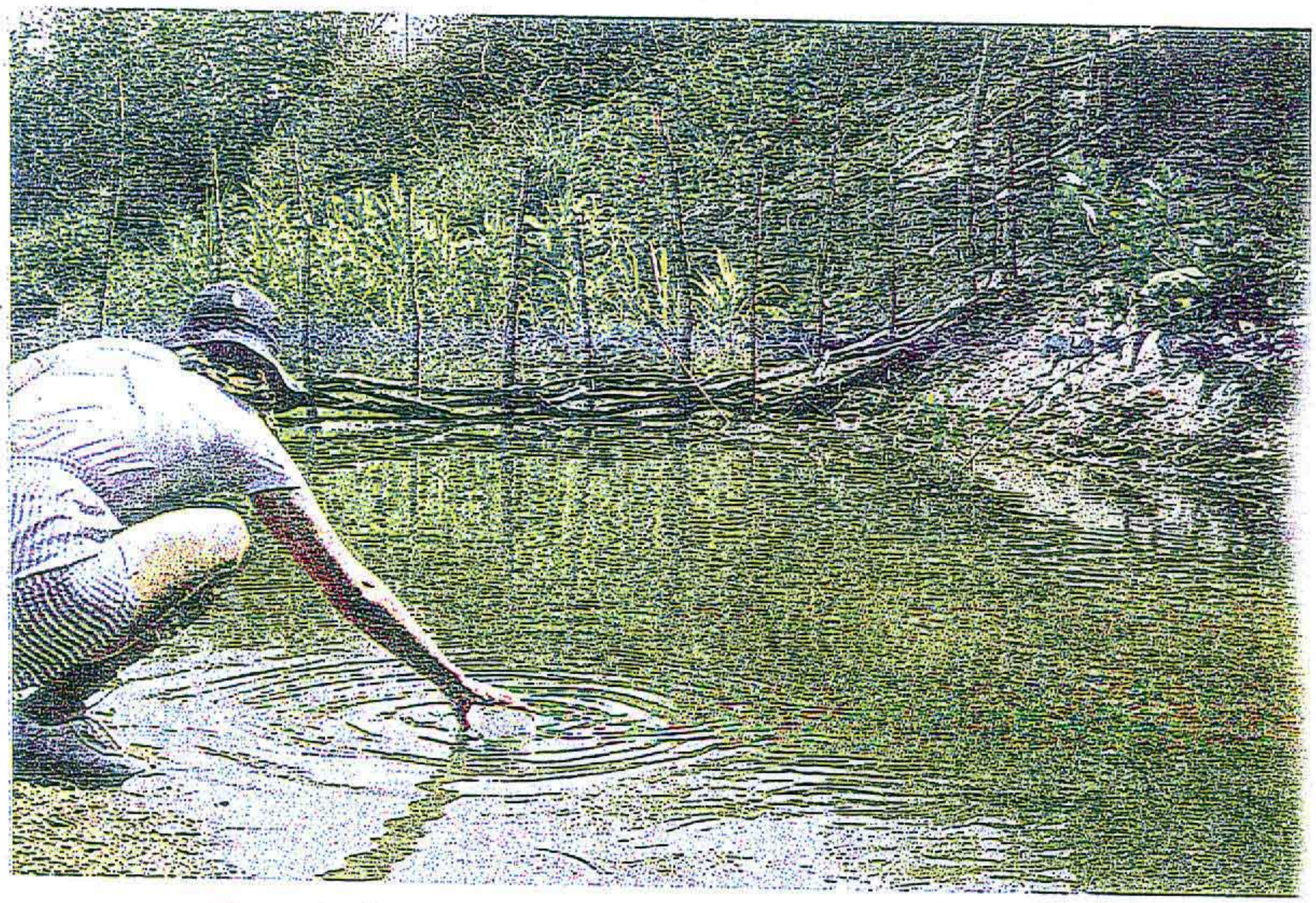


Figura 9 - Ponto de coleta RM9, distrito de Barrento
(lat.: 03° 18' 44" lon.: 39° 30' 44")

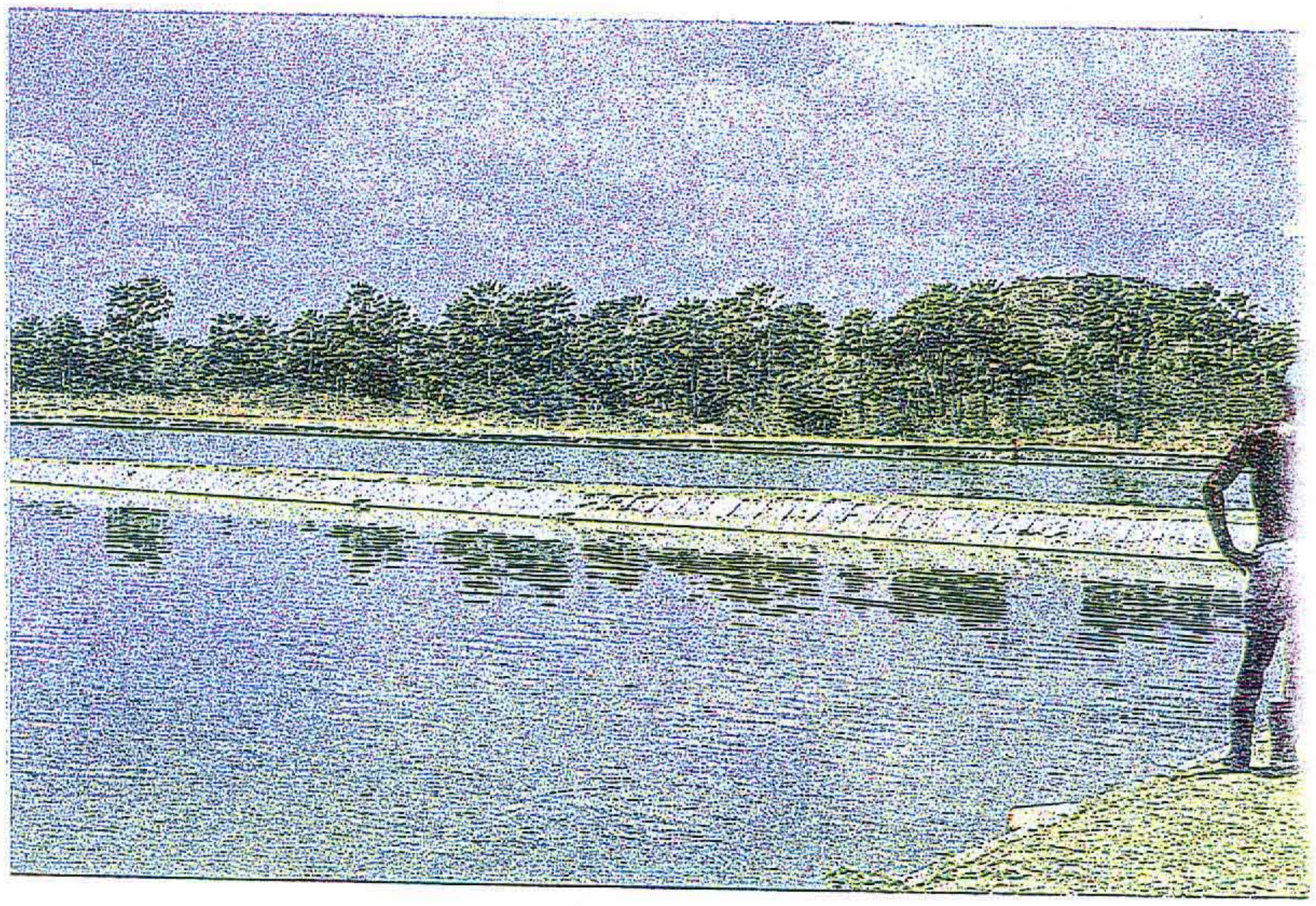


Figura 10 - Lagoa de Estabilização de Itapipoca, siatema de tratamento de esgotos
(lat.: 03° 29' 26" lon.: 39° 35' 41")

Figura 11 - Poço amozonas no matadouro de Uruburetama
(lat.: 03° 37' 15" lon.: 39° 29' 49")

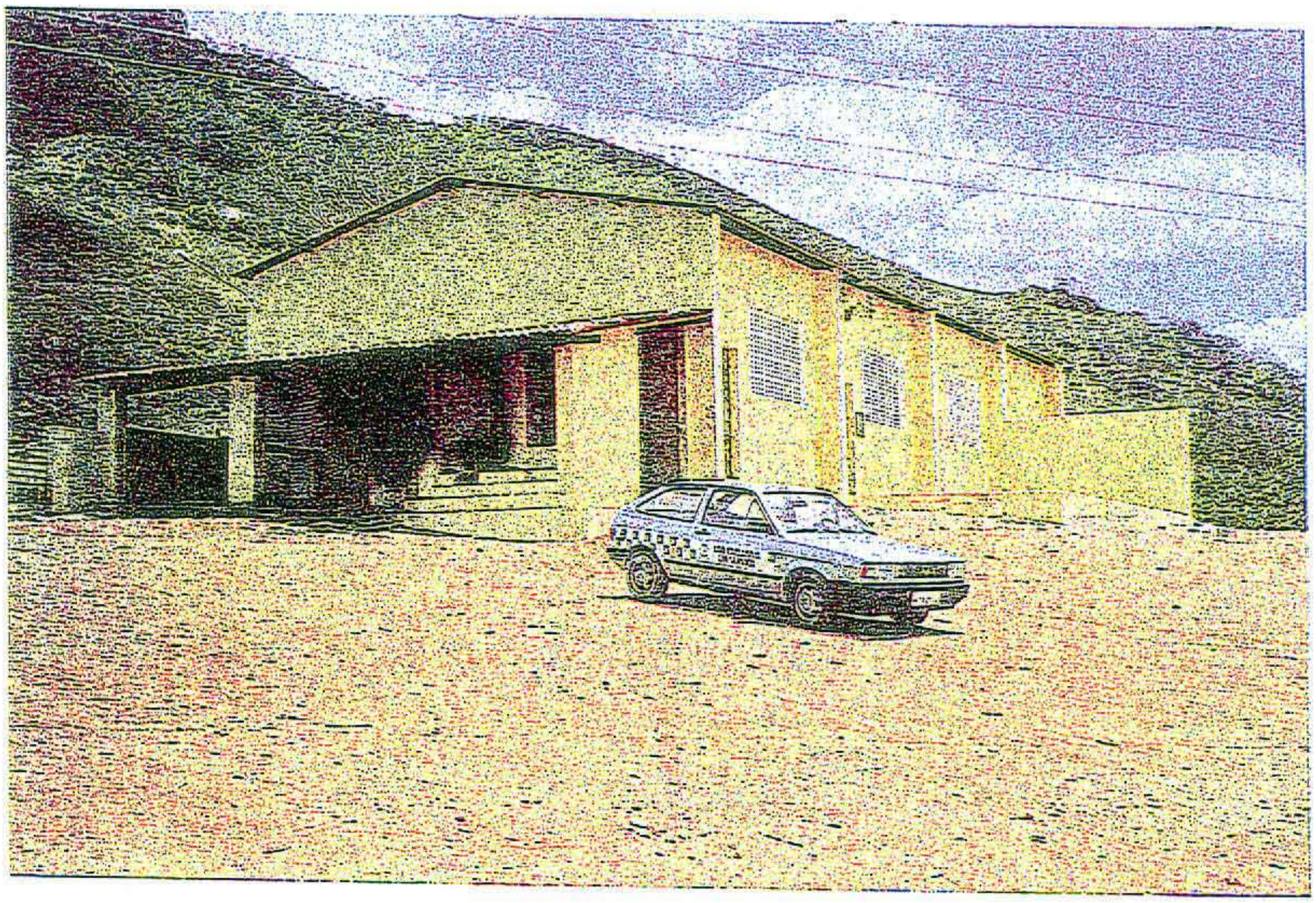
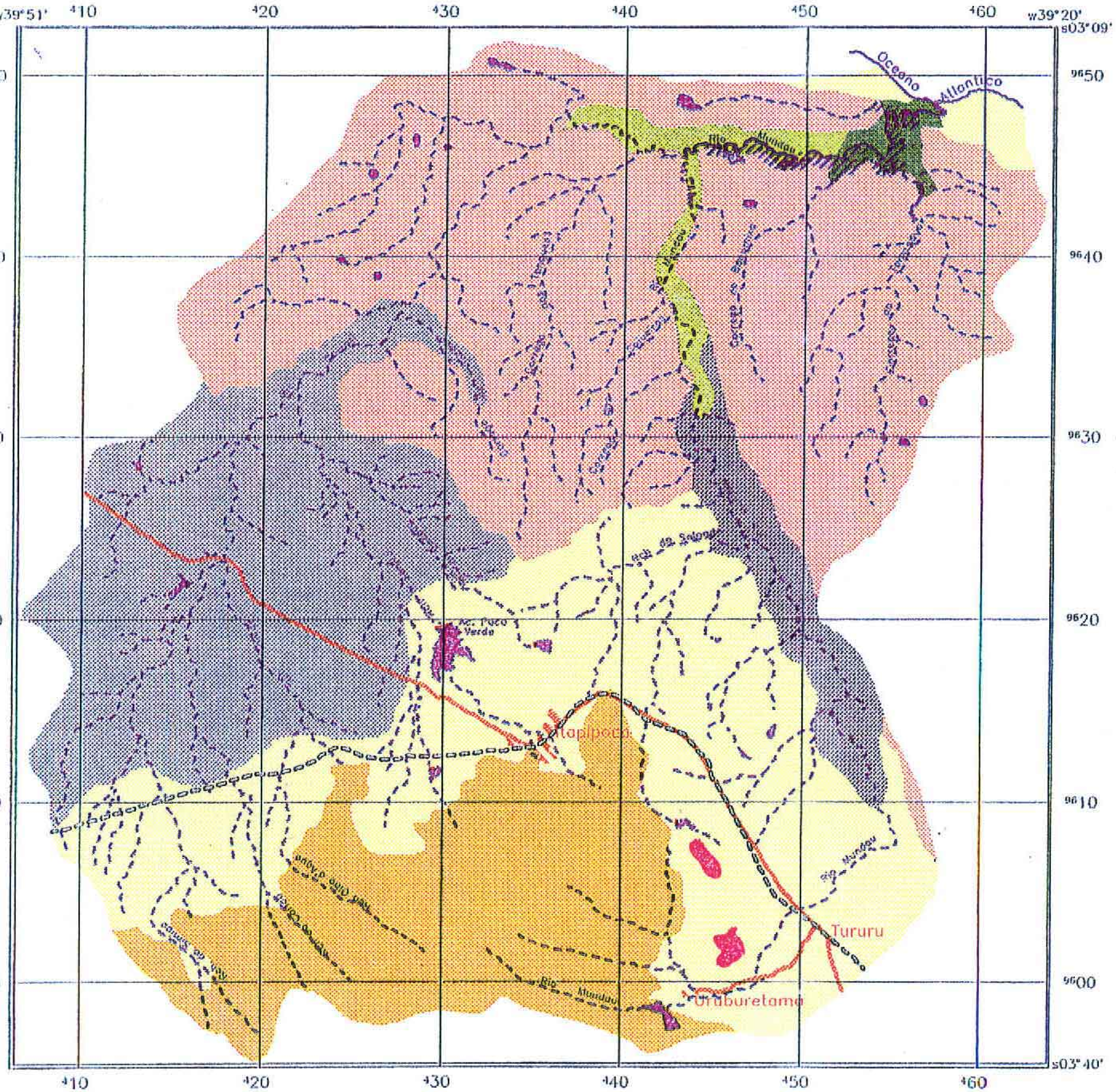


Figura 12 - Vista do matadouro municipal de Uruburetama
(lat.: 03° 37' 15" lon.: 39° 29' 49")

MAPA DE SOLOS E FONTES PONTUAIS DE POLUIÇÃO DA BACIA HIDROGRÁFICA DO RIO MUNDAÚ



Conselho Nacional de Desenvolvimento Científico e Tecnológico–CNPq
Instituto Nacional de Pesquisas Espaciais–INPE
Fundação Cearense de Meteorologia e Recursos Hídricos–FUNCEME

ZONEAMENTO GEOAMBIENTAL DA BACIA HIDROGRÁFICA DO RIO MUNDAÚ–CE
SOLOS

3,5Km 0 3,5 7 10,5 14Km

ESCALA 1:350.000

Legenda

PV7
Assoc. de Podzólico Vermelho Amarelo + Latosc
Amarelo Distrófico + Podzólico Acincentado Dist

PE6
Assoc. de Podzólico Vermelho Amarelo Equivaler
Solos Litólicos Eutróficos + Afloramentos de Ro

PE32
Assoc. de Podzólico Vermelho Amarelo Equivaler
Planosol Solódico + Laterita Hidromórfica Eutró

PL1
Assoc. de Planosol Solódico + Solonetz Solodiz
Vermelho Amarelo

SK2
Assoc. de Solonchak Solonétzico + Solos Indisc
Mangues

SS2
Assoc. de Solonetz Solodizado + Planosol Solóc
Aluviais Eutróficos

Re25
Assoc. Complexa de Solos Litólicos Eutróficos +
Cálcico + Afloramento de Rochas

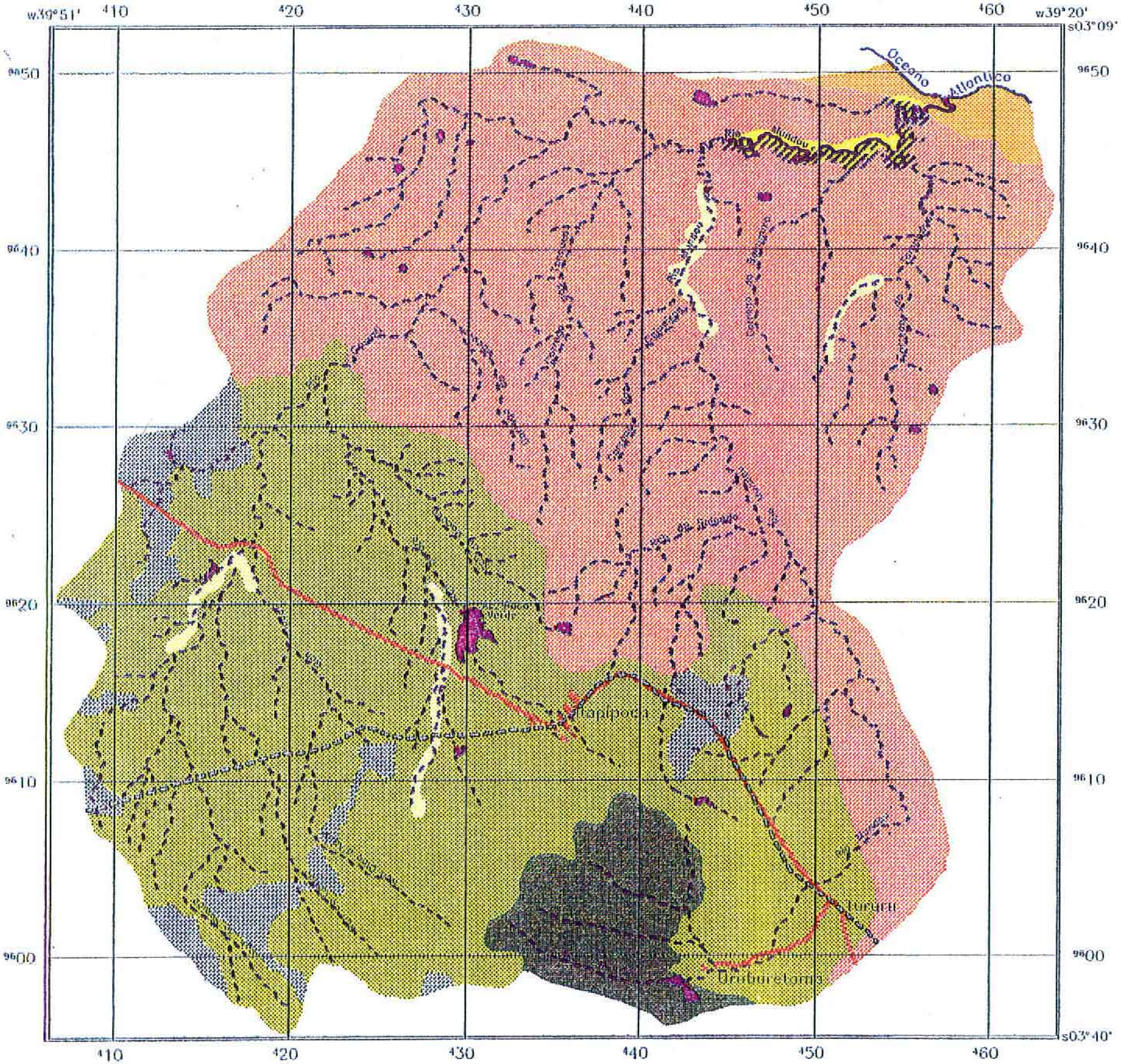
Red2
Assoc. de Solos Litólicos Eutróficos e Distrófico
licos Vermelho Amarelo Equivalente Eutrófico

AMd
Areias Quartzosas Distróficas (Dunas)

Sinais Convencionais

Sede Municipal
Rodovia
Estrada de Ferro
Acude, Lagoa
Rio Pereno
Rio Intermitente
Área Inundável

Elaborado pelo geógrafo da Fundação Cearense de Meteorologia e Recursos Hídricos–FUNCEME Manuel Rodrigues de Freitas Filho, utilizando o software SPRING/INPE 1.0, OUT/94.



Conselho Nacional de Desenvolvimento Científico e Tecnológico–CNPq
Instituto Nacional de Pesquisas Espaciais–INPE
Fundação Cearense de Meteorologia e Recursos Hídricos–FUNCEME

ZONEAMENTO GEOAMBIENTAL DA BACIA HIDROGRÁFICA DO RIO MUNDAÚ–CE

VEGETAÇÃO

3,5Km 0 3,5 7 10,5 14Km

ESCALA 1:350.000

Legenda

- Planície Litorânea
- Planície Fluvio_Marinha
- Tabuleiros Pré–Litorâneos
- Caatinga Arbórea Densa
- Caatinga Arbórea Arbustiva
- Mata Plúvio–Nebular
- Mata Ciliar

Sinais Convencionais

- Sede Municipal
- Rodovia
- Estrada de Ferro
- Acude, Lagoa
- Rio Perene
- Rio Intermitente
- Área Inundável

Elaborado pelo geógrafo da Fundação Cearense de Meteorologia e Recursos Hídricos–FUNCEME Manuel Rodrigues de Freitas Filho, utilizando o software SPRING/INPE 1.0, OUT/94.

w39°50'06" w39°45'06" w39°40'06" w39°35'06" w39°30'06" w39°25'06" w39°20'06"

'29" s03°10'29"

'29" s03°15'29"

'29" s03°20'29"

'29" s03°25'29"

'29" s03°30'29"

'29" s03°35'29"

w39°50'06" w39°45'06" w39°40'06" w39°35'06" w39°30'06" w39°25'06" w39°20'06"

CRUXATI

BARRENTO

CEMOABA

E.T.E

PIPOCA

CONCEICAO

DESERTO

ASSUNCAO

TURURU

MATADOURO

URUBURETAMA

SANTA LUZIA

Presidência da República
Ministério da Ciência e Tecnologia--MCT
Conselho Nacional de Desenvolvimento
Científico e Tecnológico--CNPq
Instituto Nacional de Pesquisas Espaciais--INPE

DRENAGEM DA BACIA HIDROGRAFICA DO RIO MUNDAU--CE

ESCALA 1:350.000

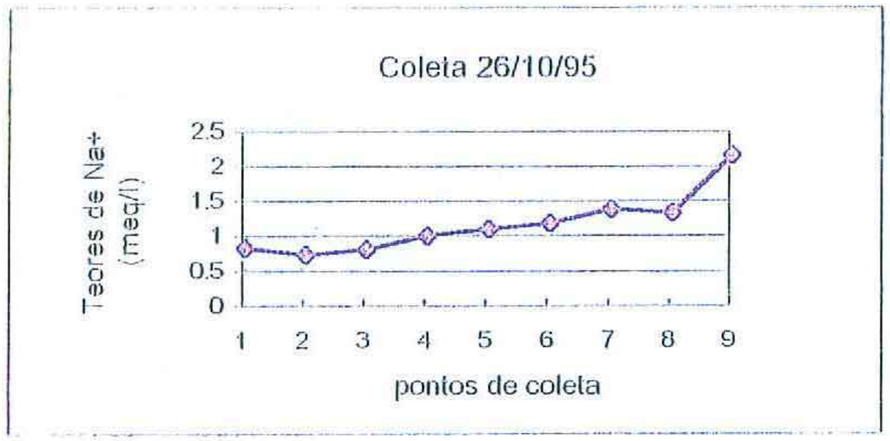
Sinais Convencionais

- Rodovia
- Estrada de Ferro
- Acude, Lagoa
- Rio Perene
- Rio Intermitente

Elaborado pelo geógrafo da Fundação Cearense de Meteorologia e Recursos Hídricos--FUNCEME Manuel Rodrigues de Freitas Filho, utilizando o software SPRING/INPE 1.0, OUT/94.

000194

GRÁFICO DOS PARÂMETROS DE QUALIDADE DE ÁGUA ANALISADOS NOS LABORATÓRIOS DA SEMACE E LABORATÓRIO DE SOLOS DA FUNCEME/UFC


Coleta 26/10/95
Teores de Na+ (meq/l)
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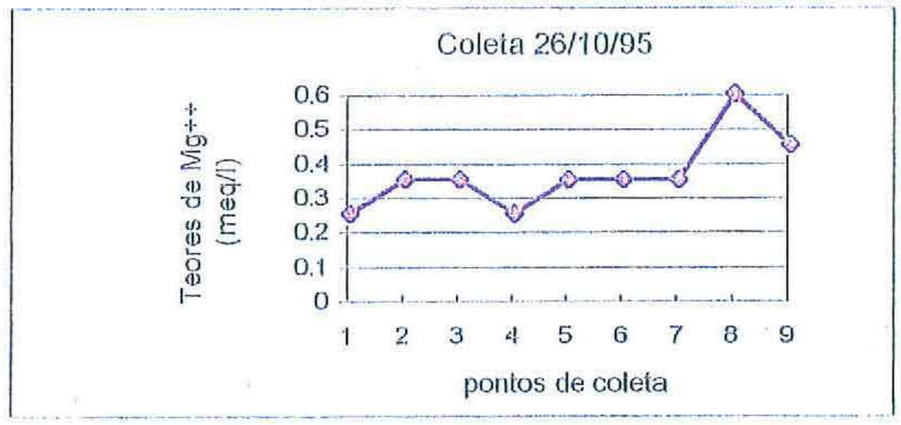
2
1.5
1
0.5
0
1 2 3 4 5 6 7 8 9
pontos de coleta


Coleta 26/10/95
Teores de Mg++ (meq/l)
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0.3
0.2
0.1
0
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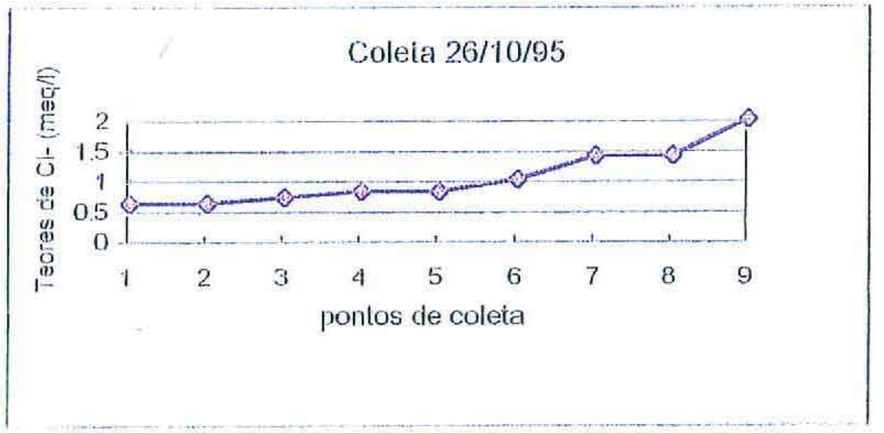
pontos de coleta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Teores de Cl- (meq/l)
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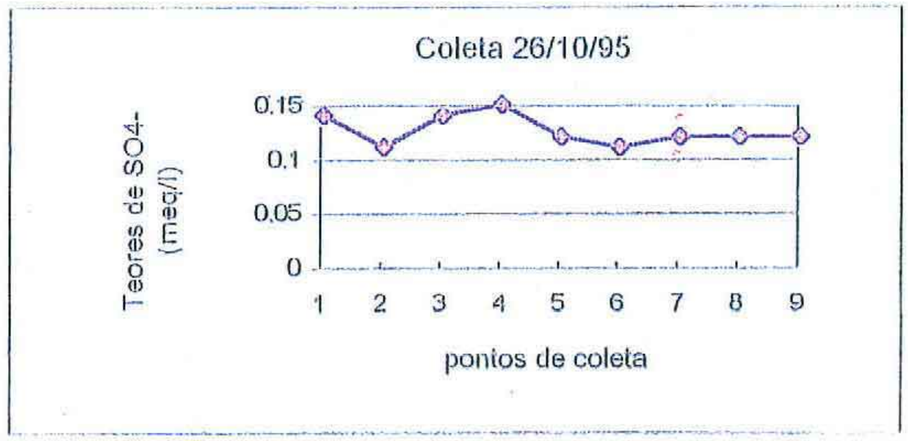
1.5
1
0.5
0
1 2 3 4 5 6 7 8 9
pontos de coleta


Coleta 26/10/95
Teores de SO4- (meq/l)
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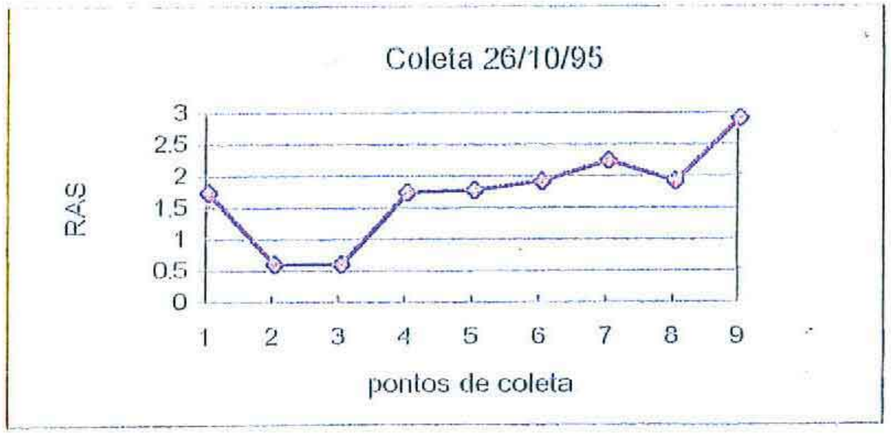
0.1
0.05
0
1 2 3 4 5 6 7 8 9
pontos de coleta


Coleta 26/10/95
RAS
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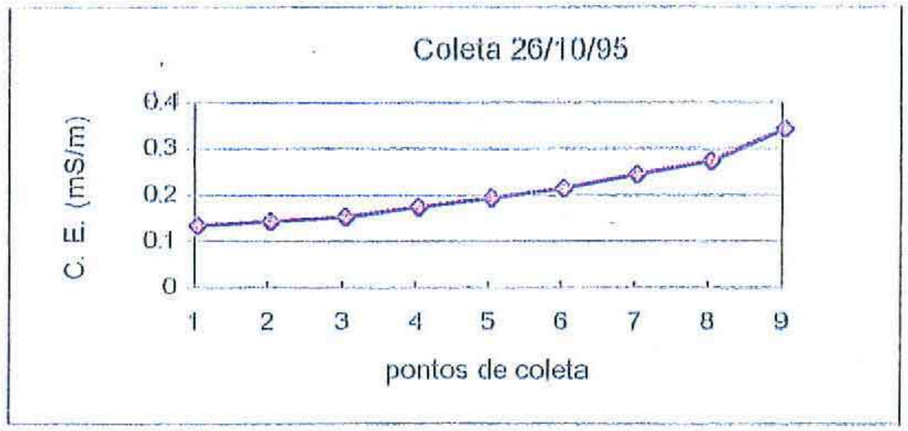
2
1.5
1
0.5
0
1 2 3 4 5 6 7 8 9
pontos de coleta


Coleta 26/10/95
C. E. (mS/m)
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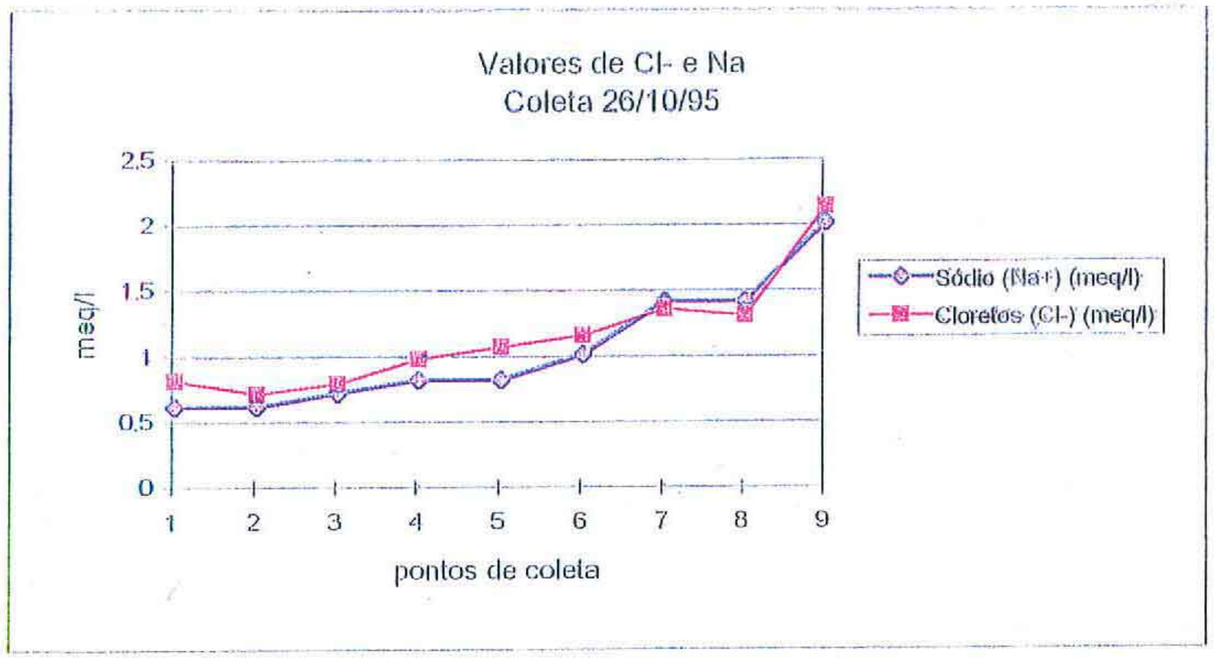
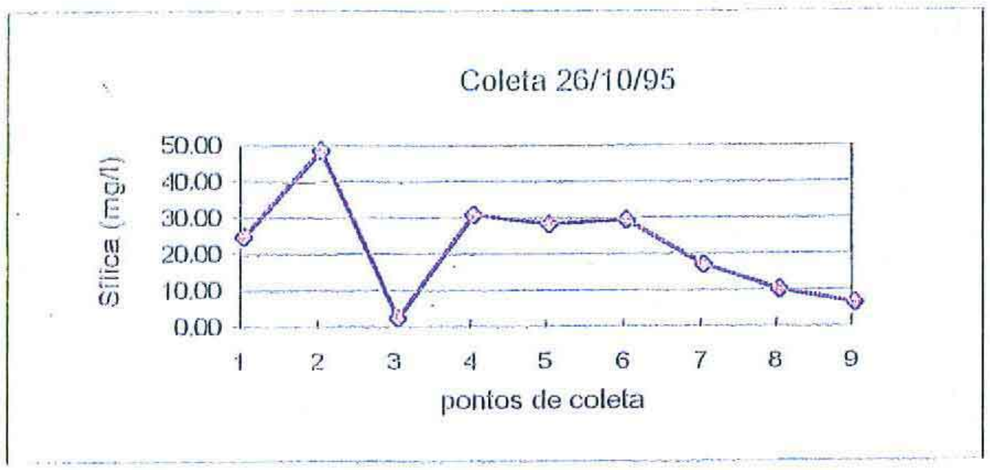
0.3
0.2
0.1
0
1 2 3 4 5 6 7 8 9
pontos de coleta


Valores de Cl- e Na
Coleta 26/10/95
2,5
2
1,5
1
0,5
0
meq/l
1
2
3
4
5
6
7
8
9
pontos de coleta
Sódio (Na+) (meq/l)
Cloretos (Cl-) (meq/l)


Coleta 26/10/95
Sílica (mg/l)
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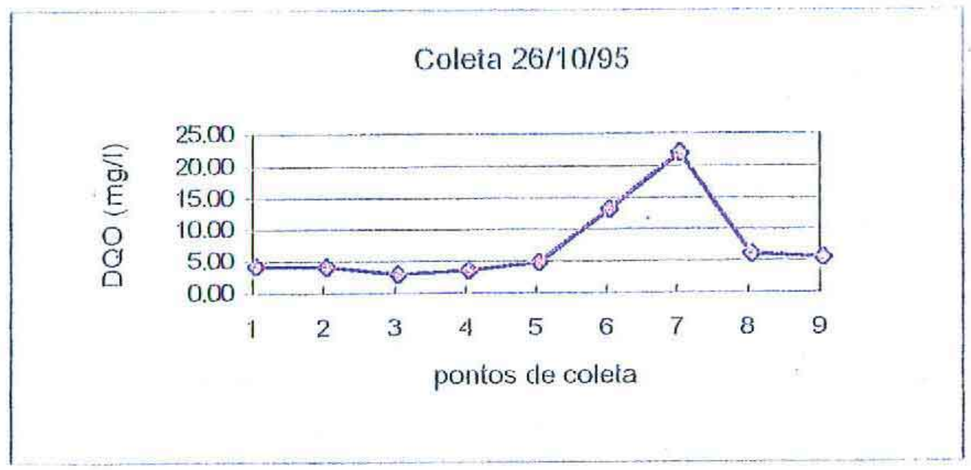
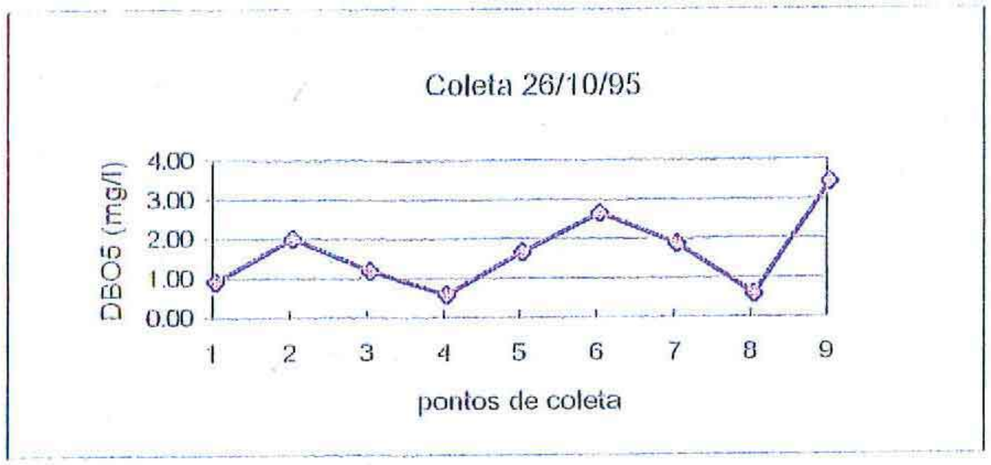
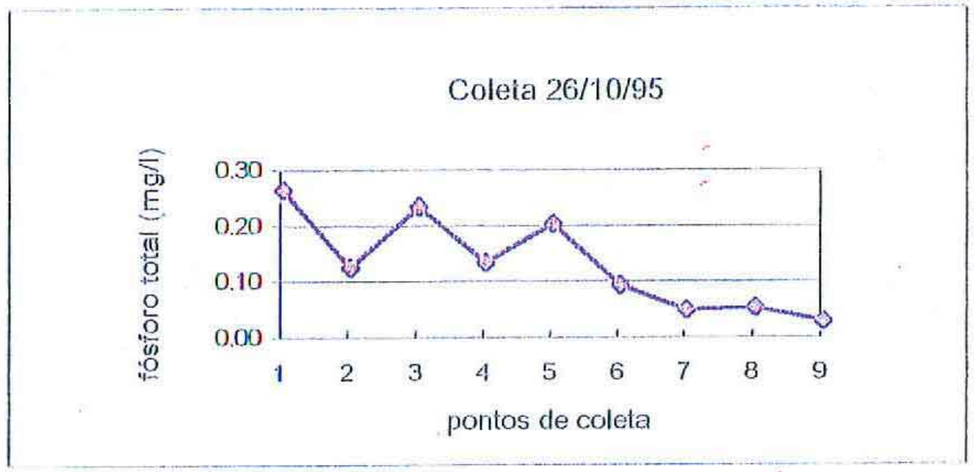
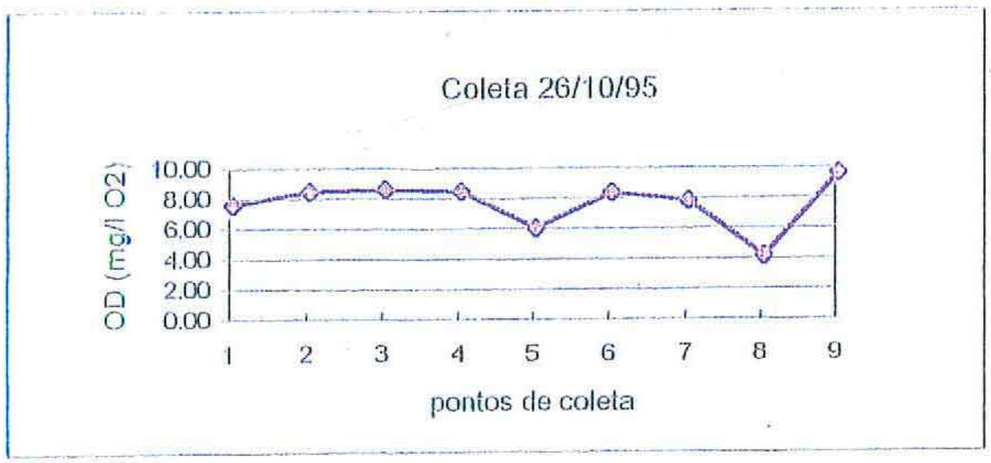
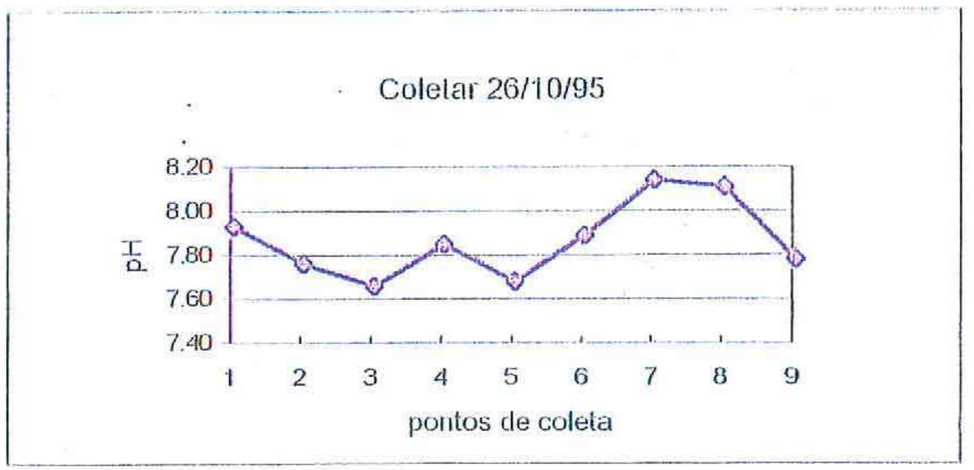
40.00
30.00
20.00
10.00
0.00
1 2 3 4 5 6 7 8 9
pontos de coleta

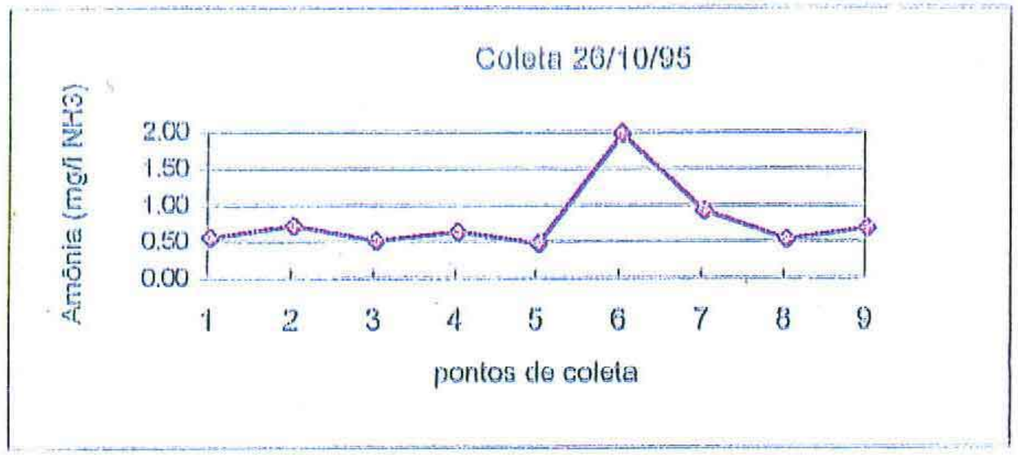

Coleta 26/10/95
DQO (mg/l)
25.00
20.00
15.00
10.00
5.00
0.00
1 2 3 4 5 6 7 8 9
pontos de coleta

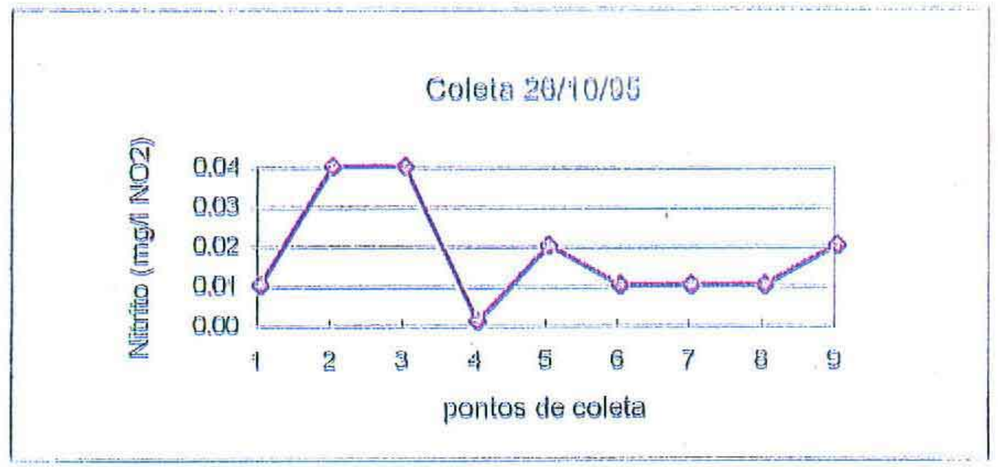

Coleta 26/10/95
DBO5 (mg/l)
4.00
3.00
2.00
1.00
0.00
1 2 3 4 5 6 7 8 9
pontos de coleta

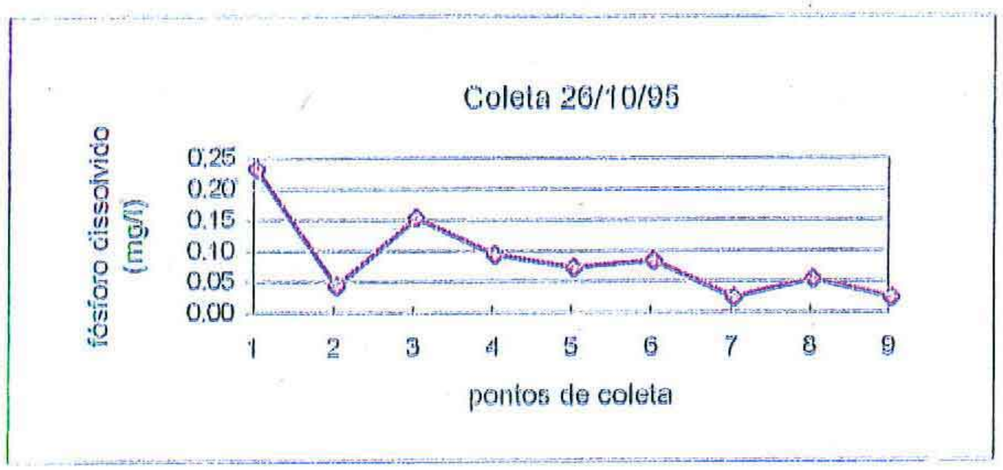

Coleta 26/10/95
fósforo total (mg/l)
0.30
0.20
0.10
0.00
1 2 3 4 5 6 7 8 9
pontos de coleta

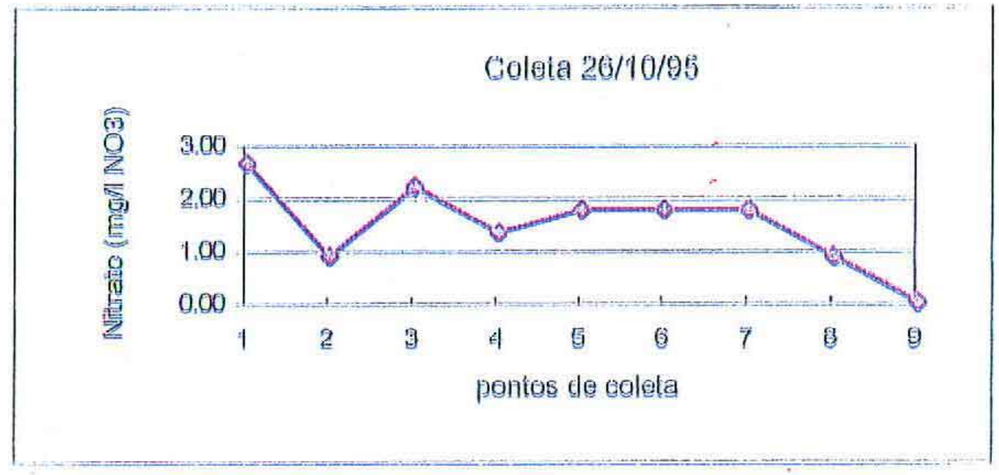

Coleta 26/10/95
OD (mg/l O2)
10.00
8.00
6.00
4.00
2.00
0.00
1 2 3 4 5 6 7 8 9
pontos de coleta

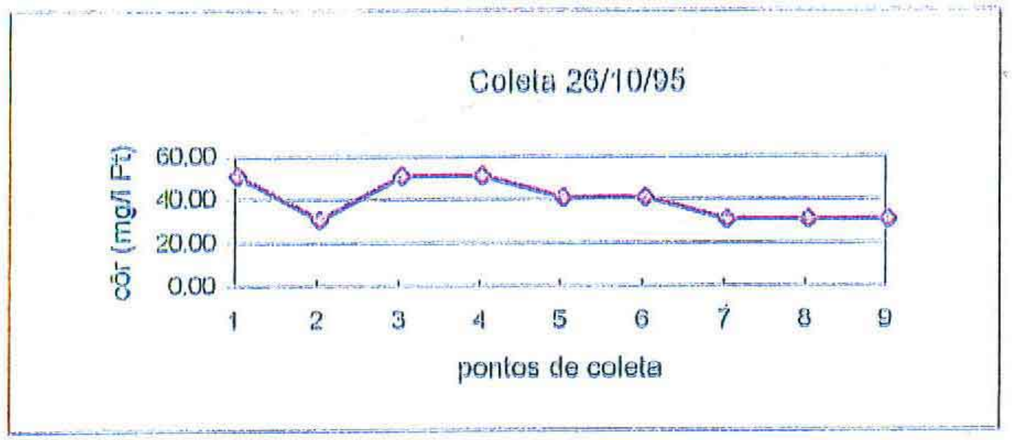

Coletar 26/10/95
pH
8.20
8.00
7.80
7.60
7.40
1 2 3 4 5 6 7 8 9
pontos de coleta

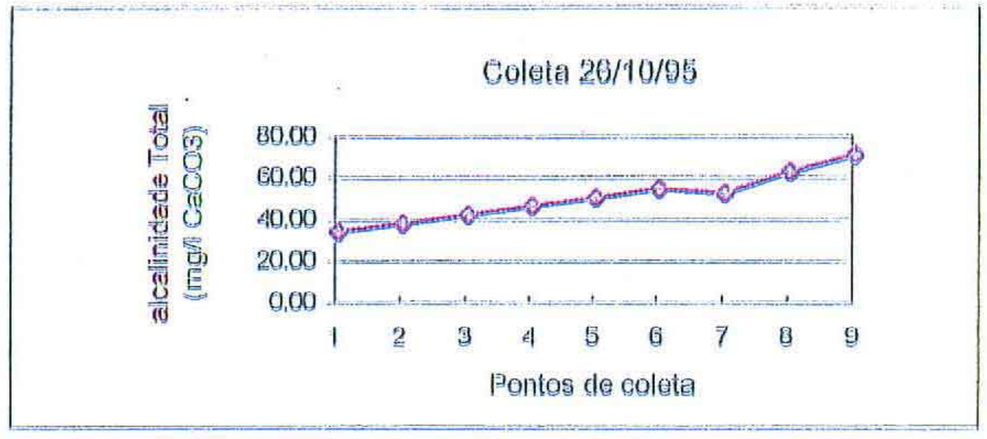

Coleta 26/10/95
Amônia (mg/l NH3)
2.00
1.50
1.00
0.50
0.00
1 2 3 4 5 6 7 8 9
pontos de coleta

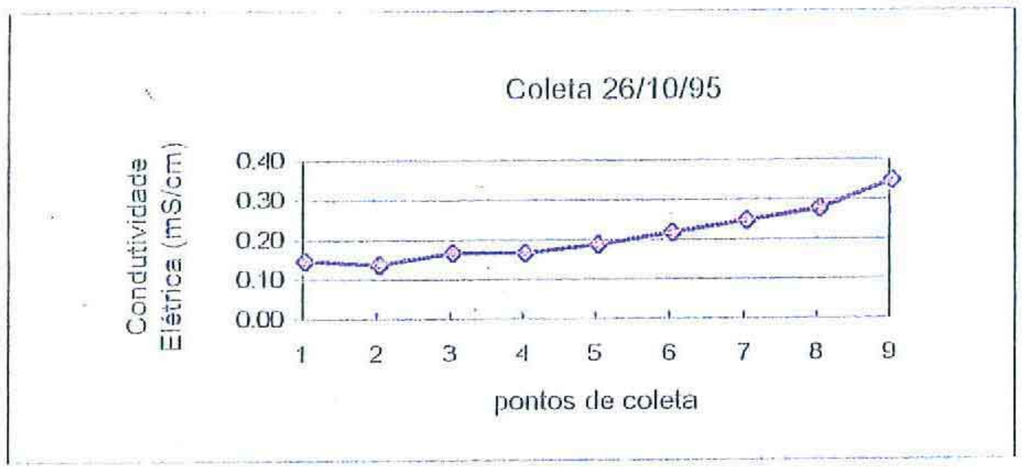

Coleta 26/10/95
Nitrito (mg/l NO2)
0,04
0,03
0,02
0,01
0,00
1 2 3 4 5 6 7 8 9
pontos de coleta

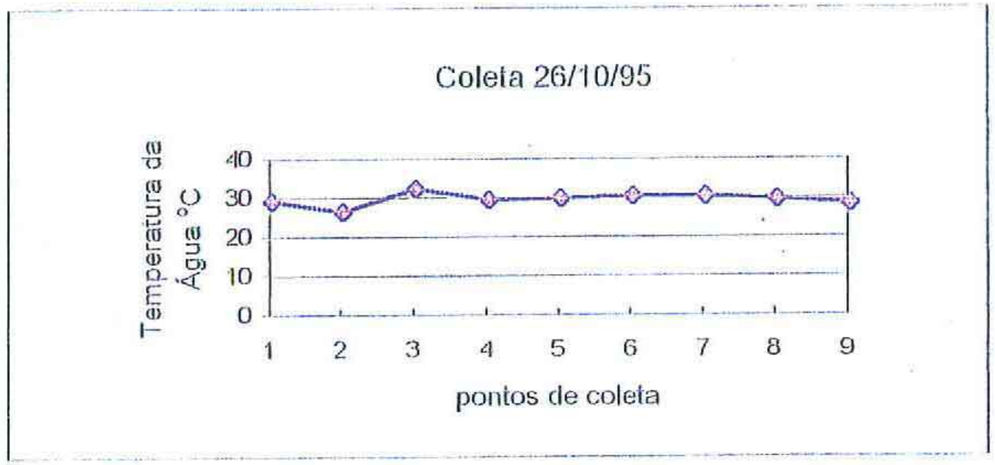

Coleta 26/10/95
fósforo dissolvido (mg/l)
0,25
0,20
0,15
0,10
0,05
0,00
1 2 3 4 5 6 7 8 9
pontos de coleta

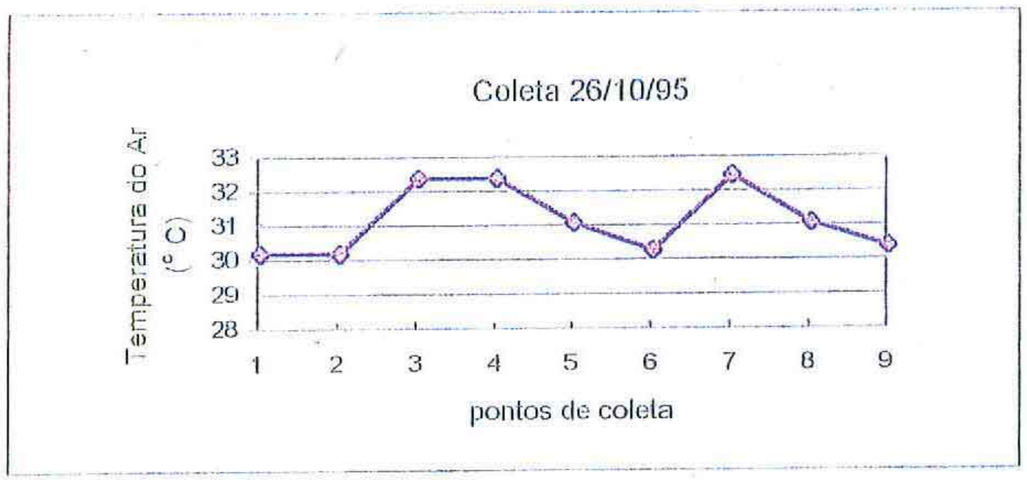

Coleta 26/10/95
Nitrato (mg/l NO3)
3,00
2,00
1,00
0,00
1 2 3 4 5 6 7 8 9
pontos de coleta

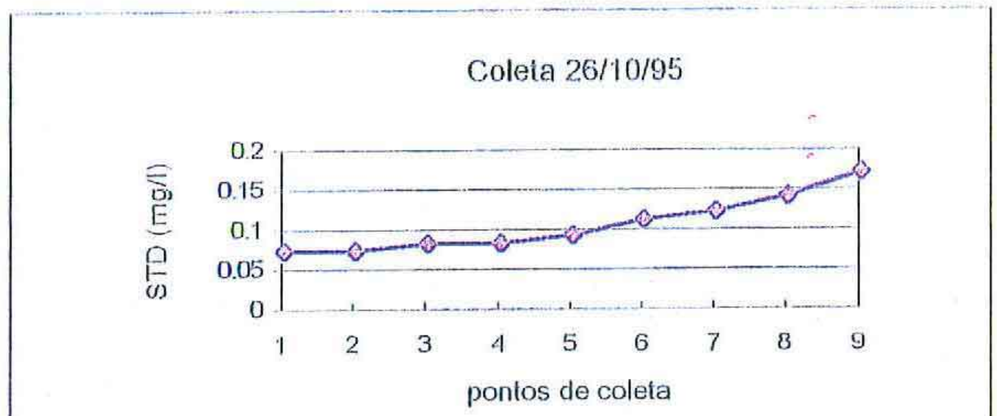

Coleta 26/10/95
côr (mg/l Pt)
60,00
40,00
20,00
0,00
1 2 3 4 5 6 7 8 9
pontos de coleta


Coleta 26/10/95
alcalinidade Total (mg/l CaCO3)
80,00
60,00
40,00
20,00
0,00
1 2 3 4 5 6 7 8 9
Pontos de coleta

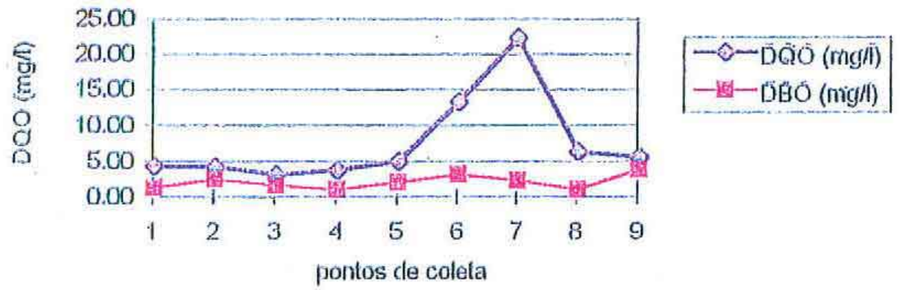

Coleta 26/10/95
Condutividade Elétrica (mS/cm)
0.40
0.30
0.20
0.10
0.00
1 2 3 4 5 6 7 8 9
pontos de coleta


Coleta 26/10/95
Temperatura da Água °C
40
30
20
10
0
1 2 3 4 5 6 7 8 9
pontos de coleta

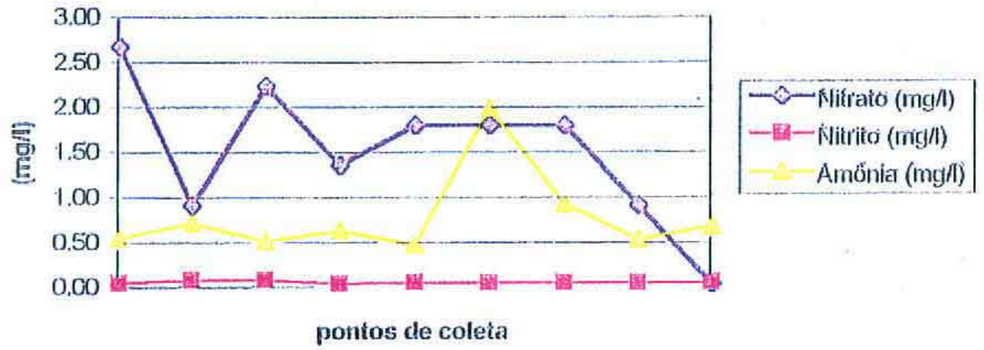

Coleta 26/10/95
Temperatura do Ar (° C)
33
32
31
30
29
28
1 2 3 4 5 6 7 8 9
pontos de coleta


Coleta 26/10/95
STD (mg/l)
0.2
0.15
0.1
0.05
0
1 2 3 4 5 6 7 8 9
pontos de coleta

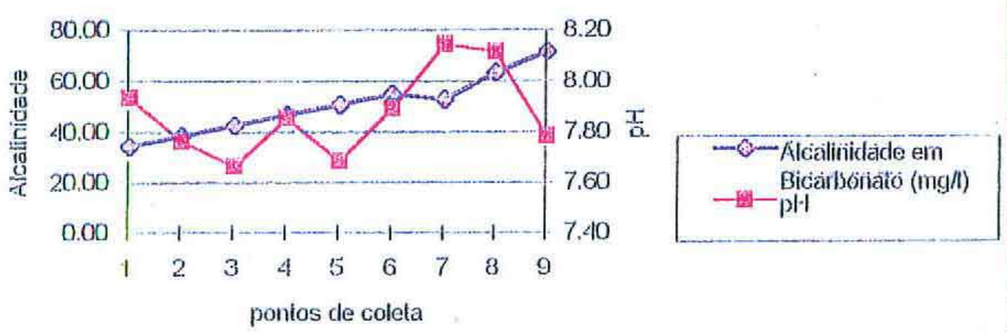
Comparação entre DQO e DBO
Coleta 26/10/95



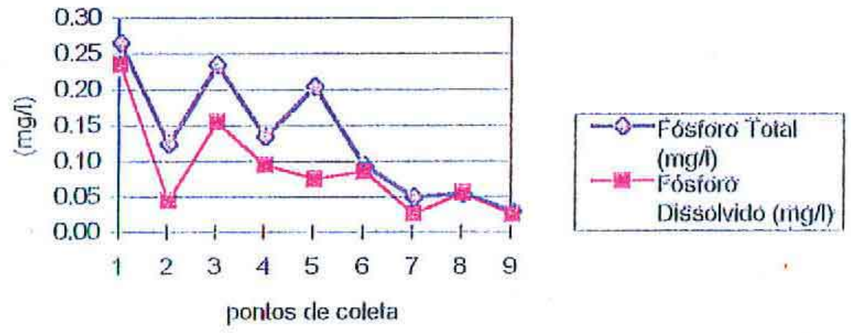
Valores de Compostos de Nitrogênio (mg/l)

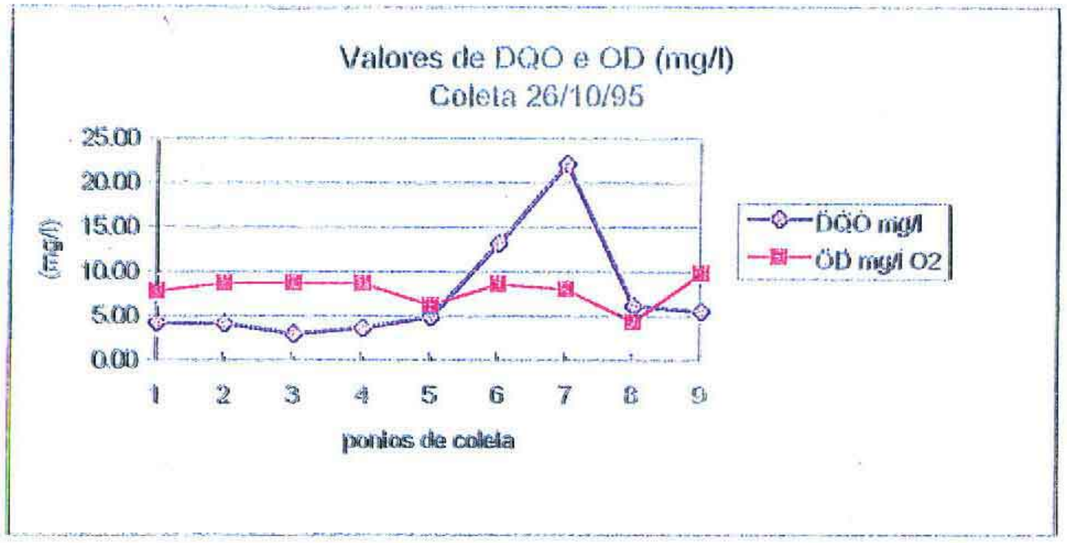


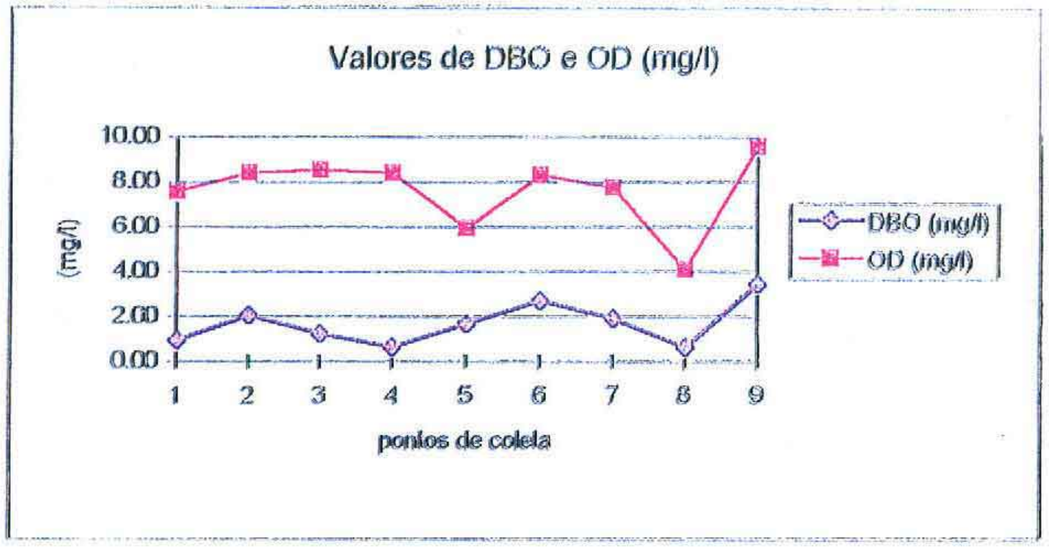
Alcalinidade em Bicarbonato e pH
Coleta 26/10/95



Valores de Fósforo Total e Fósforo Dissolvido
coleta 26/10/95




Valores de DQO e OD (mg/l)
Coleta 26/10/95
25.00
20.00
15.00
10.00
5.00
0.00
(mg/l)
1 2 3 4 5 6 7 8 9
ponios de coleta
DQO mg/l
OD mg/l O2


Valores de DBO e OD (mg/l)
10.00
8.00
6.00
4.00
2.00
0.00
(mg/l)
1 2 3 4 5 6 7 8 9
ponios de coleta
DBO (mg/l)
OD (mg/l)