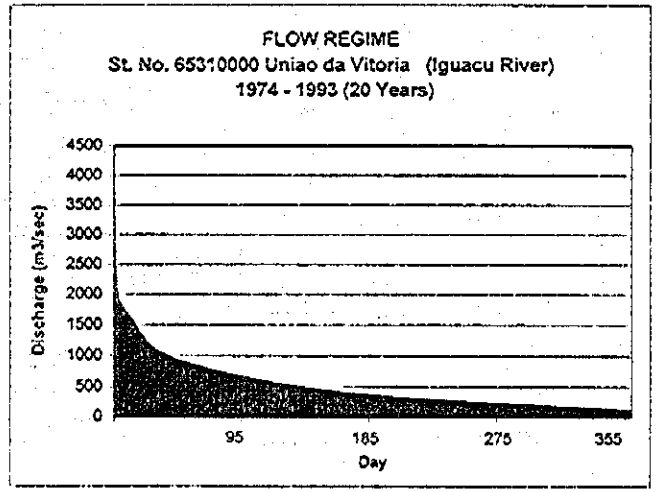
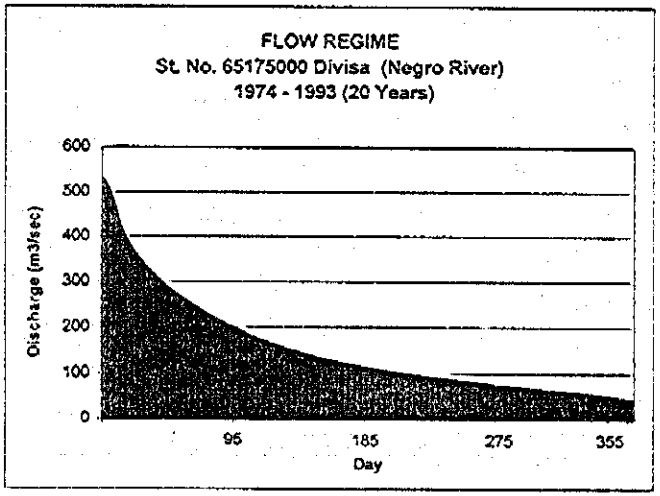


A = 24211 km2

Discharge (m3/sec)

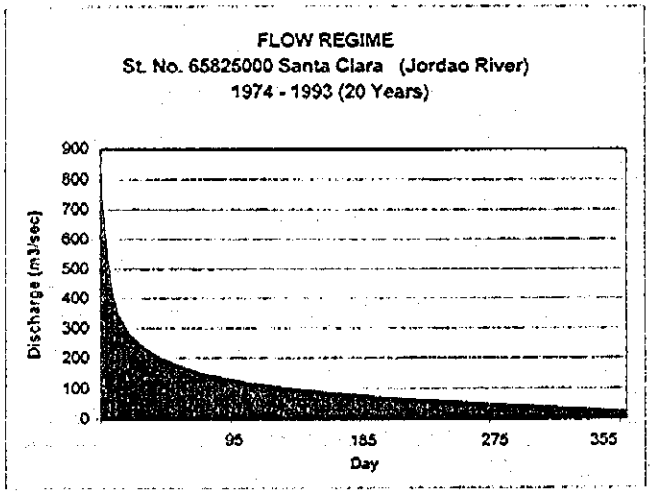
	Year	95 day	185 day	275 day	355 day	Mean	Max.	Min.
1	1974	540.59	283.19	174.09	113.99	374.07	1022.00	106.28
2	1975	561.00	299.09	189.59	119.59	490.70	2725.00	96.00
3	1976	756.69	540.59	394.00	251.59	639.03	3350.00	140.00
4	1977	596.00	387.00	223.69	125.19	433.01	1048.00	111.42
5	1978	320.79	214.39	133.59	70.30	253.74	816.00	61.94
6	1979	836.29	283.19	159.39	86.05	495.96	1565.00	72.55
7	1980	674.75	451.27	320.79	142.00	597.38	6150.01	70.50
8	1981	444.00	205.09	119.59	88.30	345.82	1804.50	81.55
9	1982	921.58	411.00	208.19	90.86	631.82	2644.09	86.05
10	1983	1374.38	686.26	486.56	280.00	1078.71	4979.59	217.64
11	1984	676.26	387.00	270.39	142.00	523.21	1850.00	119.59
12	1985	248.50	144.89	98.57	61.94	208.96	733.59	54.22
13	1986	390.50	239.19	142.00	68.05	318.89	9647.91	57.00
14	1987	595.37	339.79	208.19	125.19	518.24	3573.05	114.00
15	1988	366.00	211.29	128.00	83.80	364.65	1678.35	70.30
16	1989	800.00	437.59	226.79	119.59	575.44	9980.01	22.00
17	1990	1182.00	714.59	463.29	273.59	893.19	9932.81	198.89
18	1991	380.00	217.50	150.69	98.57	330.53	9556.31	83.80
19	1992	787.50	394.00	276.79	149.76	656.35	3808.51	108.85
20	1993	679.16	461.45	266.47	136.39	636.69	9741.61	106.28
	Mean	656.67	365.42	232.03	131.34	518.32	4330.32	98.94



A = 7970 km2

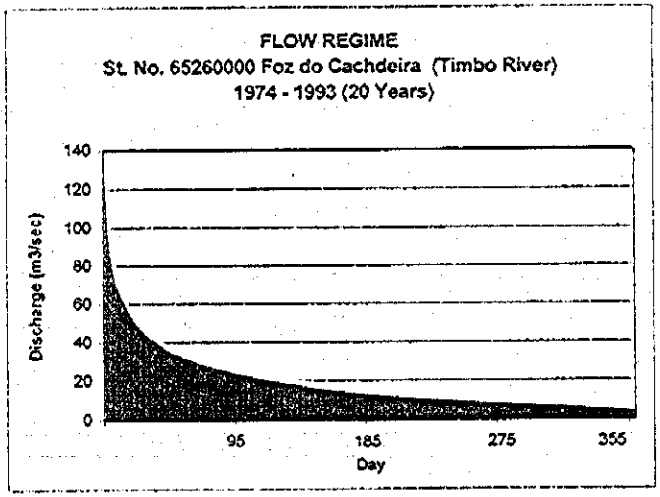
Discharge (m3/sec)

	Year	95 day	185 day	275 day	355 day	Mean	Max.	Min.
1	1974	185.00	91.00	64.19	39.43	130.67	423.19	35.45
2	1975	118.02	75.25	49.97	35.45	132.34	544.55	32.14
3	1976	231.57	160.25	124.01	90.36	191.08	468.23	75.25
4	1977	188.81	120.68	73.36	49.97	148.62	422.17	46.77
5	1978	101.87	76.50	53.75	33.50	88.65	267.69	31.25
6	1979	210.95	85.32	49.43	29.89	139.64	492.61	26.71
7	1980	224.89	168.50	112.79	53.22	194.11	585.39	49.97
8	1981	134.19	69.05	43.08	34.47	110.45	589.79	31.69
9	1982	274.69	114.74	63.59	37.41	179.53	578.79	36.43
10	1983	451.75	204.39	141.89	92.27	302.09	909.00	84.69
11	1984	201.93	122.68	86.58	56.58	165.52	620.59	48.89
12	1985	72.72	48.89	37.41	24.85	63.36	223.25	23.15
13	1986	108.91	64.79	44.13	27.85	90.22	433.39	25.19
14	1987	173.75	108.91	68.44	43.60	148.71	587.59	36.43
15	1988	120.68	73.98	49.97	36.43	118.46	548.79	32.59
16	1989	237.59	133.50	76.89	48.89	174.40	575.50	45.19
17	1990	332.97	215.05	147.50	85.29	259.18	581.00	72.24
18	1991	122.91	79.26	56.57	56.82	104.02	325.11	54.76
19	1992	216.69	120.02	85.32	54.86	181.99	862.19	41.51
20	1993	203.57	120.02	85.32	58.86	171.98	607.39	43.60
	Mean	195.67	112.64	76.21	49.50	154.75	532.31	43.70



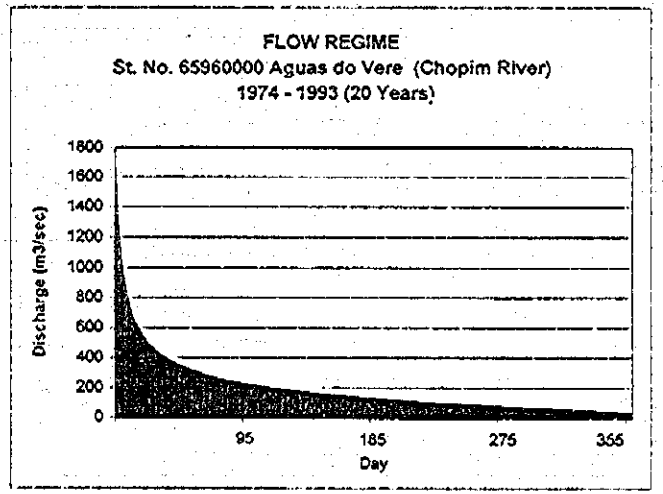
A = 3913 km2
Discharge (m3/sec)

	Year	95 day	185 day	275 day	355 day	Mean	Max.	Min.
1	1974	87.55	59.86	44.50	26.44	74.63	446.75	23.00
2	1975	124.29	64.60	44.50	29.89	104.97	746.50	23.00
3	1976	135.79	91.39	64.60	40.22	114.01	438.25	31.04
4	1977	85.63	58.27	43.08	23.00	69.09	234.00	21.19
5	1978	55.11	32.19	15.79	9.94	48.51	498.04	9.09
6	1979	142.69	64.60	35.92	18.50	108.52	860.00	14.89
7	1980	140.39	91.39	63.02	28.75	115.72	640.59	25.29
8	1981	109.39	68.03	40.22	20.29	91.66	384.00	17.59
9	1982	197.00	81.60	32.19	14.00	161.00	1110.33	12.64
10	1983	299.59	178.09	107.29	58.27	277.89	2717.00	48.60
11	1984	140.39	93.31	63.02	35.92	119.43	780.00	29.89
12	1985	68.03	43.08	24.14	13.09	55.27	384.00	12.19
13	1986	87.55	58.27	45.94	13.09	73.55	417.00	11.29
14	1987	105.19	68.03	48.80	33.34	117.16	1412.50	29.89
15	1988	78.36	45.94	23.00	13.09	68.73	660.19	12.19
16	1989	152.50	89.47	58.27	34.50	122.99	850.00	29.89
17	1990	191.59	111.50	69.75	45.94	151.89	655.29	40.22
18	1991	71.47	43.08	29.89	19.39	64.56	581.80	14.00
19	1992	155.00	109.39	74.91	45.94	150.66	2337.50	37.36
20	1993	135.79	91.39	64.60	40.22	134.04	944.00	37.36
	Mean	128.17	77.18	49.67	28.19	111.21	854.89	24.04



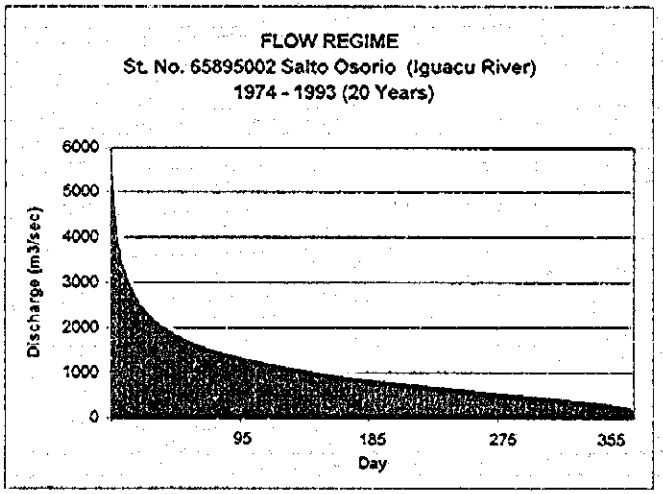
A = 693 km2
Discharge (m3/sec)

	Year	95 day	185 day	275 day	355 day	Mean	Max.	Min.
1	1974	19.89	10.42	6.41	4.19	13.77	37.61	3.91
2	1975	20.64	11.01	6.98	4.40	18.06	100.28	3.53
3	1976	27.85	19.89	14.50	9.26	23.52	123.28	5.15
4	1977	21.93	14.24	8.23	4.61	15.93	38.57	4.10
5	1978	11.81	7.89	4.92	2.59	9.34	30.03	2.28
6	1979	30.78	10.42	5.87	3.17	18.25	57.59	2.67
7	1980	24.90	17.02	11.81	5.23	22.20	226.32	2.59
8	1981	16.34	7.55	4.40	3.25	12.73	66.41	3.00
9	1982	33.91	15.12	7.66	3.34	23.25	97.30	3.17
10	1983	50.58	25.25	17.91	10.30	39.70	183.25	8.01
11	1984	24.96	14.24	9.95	5.23	19.25	68.08	4.40
12	1985	9.83	5.65	3.88	2.59	8.51	65.44	2.28
13	1986	13.00	8.19	4.62	2.03	12.48	90.00	1.30
14	1987	18.87	10.59	6.59	3.88	17.93	146.00	3.51
15	1988	18.87	8.19	4.99	3.14	17.35	260.79	2.77
16	1989	22.80	12.19	7.39	3.51	20.21	215.00	3.14
17	1990	35.00	18.87	11.39	6.59	29.28	192.59	4.99
18	1991	11.39	6.59	4.62	3.88	11.65	184.39	3.51
19	1992	22.80	13.00	8.19	4.62	23.33	393.19	4.25
20	1993	21.81	13.00	8.19	4.62	20.73	169.79	4.25
	Mean	22.90	12.47	7.92	4.52	18.88	137.30	3.64



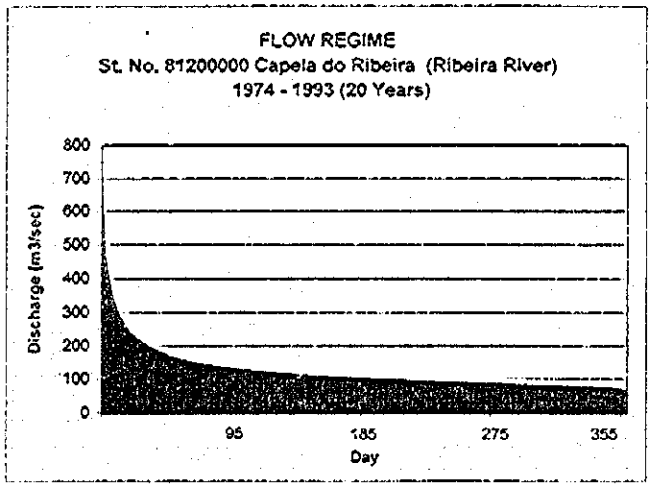
A = 6696 km2
Discharge (m3/sec)

	Year	95 day	185 day	275 day	355 day	Mean	Max.	Min.
1	1974	164.75	106.99	71.77	41.39	142.19	1048.93	34.00
2	1975	245.50	133.94	79.63	46.94	199.52	1920.00	41.39
3	1976	188.09	118.54	76.60	41.39	154.85	845.46	37.69
4	1977	133.94	88.75	57.31	24.39	112.58	695.66	21.19
5	1978	97.87	52.50	18.00	4.50	84.79	938.79	3.79
6	1979	291.79	164.75	71.77	24.39	258.28	2050.00	21.19
7	1980	212.69	133.94	88.75	41.39	167.12	831.19	34.00
8	1981	188.09	97.87	48.79	30.79	156.06	1126.26	27.59
9	1982	317.59	149.34	52.50	21.19	271.20	1806.00	15.29
10	1983	499.39	266.32	141.64	69.36	426.51	3701.59	59.72
11	1984	212.69	141.64	94.83	57.31	190.07	1716.00	41.39
12	1985	97.87	66.95	52.50	37.69	84.99	451.19	32.39
13	1986	200.39	126.25	82.67	29.19	173.42	1048.93	24.39
14	1987	200.39	118.54	76.60	45.09	203.79	2100.00	34.00
15	1988	130.09	48.79	34.00	21.19	122.54	1454.66	15.29
16	1989	261.89	153.19	97.87	59.72	229.34	2581.19	48.79
17	1990	374.50	225.00	133.94	57.31	349.48	3428.79	46.94
18	1991	141.64	79.63	46.94	22.79	126.73	1335.00	19.59
19	1992	283.19	192.19	141.64	64.55	282.54	3117.59	52.50
20	1993	253.69	157.04	94.83	62.13	216.64	1716.00	52.50
	Mean	224.80	131.11	78.13	40.14	197.63	1695.66	33.18



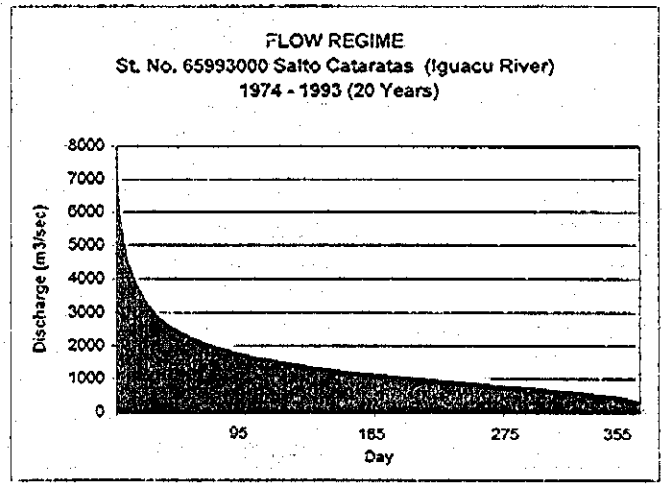
A = 45824 km2
Discharge (m3/sec)

	Year	95 day	185 day	275 day	355 day	Mean	Max.	Min.
1	1974	1072.19	664.89	462.00	310.00	788.97	2592.59	279.09
2	1975	1429.78	699.99	490.67	310.00	1134.71	6807.56	285.89
3	1976	1498.79	1068.09	771.65	440.89	1227.46	4533.34	286.63
4	1977	1140.50	814.64	528.01	226.29	895.27	2807.88	177.26
5	1978	685.66	373.00	226.29	75.81	526.35	3602.91	64.87
6	1979	1452.78	714.32	440.89	160.67	1138.98	7505.29	109.37
7	1980	1245.73	850.85	571.01	264.01	1044.90	4737.00	83.00
8	1981	941.37	642.66	440.89	286.63	881.45	6458.69	160.67
9	1982	1590.82	905.16	485.78	271.55	1374.59	7156.42	35.83
10	1983	2767.53	1498.79	941.37	614.00	2105.57	7435.51	109.37
11	1984	1222.72	905.16	757.32	503.12	1124.93	5408.33	393.37
12	1985	814.64	628.33	300.50	129.50	590.11	1590.82	66.34
13	1986	1023.59	601.69	347.59	126.69	694.14	2001.29	109.50
14	1987	1207.19	677.79	356.39	127.39	946.68	8320.00	100.00
15	1988	890.03	538.00	291.00	126.00	743.62	6008.00	100.00
16	1989	1424.19	1029.00	598.59	219.79	1196.12	9680.00	117.79
17	1990	2289.19	1424.19	887.06	267.19	1707.49	6333.00	201.00
18	1991	767.31	592.39	440.89	177.00	628.84	2062.89	136.00
19	1992	1405.86	1007.39	656.29	322.00	1359.06	9743.00	158.50
20	1993	1334.59	960.83	669.19	294.79	1266.90	9320.00	112.29
	Mean	1310.22	829.86	532.17	262.67	1068.81	5705.23	154.34



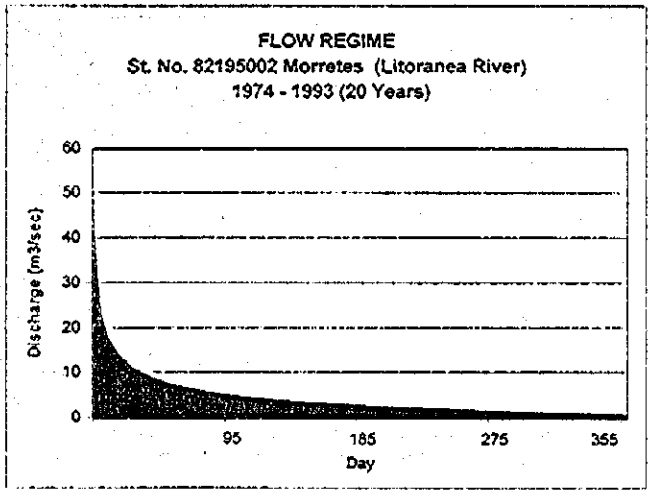
A = 7252 km2
Discharge (m3/sec)

	Year	95 day	185 day	275 day	355 day	Mean	Max.	Min.
1	1974	134.19	108.67	90.07	78.72	131.82	755.00	73.44
2	1975	135.79	102.35	82.67	73.44	128.66	766.00	65.72
3	1976	161.39	135.79	116.59	97.67	154.83	638.69	93.11
4	1977	110.25	90.07	78.72	66.98	102.72	346.00	65.72
5	1978	88.55	68.25	60.63	53.97	85.92	427.79	51.91
6	1979	102.35	68.25	57.06	51.91	93.64	573.19	49.86
7	1980	121.39	99.19	84.00	73.44	117.83	1198.59	70.80
8	1981	102.35	80.03	69.52	56.03	97.03	491.39	53.97
9	1982	140.59	90.07	68.25	53.97	126.60	1061.50	51.91
10	1983	265.59	195.19	163.00	132.59	259.14	1736.39	127.79
11	1984	142.19	115.00	105.51	82.67	131.29	531.00	74.75
12	1985	100.77	78.72	65.72	52.94	86.42	237.00	38.39
13	1986	90.07	68.25	60.63	53.97	88.65	603.00	47.80
14	1987	115.00	96.15	81.36	68.25	119.23	1168.00	65.72
15	1988	110.25	84.00	73.44	59.36	105.87	1059.00	56.03
16	1989	119.79	94.63	84.00	70.80	119.32	1249.59	68.25
17	1990	169.50	139.00	116.59	97.67	172.56	832.19	93.11
18	1991	116.59	99.19	85.51	70.80	110.88	379.19	58.10
19	1992	123.00	103.93	88.55	70.80	118.69	892.00	65.72
20	1993	163.00	118.19	105.51	90.07	153.39	725.39	66.98
	Mean	130.63	101.75	86.87	72.80	125.22	783.55	66.95



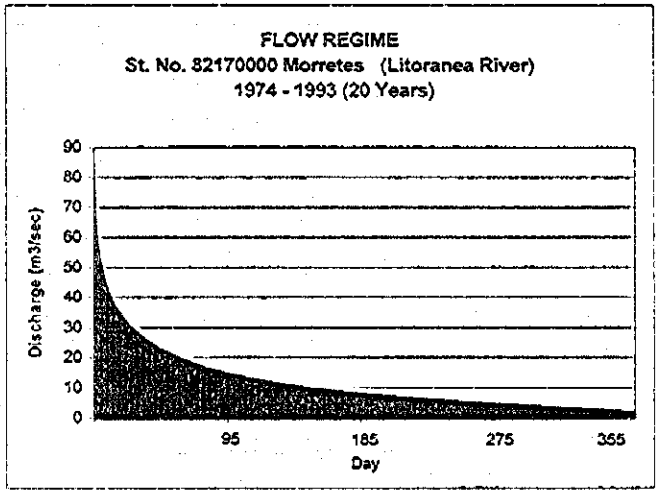
A = 65317 km2
Discharge (m3/sec)

	Year	95 day	185 day	275 day	355 day	Mean	Max.	Min.
1	1974	1512.00	1004.00	776.00	481.00	1229.22	5139.50	380.00
2	1975	1987.00	1004.00	719.00	481.00	1581.26	9025.00	413.50
3	1976	1987.00	1416.00	1023.00	584.50	1627.29	6010.00	380.00
4	1977	1512.00	1080.00	700.00	300.00	1186.89	3722.50	235.00
5	1978	909.00	494.50	300.00	100.50	697.80	4776.50	86.00
6	1979	1956.50	947.00	584.50	213.00	1512.60	9950.00	145.00
7	1980	1651.50	1128.00	757.00	350.00	1385.18	6280.00	83.00
8	1981	1248.00	852.00	584.50	380.00	1168.56	8562.50	213.00
9	1982	2109.00	1200.00	617.50	360.00	1827.22	9487.50	242.50
10	1983	3669.00	1987.00	1248.00	814.00	2791.43	9857.50	145.00
11	1984	1621.00	1200.00	1004.00	667.00	1491.35	7170.00	521.50
12	1985	1080.00	852.00	551.50	229.50	841.26	2109.00	145.00
13	1986	1344.00	1042.00	700.00	287.00	1058.70	3348.00	130.00
14	1987	1464.00	1104.00	814.00	481.00	1433.52	9950.00	350.00
15	1988	1042.00	738.00	535.00	248.00	1008.73	9765.00	155.50
16	1989	1773.50	1224.00	947.00	400.00	1515.52	8470.00	280.50
17	1990	2620.00	1773.50	1224.00	617.50	2286.14	9395.00	494.50
18	1991	985.00	814.00	634.00	440.50	890.45	3027.00	267.50
19	1992	1743.00	1392.00	1061.00	650.50	1793.44	11701.40	400.00
20	1993	1590.50	1272.00	1061.00	650.50	1547.18	9302.50	437.50
	Mean	1690.20	1126.20	792.05	436.78	1443.69	7352.45	275.25



A = 53 km2
Discharge (m3/sec)

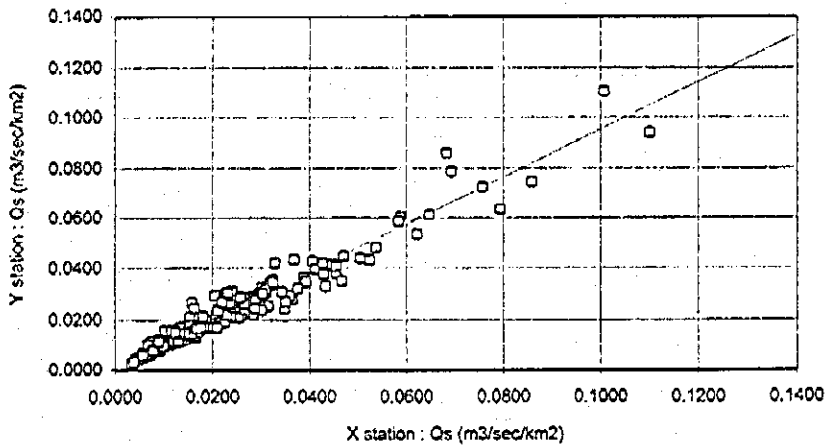
	Year	95 day	185 day	275 day	355 day	Mean	Max.	Min.
1	1974	5.75	2.62	1.52	0.64	4.44	43.85	0.64
2	1975	6.37	4.07	2.62	1.52	5.93	37.59	1.28
3	1976	4.74	3.06	2.44	1.74	4.71	53.63	1.39
4	1977	5.97	2.78	1.74	0.96	5.81	101.72	0.87
5	1978	3.06	2.09	0.96	0.70	2.98	67.19	0.70
6	1979	4.46	2.78	1.91	1.04	4.50	68.69	0.96
7	1980	5.30	2.78	1.74	0.87	4.96	83.00	0.87
8	1981	5.30	2.78	1.74	0.53	5.07	96.08	0.19
9	1982	5.57	3.34	2.09	1.22	5.05	61.55	1.04
10	1983	7.97	5.02	2.78	1.04	7.41	56.27	0.87
11	1984	4.87	2.49	1.43	0.69	3.84	21.23	0.51
12	1985	3.89	1.55	0.41	0.13	2.99	25.88	0.11
13	1986	3.89	1.69	0.88	0.22	3.28	34.95	0.16
14	1987	3.89	2.22	1.16	0.41	3.39	21.72	0.22
15	1988	5.29	2.84	1.47	0.69	4.39	39.61	0.35
16	1989	5.16	2.78	1.36	0.35	5.64	90.86	0.22
17	1990	5.42	2.97	1.66	0.80	4.99	68.28	0.57
18	1991	3.86	1.85	1.02	0.28	3.56	64.56	0.22
19	1992	5.16	3.16	1.85	0.91	4.43	59.05	0.35
20	1993	4.38	2.60	1.47	0.60	3.94	49.67	0.41
	Mean	5.02	2.77	1.61	0.77	4.57	57.27	0.60



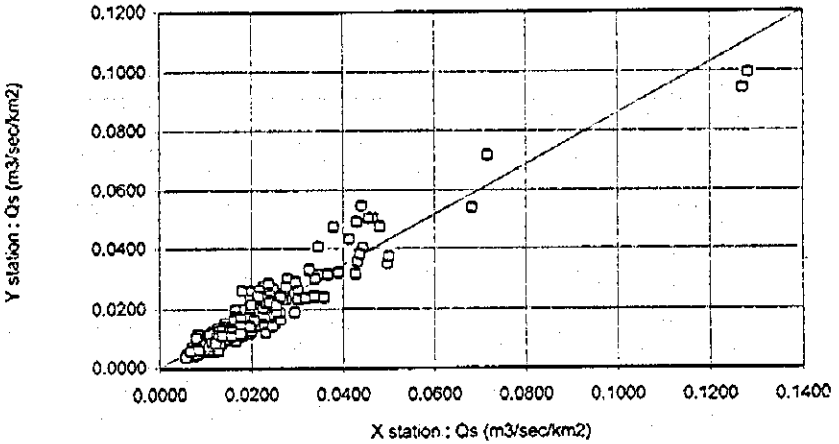
A = 217 km2
Discharge (m3/sec)

	Year	95 day	185 day	275 day	355 day	Mean	Max.	Min.
1	1974	15.47	7.19	4.30	1.98	12.01	116.00	1.98
2	1975	17.63	11.04	7.19	4.30	15.19	68.89	3.67
3	1976	17.00	10.56	6.85	5.44	14.38	125.00	4.75
4	1977	17.61	9.63	5.44	2.85	13.84	92.50	2.85
5	1978	10.10	6.50	3.34	2.36	8.61	68.00	2.11
6	1979	16.44	9.63	6.14	2.85	12.99	61.47	2.36
7	1980	17.61	9.17	5.44	2.85	13.30	83.00	2.85
8	1981	17.00	10.56	5.80	2.85	14.98	117.00	2.36
9	1982	15.89	9.63	6.85	3.34	13.35	93.00	2.85
10	1983	21.95	14.25	9.63	4.75	18.77	140.00	3.34
11	1984	13.14	6.85	4.05	2.11	10.43	56.31	1.62
12	1985	10.56	4.39	1.37	0.62	8.18	68.59	0.58
13	1986	10.56	4.75	2.61	0.88	8.96	92.50	0.71
14	1987	10.56	6.14	3.34	1.37	9.24	57.59	0.88
15	1988	14.25	7.77	4.39	2.11	11.54	81.19	1.87
16	1989	13.69	7.31	3.69	2.36	11.84	102.50	2.11
17	1990	15.89	7.77	6.14	3.10	13.87	88.00	2.85
18	1991	10.56	5.44	2.85	0.88	8.75	117.50	0.79
19	1992	12.04	6.50	4.39	2.36	10.70	65.09	2.36
20	1993	10.56	5.80	3.34	1.87	9.53	86.79	1.37
	Mean	14.43	8.04	4.86	2.56	12.02	89.05	2.21

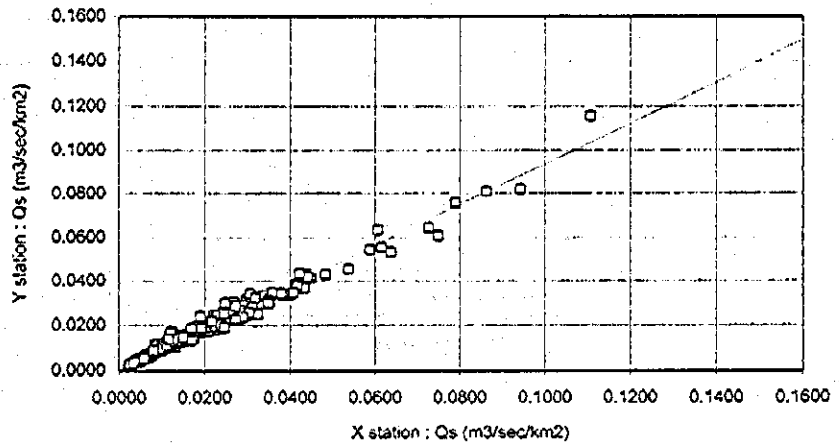
Specific Discharge Correlation Curve (4-5)
X : 64444000 Uvaia Y: 64465000 Tibagi



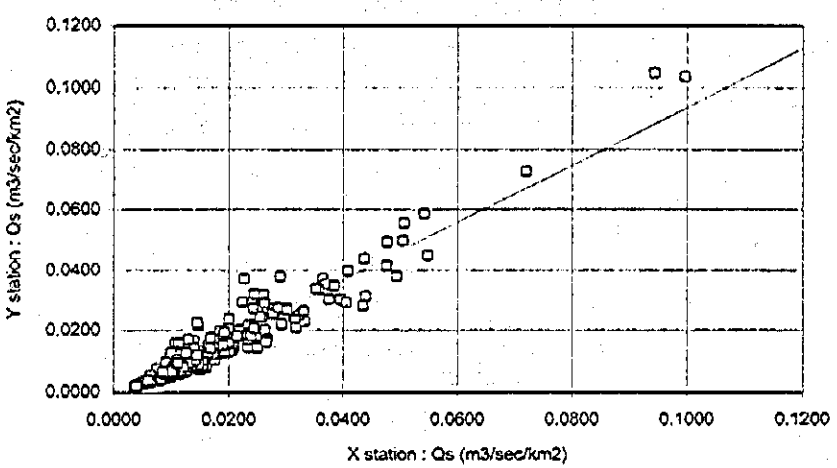
Specific Discharge Correlation Curve (1-2)
X: 64242000 Tamandua Y: 64360000 Tomazina



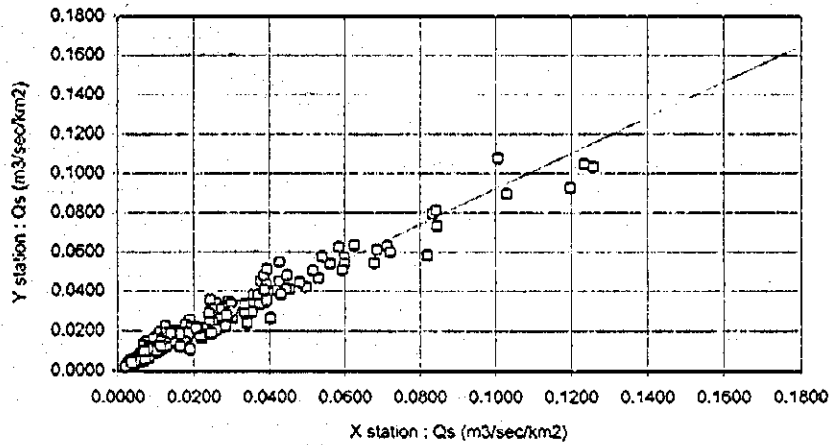
Specific Discharge Correlation Curve (5-6)
X : 64465000 Tibagi Y: 64491000 Barra Rib. Das Antas



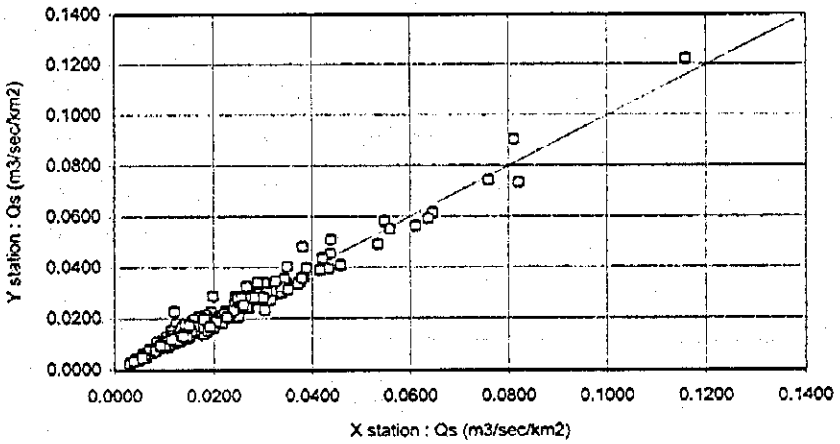
Specific Discharge Correlation Curve (2-3)
X : 64360000 Tomazina Y : 64370000 Andira



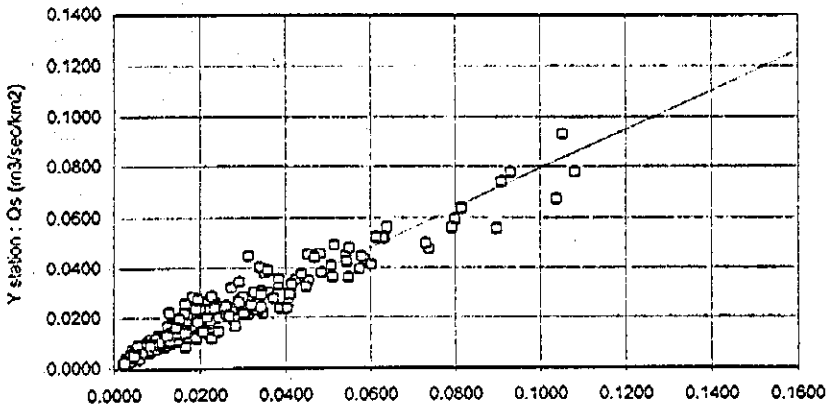
Specific Discharge Correlation Curve (9-10)
X : 64625000 Tereza Cristina Y: 64645000 Porto Espanhol



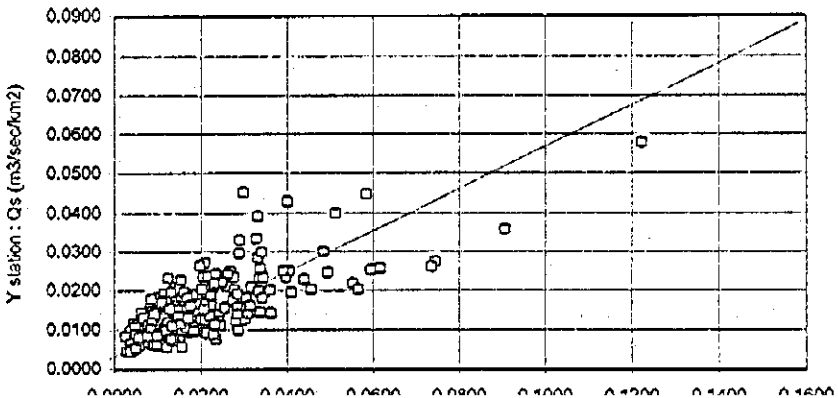
Specific Discharge Correlation Curve (6-7)
X : 64491000 Barra Rib. Das Antas Y: 64507011 Jataizinho



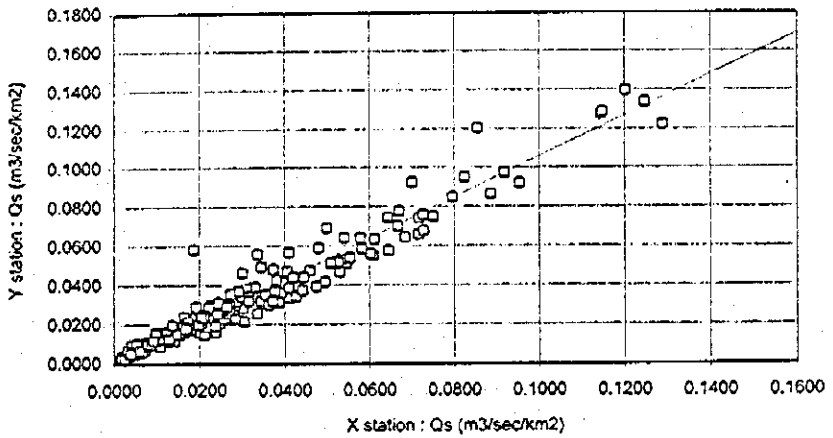
Specific Discharge Correlation Curve (10-11)
X : 64645000 Porto Espanhol Y: 64675002 Porto Bananeiras



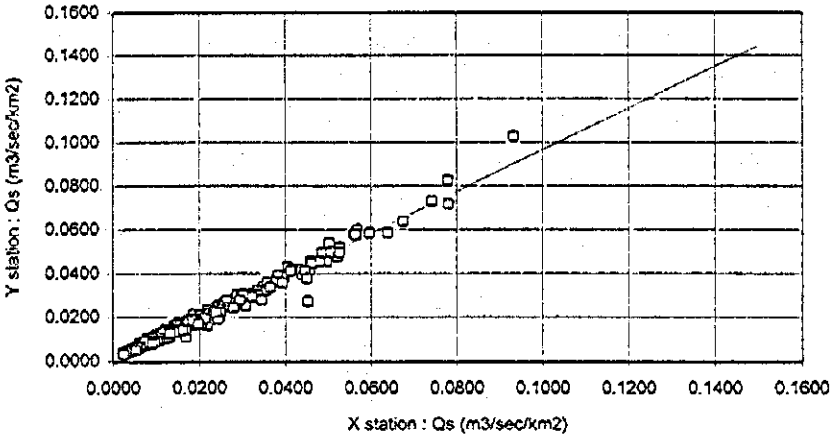
Specific Discharge Correlation Curve (7-8)
X : 64507011 Jataizinho Y: 64550000 Vila Silva Jardim



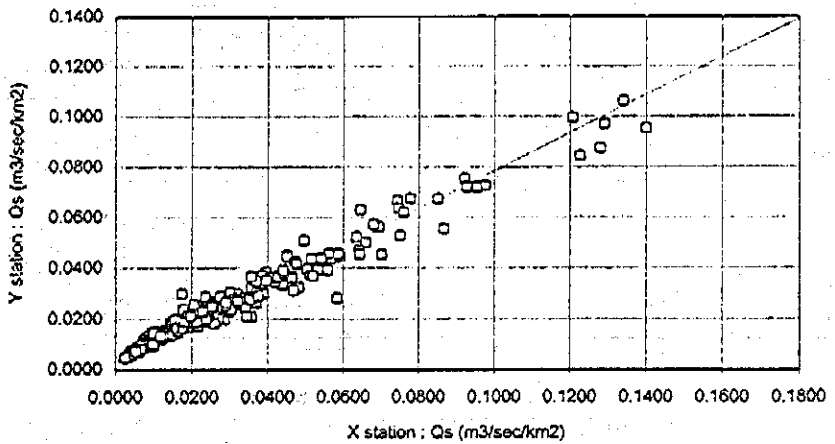
Specific Discharge Correlation Curve (14-15)
X : 64771500 Porto Guarani Y: 64795000 Ponte do Piquiri



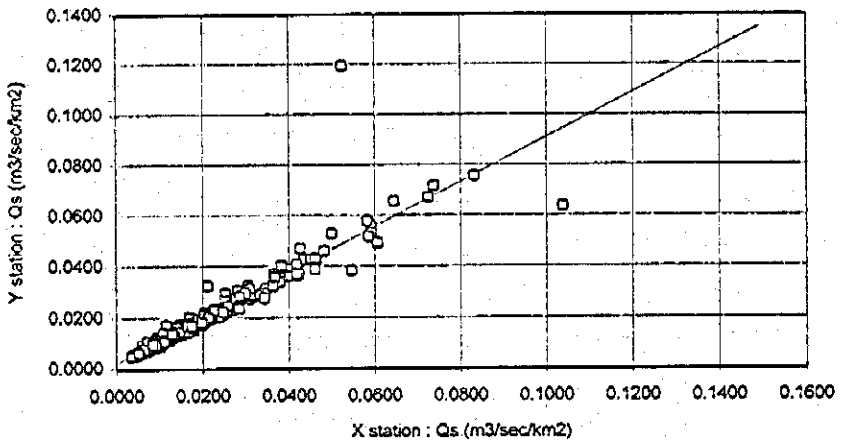
Specific Discharge Correlation Curve (11-12)
X : 64675002 Porto Bananeiras
Y : 64685000 Porto Paraiso do Norte



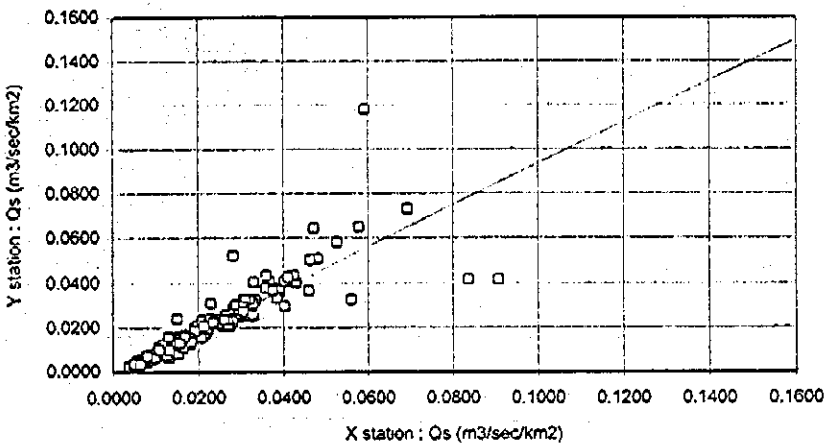
Specific Discharge Correlation Curve (15-16)
X : 64795000 Ponte do Piquiri Y: 64820000 Porto Formosa



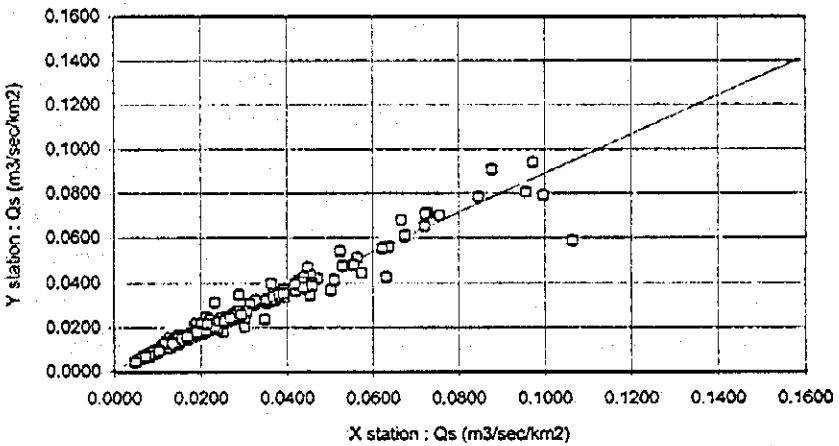
Specific Discharge Correlation Curve (12-13)
X : 64685000 Porto Paraiso do Norte
Y : 64693000 Novo Porto Taquara



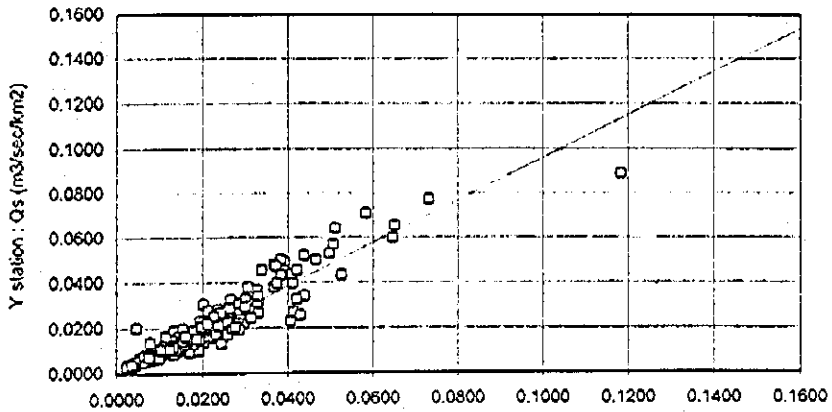
Specific Discharge Correlation Curve (19-20)
X : 65025000 Guajuvira Y: 65035000 Porto Amzonas



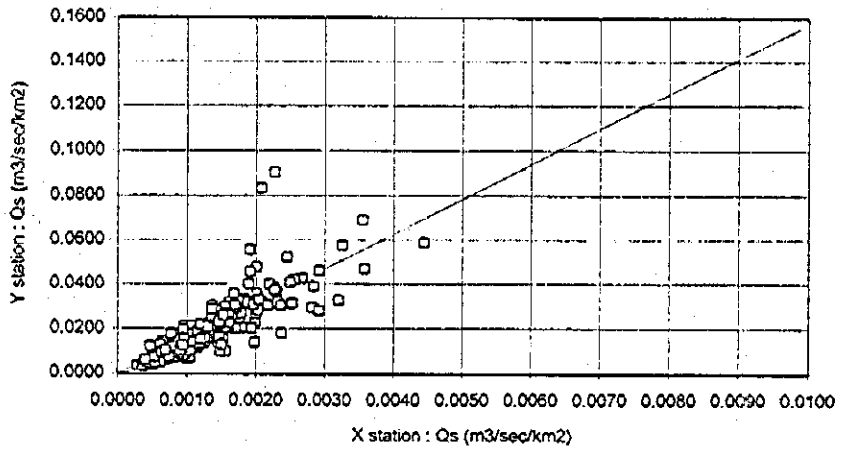
Specific Discharge Correlation Curve (16-17)
X :64820000 Porto Formosa Y:64830000 Balsa do Santa Maria



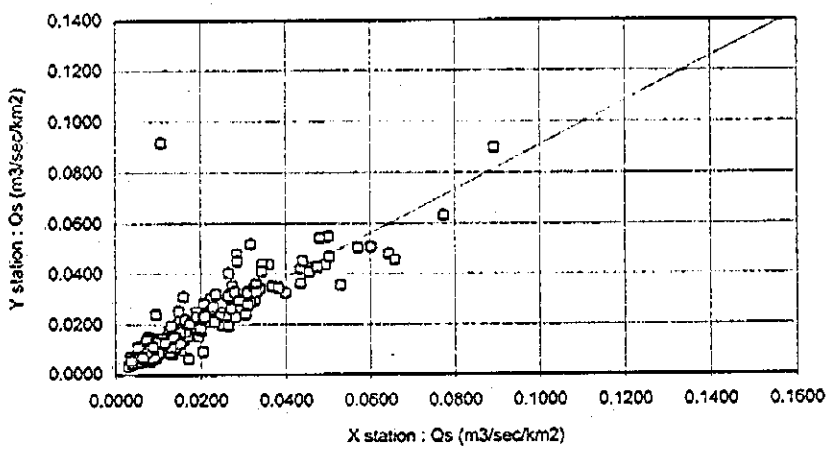
Specific Discharge Correlation Curve (20-21)
X : 65035000 porto Amzonas Y: 65060000 Sao Mateus do Sul



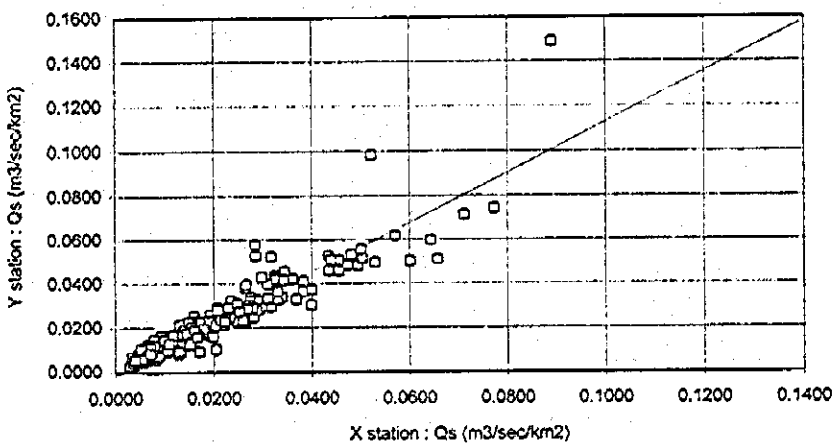
Specific Discharge Correlation Curve (18-19)
X : 65010000 Fazendinha Y: 65025000 Guajuvira



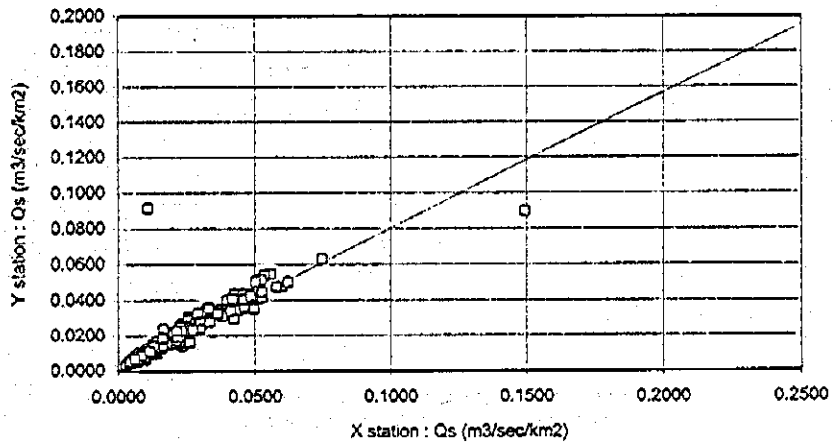
Specific Discharge Correlation Curve (21-25)
X : 65060000 Sao Mateus do Sul Y: 65175000 Divisa



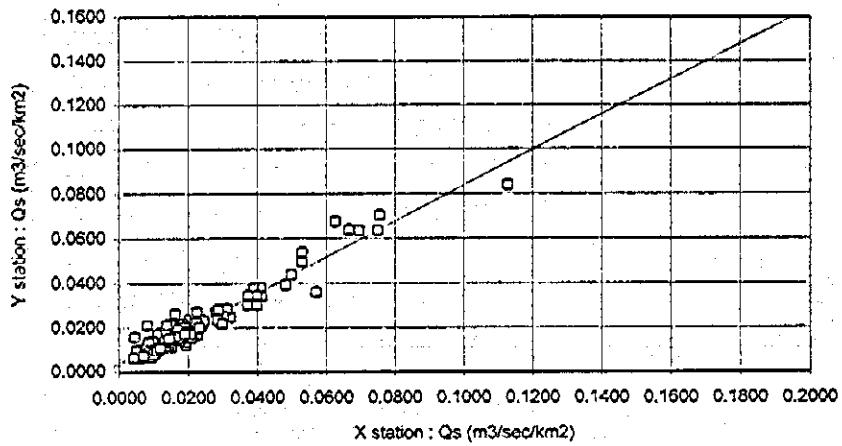
Specific Discharge Correlation Curve (21-22)
X : 65060000 Sao Mateus do Sul Y: 65310000 Uniao da Vitoria



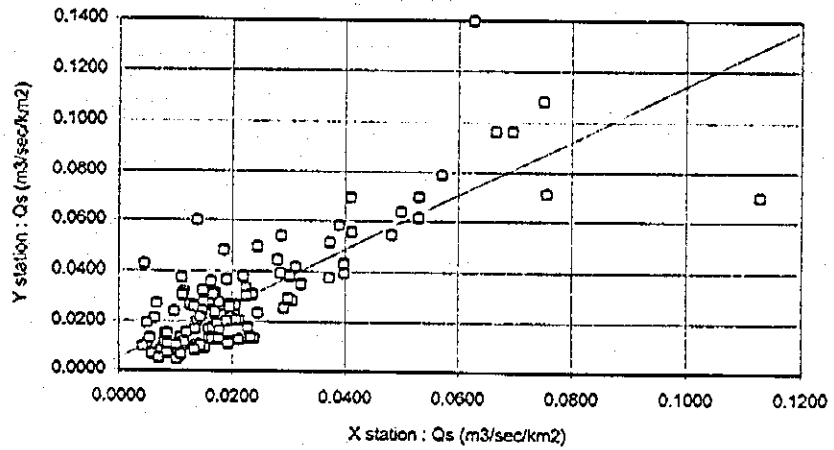
Specific Discharge Correlation Curve (22-25)
X : 65310000 Uniao da Vitoria Y: 65175000 Divisa



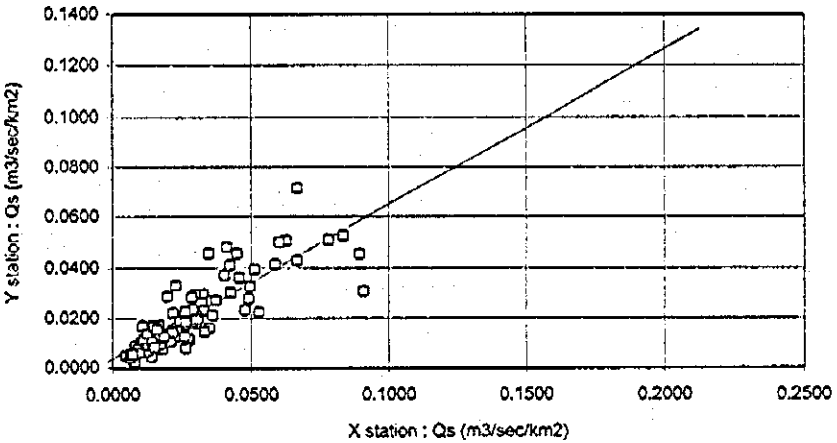
Specific Discharge Correlation Curve (23-24)
X : 65895002 Salto Osorio Y: 65993000 Salto Cataratas



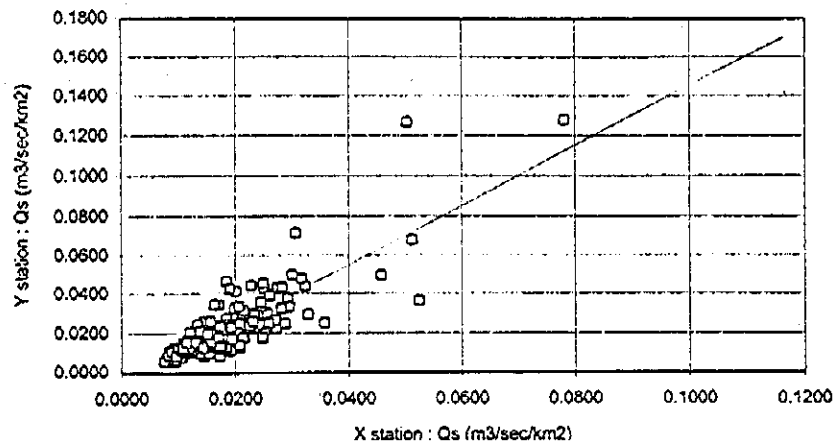
Specific Discharge Correlation Curve (23-28)
X : 65895002 Salto Osorio Y: 65960000 Aguas do Vere



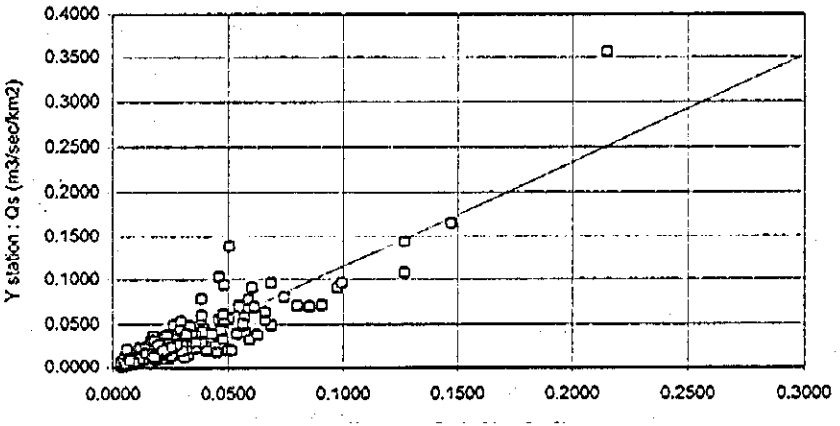
Specific Discharge Correlation Curve (26 - 22)
X : 65260000 Foz do Cachdeira Y: 65310000 Uniao do Vitoria



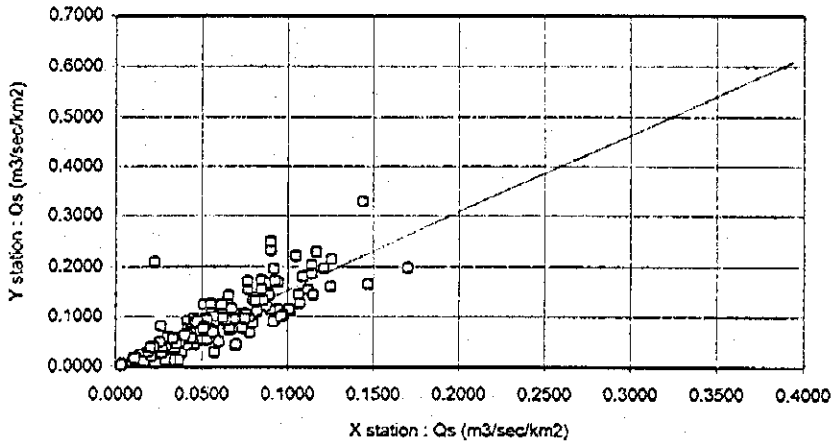
Specific Discharge Correlation Curve (31-1)
X : 81200000 Capela do Ribeira Y: 64242000 Tamandua



Specific Discharge Correlation Curve (27-28)
X : 65825000 Santa Clara Y: 65960000 Aguas do Vere



Specific Discharge Correlation Curve (32-33)
X : 82170000 Morretes Y: 82195002 Morretes



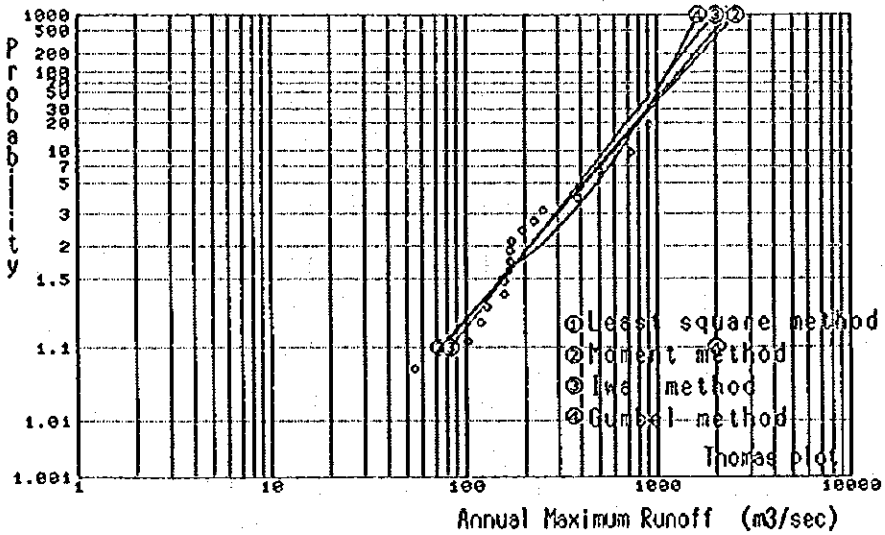


Fig. Log normal curve paper 64242000 Tamandua

table-
64242000 Tamandua

Data Summary

Date	Data	No.	Probability Exeedence thomas	hazen	Date	Data
1976 11 6	155.0	1	0.947	0.972	1989 12 31	918.0
1977 4 10	102.4	2	0.895	0.917	1990 1 10	724.6
1978 9 8	118.4	3	0.842	0.861	1983 5 20	497.0
1979 9 14	168.0	4	0.789	0.806	1980 1 26	400.1
1980 1 26	400.1	5	0.737	0.750	1987 6 15	383.2
1981 1 21	156.0	6	0.684	0.694	1982 12 22	249.2
1982 12 22	249.2	7	0.632	0.639	1992 2 2	226.0
1983 5 20	497.0	8	0.579	0.583	1993 3 24	194.0
1984 12 13	170.0	9	0.526	0.528	1984 12 13	170.0
1985 11 8	54.0	10	0.474	0.472	1979 9 14	168.0
1986 12 18	165.0	11	0.421	0.417	1991 3 7	168.0
1987 6 15	383.2	12	0.368	0.361	1986 12 18	165.0
1988 5 25	126.4	13	0.316	0.306	1981 1 21	156.0
1989 12 31	918.0	14	0.263	0.250	1976 11 6	155.0
1990 1 10	724.6	15	0.211	0.194	1988 5 25	126.4
1991 3 7	168.0	16	0.158	0.139	1978 9 8	118.4
1992 2 2	226.0	17	0.105	0.083	1977 4 10	102.4
1993 3 24	194.0	18	0.053	0.028	1985 11 8	54.0

Result of Iwai Method
64242000 Tamandua

Probability Year	Normal Variate	Expected Value
1000	3.091	2012.2
500	2.879	1721.8
200	2.576	1379.1
150	2.475	1260.5
100	2.327	1148.4
80	2.242	1079.1
70	2.190	1038.7
60	2.128	993.1
50	2.054	940.5
40	1.960	878.1
30	1.834	800.7
20	1.645	697.3
10	1.282	535.0
8	1.150	486.2
7	1.068	457.8
6	0.967	425.7
5	0.841	388.5
4	0.674	344.2
3	0.430	288.7
2	0.000	212.1

$\log(x-b)=\log(xo-b)+1/a\cdot u$

$\log(xo-b)=[Y]$
$1/a=sqr((N/(N-1))\cdot([YZ]-[Y]\cdot[Y]))$

b= -7.0
log(xo-b)= 2.31189
1/a= 0.32042

Result of GUMBEL Method
64242000 Tamandua

Probability Year	Extremal Variate	Expected Value
1000	6.907	1640.4
500	6.214	1492.3
200	5.296	1296.3
150	5.007	1234.7
100	4.600	1147.7
80	4.376	1099.8
70	4.241	1071.1
60	4.086	1037.9
50	3.902	998.6
40	3.676	950.4
30	3.384	888.1
20	2.970	799.7
10	2.250	646.0
8	2.013	595.4
7	1.870	564.7
6	1.702	528.9
5	1.500	485.7
4	1.246	431.5
3	0.903	358.2
2	0.367	243.7

$x=xo+1/a\cdot y$

$1/a=([x2]-[x]\cdot[x])/([y2]-[y]\cdot[y])$
$xo=[x]-1/a\cdot[y]$

1/a=%213.54400
xo= 165.4

Results of Ordered Probability Method
64242000 Tamandua

				log(x0)	1/a
[1]	Least Square Method	Thomas	All	2.33018	0.33845
[2]			upper10	2.21584	0.48061
[3]		Hazen	All	2.33018	0.30217
[4]			upper10	2.22973	0.41499
[5]	Moment Method	Thomas	All	2.33018	0.34953
[6]			upper10	2.21278	0.48545
[7]		Hazen	All	2.33018	0.31083
[8]			upper10	2.22553	0.42100

Fundamental Equation
$\log(X)=\log(xo)+1/a\cdot u$

Least Squre Method
$1/a=([u]\cdot[X]-[X\cdot u])/([u]\cdot[u]-[u2])$
$\log(xo)=[X]-1/a\cdot[u]$

Moment Method
$1/a=sqr(([X]\cdot[X]-[X2])/([u]\cdot[u]-[u2]))$
$\log(xo)=[X]-1/a\cdot[u]$

Probability Year	Normal Variate	Least Square Method by THOMAS All	Least Square Method by THOMAS 10	Least Square Method by HAZEN All	Least Square Method by HAZEN 10	Moment Method by THOMAS All	Moment Method by THOMAS 10	Moment Method by HAZEN All	Moment Method by HAZEN 10
1000	3.091	2377.7	5025.5	1836.8	3252.9	2572.7	5164.9	1953.5	3362.4
500	2.879	2015.6	3974.5	1584.8	2656.4	2169.1	4075.1	1678.4	2737.7
200	2.576	1592.5	2844.5	1284.2	1990.0	1700.7	2906.7	1351.9	2042.4
150	2.475	1471.9	2543.5	1197.0	1806.8	1567.9	2596.2	1237.6	1851.7
100	2.327	1311.2	2158.3	1079.6	1567.9	1391.4	2199.4	1130.9	1603.7
80	2.242	1227.2	1964.7	1017.7	1445.7	1299.4	2000.2	1064.2	1476.9
70	2.190	1178.4	1854.7	981.5	1375.6	1246.1	1887.2	1025.3	1404.2
60	2.128	1123.5	1733.1	940.5	1297.3	1186.1	1762.2	981.2	1323.2
50	2.054	1060.2	1596.3	893.1	1208.4	1117.3	1621.7	930.4	1231.3
40	1.960	985.5	1438.9	836.7	1104.8	1036.1	1460.3	870.0	1124.2
30	1.834	893.3	1251.5	766.4	979.4	936.1	1268.4	794.9	994.9
20	1.645	770.9	1015.2	671.9	817.5	803.9	1026.7	694.3	828.3
10	1.282	580.7	679.0	521.8	577.6	600.0	683.9	533.3	582.3
8	1.150	524.2	587.2	476.2	509.5	539.9	590.5	487.3	512.7
7	1.068	491.5	535.7	449.5	470.7	505.0	538.3	459.2	473.1
6	0.967	454.5	479.5	419.3	427.7	465.9	481.3	427.4	429.3
5	0.841	412.1	417.1	384.1	379.3	421.0	418.1	390.6	380.0
4	0.674	361.7	346.8	341.9	323.2	368.0	346.8	346.5	323.1
3	0.430	299.1	264.6	288.5	256.0	302.4	264.0	291.0	255.1
2	0.000	213.9	164.4	213.9	169.7	213.9	163.2	213.9	168.1

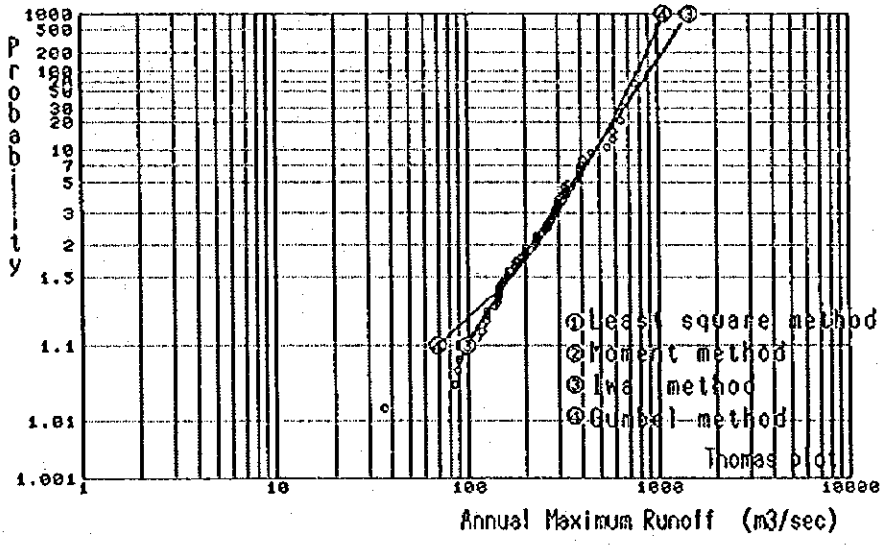


Fig. Log normal curve paper 64360000 Tamazina

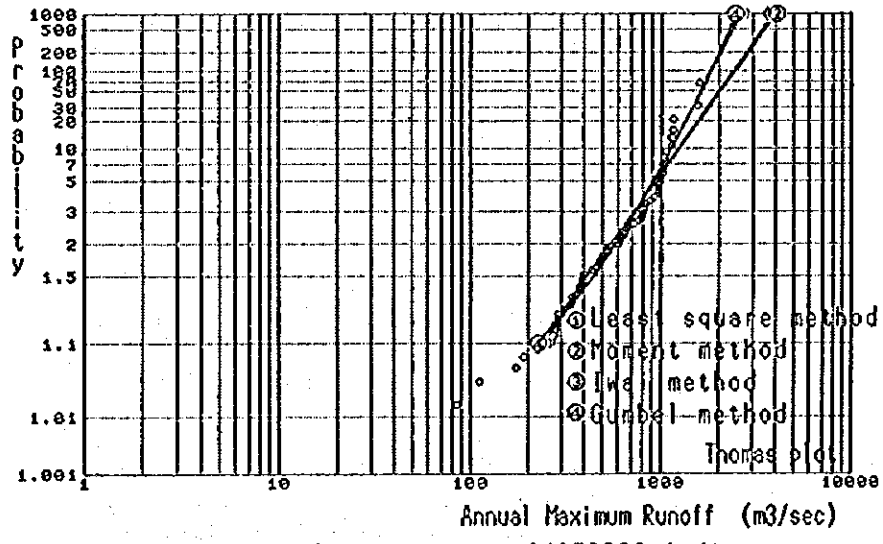


Fig. Log normal curve paper 64370000 Andira

table-
64360000 Tamazina

Data Summary

Date	Data	No.	Probability Exceedence thomas	hazen	Date	Data
1931 2 19	144.8	1	0.984	0.992	1989 12 31	758.5
1932 12 4	200.4	2	0.969	0.976	1963 1 20	657.9
1933 1 17	285.0	3	0.953	0.960	1954 5 19	648.0
1934 12 16	162.0	4	0.938	0.944	1937 1 13	580.9
1935 10 25	317.0	5	0.922	0.929	1936 1 2	580.9
1936 1 2	580.9	6	0.906	0.913	1990 1 1	541.0
1937 1 13	580.9	7	0.891	0.897	1983 4 31	455.6
1938 4 23	184.0	8	0.875	0.881	1972 10 4	408.0
1939 11 18	125.5	9	0.859	0.865	1961 4 5	394.5
1940 1 8	143.0	10	0.844	0.849	1962 12 18	391.8
1941 2 9	141.2	11	0.828	0.833	1957 9 23	391.8
1942 2 8	302.5	12	0.813	0.817	1987 6 16	386.4
1943 10 12	117.0	13	0.797	0.802	1960 1 26	334.2
1944 1 14	84.4	14	0.781	0.786	1971 1 6	326.6
1945 7 6	125.5	15	0.766	0.770	1973 1 25	324.2
1946 2 22	266.2	16	0.750	0.754	1935 10 25	317.0
1947 1 20	146.6	17	0.734	0.738	1942 2 6	302.5
1948 1 21	111.0	18	0.719	0.722	1981 1 22	300.0
1949 6 17	36.2	19	0.703	0.706	1968 1 18	300.0
1950 3 5	160.0	20	0.688	0.690	1992 5 4	290.0
1951 2 23	226.2	21	0.672	0.675	1970 12 23	287.5
1952 10 20	137.6	22	0.656	0.659	1933 1 17	285.0
1953 1 8	118.7	23	0.641	0.643	1975 11 30	275.4
1954 5 19	648.0	24	0.625	0.627	1976 2 3	273.1
1955 7 6	87.5	25	0.609	0.611	1946 2 22	266.2
1956 8 1	202.5	26	0.594	0.595	1986 5 19	266.2
1957 9 23	391.8	27	0.578	0.579	1988 5 24	257.0
1958 10 28	89.1	28	0.563	0.563	1993 2 23	246.0
1959 2 8	158.0	29	0.547	0.548	1969 11 8	230.6
1960 1 11	192.0	30	0.531	0.532	1965 2 1	230.6
1961 4 5	394.5	31	0.516	0.516	1974 3 16	226.2
1962 10 5	125.5	32	0.500	0.500	1951 2 23	226.2
1963 1 20	657.9	33	0.484	0.484	1956 8 1	202.5
1964 2 15	144.8	34	0.469	0.468	1932 12 4	200.4
1965 2 1	230.6	35	0.453	0.452	1978 12 27	198.3
1966 2 14	176.0	36	0.438	0.437	1960 1 11	192.0
1967 6 14	93.6	37	0.422	0.421	1950 3 5	180.0
1968 1 18	300.0	38	0.406	0.405	1979 9 14	178.0
1969 11 8	230.6	39	0.391	0.389	1966 2 14	176.0
1970 12 23	287.5	40	0.375	0.373	1991 12 20	176.0
1971 1 6	326.6	41	0.359	0.357	1938 4 23	164.0
1972 10 4	408.0	42	0.344	0.341	1934 12 16	162.0
1973 1 25	324.2	43	0.328	0.325	1959 2 8	158.0
1974 3 16	226.2	44	0.313	0.310	1977 4 10	154.0
1975 11 30	275.4	45	0.297	0.294	1947 1 20	146.6
1976 2 3	273.1	46	0.281	0.278	1984 9 27	144.8
1977 4 10	154.0	47	0.266	0.262	1931 2 19	144.8
1978 12 27	198.3	48	0.250	0.246	1964 2 15	144.8
1979 9 14	178.0	49	0.234	0.230	1940 1 8	143.0
1980 1 26	334.2	50	0.219	0.214	1941 2 9	141.2
1981 1 22	300.0	51	0.203	0.198	1952 10 20	137.6
1982 12 18	391.8	52	0.188	0.183	1962 10 5	125.5
1983 4 31	455.6	53	0.172	0.167	1945 7 6	125.5
1984 9 27	144.8	54	0.156	0.151	1939 11 18	125.5
1985 5 22	96.9	55	0.141	0.135	1953 1 8	118.7
1986 5 19	266.2	56	0.125	0.119	1943 10 12	117.0
1987 6 16	386.4	57	0.109	0.103	1948 1 21	111.9
1988 5 24	257.0	58	0.094	0.087	1985 5 22	96.9
1989 12 31	758.5	59	0.078	0.071	1967 6 14	93.6
1990 1 1	541.0	60	0.063	0.056	1958 10 28	89.1
1991 12 20	176.0	61	0.047	0.040	1955 7 6	87.5
1992 5 4	290.0	62	0.031	0.024	1944 1 14	84.4
1993 2 23	246.0	63	0.016	0.008	1949 6 17	36.2

Results of Ordered Probability Method
64360000 Tamazina

				log(x0)	1/a
[1]	Least Square Method	Thomas	All	2.33562	0.26629
[2]			upper10	2.33879	0.26617
[3]		Hazen	All	2.33562	0.25415
[4]			upper10	2.38719	0.22169
[5]	Moment Method	Thomas	All	2.33562	0.26891
[6]			upper10	2.31961	0.27946
[7]		Hazen	All	2.33562	0.25633
[8]			upper10	2.36431	0.23680

Fundamental Equation
log(x)=log(xo)+1/a·u

Least Squre Method
1/a=([u]·[X]-[X·u])/([u]·[u]-[u2])
log(xo)=[X]-1/a·[u]

Moment Method
1/a=sqr(([X]·[X]-[X2])/([u]·[u]-[u2]))
log(xo)=[X]-1/A·[u]

Probability Year	Normal Variate	Least Square Method by THOMAS All	by THOMAS 10	by HAZEN All	by HAZEN 10	Moment Method by THOMAS All	by THOMAS 10	by HAZEN All	by HAZEN 10
1000	3.091	1440.8	1450.1	1321.6	1181.2	1467.8	1525.1	1342.2	1247.8
500	2.879	1263.1	1273.4	1167.4	1060.1	1287.3	1330.6	1184.3	1111.6
200	2.576	1051.1	1058.1	978.1	908.5	1067.5	1095.4	990.8	942.7
150	2.475	987.9	994.5	921.9	862.8	1002.8	1026.4	933.4	892.1
100	2.327	902.0	908.1	845.2	799.9	914.7	933.0	855.2	822.8
80	2.242	856.2	862.0	804.3	765.9	867.9	883.3	813.3	785.5
70	2.190	829.3	834.9	780.1	745.8	840.4	854.2	788.7	763.6
60	2.128	798.8	804.2	752.6	722.9	809.1	821.2	760.7	738.3
50	2.054	763.2	768.4	720.6	696.0	772.7	782.9	728.1	709.1
40	1.960	720.5	725.4	682.1	663.4	729.1	737.0	688.9	673.6
30	1.834	666.9	671.5	633.6	622.1	674.3	679.6	639.5	629.0
20	1.645	593.9	598.0	567.2	564.8	599.8	601.7	571.9	567.4
10	1.282	475.3	478.6	458.5	469.2	478.9	476.2	461.5	465.4
8	1.150	438.5	441.6	424.6	438.8	441.5	437.6	427.1	433.2
7	1.068	416.8	419.7	404.5	420.6	419.5	414.9	406.7	414.1
6	0.967	391.9	394.7	381.5	399.6	394.2	389.0	383.3	392.1
5	0.841	362.8	365.4	354.4	374.7	364.7	358.7	355.9	366.1
4	0.674	327.5	329.8	321.3	344.1	328.8	322.1	322.4	334.2
3	0.430	282.0	284.0	278.6	303.8	282.7	275.3	279.2	292.6
2	0.000	216.6	218.2	216.6	240.9	216.6	208.7	216.8	231.4

Result of Iwai Method
64360000 Tamazina

Probability Year	Normal Variate	Expected Value
1000	3.091	1485.2
500	2.879	1296.7
200	2.576	1068.9
150	2.475	1002.1
100	2.327	911.7
80	2.242	863.7
70	2.190	835.6
60	2.128	803.7
50	2.054	766.6
40	1.960	722.3
30	1.834	666.9
20	1.645	591.7
10	1.282	470.7
8	1.150	433.5
7	1.068	411.6
6	0.967	386.7
5	0.841	357.5
4	0.674	322.3
3	0.430	277.4
2	0.000	213.4

log(x-b)=log(xo-b)+1/a·u

log(xo-b)=[Y]
1/a=sqr((N/(N-1))·([Y2]-[Y]·[Y]))

b= -14.2
log(xo-b)= 2.29930
1/a= 0.28096

Result of GUMBEL Method
64360000 Tamazina

Probability Year	Extremal Variate	Expected Value
1000	6.907	1084.9
500	6.214	994.4
200	5.296	874.6
150	5.007	837.0
100	4.600	783.9
80	4.376	754.6
70	4.241	737.0
60	4.086	716.8
50	3.902	692.8
40	3.678	663.3
30	3.384	625.2
20	2.970	571.2
10	2.250	477.3
8	2.010	446.4
7	1.870	427.6
6	1.702	405.7
5	1.500	379.4
4	1.246	346.2
3	0.903	301.4
2	0.367	231.5

x=xo+1/a·y

1/a=([x2]-[x]·[x])/([y2]-[y]·[y])
xo=[x]-1/a·[y]

1/a=130.47200
xo= 183.7

table-
64370000 Andira

Data Summary

Date	Data	No.	Probability Exceedence thomas	hazen	Date	Data
1931 12 8	375.2	1	0.984	0.992	1983 6 7	1373.0
1932 11 26	474.8	2	0.969	0.976	1990 1 11	1359.0
1933 1 18	672.0	3	0.953	0.960	1935 10 27	1168.0
1934 12 17	339.0	4	0.938	0.944	1946 2 23	1168.0
1935 10 27	1168.0	5	0.922	0.929	1974 3 19	1140.0
1936 12 5	281.2	6	0.906	0.913	1963 1 20	1131.3
1937 1 11	823.4	7	0.891	0.897	1973 2 19	1049.4
1938 5 24	270.2	8	0.875	0.881	1971 1 8	1029.8
1939 11 19	313.8	9	0.859	0.865	1961 4 7	1027.0
1940 1 10	172.2	10	0.844	0.849	1957 7 17	1021.4
1941 11 5	477.0	11	0.828	0.833	1972 10 4	1021.4
1942 2 6	538.1	12	0.813	0.817	1992 5 4	982.8
1943 1 31	224.4	13	0.797	0.802	1993 1 13	980.1
1944 1 15	112.5	14	0.781	0.786	1989 12 31	969.3
1945 6 24	277.6	15	0.766	0.770	1954 5 19	969.3
1946 2 23	1168.0	16	0.750	0.754	1976 6 6	961.2
1947 2 19	792.2	17	0.734	0.738	1975 12 1	918.0
1948 2 9	392.0	18	0.719	0.722	1985 5 22	878.0
1949 4 2	84.1	19	0.703	0.706	1982 12 23	831.2
1950 3 5	379.4	20	0.688	0.690	1937 1 11	823.4
1951 11 26	526.6	21	0.672	0.675	1980 12 14	813.0
1952 10 23	389.9	22	0.656	0.659	1987 6 16	797.4
1953 2 14	284.8	23	0.641	0.643	1947 2 19	792.2
1954 5 19	969.3	24	0.625	0.627	1966 10 29	754.5
1955 8 30	292.0	25	0.609	0.611	1981 12 7	722.0
1956 5 26	526.6	26	0.594	0.595	1933 1 18	672.0
1957 7 17	1021.4	27	0.578	0.579	1964 2 20	654.8
1958 10 28	400.4	28	0.563	0.563	1991 3 7	652.4
1959 2 9	457.2	29	0.547	0.548	1968 1 19	642.8
1960 5 25	361.0	30	0.531	0.532	1985 5 20	614.0
1961 4 7	1027.0	31	0.516	0.516	1986 5 19	604.8
1962 10 12	343.0	32	0.500	0.500	1988 5 31	595.6
1963 1 20	1131.3	33	0.484	0.484	1942 2 6	538.1
1964 2 20	654.8	34	0.469	0.468	1951 11 26	526.6
1965 5 20	614.0	35	0.453	0.452	1956 5 26	526.6
1966 10 29	754.5	36	0.438	0.437	1970 9 23	499.0
1967 6 14	191.8	37	0.422	0.421	1969 11 20	488.0
1968 1 19	642.8	38	0.406	0.405	1941 11 5	477.0
1969 11 20	488.0	39	0.391	0.389	1932 11 26	474.8
1970 9 23	499.0	40	0.375	0.373	1959 2 9	457.2
1971 1 8	1029.8	41	0.359	0.357	1977 4 10	436.1
1972 10 4	1021.4	42	0.344	0.341	1958 10 28	400.4
1973 2 19	1049.4	43	0.328	0.325	1948 2 9	392.0
1974 3 19	1140.0	44	0.313	0.310	1978 9 9	389.9
1975 12 1	918.0	45	0.297	0.294	1952 10 23	389.9
1976 6 6	961.2	46	0.281	0.278	1950 3 5	379.4
1977 4 10	436.1	47	0.266	0.262	1931 12 8	375.2
1978 9 9	389.9	48	0.250	0.246	1960 5 25	361.0
1979 9 15	292.0	49	0.234	0.230	1984 12 2	345.0
1980 12 14	813.0	50	0.219	0.214	1962 10 12	343.0
1981 12 7	722.0	51	0.203	0.198	1934 12 17	339.0
1982 12 23	831.2	52	0.188	0.183	1939 11 19	315.8
1983 6 7	1373.0	53	0.172	0.167	1955 8 30	292.0
1984 12 2	345.0	54	0.156	0.151	1979 9 15	292.0
1985 5 22	878.0	55	0.141	0.135	1953 2 14	284.8
1986 5 19	604.8	56	0.125	0.119	1936 12 5	281.2
1987 6 16	797.4	57	0.109	0.103	1945 6 24	277.6
1988 5 31	595.6	58	0.094	0.087	1938 5 24	270.2
1989 12 31	969.3	59	0.078	0.071	1943 1 31	224.4
1990 1 11	1359.0	60	0.063	0.056	1967 6 14	191.8
1991 3 7	652.4	61	0.047	0.040	1940 1 10	172.2
1992 5 4	982.8	62	0.031	0.024	1944 1 15	112.5
1993 1 13	980.1	63	0.016	0.008	1949 4 2	84.1

Results of Ordered Probability Method
64370000 Andira

				log(X0)	1/a
[1]	Least	Thomas	All	2.73649	0.27534
[2]	Square		upper10	2.80945	0.17980
[3]	Method	Hazen	All	2.73649	0.26260
[4]			upper10	2.83754	0.15279
[5]	Moment	Thomas	All	2.73649	0.28133
[6]	Method		upper10	2.79287	0.19129
[7]		Hazen	All	2.73649	0.26818
[8]			upper10	2.82346	0.16208

Fundamental Equation

$$\log(x)=\log(x_0)-1/a\cdot u$$

Least Squre Method

$$1/a=([u]\cdot[X]-[X\cdot u])/([u]\cdot[u]-[u2])$$

$$\log(x_0)=[X]-1/a\cdot[u]$$

Moment Method

$$1/a=sqr(([X]\cdot[X]-[X2])/([u]\cdot[u]-[u2]))$$

$$\log(x_0)=[X]-1/a\cdot[u]$$

Probability Year	Normal Variate	Least Square Method by THOMAS All	Least Square Method by THOMAS 10	Least Square Method by HAZEN All	Least Square Method by HAZEN 10	Moment Method by THOMAS All	Moment Method by THOMAS 10	Moment Method by HAZEN All	Moment Method by HAZEN 10
1000	3.091	3867.6	2318.0	3532.3	2040.5	4036.1	2421.3	3675.4	2110.5
500	2.879	3381.2	2123.2	3107.3	1893.8	3518.1	2205.4	3224.4	1949.9
200	2.576	2791.5	1873.5	2586.3	1702.8	2892.5	1930.5	2675.4	1741.9
150	2.475	2618.2	1796.7	2434.8	1643.2	2709.2	1846.4	2515.5	1677.4
100	2.327	2383.2	1689.7	2225.9	1559.7	2460.9	1729.6	2292.4	1587.1
80	2.242	2258.2	1631.3	2114.5	1513.8	2329.1	1666.1	2176.3	1537.5
70	2.190	2184.9	1596.5	2048.9	1486.3	2251.9	1628.3	2107.4	1508.0
60	2.128	2101.6	1556.5	1974.4	1454.6	2164.2	1585.0	2029.1	1473.8
50	2.054	2004.9	1509.3	1887.6	1417.1	2062.5	1533.9	1938.1	1433.5
40	1.960	1889.2	1451.9	1783.6	1371.1	1941.0	1471.9	1829.1	1384.2
30	1.834	1744.0	1378.0	1652.7	1311.6	1788.7	1392.4	1692.1	1320.6
20	1.645	1547.0	1274.3	1474.1	1227.2	1582.5	1281.1	1505.6	1230.6
10	1.282	1228.6	1096.2	1183.2	1079.9	1250.5	1091.6	1202.9	1074.5
8	1.150	1130.5	1038.2	1092.9	1031.1	1148.5	1030.2	1109.2	1023.1
7	1.068	1072.6	1003.2	1039.5	1001.5	1086.5	993.3	1053.9	992.0
6	0.967	1006.6	962.5	978.4	966.8	1020.1	950.4	990.6	955.6
5	0.841	929.4	913.6	906.7	924.9	940.2	899.1	916.5	911.7
4	0.674	835.8	852.4	819.5	872.1	843.7	835.3	826.6	856.5
3	0.430	716.1	770.6	707.1	800.4	720.4	750.2	711.0	782.0
2	0.000	545.1	644.8	545.1	687.9	545.1	620.7	543.1	666.0

Result of Iwai Method
64370000 Andira

Probability Year	Normal Variate	Expected Value
1000	3.091	2619.8
500	2.879	2381.7
200	2.576	2076.5
150	2.475	1982.7
100	2.327	1851.9
80	2.242	1780.6
70	2.190	1738.1
60	2.128	1689.2
50	2.054	1631.5
40	1.960	1561.3
30	1.834	1471.1
20	1.645	1344.2
10	1.282	1126.7
8	1.150	1055.8
7	1.068	1013.0
6	0.967	963.2
5	0.841	903.5
4	0.674	828.8
3	0.430	728.7
2	0.000	595.0

$$\log(x-b)=\log(x_0-b)-1/a\cdot u$$

$$\log(x_0-b)=[Y]$$

$$1/a=sqr((N/(N-1))\cdot([Y2]-[Y]\cdot[Y]))$$

$$b= 213.2$$

$$\log(x_0-b)= 2.89664$$

$$1/a= 0.17978$$

Result of GUMBEL Method
64370000 Andira

Probability Year	Extremal Variate	Expected Value
1000	6.907	2486.6
500	6.214	2265.2
200	5.296	2018.8
150	5.007	1935.1
100	4.600	1816.9
80	4.376	1751.6
70	4.241	1712.7
60	4.086	1667.6
50	3.902	1614.2
40	3.676	1548.7
30	3.384	1464.0
20	2.970	1343.8
10	2.250	1134.8
8	2.013	1066.1
7	1.870	1024.4
6	1.702	975.7
5	1.500	917.0
4	1.246	843.3
3	0.903	743.6
2	0.367	588.0

$$x=x_0-1/a\cdot y$$

$$1/a=([x2]-[x]\cdot[x])/([y2]-[y]\cdot[y])$$

$$x_0=[x]-1/a\cdot[y]$$

$$1/a=\%200.26900$$

$$x_0= 481.6$$

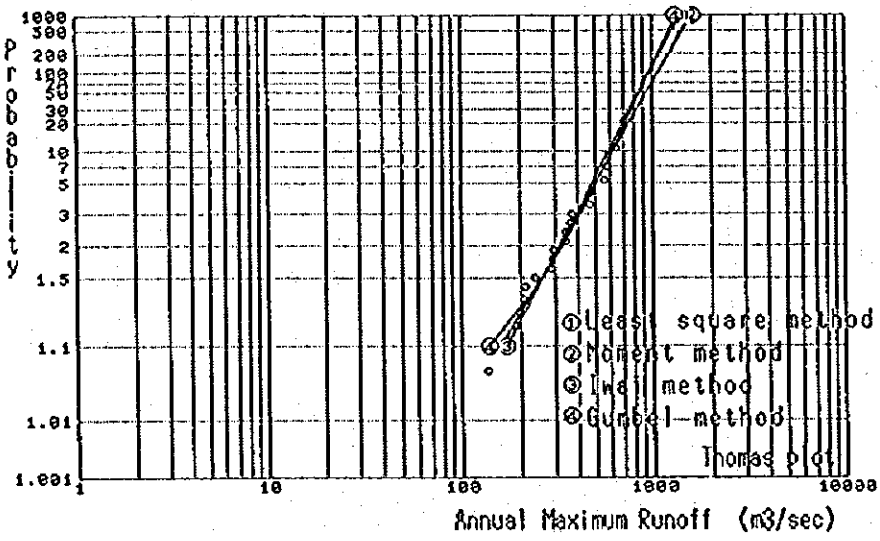


Fig. Log normal curve paper 64444000 Uvaia

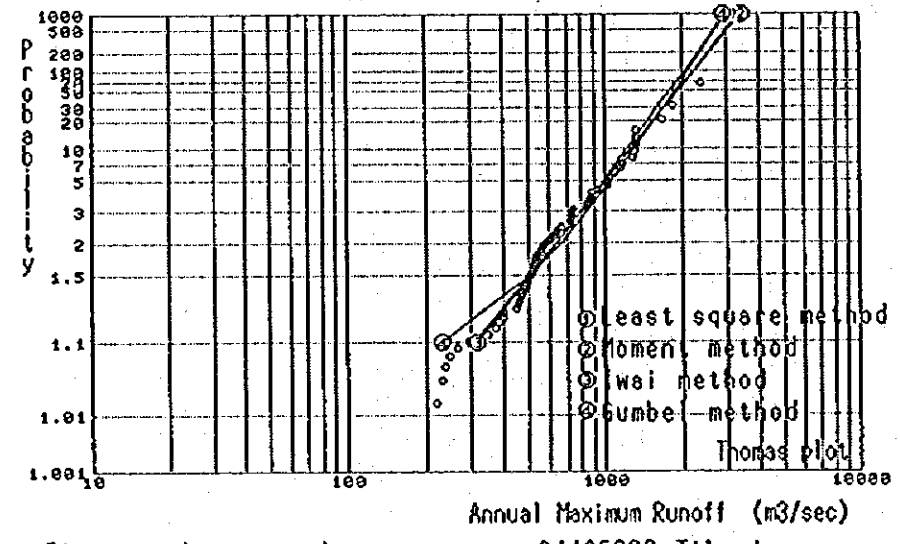


Fig. Log normal curve paper 64465000 Tibagi

table-
64444000 Uvala

Data Summary

Date	Data	No.	Probability Exeedence thomas	hazen	Date	Data
1974 2 1	191.0	1	0.952	0.975	1983 7 13	710.8
1975 10 11	341.0	2	0.905	0.925	1992 6 4	642.5
1976 6 15	287.7	3	0.857	0.875	1993 10 8	573.7
1977 2 14	297.9	4	0.810	0.825	1987 5 25	550.9
1978 7 30	172.8	5	0.762	0.775	1990 2 20	467.7
1979 5 21	289.0	6	0.714	0.725	1982 7 3	457.6
1980 9 29	208.1	7	0.667	0.675	1986 12 27	370.2
1981 1 19	198.3	8	0.619	0.625	1988 5 30	361.2
1982 7 3	457.6	9	0.571	0.575	1989 9 19	345.0
1983 7 13	710.8	10	0.524	0.525	1975 10 11	341.0
1984 6 24	235.7	11	0.476	0.475	1977 2 14	297.9
1985 4 20	136.2	12	0.429	0.425	1979 5 21	289.0
1986 12 27	370.2	13	0.381	0.375	1976 6 15	287.7
1987 5 25	550.9	14	0.333	0.325	1984 6 24	235.7
1988 5 30	361.2	15	0.286	0.275	1991 6 30	214.2
1989 9 19	345.0	16	0.238	0.225	1980 9 29	208.1
1990 2 20	467.7	17	0.190	0.175	1981 1 19	198.3
1991 6 30	214.2	18	0.143	0.125	1974 2 1	191.0
1992 6 4	642.5	19	0.095	0.075	1978 7 30	172.8
1993 10 8	573.7	20	0.048	0.025	1985 4 20	136.2

Result of Iwai Method
64444000 Uvala

Probability Year	Normal Variate	Expected Value
1000	3.091	1400.7
500	2.879	1262.7
200	2.576	1089.4
150	2.475	1037.0
100	2.327	964.7
80	2.242	925.7
70	2.190	902.5
60	2.128	876.0
50	2.054	845.0
40	1.960	807.4
30	1.834	759.5
20	1.645	693.1
10	1.282	581.7
8	1.150	546.1
7	1.068	524.8
6	0.967	500.2
5	0.841	471.0
4	0.674	434.9
3	0.430	387.3
2	0.000	316.2

$$\log(x-b)=\log(xo-b)+1/a\cdot u$$

$$\log(xo-b)=[Y]$$
$$1/a=sqr((N/(N-1))\cdot([YZ]-[Y]\cdot[Y]))$$

b= -17.0
log(xo-b)= 2.47597
1/a= 0.21520

Result of GUMBEL Method
64444000 Uvala

Probability Year	Extremal Variate	Expected Value
1000	6.907	1320.6
500	6.214	1215.4
200	5.296	1076.2
150	5.007	1032.5
100	4.600	970.7
80	4.376	936.7
70	4.241	916.3
60	4.086	892.7
50	3.902	864.8
40	3.676	830.6
30	3.384	786.4
20	2.970	723.6
10	2.250	614.4
8	2.013	578.5
7	1.870	556.7
6	1.702	531.3
5	1.500	500.6
4	1.246	462.1
3	0.903	410.1
2	0.367	328.8

$$x=xo+1/a\cdot y$$

$$1/a=([x2]-[x]\cdot[x])/([y2]-[y]\cdot[y])$$
$$xo=[x]-1/a\cdot[y]$$

1/a=131.63200
xo= 273.2

Results of Ordered Probability Method
64444000 Uvala

				log(x0)	1/a
[1]	Least Square Method	Thomas	All	2.50260	0.22604
[2]			upper10	2.50887	0.22281
[3]		Hazen	All	2.50260	0.20205
[4]			upper10	2.51849	0.19104
[5]	Moment Method	Thomas	All	2.50260	0.22765
[6]			upper10	2.50537	0.22741
[7]		Hazen	All	2.50260	0.20412
[8]			upper10	2.51395	0.19682

Fundamental Equation

$$\log(x)=\log(xo)+1/a\cdot u$$

Least Squre Method

$$1/a=([u]\cdot[X]-[X\cdot u])/([u]\cdot[u]-[u2])$$
$$\log(xo)=[X]-1/a\cdot[u]$$

Moment Method

$$1/a=sqr(([X]\cdot[X]-[X2])/([u]\cdot[u]-[u2]))$$
$$\log(xo)=[X]-1/a\cdot[u]$$

Probability Year	Normal Variate	Least Square Method by THOMAS All	by THOMAS 10	by HAZEN All	by HAZEN 10	Moment Method by THOMAS All	by THOMAS 10	by HAZEN All	by HAZEN 10
1000	3.091	1589.2	1575.7	1339.8	1285.0	1607.6	1615.8	1359.7	1325.0
500	2.879	1423.2	1413.3	1214.0	1170.6	1438.5	1446.0	1230.7	1203.6
200	2.576	1216.0	1210.3	1054.7	1024.8	1227.7	1234.3	1067.7	1049.6
150	2.475	1153.7	1149.1	1006.3	980.3	1164.3	1170.7	1018.2	1002.6
100	2.327	1068.0	1064.9	939.2	918.3	1077.2	1083.2	949.6	937.4
80	2.242	1021.8	1019.5	902.8	884.7	1030.3	1036.1	912.4	902.0
70	2.190	994.5	992.6	881.2	864.6	1002.6	1008.2	890.4	880.9
60	2.128	963.2	961.9	856.4	841.6	970.9	976.4	865.1	856.8
50	2.054	926.7	925.9	827.3	814.6	933.8	939.1	835.4	828.4
40	1.960	882.5	882.4	792.0	781.6	889.0	894.1	799.4	794.0
30	1.834	826.5	827.1	746.8	739.3	832.1	837.0	753.4	749.9
20	1.645	749.0	750.7	683.9	680.4	753.6	758.1	689.3	688.3
10	1.282	619.9	623.0	577.5	579.9	622.9	626.7	581.1	583.7
8	1.150	579.0	582.4	543.3	547.4	581.4	585.0	546.3	550.0
7	1.068	554.5	558.1	522.8	527.8	556.7	560.2	525.4	529.8
6	0.967	526.3	530.2	499.0	505.0	528.2	531.6	501.3	506.2
5	0.841	493.0	497.0	470.6	477.8	494.5	497.7	472.5	478.1
4	0.674	451.9	456.1	435.3	443.9	453.0	455.9	436.7	443.2
3	0.430	398.0	402.5	388.6	398.7	398.6	401.3	389.4	396.9
2	0.000	318.1	322.8	318.1	330.0	318.1	320.3	318.1	326.5

table-
64465000 Tibagi

Data Summary

Date	Data	No.	Probability Exeedence thomas	hazen	Date	Data
1931 12 9	347.0	1	0.984	0.992	1937 11 17	2370.0
1932 12 3	931.5	2	0.969	0.976	1983 5 29	1841.2
1933 2 20	736.5	3	0.953	0.960	1957 9 23	1674.0
1934 12 13	218.0	4	0.938	0.944	1971 1 6	1337.0
1935 10 10	1523.2	5	0.922	0.929	1987 5 21	1333.6
1936 1 2	599.4	6	0.906	0.913	1935 10 10	1323.2
1937 11 17	2370.0	7	0.891	0.897	1954 5 18	1314.4
1938 7 1	732.0	8	0.875	0.881	1955 6 22	1288.0
1939 12 2	567.6	9	0.859	0.865	1993 10 5	1174.2
1940 1 8	229.1	10	0.844	0.849	1990 1 13	1161.4
1941 2 9	848.0	11	0.828	0.833	1982 7 9	1094.0
1942 2 3	852.0	12	0.813	0.817	1992 6 5	1043.6
1943 10 13	385.4	13	0.797	0.802	1946 2 27	1030.0
1944 3 18	534.2	14	0.781	0.786	1972 2 20	1021.2
1945 7 19	446.0	15	0.766	0.770	1932 12 3	931.5
1946 2 27	1030.0	16	0.750	0.754	1988 5 23	883.8
1947 9 28	844.0	17	0.734	0.738	1980 12 22	876.0
1948 11 8	468.8	18	0.719	0.722	1942 2 3	852.0
1949 6 12	264.0	19	0.703	0.706	1941 2 9	848.0
1950 10 16	357.0	20	0.688	0.690	1947 9 28	844.0
1951 11 25	400.3	21	0.672	0.675	1963 1 19	745.0
1952 11 11	400.3	22	0.656	0.659	1970 12 31	735.0
1953 11 13	489.6	23	0.641	0.643	1938 7 1	732.0
1954 5 18	1314.4	24	0.625	0.627	1965 2 1	727.5
1955 6 22	1288.0	25	0.609	0.611	1976 6 6	725.0
1956 8 1	517.1	26	0.594	0.595	1973 6 25	667.5
1957 9 23	1674.0	27	0.578	0.579	1975 10 11	665.0
1958 9 15	375.8	28	0.563	0.563	1961 4 5	637.5
1959 2 7	300.0	29	0.547	0.548	1978 7 25	627.5
1960 8 24	473.7	30	0.531	0.532	1989 7 31	615.0
1961 4 5	637.5	31	0.516	0.516	1936 1 2	599.4
1962 10 4	489.0	32	0.500	0.500	1966 2 20	582.5
1963 1 19	745.0	33	0.484	0.484	1939 12 2	567.6
1964 2 17	318.4	34	0.469	0.468	1977 2 8	557.5
1965 2 1	727.5	35	0.453	0.452	1950 10 16	557.0
1966 2 20	582.5	36	0.438	0.437	1969 11 18	535.5
1967 3 6	512.7	37	0.422	0.421	1944 3 18	534.2
1968 1 25	458.0	38	0.406	0.405	1979 11 9	529.8
1969 11 18	535.5	39	0.391	0.389	1984 11 12	529.8
1970 12 31	735.0	40	0.375	0.373	1964 2 17	518.4
1971 1 6	1337.0	41	0.359	0.357	1956 8 1	517.1
1972 2 20	1021.2	42	0.344	0.341	1967 3 6	512.7
1973 6 25	667.5	43	0.328	0.325	1959 2 7	500.0
1974 9 1	487.0	44	0.313	0.310	1953 11 13	489.6
1975 10 11	665.0	45	0.297	0.294	1962 10 4	489.0
1976 6 6	725.0	46	0.281	0.278	1974 9 1	487.0
1977 2 8	557.5	47	0.266	0.262	1986 12 28	475.6
1978 7 25	627.5	48	0.250	0.246	1960 8 24	473.7
1979 11 9	529.8	49	0.234	0.230	1948 11 8	468.8
1980 12 22	876.0	50	0.219	0.214	1968 1 25	458.0
1981 1 15	452.0	51	0.203	0.198	1981 1 15	452.0
1982 7 9	1094.0	52	0.188	0.183	1945 7 19	446.0
1983 5 29	1841.2	53	0.172	0.167	1951 11 25	400.3
1984 11 12	529.8	54	0.156	0.151	1952 11 11	400.3
1985 4 18	247.0	55	0.141	0.135	1943 10 13	385.4
1986 12 28	475.6	56	0.125	0.119	1958 9 15	375.8
1987 5 21	1333.6	57	0.109	0.103	1931 12 9	347.0
1988 5 23	883.8	58	0.094	0.087	1991 6 29	327.0
1989 7 31	615.0	59	0.078	0.071	1949 6 12	264.0
1990 1 13	1161.4	60	0.063	0.056	1985 4 18	247.0
1991 6 29	327.0	61	0.047	0.040	1933 2 20	236.5
1992 6 5	1043.6	62	0.031	0.024	1940 1 8	229.1
1993 10 5	1174.2	63	0.016	0.008	1934 12 13	218.0

Results of Ordered Probability Method
64465000 Tibagi

				log(x0)	1/a
[1]	Least Square	Thomas	All	2.60288	0.23491
[2]			upper10	2.78900	0.25704
[3]	Method	Hazen	All	2.60288	0.22399
[4]			upper10	2.62651	0.22018
[5]	Moment Method	Thomas	All	2.60288	0.23695
[6]			upper10	2.77476	0.26691
[7]		Hazen	All	2.60288	0.22587
[8]			upper10	2.61746	0.22816

Fundamental Equation
log(x)=log(xo)+1/a*u

Least Squre Method
1/a=([u]*[X]-[X*u])/([u]*[u]-[uZ])
log(xo)=[X]-1/a*[u]

Moment Method
1/a=sqr(([X]*[X]-[XZ])/([u]*[u]-[uZ]))
log(xo)=[X]-1/a*[u]

Probability Year	Normal Variate	Least Square Method by THOMAS All	Least Square Method by THOMAS 10	Least Square Method by HAZEN All	Least Square Method by HAZEN 10	Moment Method by THOMAS All	Moment Method by THOMAS 10	Moment Method by HAZEN All	Moment Method by HAZEN 10
1000	3.091	3379.6	3831.6	3126.9	3213.5	3429.1	3977.8	3169.1	3284.0
500	2.879	3013.5	3379.9	2803.1	2886.0	3054.5	3491.9	2838.2	2940.7
200	2.576	2558.9	2826.2	2398.4	2475.9	2590.1	2899.9	2425.4	2512.4
150	2.475	2422.8	2662.1	2276.6	2352.3	2451.1	2725.2	2301.2	2383.6
100	2.327	2235.9	2436.3	2108.9	2181.8	2260.5	2487.7	2130.3	2206.3
80	2.242	2135.5	2318.7	2018.3	2089.8	2158.2	2361.2	2038.2	2110.9
70	2.190	2078.3	2248.4	1965.0	2035.4	2097.7	2286.8	1983.8	2054.4
60	2.128	2006.5	2168.3	1903.9	1973.1	2028.7	2202.3	1921.5	1989.9
50	2.054	1929.4	2075.0	1832.3	1900.2	1948.1	2104.0	1848.7	1914.4
40	1.960	1834.0	1962.9	1745.8	1811.9	1850.9	1986.1	1760.7	1825.1
30	1.834	1713.1	1821.8	1635.9	1699.8	1727.9	1838.1	1648.9	1707.3
20	1.645	1546.5	1628.9	1483.8	1544.4	1556.5	1636.4	1494.5	1547.1
10	1.282	1270.5	1313.6	1230.2	1284.5	1278.2	1308.8	1237.0	1280.3
8	1.150	1183.4	1215.4	1149.7	1201.7	1189.6	1207.3	1155.4	1195.7
7	1.068	1131.5	1157.2	1101.6	1152.3	1137.2	1147.4	1106.7	1145.3
6	0.967	1071.8	1090.6	1046.1	1095.2	1076.7	1078.9	1050.5	1087.0
5	0.841	1001.3	1012.3	980.3	1027.5	1005.2	998.5	983.9	1018.0
4	0.674	914.6	916.8	899.3	944.0	917.6	901.0	901.9	933.1
3	0.430	801.6	793.6	793.0	824.2	803.2	773.6	794.5	821.6
2	0.000	635.2	615.2	635.2	670.7	635.2	595.3	635.2	656.8

Result of Iwai Method
64465000 Tibagi

Probability Year	Normal Variate	Expected Value
1000	3.091	3031.7
500	2.879	2729.3
200	2.576	2349.0
150	2.475	2233.8
100	2.327	2074.8
80	2.242	1988.9
70	2.190	1937.9
60	2.128	1879.6
50	2.054	1811.1
40	1.960	1728.3
30	1.834	1622.7
20	1.645	1476.0
10	1.282	1229.6
8	1.150	1150.8
7	1.068	1103.6
6	0.967	1049.1
5	0.841	984.2
4	0.674	904.0
3	0.430	798.2
2	0.000	639.8

log(x+b)=log(xo+b)+1/a*u

log(xo+b)=[Y]
1/a=sqr((N/(N-1))*([Y2]-[Y]*[Y]))

b= 36.0
log(xo+b)= 2.82980
1/a= 0.21259

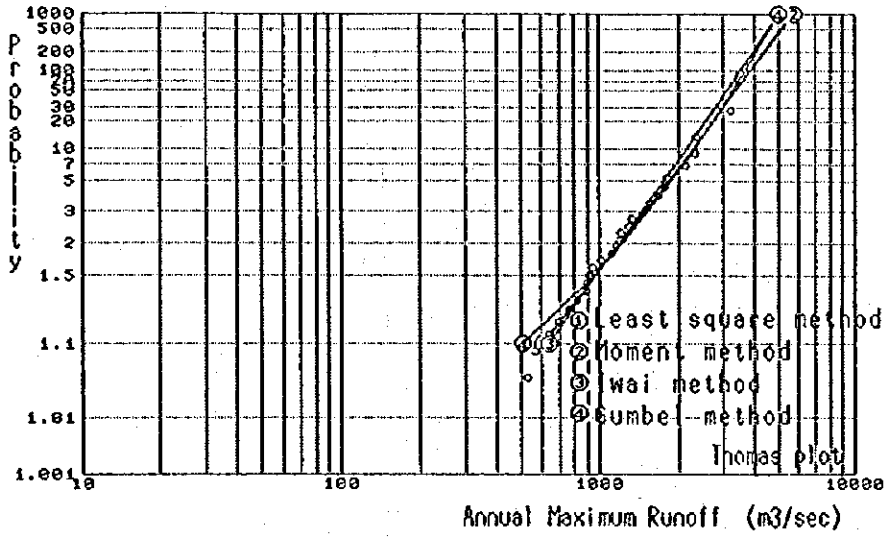
Result of GUMBEL Method
64465000 Tibagi

Probability Year	Extremal Variate	Expected Value
1000	6.907	2936.0
500	6.214	2694.9
200	5.296	2375.9
150	5.007	2273.6
100	4.600	2134.1
80	4.376	2058.1
70	4.241	2009.4
60	4.086	1955.4
50	3.902	1891.5
40	3.676	1813.0
30	3.384	1711.5
20	2.970	1567.6
10	2.250	1317.4
8	2.013	1235.1
7	1.870	1185.2
6	1.702	1126.8
5	1.500	1056.6
4	1.248	968.3
3	0.903	849.0
2	0.367	682.7

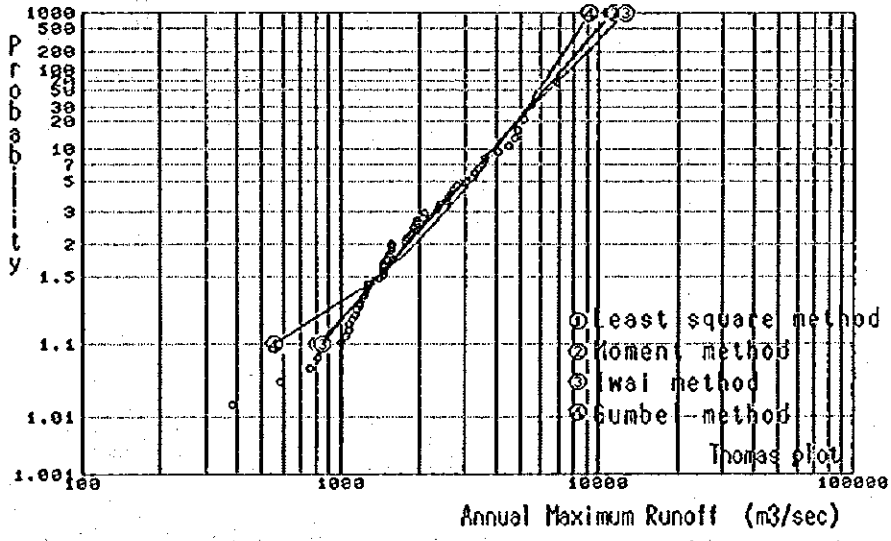
x=xo+1/a*y

1/a=([x2]-[x]*[x])/([y2]-[y]*[y])
xo=[x]-1/a*[y]

1/a=347.55700
xo= 535.3



ig. Log normal curve paper 64491000 Barra Rib.Das Antas



Log normal curve paper 64507011 Jataizinho(Extendido)

table-
Data Summary
64491000 Barra Rib.Das Antas

Date	Data	No.	Probability Exaedence thomas	hazen	Date	Data
1941 11 23	699.4	1	0.963	0.981	1983 5 29	3235.0
1942 2 5	1200.4	2	0.926	0.942	1990 2 11	2337.0
1943 10 14	641.6	3	0.889	0.904	1987 5 21	2319.0
1944 3 19	886.3	4	0.852	0.865	1982 7 10	2134.0
1945 7 12	768.8	5	0.815	0.827	1946 2 27	1797.2
1946 2 27	1797.2	6	0.778	0.788	1993 10 2	1770.0
1974 9 2	919.0	7	0.741	0.750	1988 5 24	1678.0
1975 10 12	937.6	8	0.704	0.712	1980 12 22	1552.0
1976 2 3	1301.6	9	0.667	0.673	1992 6 1	1483.6
1977 2 9	895.0	10	0.630	0.635	1978 7 25	1339.0
1978 7 25	1339.0	11	0.593	0.596	1976 2 3	1301.6
1979 9 14	1192.8	12	0.556	0.558	1942 2 5	1200.4
1980 12 22	1552.0	13	0.519	0.519	1979 9 14	1192.8
1981 12 8	822.4	14	0.481	0.481	1989 7 31	1152.0
1982 7 10	2134.0	15	0.444	0.442	1984 9 27	1118.0
1983 5 29	3235.0	16	0.407	0.404	1986 5 19	1009.2
1984 9 27	1118.0	17	0.370	0.365	1975 10 12	937.6
1985 5 22	530.7	18	0.333	0.327	1974 9 2	919.0
1986 5 19	1009.2	19	0.296	0.288	1977 2 9	895.0
1987 5 21	2319.0	20	0.259	0.250	1944 3 19	886.3
1988 5 24	1678.0	21	0.222	0.212	1981 12 8	822.4
1989 7 31	1152.0	22	0.185	0.173	1945 7 12	768.8
1990 2 11	2337.0	23	0.148	0.135	1941 11 23	699.4
1991 10 7	565.2	24	0.111	0.096	1943 10 14	641.6
1992 6 1	1483.6	25	0.074	0.058	1991 10 7	565.2
1993 10 2	1770.0	26	0.037	0.019	1985 5 22	530.7

Result of Iwai Method
64491000 Barra Rib.Das Antas

Probability Year	Normal Variate	Expected Value
1000	3.091	5030.2
500	2.879	4552.2
200	2.576	3948.7
150	2.475	3765.4
100	2.327	3511.7
80	2.242	3374.3
70	2.190	3292.8
60	2.128	3199.3
50	2.054	3089.6
40	1.960	2956.6
30	1.834	2786.8
20	1.645	2550.3
10	1.282	2151.2
8	1.150	2023.2
7	1.068	1946.3
6	0.967	1857.3
5	0.841	1751.4
4	0.674	1620.0
3	0.430	1446.2
2	0.000	1184.5

$$\log(x+b)=\log(x_0+b)+1/a\cdot u$$

$$\log(x_0+b)=[Y]$$
$$1/a=\mathrm{sqr}((N/(N-1))\cdot([Y2]-[Y]\cdot[Y]))$$

b= -26.3
log(xo+b)= 3.06376
1/a= 0.20564

Result of GUMBEL Method
64491000 Barra Rib.Das Antas

Probability Year	Extremal Variate	Expected Value
1000	6.907	5008.2
500	6.214	4606.8
200	5.296	4075.6
150	5.007	3908.6
100	4.600	3673.0
80	4.376	3543.1
70	4.241	3465.3
60	4.086	3375.4
50	3.902	3268.9
40	3.676	3138.3
30	3.384	2969.3
20	2.970	2729.7
10	2.250	2313.1
8	2.013	2176.0
7	1.870	2092.9
6	1.702	1995.7
5	1.500	1878.8
4	1.246	1731.8
3	0.903	1533.2
2	0.367	1222.8

$$x=x_0+1/a\cdot y$$

$$1/a=([xz]-[x]\cdot[x])/([y2]-[y]\cdot[y])$$
$$x_0=[x]-1/a\cdot[y]$$

1/a=\578.73900
xo=1010.7

Results of Ordered Probability Method
64491000 Barra Rib.Das Antas

				log(x0)	1/a
[1]	Least Square Method	Thomas	All	3.07455	0.22008
[2]			upper10	3.05889	0.24184
[3]		Hazen	All	3.07455	0.20075
[4]			upper10	3.07425	0.20843
[5]	Moment Method	Thomas	All	3.07455	0.22106
[6]			upper10	3.05586	0.24517
[7]		Hazen	All	3.07455	0.20186
[8]			upper10	3.07166	0.21107

Fundamental Equation
$$\log(x)=\log(x_0)+1/a\cdot u$$

Least Squre Method
$$1/a=([u]\cdot[X]-[X\cdot u])/([u]\cdot[u]-[u2])$$
$$\log(x_0)=[X]-1/a\cdot[u]$$

Moment Method
$$1/a=\mathrm{sqr}(([X]\cdot[X]-[X2])/([u]\cdot[u]-[u2]))$$
$$\log(x_0)=[X]-1/a\cdot[u]$$

Probability Year	Normal Variate	Least Square Method by THOMAS All	by THOMAS 10	by HAZEN All	by HAZEN 10	Moment Method by THOMAS All	by THOMAS 10	by HAZEN All	by HAZEN 10
1000	3.091	5684.7	6401.9	4954.2	5229.1	5724.7	6509.6	4993.3	5296.3
500	2.879	5105.6	5689.0	4491.7	4723.1	5139.0	5775.3	4524.7	4777.8
200	2.576	4380.5	4807.6	3906.0	4085.3	4406.2	4869.3	3931.7	4125.0
150	2.475	4161.8	4544.5	3727.7	3891.9	4185.2	4599.3	3751.3	3927.3
100	2.327	3860.3	4184.1	3480.6	3624.4	3880.7	4229.7	3501.3	3654.0
80	2.242	3697.7	3990.8	3346.6	3479.6	3716.5	4031.7	3365.7	3506.3
70	2.190	3601.4	3876.8	3267.0	3393.7	3619.4	3914.9	3285.3	3418.7
60	2.128	3491.3	3746.7	3175.7	3295.3	3508.2	3781.8	3193.0	3318.3
50	2.054	3362.3	3594.8	3068.5	3179.9	3378.0	3626.4	3084.6	3200.6
40	1.960	3206.2	3411.9	2938.3	3039.9	3220.5	3439.4	2953.0	3058.0
30	1.834	3007.8	3180.6	2772.0	2861.5	3020.3	3203.1	2785.0	2876.3
20	1.645	2732.9	2862.7	2539.9	2613.2	2743.1	2878.8	2550.6	2623.7
10	1.282	2273.2	2338.1	2147.1	2194.9	2279.8	2344.8	2154.1	2198.9
8	1.150	2126.8	2173.3	2020.7	2060.8	2132.4	2177.3	2026.6	2062.9
7	1.068	2039.4	2075.3	1944.8	1980.5	2044.4	2077.8	1950.1	1981.5
6	0.967	1938.4	1962.6	1856.7	1887.5	1942.7	1963.5	1861.3	1887.3
5	0.841	1818.6	1829.7	1751.8	1776.8	1822.1	1828.8	1755.5	1775.3
4	0.674	1670.8	1667.0	1621.4	1639.7	1673.4	1664.0	1624.2	1636.7
3	0.430	1476.6	1455.3	1448.5	1458.6	1478.0	1450.0	1450.1	1453.7
2	0.000	1187.3	1145.2	1187.3	1186.5	1187.3	1137.3	1187.3	1179.4

Table- Data Summary
64507011 Jataizinho(Extendido)

Date	Data	No.	Probability Exceedance thomas	Probability Exceedance hazen	Date	Data
1931 2 19	1781.0	1	0.984	0.992	1937 11 18	6828.0
1932 12 5	1904.0	2	0.969	0.976	1985 5 31	5517.8
1933 2 12	1160.0	3	0.953	0.960	1989 12 30	5161.5
1934 12 21	828.8	4	0.938	0.944	1934 5 19	4875.0
1935 10 10	4029.2	5	0.922	0.929	1990 1 11	4730.0
1936 1 4	2410.0	6	0.906	0.913	1957 9 23	4463.2
1937 11 18	6828.0	7	0.891	0.897	1935 10 10	4029.2
1938 5 23	1940.0	8	0.875	0.881	1963 1 19	3578.0
1939 12 2	1256.0	9	0.859	0.865	1955 6 23	3556.0
1940 1 9	584.0	10	0.844	0.849	1961 4 6	3391.0
1941 2 10	1940.0	11	0.828	0.833	1967 5 21	3317.2
1942 2 5	1472.0	12	0.813	0.817	1965 10 2	3208.8
1943 10 14	1001.0	13	0.797	0.802	1972 9 29	2922.0
1944 3 13	1264.0	14	0.781	0.786	1988 5 24	2799.7
1945 7 5	1112.0	15	0.766	0.770	1993 10 2	2690.1
1946 10 20	2520.0	16	0.750	0.754	1982 7 10	2647.7
1947 2 20	1805.0	17	0.734	0.738	1971 1 7	2569.0
1948 11 7	821.0	18	0.719	0.722	1946 10 20	2520.0
1949 6 13	384.0	19	0.703	0.706	1936 1 4	2410.0
1950 3 6	1454.0	20	0.688	0.690	1975 11 30	2370.0
1951 11 26	1463.0	21	0.672	0.675	1980 12 23	2340.2
1952 10 19	1073.0	22	0.656	0.659	1992 6 1	2100.8
1953 5 27	1264.0	23	0.641	0.643	1976 6 6	2064.0
1954 5 19	4875.0	24	0.625	0.627	1938 5 23	1940.0
1955 6 23	3556.0	25	0.609	0.611	1941 2 10	1940.0
1956 8 1	1886.0	26	0.594	0.595	1932 12 5	1904.0
1957 9 23	4463.2	27	0.578	0.579	1978 7 25	1888.7
1958 9 15	1490.0	28	0.563	0.563	1956 8 1	1886.0
1959 2 9	1184.0	29	0.547	0.548	1973 1 25	1852.0
1960 6 24	1353.0	30	0.531	0.532	1947 2 20	1805.0
1961 4 6	3391.0	31	0.516	0.516	1931 2 19	1781.0
1962 10 4	1535.0	32	0.500	0.500	1974 6 26	1572.5
1963 1 19	3578.0	33	0.484	0.484	1977 1 6	1565.0
1964 2 17	1184.0	34	0.469	0.468	1960 6 24	1553.0
1965 10 2	3208.8	35	0.453	0.452	1986 5 19	1542.3
1966 2 15	1224.0	36	0.438	0.437	1962 10 4	1535.0
1967 3 8	1052.0	37	0.422	0.421	1958 9 15	1490.0
1968 1 19	1073.0	38	0.406	0.405	1942 2 5	1472.0
1969 11 15	1144.0	39	0.391	0.389	1981 1 22	1466.5
1970 7 3	1350.0	40	0.375	0.373	1951 11 26	1463.0
1971 1 7	2569.0	41	0.359	0.357	1950 3 6	1454.0
1972 9 29	2922.0	42	0.344	0.341	1979 9 15	1450.4
1973 1 25	1852.0	43	0.328	0.325	1985 5 22	1401.9
1974 6 26	1572.5	44	0.313	0.310	1970 7 3	1350.0
1975 11 30	2370.0	45	0.297	0.294	1944 3 13	1264.0
1976 6 6	2064.0	46	0.281	0.278	1953 5 27	1264.0
1977 1 6	1565.0	47	0.266	0.262	1939 12 2	1256.0
1978 7 25	1888.7	48	0.250	0.246	1984 9 28	1240.3
1979 9 15	1450.4	49	0.234	0.230	1966 2 15	1224.0
1980 12 23	2340.2	50	0.219	0.214	1964 2 17	1184.0
1981 1 22	1466.5	51	0.203	0.198	1959 2 9	1184.0
1982 7 10	2647.7	52	0.188	0.183	1933 2 12	1160.0
1983 5 31	5517.8	53	0.172	0.167	1969 11 15	1144.0
1984 9 28	1240.3	54	0.156	0.151	1945 7 5	1112.0
1985 5 22	1401.9	55	0.141	0.135	1952 10 19	1073.0
1986 5 19	1542.3	56	0.125	0.119	1968 1 19	1073.0
1987 5 21	3317.2	57	0.109	0.103	1967 3 8	1052.0
1988 5 24	2799.7	58	0.094	0.087	1943 10 14	1001.0
1989 12 30	5161.5	59	0.078	0.071	1934 12 21	828.8
1990 1 11	4730.0	60	0.063	0.056	1948 11 7	821.0
1991 12 20	761.5	61	0.047	0.040	1991 12 20	761.5
1992 6 1	2100.8	62	0.031	0.024	1940 1 9	584.0
1993 10 2	2690.1	63	0.016	0.008	1949 6 13	384.0

Results of Ordered Probability Method
64507011 Jataizinho(Extendido)

				log(x0)	1/a
[1]	Least Square	Thomas	All	3.25823	0.25501
[2]			upper10	3.28109	0.25787
[3]	Method	Hazen	All	3.25823	0.24348
[4]			upper10	3.32531	0.21712
[5]	Moment	Thomas	All	3.25823	0.25794
[6]	Method		upper10	3.27528	0.26251
[7]		Hazen	All	3.25823	0.24585
[8]			upper10	3.31727	0.22243

Fundamental Equation
log(x)=log(xo)+1/a*u

Least Squre Method
1/a=([u]*[X]-[X*u])/([u]*[u]-[u2])
log(xo)=[X]-1/a*[u]

Moment Method
1/a=sqr(([X]*[X]-[X2])/([u]*[u]-[u2]))
log(xo)=[X]-1/a*[u]

Probability Year	Normal Variate	Least Square Method by THOMAS All	Least Square Method by THOMAS 10	Least Square Method by HAZEN All	Least Square Method by HAZEN 10	Moment Method by THOMAS All	Moment Method by THOMAS 10	Moment Method by HAZEN All	Moment Method by HAZEN 10
1000	3.091	%11126.1	%11992.9	%10249.9	9915.8	%11360.2	%12206.2	%10426.0	%10108.8
500	2.879	9823.7	%10374.3	9101.2	8918.6	%10016.1	%10738.0	9246.8	9068.6
200	2.576	8228.1	8837.0	7662.5	7667.7	8370.2	8944.8	7792.3	7767.9
150	2.475	7752.1	8322.3	7259.2	7289.9	7882.5	8414.7	7359.0	7376.1
100	2.327	7103.3	7620.5	6679.8	6768.7	7217.6	7692.9	6766.0	6836.5
80	2.242	6739.6	7245.7	6369.2	6487.3	6862.5	7307.9	6448.4	6545.2
70	2.190	6556.1	7025.2	6186.0	6320.6	6653.6	7081.5	6261.1	6373.1
60	2.128	6324.3	6774.0	5977.0	6129.9	6415.7	6823.9	6047.5	6176.1
50	2.054	6054.4	6481.7	5733.1	5906.3	6138.7	6524.2	5796.4	5945.5
40	1.960	5729.9	6130.6	5439.5	5635.8	5806.1	6184.6	5498.5	5666.6
30	1.834	5321.1	5688.4	5068.3	5291.5	5387.3	5712.3	5119.8	5312.3
20	1.645	4761.9	5084.3	4558.4	4814.2	4814.9	5095.3	4599.9	4821.9
10	1.282	3846.7	4097.3	3718.0	4014.2	3880.0	4090.2	3744.4	4002.8
8	1.150	3561.3	3790.0	3454.2	3739.2	3589.0	3778.2	3476.1	3742.5
7	1.068	3392.2	3608.1	3297.4	3606.7	3416.7	3593.6	3316.9	3587.0
6	0.967	3198.3	3399.7	3117.2	3430.4	3219.2	3382.4	3133.9	3407.5
5	0.841	2970.4	3154.8	2904.8	3221.1	2987.3	3134.5	2916.3	3194.7
4	0.674	2692.5	2856.5	2644.8	2962.7	2704.8	2833.1	2654.6	2932.4
3	0.430	2333.3	2471.4	2306.8	2622.6	2340.0	2444.8	2312.2	2588.1
2	0.000	1812.3	1914.2	1812.3	2115.0	1812.3	1884.9	1812.3	2076.2

Result of Iwai Method
64507011 Jataizinho(Extendido)

Probability Year	Normal Variate	Expected Value
1000	3.091	%12642.9
500	2.879	%10983.0
200	2.576	8993.0
150	2.475	8413.4
100	2.327	7631.3
80	2.242	7217.7
70	2.190	6975.8
60	2.128	6701.6
50	2.054	6384.1
40	1.960	6005.5
30	1.834	5533.1
20	1.645	4895.8
10	1.282	3878.2
8	1.150	3568.0
7	1.068	3386.0
6	0.967	3179.0
5	0.841	2938.2
4	0.674	2648.3
3	0.430	2280.4
2	0.000	1762.6

log(x+b)=log(xo+b)+1/a*u

log(xo+b)=[Y]
1/a=sqr((N/(N-1))*([Y2]-[Y]*[Y]))

b=-231.6
log(xo+b)= 3.18496
1/a= 0.29408

Result of GUMBEL Method
64507011 Jataizinho(Extendido)

Probability Year	Extremal Variate	Expected Value
1000	6.907	9141.7
500	6.214	8376.0
200	5.296	7362.8
150	5.007	7044.3
100	4.600	6594.9
80	4.376	6347.1
70	4.241	6198.7
60	4.086	6027.2
50	3.902	5824.1
40	3.676	5575.0
30	3.384	5252.7
20	2.970	4795.6
10	2.250	4000.9
8	2.013	3739.4
7	1.870	3580.9
6	1.702	3395.6
5	1.500	3172.5
4	1.246	2892.1
3	0.903	2513.3
2	0.367	1921.4

x=xo+1/a*y

1/a=([x2]-[x]*[x])/([y2]-[y]*[y])
xo=[x]-1/a*[y]

1/a=%1103.90000
xo=1516.8

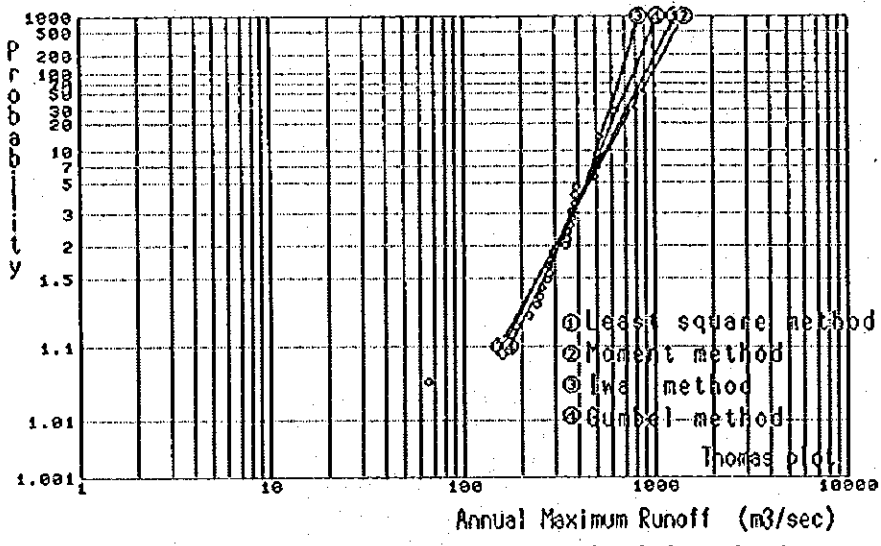


Fig. Log normal curve paper 64550000 Vila Silva Jardim

table- Data Summary
64550000 Vila Silva Jardim

Date	Data	No.	Probability Exeedance thomas	hazen	Date	Data
1967 10 22	65.4	1	0.964	0.981	1983 3 7	618.0
1968 1 22	187.7	2	0.929	0.944	1981 12 8	514.3
1969 6 1	279.0	3	0.893	0.907	1982 12 20	506.5
1970 10 3	164.6	4	0.857	0.870	1972 10 4	506.5
1971 12 16	371.0	5	0.821	0.833	1973 1 26	485.7
1972 10 4	506.5	6	0.786	0.796	1974 1 1	388.8
1973 1 26	485.7	7	0.750	0.759	1992 5 3	384.0
1974 1 1	388.8	8	0.714	0.722	1980 4 14	382.7
1975 12 21	250.2	9	0.679	0.685	1971 12 16	371.0
1976 10 20	366.2	10	0.643	0.648	1993 2 19	367.4
1977 1 6	352.5	11	0.607	0.611	1976 10 20	366.2
1978 7 21	283.8	12	0.571	0.574	1977 1 6	352.5
1979 2 14	273.0	13	0.536	0.537	1987 11 16	347.3
1980 4 14	382.7	14	0.500	0.500	1990 1 11	344.8
1981 12 8	514.3	15	0.464	0.463	1985 5 22	297.0
1982 12 20	506.5	16	0.429	0.426	1978 7 21	283.8
1983 3 7	618.0	17	0.393	0.389	1969 6 1	279.0
1984 4 15	255.0	18	0.357	0.352	1991 12 12	279.0
1985 5 22	297.0	19	0.321	0.315	1979 2 14	273.0
1986 5 14	158.0	20	0.286	0.278	1984 4 15	255.0
1987 11 16	347.3	21	0.250	0.241	1975 12 21	250.2
1988 10 26	222.4	22	0.214	0.204	1989 1 17	244.2
1989 1 17	244.2	23	0.179	0.167	1988 10 26	222.4
1990 1 11	344.8	24	0.143	0.130	1968 1 22	187.7
1991 12 12	279.0	25	0.107	0.093	1970 10 3	164.6
1992 5 3	384.0	26	0.071	0.056	1986 5 14	158.0
1993 2 19	367.4	27	0.036	0.019	1967 10 22	65.4

Result of Iwai Method
64550000 Vila Silva Jardim

Probability Year	Normal Variate	Expected Value
1000	3.091	832.2
500	2.879	787.5
200	2.576	726.3
150	2.475	706.8
100	2.327	678.6
80	2.242	662.7
70	2.190	653.1
60	2.128	641.9
50	2.054	628.5
40	1.960	611.9
30	1.834	589.9
20	1.645	557.8
10	1.282	499.0
8	1.150	478.6
7	1.068	466.0
6	0.967	451.0
5	0.841	432.6
4	0.674	408.7
3	0.430	375.0
2	0.000	319.0

$\log(x-b)=\log(xo-b)+1/a\cdot u$

$\log(xo-b)=[Y]$
$1/a=sqr((N/(N-1))\cdot([Y2]-[Y]\cdot[Y])$

b= 399.9

Result of GUMBEL Method
64550000 Vila Silva Jardim

Probability Year	Extremal Variate	Expected Value
1000	6.907	1041.3
500	6.214	963.8
200	5.296	861.3
150	5.007	829.1
100	4.600	783.6
80	4.376	758.6
70	4.241	743.5
60	4.086	726.2
50	3.902	705.6
40	3.676	680.4
30	3.384	647.8
20	2.970	601.6
10	2.250	521.2
8	2.013	494.7
7	1.870	478.7
6	1.702	460.0
5	1.500	437.4
4	1.246	409.0
3	0.903	370.7
2	0.367	310.8

$x=xo+1/a\cdot y$

$1/a=([x2]-[x]\cdot[x])/([y2]-[y]\cdot[y])$
$xo=[x]-1/a\cdot[y]$

1/a=111.67300

Results of Ordered Probability Method
64550000 Vila Silva Jardim

				log(x0)	1/a
[1]	Least Square Method	Thomas	All	2.48057	0.20544
[2]			upper10	2.49514	0.16431
[3]		Hazen	All	2.48057	0.18947
[4]			upper10	2.50704	0.14071
[5]	Moment Method	Thomas	All	2.48057	0.21918
[6]			upper10	2.48755	0.17242
[7]		Hazen	All	2.48057	0.20062
[8]			upper10	2.49937	0.14832

Fundamental Equation
$\log(x)=\log(xo)+1/a\cdot u$

Least Squre Method
$1/a=([u]\cdot[X]-[X\cdot u])/([u]\cdot[u]-[u2])$
$\log(xo)=[X]-1/a\cdot[u]$

Moment Method
$1/a=sqr(([X]\cdot[X]-[X2])/([u]\cdot[u]-[u2]))$
$\log(xo)=[X]-1/a\cdot[u]$

Probability Year	Normal Variate	Least Square Method by THOMAS All	10	by HAZEN All	10	Moment Method by THOMAS All	10	by HAZEN All	10
1000	3.091	1304.6	1006.8	1164.5	874.8	1438.7	1048.1	1260.6	907.3
500	2.879	1180.1	929.2	1061.6	816.7	1292.7	963.5	1143.0	843.9
200	2.576	1022.9	828.8	930.4	740.5	1109.8	854.5	994.0	761.2
150	2.475	975.1	797.7	890.3	716.7	1054.6	820.9	948.7	735.3
100	2.327	909.0	754.1	834.5	683.0	978.5	774.0	885.9	699.0
80	2.242	873.2	730.3	804.1	664.5	937.4	748.3	851.8	679.0
70	2.190	852.0	716.0	786.1	653.4	913.1	733.0	831.5	667.1
60	2.128	827.6	699.6	765.3	640.5	885.3	715.4	808.3	653.2
50	2.054	799.1	680.2	740.9	625.3	852.7	694.6	781.0	636.9
40	1.960	764.4	656.5	711.2	606.6	813.3	669.2	747.9	616.8
30	1.834	720.1	625.9	673.2	582.3	763.2	636.5	705.6	590.8
20	1.645	658.5	582.7	619.8	547.7	693.7	590.5	646.6	553.8
10	1.282	554.5	507.9	529.0	486.8	577.4	511.1	546.6	489.2
8	1.150	521.1	483.2	499.5	466.6	540.4	485.2	514.5	467.7
7	1.068	501.1	468.3	481.8	454.2	518.3	469.5	495.2	454.7
6	0.967	477.9	450.9	461.2	439.7	492.7	451.2	472.8	439.4
5	0.841	450.2	429.9	436.5	422.1	462.4	429.2	446.0	420.9
4	0.674	416.0	403.6	405.8	399.9	424.9	401.6	412.9	397.5
3	0.430	370.7	368.0	364.8	369.5	375.7	364.5	368.9	365.8
2	0.000	302.4	312.7	302.4	321.4	302.4	307.3	302.4	315.8

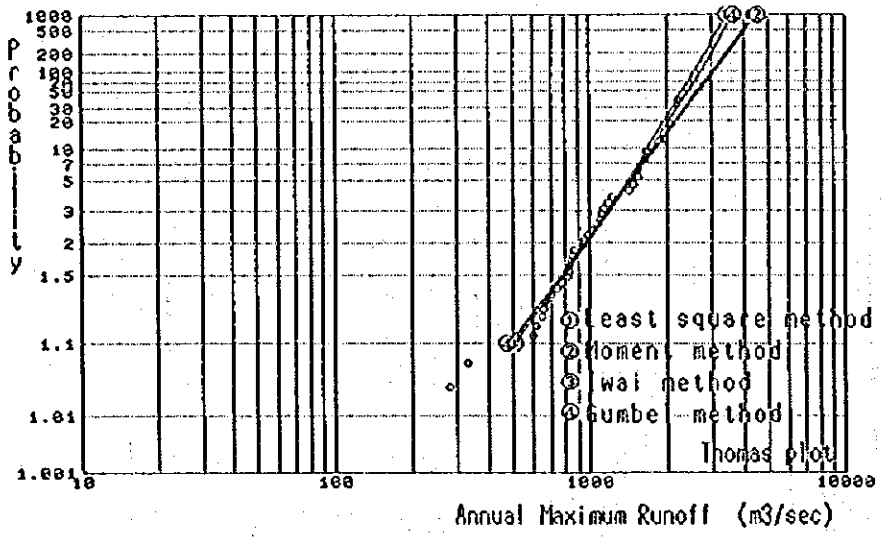


Fig. Log normal curve paper 64625000 Tereza Cristina

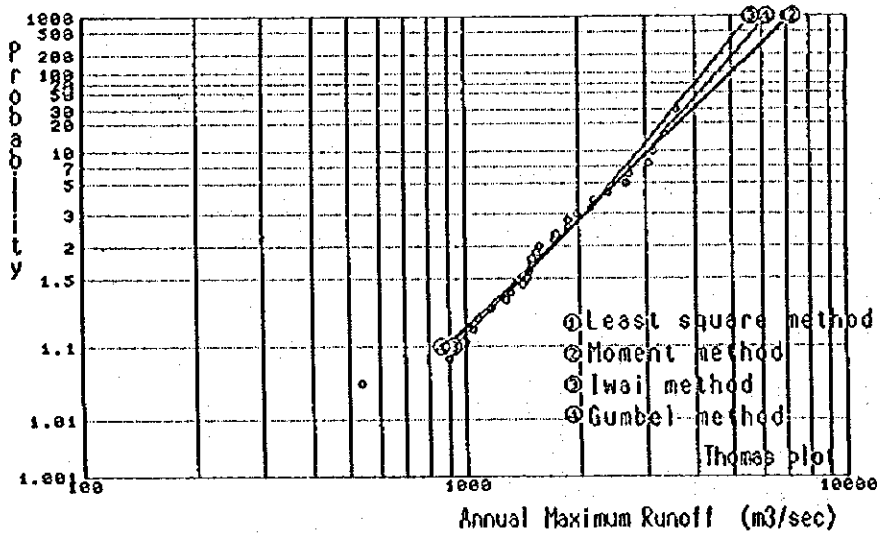


Fig. Log normal curve paper 64645000 Porto Espanhol

table-
Data Summary
64625000 Teresa Cristina

Date			Data	No.	Probability Exceedence thomas	hazen	Date			Data
1957	9	4	1344.2	1	0.973	0.966	1992	5	1	2233.2
1936	9	14	746.3	2	0.946	0.938	1987	2	21	2097.2
1959	2	7	327.5	3	0.919	0.911	1988	5	23	1968.0
1960	8	2	778.5	4	0.892	0.903	1983	5	21	1651.8
1961	10	2	1227.1	5	0.865	0.875	1965	3	15	1635.8
1962	10	4	861.3	6	0.838	0.847	1982	6	25	1547.0
1963	11	21	836.0	7	0.811	0.819	1957	9	4	1544.2
1964	6	15	615.0	8	0.784	0.792	1990	7	20	1477.0
1965	3	15	1635.8	9	0.757	0.764	1986	5	19	1421.5
1966	10	8	826.8	10	0.730	0.736	1961	10	2	1227.1
1967	3	6	819.9	11	0.703	0.708	1979	9	14	1170.4
1968	1	24	279.3	12	0.676	0.681	1970	12	31	1127.2
1969	11	13	838.3	13	0.649	0.653	1984	9	27	1116.4
1970	12	31	1127.2	14	0.622	0.625	1989	7	30	1094.8
1971	1	1	1025.0	15	0.595	0.597	1973	8	28	1073.2
1972	9	28	975.0	16	0.568	0.569	1971	1	1	1025.0
1973	8	28	1073.2	17	0.541	0.542	1972	9	28	975.0
1974	8	30	499.0	18	0.514	0.514	1980	12	22	955.0
1975	10	3	709.5	19	0.486	0.486	1976	6	6	945.0
1976	6	6	945.0	20	0.459	0.458	1962	10	4	861.3
1977	2	3	593.0	21	0.432	0.431	1978	7	24	849.8
1978	7	24	849.8	22	0.405	0.403	1969	11	13	838.3
1979	9	14	1170.4	23	0.378	0.375	1963	11	21	836.0
1980	12	22	955.0	24	0.351	0.347	1966	10	8	826.8
1981	12	7	661.0	25	0.324	0.319	1967	3	6	819.9
1982	6	25	1547.0	26	0.297	0.292	1960	8	2	778.5
1983	5	21	1651.8	27	0.270	0.264	1958	9	14	746.3
1984	9	27	1116.4	28	0.243	0.236	1975	10	3	709.5
1985	4	6	649.0	29	0.216	0.208	1991	6	21	671.0
1986	5	19	1421.5	30	0.189	0.181	1981	12	7	661.0
1987	2	21	2097.2	31	0.162	0.153	1985	4	6	649.0
1988	5	23	1968.0	32	0.135	0.125	1964	6	15	615.0
1989	7	30	1094.8	33	0.108	0.097	1977	2	3	593.0
1990	7	20	1477.0	34	0.081	0.069	1974	8	30	499.0
1991	6	21	671.0	35	0.054	0.042	1959	2	7	327.5
1992	5	1	2233.2	36	0.027	0.014	1968	1	24	279.3

Results of Ordered Probability Method
64625000 Teresa Cristina

				log(X0)	1/a
[1]	Least Square	Thomas	All	2.97825	0.21540
[2]			Upper10	3.01028	0.18546
[3]	Method	Hazen	All	2.97825	0.20086
[4]			Upper10	3.03056	0.15717
[5]	Moment	Thomas	All	2.97825	0.21909
[6]	Method		Upper10	3.00397	0.19108
[7]		Hazen	All	2.97825	0.20385
[8]			Upper10	3.02305	0.16345

Fundamental Equation
log(X)=log(Xo)+1/a·u

Least Squre Method
1/a=([u]·[X]-[X·u])/([u]·[u]-[u2])
log(Xo)=[X]-1/a·[u]

Moment Method
1/a=sqr(([X]·[X]-[X2])/([u]·[u]-[u2]))
log(Xo)=[X]-1/a·[u]

Probability Year	Normal Variate	Least Square Method by THOMAS All	Least Square Method by THOMAS 10	Least Square Method by HAZEN All	Least Square Method by HAZEN 10	Moment Method by THOMAS All	Moment Method by THOMAS 10	Moment Method by HAZEN All	Moment Method by HAZEN 10
1000	3.091	4404.9	3832.3	3972.0	3283.2	4522.3	3931.0	4057.5	3374.5
500	2.879	3965.3	3500.6	3601.0	3040.7	4063.6	3580.9	3673.1	3113.7
200	2.576	3413.2	3076.8	3131.2	2725.6	3488.9	3135.0	3187.3	2780.6
150	2.475	3246.3	2946.7	2988.2	2627.7	3315.4	2998.6	3039.8	2676.6
100	2.327	3016.0	2765.7	2790.0	2490.4	3076.3	2809.1	2835.1	2531.4
80	2.242	2891.6	2667.2	2682.6	2415.0	2947.3	2706.1	2724.3	2451.8
70	2.190	2817.9	2608.6	2618.6	2369.9	2870.9	2644.8	2658.5	2404.2
60	2.128	2733.5	2541.2	2545.5	2317.9	2783.5	2574.4	2583.1	2349.4
50	2.054	2634.8	2461.8	2459.6	2256.4	2681.1	2491.6	2494.6	2284.6
40	1.960	2514.9	2365.2	2355.1	2181.1	2557.2	2390.9	2387.2	2205.4
30	1.834	2362.4	2241.2	2221.7	2083.8	2399.6	2261.9	2250.0	2103.2
20	1.645	2130.9	2067.3	2035.7	1946.0	2161.3	2081.3	2038.9	1958.7
10	1.282	1796.1	1770.1	1720.7	1706.1	1813.8	1773.7	1735.9	1708.2
8	1.150	1682.9	1673.8	1619.3	1627.0	1699.4	1674.2	1632.2	1625.9
7	1.068	1615.1	1613.4	1556.4	1578.9	1629.9	1614.2	1569.9	1576.0
6	0.967	1536.8	1547.7	1487.8	1522.7	1549.5	1544.6	1497.8	1517.8
5	0.841	1443.8	1466.7	1403.7	1454.8	1454.2	1461.4	1411.8	1447.4
4	0.674	1328.8	1365.6	1299.2	1369.4	1336.5	1357.7	1305.2	1359.1
3	0.430	1177.4	1230.5	1160.6	1253.7	1181.8	1219.5	1164.0	1239.9
2	0.000	951.2	1024.0	951.2	1072.9	951.2	1009.2	951.2	1054.5

Result of Iwai Method
64625000 Teresa Cristina

Probability Year	Normal Variate	Expected Value
1000	3.091	3465.2
500	2.879	3192.4
200	2.576	2837.6
150	2.475	2727.4
100	2.327	2572.6
80	2.242	2487.7
70	2.190	2436.9
60	2.128	2378.3
50	2.054	2309.0
40	1.960	2224.1
30	1.834	2114.5
20	1.645	1959.0
10	1.282	1686.4
8	1.150	1599.0
7	1.068	1544.7
6	0.967	1481.2
5	0.841	1404.6
4	0.674	1306.1
3	0.430	1177.3
2	0.000	972.9

log(X-b)=log(Xo-b)-1/a·u

log(Xo-b)=[Y]
1/a=sqr((N/(N-1))·([Y2]-[Y]·[Y]))

b= 246.9
log(Xo-b)= 3.08628
1/a= 0.15640

Result of GUMBEL Method
64625000 Teresa Cristina

Probability Year	Extremal Variate	Expected Value
1000	6.907	3864.7
500	6.214	3580.0
200	5.296	3003.2
150	5.007	2884.8
100	4.600	2717.6
80	4.376	2625.5
70	4.241	2570.3
60	4.086	2506.5
50	3.902	2431.0
40	3.676	2338.4
30	3.384	2218.5
20	2.970	2048.5
10	2.250	1753.0
8	2.013	1653.8
7	1.870	1594.8
6	1.702	1527.9
5	1.500	1445.0
4	1.246	1340.7
3	0.903	1199.8
2	0.367	979.7

X=Xo+1/a·y

1/a=([X2]-[X]·[X])/([Y2]-[Y]·[Y])
Xo=[X]-1/a·[Y]

1/a=1410.50700
Xo= 829.2

64645000 Porto Espanhol

Date	Data	No.	Probability Exceedence thomas	hazen	Date	Data
1965 10 2	2374.0	1	0.967	0.983	1992 5 31	3611.4
1966 10 9	1319.0	2	0.933	0.948	1987 5 21	3327.4
1967 3 6	1415.6	3	0.900	0.914	1983 5 30	3122.2
1968 1 20	538.2	4	0.867	0.879	1993 10 2	3052.0
1969 10 30	1572.0	5	0.833	0.845	1988 5 24	2704.8
1970 7 2	1493.8	6	0.800	0.810	1990 7 21	2652.0
1971 1 1	1874.2	7	0.767	0.776	1965 10 2	2374.0
1972 10 5	1463.9	8	0.733	0.741	1982 6 25	2188.0
1973 8 29	1731.0	9	0.700	0.707	1989 7 31	2156.8
1974 8 30	1283.0	10	0.667	0.672	1979 9 14	1973.5
1975 10 5	1167.5	11	0.633	0.638	1971 1 1	1874.2
1976 6 8	1470.5	12	0.600	0.603	1984 9 27	1874.2
1977 2 4	901.5	13	0.567	0.569	1973 8 29	1731.0
1978 7 25	1720.2	14	0.533	0.534	1978 7 25	1720.2
1979 9 14	1973.5	15	0.500	0.500	1969 10 30	1572.0
1980 12 23	1493.8	16	0.467	0.466	1986 5 19	1538.0
1981 12 7	1079.0	17	0.433	0.431	1970 7 2	1493.8
1982 6 25	2188.0	18	0.400	0.397	1980 12 23	1493.8
1983 5 30	3122.2	19	0.367	0.362	1976 6 8	1470.5
1984 9 27	1874.2	20	0.333	0.328	1972 10 5	1463.9
1985 4 7	1046.5	21	0.300	0.293	1967 3 6	1415.6
1986 5 19	1538.0	22	0.267	0.259	1966 10 9	1319.0
1987 5 21	3327.4	23	0.233	0.224	1974 8 30	1283.0
1988 5 24	2704.8	24	0.200	0.190	1975 10 5	1167.5
1989 7 31	2156.8	25	0.167	0.155	1981 12 7	1079.0
1990 7 21	2652.0	26	0.133	0.121	1985 4 7	1046.5
1991 6 22	1001.5	27	0.100	0.086	1991 6 22	1001.5
1992 5 31	3611.4	28	0.067	0.052	1977 2 4	901.5
1993 10 2	3052.0	29	0.033	0.017	1968 1 20	538.2

Result of Iwai Method
64645000 Porto Espanhol

Probability Year	Normal Variate	Expected Value
1000	3.091	5639.1
500	2.879	5221.7
200	2.576	4675.7
150	2.475	4505.1
100	2.327	4264.9
80	2.242	4132.6
70	2.190	4053.4
60	2.128	3961.9
50	2.054	3853.5
40	1.960	3720.4
30	1.834	3548.0
20	1.645	3302.6
10	1.282	2872.4
8	1.150	2729.5
7	1.068	2642.5
6	0.967	2540.4
5	0.841	2416.9
4	0.674	2260.7
3	0.430	2048.0
2	0.000	1712.6

$\log(x+b)=\log(xo+b)+1/a\cdot u$

$\log(xo+b)=[Y]$

$1/a=sqr((N/(N-1))\cdot([Y2]-[Y]\cdot[Y])$

b= 451.4
log(xo+b)= 3.33526
1/a= 0.14541

Result of GUMBEL Method
64645000 Porto Espanhol

Probability Year	Extremal Variate	Expected Value
1000	6.907	6207.8
500	6.214	5731.5
200	5.296	5101.3
150	5.007	4903.2
100	4.600	4623.6
80	4.376	4469.6
70	4.241	4377.2
60	4.086	4270.6
50	3.902	4144.2
40	3.676	3989.3
30	3.384	3788.8
20	2.970	3504.5
10	2.250	3010.2
8	2.013	2847.5
7	1.870	2748.9
6	1.702	2633.7
5	1.500	2495.0
4	1.246	2320.5
3	0.903	2084.9
2	0.367	1716.7

$x=xo+1/a\cdot y$

$1/a=([x2]-[x]\cdot[x])/([y2]-[y]\cdot[y])$

$xo=[x]-1/a\cdot[y]$

1/a=%686.61800
xo=1465.1

64645000 Porto Espanhol

				log(x0)	1/a
[1]	Least Square Method	Thomas	All	3.22516	0.20295
[2]			upper10	3.23851	0.19042
[3]		Hazen	All	3.22516	0.18692
[4]			upper10	3.25563	0.16111
[5]	Moment Method	Thomas	All	3.22516	0.20587
[6]			upper10	3.23308	0.19593
[7]		Hazen	All	3.22516	0.18925
[8]			upper10	3.24802	0.16831

Fundamental Equation
$\log(x)=\log(xo)-1/a\cdot u$

Least Squre Method
$1/a=([u]\cdot[X]-[X\cdot u])/([u]\cdot[u]-[u2])$
$\log(xo)=[X]-1/a\cdot[u]$

Moment Method
$1/a=sqr(([X]\cdot[X]-[X2])/([u]\cdot[u]-[u2]))$
$\log(xo)=[X]-1/a\cdot[u]$

Probability Year	Normal Variate	Least Square Method by THOMAS All	10	by HAZEN All	10	Moment Method by THOMAS All	10	by KAZEN All	10
1000	3.091	7118.5	6714.2	6350.7	5669.6	7267.7	6896.4	6457.3	5864.0
500	2.879	6447.0	6118.2	5796.9	5240.8	6572.8	6267.3	5887.4	5401.5
200	2.576	5597.7	5338.8	5089.7	4684.9	5695.4	5468.3	5160.8	4804.4
150	2.475	5339.5	5126.5	4873.1	4512.4	5428.9	5224.5	4938.5	4619.8
100	2.327	4981.8	4803.6	4571.6	4270.8	5060.2	4886.3	4629.3	4361.6
80	2.242	4787.9	4628.0	4407.5	4138.3	4860.5	4702.6	4461.0	4220.4
70	2.190	4672.8	4523.6	4309.9	4059.2	4742.0	4593.4	4361.0	4136.1
60	2.128	4540.9	4403.6	4197.6	3967.9	4606.2	4468.1	4246.0	4039.0
50	2.054	4385.9	4262.5	4065.5	3860.0	4446.8	4320.8	4110.8	3924.4
40	1.960	4197.8	4090.7	3904.7	3728.0	4253.4	4141.8	3946.1	3784.3
30	1.834	3957.7	3870.8	3698.5	3557.7	4006.7	3912.8	3733.2	3603.8
20	1.645	3622.9	3562.8	3409.4	3316.6	3663.1	3592.8	3439.7	3349.1
10	1.282	3056.9	3037.9	2915.6	2898.3	3083.4	3049.4	2935.8	2909.1
8	1.150	2875.0	2868.0	2755.4	2760.5	2897.3	2874.0	2772.6	2764.8
7	1.068	2765.9	2765.7	2658.9	2676.9	2785.7	2768.6	2674.3	2677.4
6	0.967	2639.3	2646.8	2546.7	2579.2	2656.5	2646.2	2560.0	2575.4
5	0.841	2488.5	2504.6	2412.3	2461.5	2502.6	2500.1	2423.3	2452.7
4	0.674	2301.4	2327.5	2244.8	2313.4	2311.8	2318.3	2252.9	2298.8
3	0.430	2053.5	2091.4	2021.1	2113.3	2059.4	2076.8	2023.8	2091.5
2	0.000	1679.4	1731.9	1679.4	1801.5	1679.4	1710.3	1679.4	1770.2

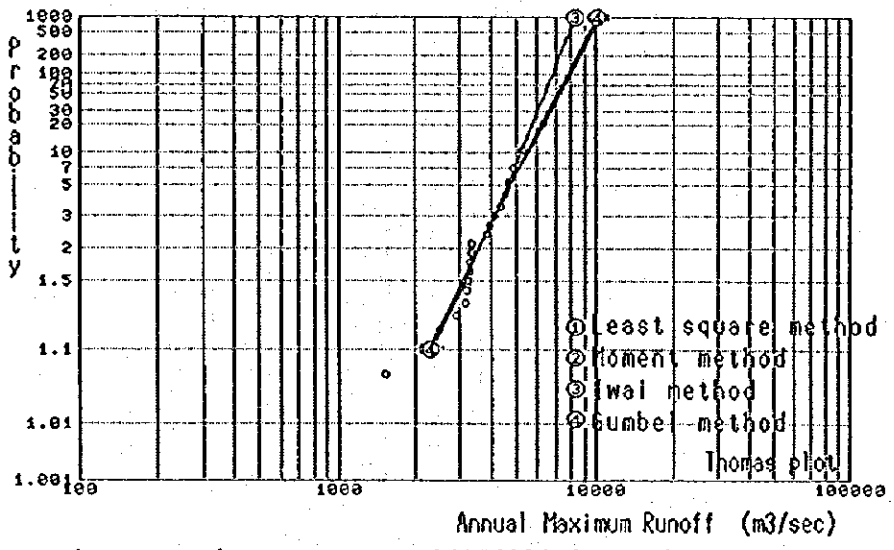
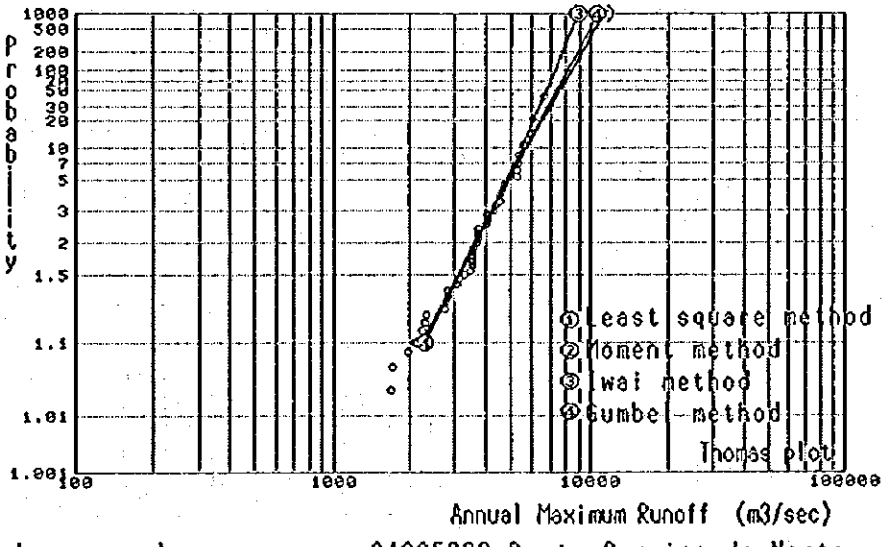


Fig. Log normal curve paper 64675002 Porto Bananeiras



Log normal curve paper 64685000 Porto Paraiso do Norte

table-
Data Summary
64675002 Porto Bananeiras

Date	Data	No.	Probability Exeedence thomas	Probability Exeedence hazen	Date	Data
1974 10 29	2909.4	1	0.952	0.975	1983 9 19	6323.8
1975 10 6	2488.0	2	0.905	0.925	1993 10 2	5238.5
1976 6 7	3285.6	3	0.857	0.875	1992 6 1	4858.6
1977 1 20	3224.0	4	0.810	0.825	1990 1 11	4668.0
1978 7 25	3338.4	5	0.762	0.775	1987 5 21	4524.0
1979 9 14	3931.5	6	0.714	0.725	1988 5 24	4353.0
1980 12 23	3180.0	7	0.667	0.675	1982 6 26	4119.0
1981 12 28	2496.6	8	0.619	0.625	1979 9 14	3931.5
1982 6 26	4119.0	9	0.571	0.575	1985 5 22	3833.6
1983 9 19	6323.8	10	0.524	0.525	1986 5 19	3338.4
1984 9 27	3276.8	11	0.476	0.475	1978 7 25	3338.4
1985 5 22	3833.6	12	0.429	0.425	1976 6 7	3285.6
1986 5 19	3338.4	13	0.381	0.375	1984 9 27	3276.8
1987 5 21	4524.0	14	0.333	0.325	1989 7 31	3250.4
1988 5 24	4353.0	15	0.286	0.275	1977 1 20	3224.0
1989 7 31	3250.4	16	0.238	0.225	1980 12 23	3180.0
1990 1 11	4668.0	17	0.190	0.175	1974 10 29	2909.4
1991 6 23	1542.8	18	0.143	0.125	1981 12 28	2496.6
1992 6 1	4858.6	19	0.095	0.075	1975 10 6	2488.0
1993 10 2	5238.5	20	0.048	0.025	1991 6 23	1542.8

Result of Iwai Method
64675002 Porto Bananeiras

Probability Year	Normal Variate	Expected Value
1000	3.091	8282.2
500	2.879	7855.8
200	2.576	7279.7
150	2.473	7095.0
100	2.327	6830.9
80	2.242	6663.4
70	2.190	6564.3
60	2.128	6490.3
50	2.054	6366.6
40	1.960	6212.8
30	1.834	6010.9
20	1.645	5717.8
10	1.282	5185.9
8	1.150	5003.3
7	1.068	4891.0
6	0.967	4757.5
5	0.841	4593.6
4	0.674	4382.5
3	0.430	4087.6
2	0.000	3602.6

$\log(x-b)=\log(xo-b)-1/a\cdot u$

$\log(xo-b)=[Y]$

$1/a=sqr((N/(N-1))\cdot([Y2]-[Y]\cdot[Y])$

b=1545.7
log(xo-b)= 3.71166
1/a= 0.09086

Result of GUMBEL Method
64675002 Porto Bananeiras

Probability Year	Extremal Variate	Expected Value
1000	6.907	%10064.0
500	6.214	9373.4
200	5.296	8459.8
150	5.007	8172.6
100	4.600	7767.2
80	4.378	7543.9
70	4.241	7410.0
60	4.086	7255.4
50	3.902	7072.2
40	3.676	6847.5
30	3.384	6556.9
20	2.970	6144.6
10	2.250	5428.1
8	2.013	5192.2
7	1.870	5049.2
6	1.702	4882.1
5	1.500	4681.0
4	1.246	4428.1
3	0.903	4086.5
2	0.367	3552.7

$x=xo+1/a\cdot y$

$1/a=([x2]-[x]\cdot[x])/([y2]-[y]\cdot[y])$

$xo=[x]-1/a\cdot[y]$

1/a=%995.49200
xo=3187.8

Results of Ordered Probability Method
64675002 Porto Bananeiras

				log(x0)	1/a
[1]	Least Square Method	Thomas	All	3.55051	0.14560
[2]			upper10	3.54298	0.14737
[3]		Hazen	All	3.55051	0.13153
[4]			upper10	3.54833	0.12764
[5]	Moment Method	Thomas	All	3.55051	0.15127
[6]			upper10	3.54100	0.15012
[7]		Hazen	All	3.55051	0.13563
[8]			upper10	3.54653	0.12993

Fundamental Equation
$\log(x)=\log(xo)-1/a\cdot u$

Least Squre Method
$1/a=([u]\cdot[X]-[X\cdot u])/([u]\cdot[u]-[u2])$
$\log(xo)=[X]-1/a\cdot[u]$

Moment Method
$1/a=sqr(([X]\cdot[X]-[X2])/([u]\cdot[u]-[u2]))$
$\log(xo)=[X]-1/a\cdot[u]$

Probability Year	Normal Variate	Least Square Method by THOMAS All	Least Square Method by THOMAS 10	Least Square Method by HAZEN All	Least Square Method by HAZEN 10	Moment Method by THOMAS All	Moment Method by THOMAS 10	Moment Method by HAZEN All	Moment Method by HAZEN 10
1000	3.091	%10011.4	9963.7	9057.4	8766.3	%10423.4	%10114.7	9325.6	8873.2
500	2.879	9324.5	9272.1	8494.1	8236.7	9681.4	9399.9	8728.1	8327.9
200	2.576	8425.9	8368.2	7751.0	7536.5	8713.9	8467.4	7941.9	7607.8
150	2.473	8145.2	8086.1	7517.4	7315.9	8412.5	8176.6	7695.1	7381.2
100	2.327	7749.9	7689.0	7187.0	7003.7	7988.8	7767.8	7346.7	7060.7
80	2.242	7532.3	7470.6	7004.5	6831.0	7755.9	7543.1	7154.4	6883.5
70	2.190	7402.0	7339.8	6895.0	6727.3	7616.5	7408.6	7039.0	6777.2
60	2.128	7251.4	7188.7	6768.1	6607.2	7455.6	7253.2	6905.5	6654.0
50	2.054	7073.0	7009.7	6617.5	6464.5	7265.2	7069.3	6747.1	6507.8
40	1.960	6854.1	6790.1	6432.2	6288.7	7031.7	6843.8	6552.4	6327.7
30	1.834	6570.4	6505.8	6191.2	6060.0	6729.6	6552.0	6299.4	6093.5
20	1.645	6166.8	6101.4	5846.6	5732.3	6300.6	6137.4	5938.2	5756.3
10	1.282	5459.3	5393.4	5237.2	5151.5	5551.3	5412.7	5300.9	5164.9
8	1.150	5224.2	5158.4	5033.0	4956.5	5303.2	5172.6	5088.0	4966.0
7	1.068	5081.1	5015.4	4908.3	4837.3	5152.4	5026.6	4958.0	4844.4
6	0.967	4913.2	4847.7	4761.6	4696.8	4975.6	4855.4	4805.3	4701.3
5	0.841	4710.1	4645.0	4583.4	4526.2	4762.1	4648.6	4620.0	4527.5
4	0.674	4453.3	4388.7	4357.0	4309.1	4492.6	4387.5	4384.8	4306.5
3	0.430	4103.6	4040.1	4046.8	4011.0	4126.7	4032.7	4063.3	4003.5
2	0.000	3552.3	3491.2	3552.3	3534.5	3552.3	3475.4	3552.3	3519.9

table-

Data Summary

64685000 Porto Paraiso do Norte

Date	Data	No.	Probability Exeedence Thomas	Probability Exeedence hazen	Date	Data
1953 10 8	2237.0	1	0.976	0.986	1983 5 31	6676.0
1954 5 20	4040.0	2	0.952	0.963	1957 9 24	6072.2
1955 6 20	5262.2	3	0.929	0.939	1993 10 3	5991.6
1956 8 2	3575.0	4	0.905	0.915	1992 6 2	5539.2
1957 9 24	6072.2	5	0.881	0.890	1961 4 6	5364.8
1958 9 15	2788.8	6	0.857	0.866	1987 5 22	5324.6
1959 2 8	2841.6	7	0.833	0.841	1990 1 12	5295.6
1960 8 4	2336.0	8	0.810	0.817	1955 6 20	5262.2
1961 4 6	5364.8	9	0.786	0.793	1965 10 3	4716.0
1962 10 5	3095.0	10	0.762	0.768	1982 6 27	4061.6
1963 11 22	3290.0	11	0.738	0.744	1972 10 5	4519.0
1964 2 17	1985.0	12	0.714	0.720	1988 5 25	4513.6
1965 10 3	4716.0	13	0.690	0.695	1979 9 15	4057.0
1966 1 1	2290.0	14	0.667	0.671	1977 1 20	4276.0
1967 3 7	2122.0	15	0.643	0.646	1976 6 7	4043.8
1968 1 23	1718.4	16	0.619	0.622	1954 5 20	4040.0
1969 10 1	3979.0	17	0.595	0.598	1969 10 1	3979.0
1970 12 24	3712.0	18	0.571	0.573	1985 5 22	3753.6
1971 6 21	3514.4	19	0.548	0.549	1984 9 28	3727.6
1972 10 5	4519.0	20	0.524	0.524	1970 12 24	3712.0
1973 8 30	3535.2	21	0.500	0.500	1986 5 20	3686.0
1974 10 27	3478.0	22	0.476	0.476	1956 8 2	3575.0
1975 10 6	2770.0	23	0.452	0.451	1978 7 26	3556.0
1976 6 7	4043.8	24	0.429	0.427	1973 8 30	3535.2
1977 1 20	4276.0	25	0.405	0.402	1989 8 1	3519.6
1978 7 26	3556.0	26	0.381	0.378	1971 6 21	3514.4
1979 9 15	4057.0	27	0.357	0.354	1974 10 27	3478.0
1980 12 23	3119.2	28	0.333	0.329	1963 11 22	3290.0
1981 12 8	2835.0	29	0.310	0.305	1980 12 23	3119.2
1982 6 27	4061.6	30	0.286	0.280	1962 10 5	3095.0
1983 5 31	6676.0	31	0.262	0.256	1959 2 8	2841.6
1984 9 28	3727.6	32	0.238	0.232	1981 12 8	2835.0
1985 5 22	3753.6	33	0.214	0.207	1958 9 15	2788.8
1986 5 20	3686.0	34	0.190	0.183	1975 10 6	2770.0
1987 5 22	5324.6	35	0.167	0.159	1960 8 4	2336.0
1988 5 25	4513.6	36	0.143	0.134	1966 1 1	2290.0
1989 8 1	3519.6	37	0.119	0.110	1953 10 8	2237.0
1990 1 12	5295.6	38	0.095	0.085	1967 3 7	2122.0
1991 12 13	1695.4	39	0.071	0.061	1964 2 17	1985.0
1992 6 2	5539.2	40	0.048	0.037	1968 1 23	1718.4
1993 10 3	5991.6	41	0.024	0.012	1991 12 13	1695.4

Results of Ordered Probability Method

64685000 Porto Paraiso do Norte

				log(xO)	1/A
[1]	Least Square	Thomas	All	3.55600	0.15805
[2]			upper10	3.60004	0.11412
[3]	Method	Hazen	All	3.55600	0.14782
[4]			upper10	3.61367	0.09690
[5]	Moment Method	Thomas	All	3.55600	0.15983
[6]			upper10	3.59544	0.11795
[7]		Hazen	All	3.55600	0.14968
[8]			upper10	3.60888	0.10066

Fundamental Equation

$$\log(x)=\log(xo)+1/a\cdot u$$

Least Squre Method

$$1/a=([u]\cdot[X]-[X\cdot u])/([u]\cdot[u]-[u2])$$

$$\log(xo)=[X]-1/a\cdot[u]$$

Moment Method

$$1/a=sqr(([X]\cdot[X]-[X2])/([u]\cdot[u]-[u2]))$$

$$\log(xo)=[X]-1/a\cdot[u]$$

Probability Year	Normal Variate	Least Square Method by THOMAS All	Least Square Method by THOMAS 10	Least Square Method by HAZEN All	Least Square Method by HAZEN 10	Moment Method by THOMAS All	Moment Method by THOMAS 10	Moment Method by HAZEN All	Moment Method by HAZEN 10
1000	3.091	%11077.9	8968.9	%10299.8	8187.4	%11219.3	9119.5	%10437.2	8317.0
500	2.879	%10255.3	8482.8	9582.7	7809.1	%10377.2	8609.2	9701.7	7916.2
200	2.576	9187.0	7835.1	8645.8	7299.8	9284.7	7930.7	8741.9	7382.4
150	2.475	8855.2	7629.8	8353.5	7137.0	8945.6	7715.9	8442.6	7211.5
100	2.327	8389.7	7338.0	7942.1	6904.6	8470.3	7411.2	8021.7	6967.7
80	2.242	8134.4	7178.0	7715.8	6775.0	8209.8	7242.1	7790.3	6831.9
70	2.190	7981.7	7078.5	7580.3	6696.8	8053.8	7140.3	7651.8	6749.9
60	2.128	7805.8	6963.4	7423.8	6605.8	7874.1	7022.6	7491.8	6654.7
50	2.054	7597.4	6830.8	7238.4	6497.2	7661.7	6882.3	7302.4	6541.1
40	1.960	7342.4	6664.5	7010.9	6362.6	7401.8	6709.2	7070.1	6400.4
30	1.834	7013.2	6447.3	6716.5	6186.1	7066.2	6483.4	6769.5	6216.1
20	1.645	6546.7	6134.7	6297.8	5930.5	6591.1	6158.8	6342.4	5949.5
10	1.282	5735.6	5573.9	5564.9	5468.5	5765.8	5579.8	5595.6	5488.9
8	1.150	5468.0	5386.8	5321.7	5310.7	5493.9	5384.4	5348.0	5304.9
7	1.068	5305.6	5270.8	5173.8	5213.4	5328.9	5284.8	5197.5	5204.1
6	0.967	5115.5	5130.8	5000.2	5098.1	5135.9	5123.2	5021.0	5084.6
5	0.841	4886.4	4966.7	4790.5	4956.9	4903.3	4951.0	4807.8	4938.3
4	0.674	4597.9	4753.1	4525.4	4775.3	4610.6	4731.1	4538.5	4750.5
3	0.430	4207.3	4458.1	4164.9	4522.4	4214.8	4427.8	4172.6	4489.4
2	0.000	3597.5	3981.5	3597.5	4106.4	3597.5	3939.5	3597.5	4063.3

Result of Iwai Method

64685000 Porto Paraiso do Norte

Probability Year	Normal Variate	Expected Value
1000	3.091	8913.3
500	2.879	8441.0
200	2.576	7801.7
150	2.475	7596.5
100	2.327	7302.7
80	2.242	7138.4
70	2.190	7039.1
60	2.128	6923.5
50	2.054	6785.3
40	1.960	6613.8
30	1.834	6388.2
20	1.645	6060.5
10	1.282	5464.7
8	1.150	5260.0
7	1.068	5133.5
6	0.967	4983.4
5	0.841	4799.1
4	0.674	4561.3
3	0.430	4228.6
2	0.000	3680.2

$$\log(x-b)=\log(xo-b)+1/a\cdot u$$

$$\log(xo-b)=[Y]$$

$$1/a=sqr((N/(N-1))\cdot([Y2]-[Y]\cdot[Y]))$$

$$b=2369.8$$

$$\log(xo-b)=3.78173$$

$$1/a=0.08758$$

Result of GUMBEL Method

64685000 Porto Paraiso do Norte

Probability Year	Extremal Variate	Expected Value
1000	6.907	%10591.5
500	6.214	9851.0
200	5.296	8871.5
150	5.007	8563.6
100	4.600	8129.0
80	4.376	7889.5
70	4.241	7746.1
60	4.086	7580.3
50	3.902	7383.9
40	3.676	7143.0
30	3.384	6831.4
20	2.970	6389.5
10	2.250	5621.3
8	2.013	5368.4
7	1.870	5215.1
6	1.702	5036.0
5	1.500	4820.4
4	1.246	4549.3
3	0.903	4183.0
2	0.367	3610.7

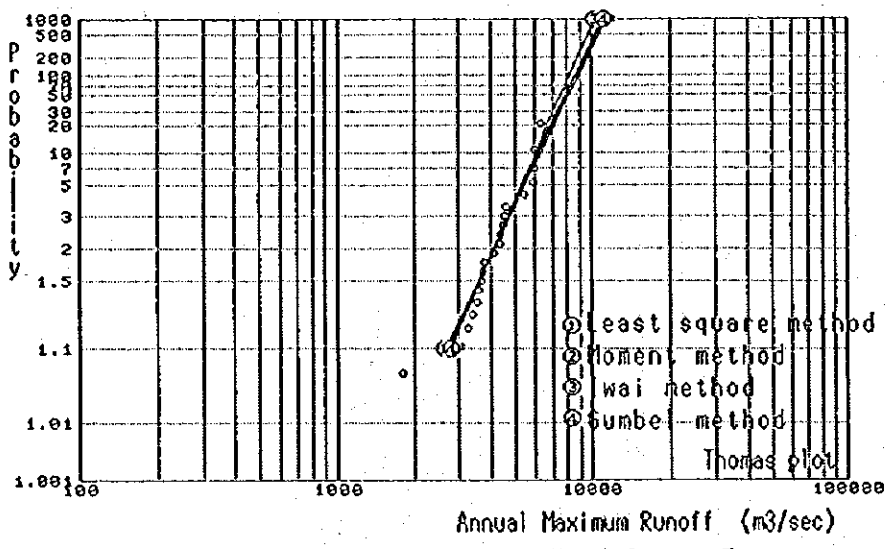
$$x=xo+1/a\cdot y$$

$$1/a=([x2]-[x]\cdot[x])/([y2]-[y]\cdot[y])$$

$$xo=[x]-1/a\cdot[y]$$

1/a=%1067.24000

xo=3219.6



ig. Log normal curve paper 64693000 Novo Porto Taquara

table- Data Summary
64693000 Novo Porto Taquara

Date	Data	No.	Probability Exeedence thomas	hazen	Date	Data
1974 10 30	3757.5	1	0.952	0.975	1993 10 4	6322.2
1975 10 7	3016.0	2	0.905	0.925	1983 3 6	5991.0
1976 6 8	4481.7	3	0.857	0.875	1990 1 16	5963.4
1977 1 21	4351.5	4	0.810	0.825	1987 5 24	5880.6
1978 7 27	3402.4	5	0.762	0.775	1992 5 3	5412.8
1979 9 16	4341.0	6	0.714	0.725	1982 6 28	4572.5
1980 12 24	3597.6	7	0.667	0.675	1988 5 26	4503.9
1981 12 9	3267.2	8	0.619	0.625	1976 6 8	4481.7
1982 6 28	4572.5	9	0.571	0.575	1977 1 21	4351.5
1983 3 6	5991.0	10	0.524	0.525	1979 9 16	4341.0
1984 9 29	3787.5	11	0.476	0.475	1985 5 23	4095.6
1985 5 23	4095.6	12	0.429	0.425	1984 9 29	3787.5
1986 5 21	3662.4	13	0.381	0.375	1974 10 30	3757.5
1987 5 24	5880.6	14	0.333	0.325	1986 5 21	3662.4
1988 5 26	4503.9	15	0.286	0.275	1980 12 24	3597.6
1989 9 12	3548.8	16	0.238	0.225	1989 9 12	3548.8
1990 1 16	5963.4	17	0.190	0.175	1978 7 27	3402.4
1991 12 13	1792.4	18	0.143	0.125	1981 12 9	3267.2
1992 5 3	5412.8	19	0.095	0.075	1975 10 7	3016.0
1993 10 4	6322.2	20	0.048	0.025	1991 12 13	1792.4

Result of Iwai Method
64693000 Novo Porto Taquara

Probability Year	Normal Variate	Expected Value
1000	3.091	%10241.4
500	2.879	9622.3
200	2.576	8803.8
150	2.475	8546.0
100	2.327	8181.1
80	2.242	7979.2
70	2.190	7858.0
60	2.128	7717.6
50	2.054	7550.8
40	1.960	7345.3
30	1.834	7078.0
20	1.645	6695.1
10	1.282	6016.3
8	1.150	5788.4
7	1.068	5649.1
6	0.967	5485.0
5	0.841	5285.6
4	0.674	5031.9
3	0.430	4683.6
2	0.000	4126.9

$\log(x-b)=\log(xo-b)+1/a\cdot u$

$\log(xo-b)=[Y]$
$1/a=sqr((N/(N-1))\cdot([Y2]-[Y]\cdot[Y]))$

b= 0.0
log(xo-b)= 3.61562
1/a= 0.12773

Result of GUMBEL Method
64693000 Novo Porto Taquara

Probability Year	Extremal Variate	Expected Value
1000	6.907	%11066.2
500	6.214	%10329.6
200	5.296	9355.0
150	5.007	9048.6
100	4.600	8616.3
80	4.376	8378.0
70	4.241	8235.2
60	4.086	8070.3
50	3.902	7874.8
40	3.676	7635.2
30	3.384	7325.2
20	2.970	6885.4
10	2.250	6121.1
8	2.013	5869.5
7	1.870	5717.0
6	1.702	5538.8
5	1.500	5324.2
4	1.246	5054.5
3	0.903	4690.0
2	0.367	4120.6

$x=xo+1/a\cdot y$

$1/a=([x2]-[x]\cdot[x])/([y2]-[y]\cdot[y])$
$xo=[x]-1/a\cdot[y]$

1/a=%1061.88000
xo=3731.5

Results of Ordered Probability Method
64693000 Novo Porto Taquara

				log(xo)	1/a
[1]	Least Square Method	Thomas	All	3.61562	0.13614
[2]			upper10	3.62245	0.12182
[3]		Hazen	All	3.61562	0.12272
[4]			upper10	3.62812	0.10393
[5]	Moment Method	Thomas	All	3.61562	0.14331
[6]			upper10	3.61659	0.12998
[7]		Hazen	All	3.61562	0.12850
[8]			upper10	3.62138	0.11250

Fundamental Equation
$\log(x)=\log(xo)+1/a\cdot u$

Least Squre Method
$1/a=([u]\cdot[X]-[X\cdot u])/([u]\cdot[u]-[u2])$
$\log(xo)=[X]-1/a\cdot[u]$

Moment Method
$1/a=sqr(([X]\cdot[X]-[X2])/([u]\cdot[u]-[u2]))$
$\log(xo)=[X]-1/a\cdot[u]$

Probability Year	Normal Variate	Least Square Method by THOMAS All	Least Square Method by THOMAS 10	Least Square Method by HAZEN All	Least Square Method by HAZEN 10	Moment Method by THOMAS All	Moment Method by THOMAS 10	Moment Method by HAZEN All	Moment Method by HAZEN 10
1000	3.091	%10873.2	9975.4	9882.7	8898.6	%11442.8	%10430.7	%10297.7	9312.6
500	2.879	%10174.1	9399.4	9308.1	8458.4	%10669.5	9789.4	9671.5	8814.9
200	2.576	9254.3	8635.3	8546.1	7868.1	9656.7	8942.6	8844.1	8151.0
150	2.475	8965.7	8394.0	8305.4	7680.1	9339.9	8676.1	8583.6	7940.4
100	2.327	8558.2	8051.8	7964.4	7412.2	8893.6	8299.3	8214.9	7640.9
80	2.242	8333.4	7862.2	7775.5	7263.0	8647.8	8090.9	8011.0	7474.7
70	2.190	8198.5	7748.3	7662.0	7173.1	8500.5	7965.9	7888.6	7374.5
60	2.128	8042.5	7616.2	7530.4	7068.6	8330.3	7821.0	7746.8	7258.4
50	2.054	7857.3	7459.1	7374.0	6944.1	8128.5	7649.0	7578.3	7120.0
40	1.960	7629.6	7265.4	7181.1	6789.9	7880.8	7437.3	7370.9	6949.1
30	1.834	7334.0	7013.0	6929.8	6568.1	7559.6	7161.9	7101.0	6725.8
20	1.645	6911.9	6650.7	6569.2	6296.6	7102.3	6767.8	6714.6	6404.3
10	1.282	6167.5	6006.0	5928.0	5772.0	6299.5	6070.1	6030.0	5828.8
8	1.150	5918.9	5786.9	5712.1	5593.5	6032.4	5836.2	5800.2	5633.9
7	1.068	5767.1	5655.9	5580.0	5483.7	5869.7	5693.3	5659.8	5514.2
6	0.967	5588.7	5499.1	5424.1	5353.7	5678.8	5525.0	5494.4	5372.9
5	0.841	5372.5	5308.3	5234.6	5194.8	5447.7	5320.7	5293.5	5200.5
4	0.674	5098.0	5065.0	4992.9	4991.0	5155.1	5060.9	5037.9	4980.0
3	0.430	4722.8	4730.1	4660.4	4708.0	4756.5	4704.6	4687.2	4675.1
2	0.000	4126.9	4192.3	4126.9	4247.3	4126.9	4136.1	4126.9	4182.0

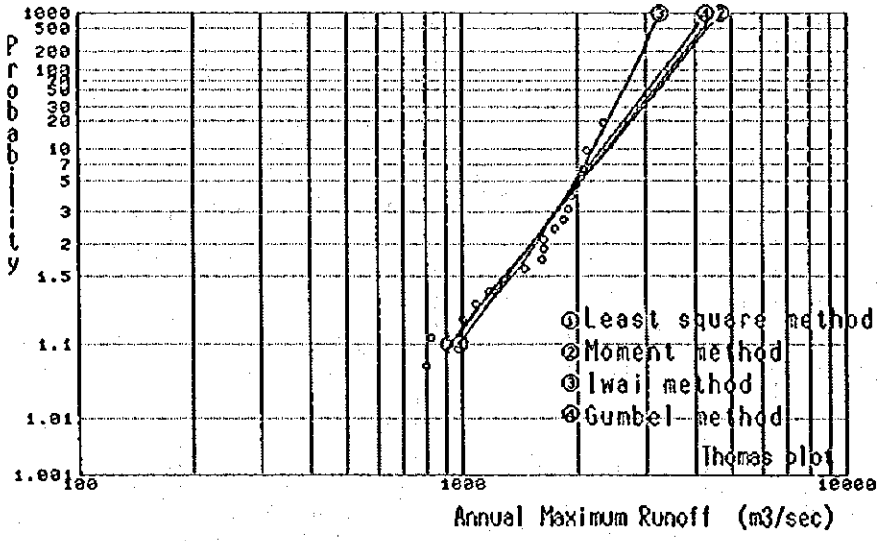


Fig. Log normal curve paper 64771500 Porto Guarani

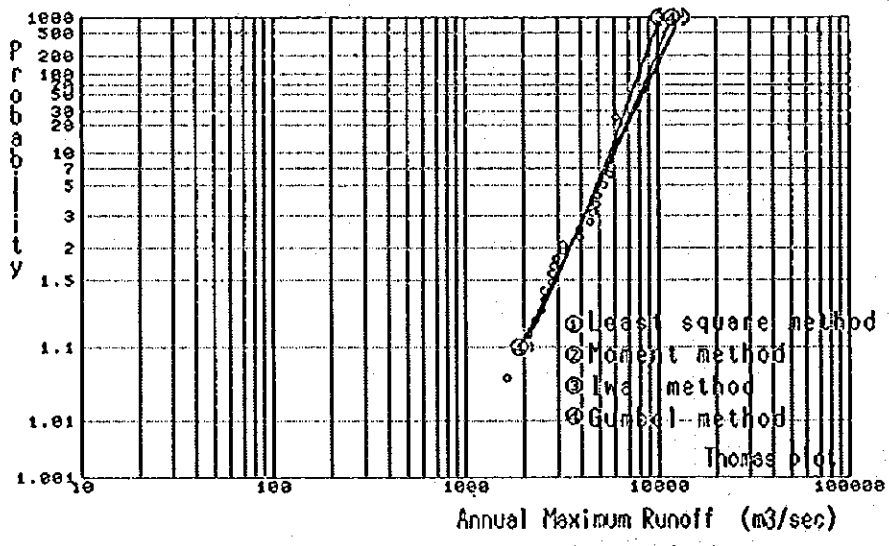


Fig. Log normal curve paper 64795000 Ponte do Piquiri

table- Data Summary
64771500 Porto Guarani

Date	Data	No.	Probability Exeedence thomas	hazen	Date	Data
1976 11 6	1464.0	1	0.947	0.972	1988 5 23	2340.0
1977 1 5	821.8	2	0.895	0.917	1987 5 20	2112.0
1978 7 25	1626.0	3	0.842	0.861	1982 7 18	2076.0
1979 5 13	1840.0	4	0.789	0.806	1990 8 20	1996.0
1980 1 25	1732.0	5	0.737	0.750	1984 1 30	1920.0
1981 12 2	1297.4	6	0.684	0.694	1993 10 1	1880.0
1982 7 18	2076.0	7	0.632	0.639	1979 5 13	1840.0
1983 9 19	1607.5	8	0.579	0.583	1980 1 25	1732.0
1984 1 30	1920.0	9	0.526	0.528	1992 5 31	1633.4
1985 4 6	803.0	10	0.474	0.472	1978 7 25	1626.0
1986 5 18	1002.4	11	0.421	0.417	1983 9 19	1607.5
1987 5 20	2112.0	12	0.368	0.361	1976 11 6	1464.0
1988 5 23	2340.0	13	0.316	0.306	1981 12 2	1297.4
1989 7 31	1175.0	14	0.263	0.250	1989 7 31	1175.0
1990 8 20	1996.0	15	0.211	0.194	1991 6 23	1087.1
1991 6 23	1087.1	16	0.158	0.139	1986 5 18	1002.4
1992 5 31	1633.4	17	0.105	0.083	1977 1 5	821.8
1993 10 1	1880.0	18	0.053	0.028	1985 4 6	803.0

Result of Iwai Method
64771500 Porto Guarani

Probability Year	Normal Variate	Expected Value
1000	3.091	3248.3
500	2.879	3114.7
200	2.576	2929.0
150	2.475	2868.1
100	2.327	2779.9
80	2.242	2730.0
70	2.190	2699.7
60	2.128	2664.1
50	2.054	2621.3
40	1.960	2567.7
30	1.834	2496.3
20	1.645	2391.4
10	1.282	2194.8
8	1.150	2125.6
7	1.068	2082.3
6	0.967	2030.5
5	0.841	1966.2
4	0.674	1882.0
3	0.430	1761.7
2	0.000	1556.5

$\log(x-b)=\log(xo-b)+1/a\cdot u$

$\log(xo-b)=[Y]$
$1/a=sqr((N/(N-1))\cdot([Y2]-[Y]\cdot[Y])$

b=3064.9
log(xo-b)= 3.66478
1/a= 0.04384

Result of GUMBEL Method
64771500 Porto Guarani

Probability Year	Extremal Variate	Expected Value
1000	6.907	4301.9
500	6.214	4006.1
200	5.296	3614.8
150	5.007	3491.8
100	4.600	3318.2
80	4.376	3222.5
70	4.241	3165.2
60	4.086	3099.0
50	3.902	3020.5
40	3.676	2924.3
30	3.384	2799.8
20	2.970	2623.3
10	2.250	2316.4
8	2.013	2215.4
7	1.870	2154.1
6	1.702	2082.6
5	1.500	1996.4
4	1.246	1888.1
3	0.903	1741.8
2	0.367	1513.2

$x=xo+1/a\cdot y$

$1/a=([x2]-[x]\cdot[x])/([y2]-[y]\cdot[y])$
$xo=[x]-1/a\cdot[y]$

1/a=%426.35500
xo=1356.9

Results of Ordered Probability Method
64771500 Porto Guarani

				log(x0)	1/a
[1]	Least Square Method	Thomas	All	3.17822	0.15433
[2]			upper10	3.22142	0.09202
[3]		Hazen	All	3.17822	0.13679
[4]			upper10	3.22409	0.07943
[5]	Moment Method	Thomas	All	3.17822	0.15971
[6]			upper10	3.22060	0.09331
[7]		Hazen	All	3.17822	0.14203
[8]			upper10	3.22305	0.08093

Fundamental Equation
$\log(x)=\log(xo)+1/a\cdot u$

Least Squre Method
$1/a=([u]\cdot[X]-[X\cdot u])/([u]\cdot[u]-[u2])$
$\log(xo)=[X]-1/a\cdot[u]$

Moment Method
$1/a=sqr(([X]\cdot[X]-[X2])/([u]\cdot[u]-[u2]))$
$\log(xo)=[X]-1/a\cdot[u]$

Probability Year	Normal Variate	Least Square Method by THOMAS All	10	by HAZEN All	10	Moment Method by THOMAS All	10	by HAZEN All	10
1000	3.091	4520.3	3204.8	3990.0	2948.3	4697.0	3228.4	4141.7	2972.7
500	2.879	4192.3	3064.0	3732.3	2836.2	4344.7	3084.6	3864.2	2857.6
200	2.576	3765.3	2873.9	3393.3	2683.6	3887.6	2890.6	3500.5	2701.0
150	2.475	3632.5	2813.0	3267.0	2634.5	3745.7	2828.5	3386.7	2650.7
100	2.327	3445.9	2726.0	3136.9	2564.0	3546.8	2739.8	3226.2	2578.4
80	2.242	3343.5	2677.4	3054.1	2524.4	3437.7	2690.2	3137.9	2537.9
70	2.190	3282.2	2648.0	3004.4	2500.5	3372.6	2660.3	3084.9	2513.4
60	2.128	3211.5	2613.8	2947.0	2472.6	3297.4	2625.5	3023.7	2484.8
50	2.054	3127.8	2573.0	2878.8	2439.3	3208.5	2583.9	2951.1	2450.7
40	1.960	3025.2	2522.4	2795.0	2397.8	3099.7	2532.4	2861.9	2408.2
30	1.834	2892.7	2455.9	2686.2	2343.1	2959.3	2464.7	2746.3	2352.3
20	1.645	2704.7	2359.4	2530.9	2263.5	2760.5	2366.6	2581.6	2270.9
10	1.282	2377.0	2184.5	2257.1	2117.9	2415.1	2188.8	2292.3	2122.1
8	1.150	2268.6	2124.6	2165.7	2067.6	2301.2	2127.9	2195.9	2070.8
7	1.068	2202.8	2087.6	2109.9	2036.5	2232.2	2090.3	2137.2	2039.1
6	0.967	2125.7	2043.8	2044.3	1999.5	2151.4	2045.8	2068.3	2001.4
5	0.841	2032.7	1990.0	1964.8	1954.0	2054.1	1991.2	1984.9	1955.0
4	0.674	1915.4	1920.7	1864.0	1895.2	1931.5	1920.9	1879.2	1895.0
3	0.430	1756.4	1823.9	1726.2	1812.5	1765.8	1822.8	1735.1	1810.8
2	0.000	1507.4	1665.0	1507.4	1675.3	1507.4	1661.9	1507.4	1671.3

table- Data Summary
64795000 Ponte do Piquiri

Date	Data	No.	Probability Exeedence thomas	hazen	Date	Data
1970 12 31	2289.1	1	0.960	0.979	1983 9 19	6136.0
1971 1 1	2818.0	2	0.920	0.938	1987 5 21	6125.0
1972 8 29	2454.4	3	0.880	0.896	1992 5 29	5696.0
1973 1 26	3886.0	4	0.840	0.854	1993 10 2	5641.0
1974 8 30	2536.0	5	0.800	0.813	1982 7 18	5256.0
1975 10 6	1822.5	6	0.760	0.771	1984 1 30	4901.0
1976 11 6	2878.0	7	0.720	0.729	1988 5 24	4827.5
1977 1 5	1647.0	8	0.680	0.688	1979 5 13	4649.0
1978 7 25	2794.0	9	0.640	0.646	1981 12 7	4481.0
1979 5 13	4649.0	10	0.600	0.604	1990 8 20	3940.6
1980 9 22	3188.8	11	0.560	0.563	1973 1 26	3886.0
1981 12 7	4481.0	12	0.520	0.521	1986 5 19	3214.0
1982 7 18	5256.0	13	0.480	0.479	1980 9 22	3188.8
1983 9 19	6136.0	14	0.440	0.438	1989 7 31	2953.6
1984 1 30	4901.0	15	0.400	0.396	1976 11 6	2878.0
1985 4 7	2124.0	16	0.360	0.354	1971 1 1	2818.0
1986 5 19	3214.0	17	0.320	0.313	1978 7 25	2794.0
1987 5 21	6125.0	18	0.280	0.271	1991 12 12	2567.2
1988 5 24	4827.5	19	0.240	0.229	1974 8 30	2536.0
1989 7 31	2953.6	20	0.200	0.188	1972 8 29	2454.4
1990 8 20	3940.6	21	0.160	0.146	1970 12 31	2289.1
1991 12 12	2567.2	22	0.120	0.104	1985 4 7	2124.0
1992 5 29	5696.0	23	0.080	0.063	1975 10 6	1822.5
1993 10 2	5641.0	24	0.040	0.021	1977 1 5	1647.0

Result of Iwai Method
64795000 Ponte do Piquiri

Probability Year	Normal Variate	Expected Value
1000	3.091	%10237.0
500	2.879	9582.8
200	2.576	8688.9
150	2.475	8406.8
100	2.327	8006.9
80	2.242	7785.4
70	2.190	7652.4
60	2.128	7498.1
50	2.054	7314.7
40	1.960	7088.7
30	1.834	6794.2
20	1.645	6371.7
10	1.282	5620.6
8	1.150	5367.8
7	1.068	5213.1
6	0.967	5030.6
5	0.841	4808.7
4	0.674	4525.9
3	0.430	4136.8
2	0.000	3512.8

$$\log(x-b)=\log(x_o-b)+1/a\cdot u$$

$$\log(x_o-b)=[Y]$$
$$1/a=\mathrm{sqr}((N/(N-1))\cdot([YZ]-[Y]\cdot[Y])$$

b=1293.9
log(xo-b)= 3.68185
1/a= 0.12321

Result of GUMBEL Method
64795000 Ponte do Piquiri

Probability Year	Extremal Variate	Expected Value
1000	6.907	%11831.8
500	6.214	%10947.5
200	5.296	9777.4
150	5.007	9409.6
100	4.600	8890.5
80	4.376	8604.5
70	4.241	8433.1
60	4.086	8235.0
50	3.902	8000.4
40	3.676	7712.7
30	3.384	7340.5
20	2.970	6812.6
10	2.250	5894.9
8	2.013	5592.8
7	1.870	5409.8
6	1.702	5195.8
5	1.500	4938.2
4	1.246	4614.4
3	0.903	4176.8
2	0.367	3493.3

$$x=x_o+1/a\cdot y$$

$$1/a=([x2]-[x]\cdot[x])/([y2]-[y]\cdot[y])$$
$$x_o=[x]-1/a\cdot[y]$$

1/a=%1274.86000
xo=3026.0

Results of Ordered Probability Method
64795000 Ponte do Piquiri

				log(X0)	1/a
[1]	Least Square Method	Thomas	All	3.53686	0.18639
[2]			upper10	3.60384	0.12335
[3]		Hazen	All	3.53686	0.16843
[4]			upper10	3.61266	0.10428
[5]	Moment Method	Thomas	All	3.53686	0.18922
[6]			upper10	3.59798	0.13021
[7]		Hazen	All	3.53686	0.17187
[8]			upper10	3.60526	0.11228

Fundamental Equation
$$\log(x)=\log(x_o)+1/a\cdot u$$

Least Squre Method
$$1/a=([u]\cdot[X]-[X\cdot u])/([u]\cdot[u]-[u2])$$
$$\log(x_o)=[X]-1/a\cdot[u]$$

Moment Method
$$1/a=\mathrm{sqr}(([X]\cdot[X]-[X2])/([u]\cdot[u]-[u2]))$$
$$\log(x_o)=[X]-1/a\cdot[u]$$

Probability Year	Normal Variate	Least Square Method by THOMAS All	Least Square Method by THOMAS 10	Least Square Method by HAZEN All	Least Square Method by HAZEN 10	Moment Method by THOMAS All	Moment Method by THOMAS 10	Moment Method by HAZEN All	Moment Method by HAZEN 10
1000	3.091	%12968.4	9661.7	%11412.4	8608.8	%13232.5	%10009.0	%11696.0	8959.1
500	2.879	%11840.5	9097.1	%10511.6	8181.5	%12065.0	9392.6	%10754.7	8481.2
200	2.576	%10399.9	8348.7	9348.9	7608.7	%10576.2	8578.8	9542.1	7843.7
150	2.475	9958.5	8112.4	8989.5	7426.3	%10120.6	8322.7	9168.0	7641.4
100	2.327	9344.1	7777.6	8486.8	7166.3	9487.0	7960.6	8645.1	7353.8
80	2.242	9009.6	7592.2	8211.8	7021.7	9142.3	7760.5	8359.3	7194.1
70	2.190	8810.6	7480.8	8047.7	6934.4	8937.3	7640.3	8188.9	7097.9
60	2.128	8581.8	7351.7	7858.7	6833.1	8701.8	7501.1	7992.6	6986.3
50	2.054	8312.4	7198.2	7635.4	6712.3	8424.6	7335.9	7761.0	6853.4
40	1.960	7984.5	7008.9	7362.7	6562.8	8087.3	7132.5	7478.2	6689.2
30	1.834	7564.0	6762.4	7011.4	6367.1	7655.0	6867.9	7114.3	6474.7
20	1.645	6974.3	6408.8	6515.6	6084.3	7049.6	6489.4	6601.3	6165.7
10	1.282	5967.0	5780.1	5658.9	5576.0	6017.1	5819.3	5716.8	5612.7
8	1.150	5640.0	5568.6	5378.0	5402.9	5682.5	5594.7	5427.3	5425.4
7	1.068	5443.0	5439.1	5208.0	5296.5	5481.1	5457.5	5252.3	5310.4
6	0.967	5213.9	5286.4	5009.4	5170.5	5246.9	5295.9	5048.0	5174.6
5	0.841	4939.6	5100.7	4770.7	5016.6	4966.8	5099.7	4802.7	5008.9
4	0.674	4597.4	4864.0	4471.0	4819.1	4617.7	4850.3	4495.0	4796.9
3	0.430	4140.5	4538.5	4067.5	4545.0	4152.2	4508.3	4081.4	4503.8
2	0.000	3442.4	4016.4	3442.4	4098.8	3442.4	3962.6	3442.4	4029.6

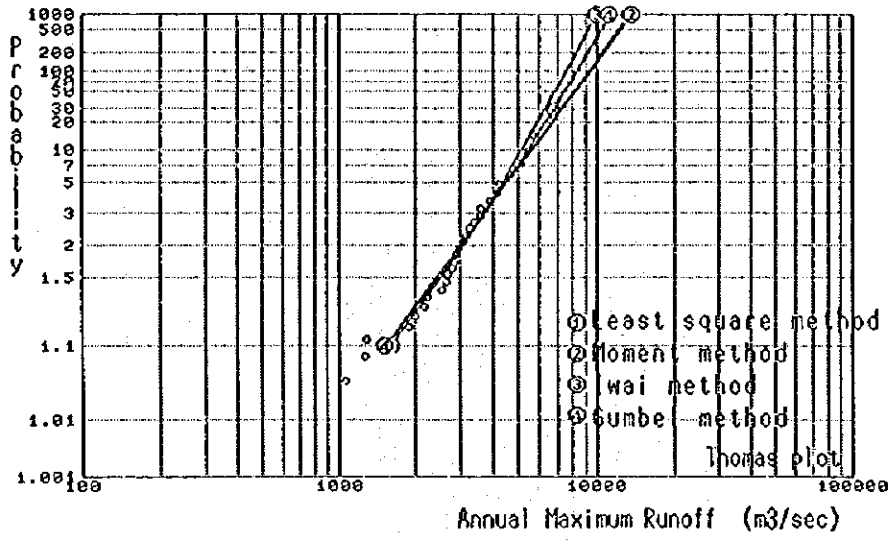
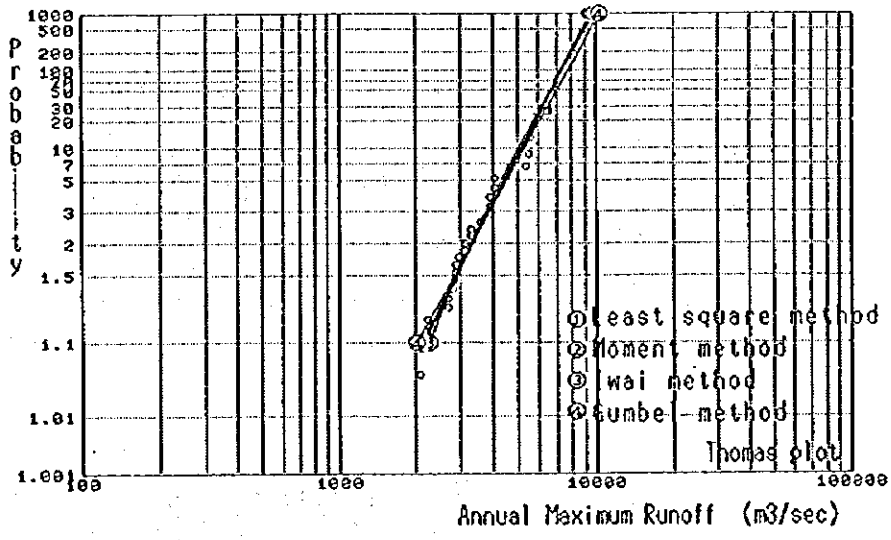


Fig. Log normal curve paper 64820000 Porto Formosa



g. Log normal curve paper 64830000 Balsa do Santa Maria

64820000 Porto Formosa

No.	Date	Data	Probability Exeedence thomas	Probability Exeedence hazen	Date	Data
1	1966 10 30	1271.4	0.966	0.982	1992 5 30	7070.0
2	1967 12 5	1055.4	0.931	0.946	1993 10 2	5630.0
3	1968 10 25	1293.0	0.897	0.911	1987 5 9	5410.0
4	1969 10 1	2544.0	0.862	0.875	1983 9 19	5117.2
5	1970 7 3	2186.0	0.828	0.839	1982 7 19	4648.0
6	1971 1 1	3264.0	0.793	0.804	1979 5 16	4241.6
7	1972 10 5	3080.0	0.759	0.768	1988 5 24	4184.0
8	1973 1 26	3876.8	0.724	0.732	1973 1 26	3876.8
9	1974 8 30	2960.0	0.690	0.696	1981 12 28	3600.0
10	1975 10 6	1994.0	0.655	0.661	1990 8 21	3600.0
11	1976 6 7	3176.0	0.621	0.625	1984 1 31	3400.0
12	1977 1 6	1904.4	0.586	0.589	1971 1 1	3264.0
13	1978 7 28	2640.0	0.552	0.554	1976 6 7	3176.0
14	1979 5 16	4241.6	0.517	0.518	1972 10 5	3080.0
15	1980 1 26	2840.0	0.483	0.482	1974 8 30	2960.0
16	1981 12 28	3600.0	0.448	0.446	1986 5 19	2856.0
17	1982 7 19	4648.0	0.414	0.411	1980 1 26	2840.0
18	1983 9 19	5117.2	0.379	0.375	1989 7 31	2776.0
19	1984 1 31	3400.0	0.345	0.339	1991 12 13	2696.0
20	1985 4 7	2243.6	0.310	0.304	1978 7 28	2640.0
21	1986 5 19	2856.0	0.276	0.268	1969 10 1	2544.0
22	1987 5 9	5410.0	0.241	0.232	1985 4 7	2243.6
23	1988 5 24	4184.0	0.207	0.196	1970 7 3	2186.0
24	1989 7 31	2776.0	0.172	0.161	1975 10 6	1994.0
25	1990 8 21	3600.0	0.138	0.125	1977 1 6	1904.4
26	1991 12 13	2696.0	0.103	0.089	1968 10 25	1293.0
27	1992 5 30	7070.0	0.069	0.054	1966 10 30	1271.4
28	1993 10 2	5630.0	0.034	0.018	1967 12 5	1055.4

Result of Iwai Method
64820000 Porto Formosa

Probability Year	Normal Variate	Expected Value
1000	3.091	9905.3
500	2.879	9202.8
200	2.576	8277.0
150	2.475	7986.1
100	2.327	7575.1
80	2.242	7348.0
70	2.190	7211.8
60	2.128	7054.1
50	2.054	6867.0
40	1.960	6636.7
30	1.834	6337.4
20	1.645	5909.6
10	1.282	5153.9
8	1.150	4901.0
7	1.068	4746.5
6	0.967	4564.9
5	0.841	4344.4
4	0.674	4064.4
3	0.430	3681.1
2	0.000	3070.8

$\log(x-b)=\log(xo-b)+1/a\cdot u$

$\log(xo-b)=[Y]$

$1/a=sqr((N/(N-1))\cdot([Y2]-[Y]\cdot[Y])$

b=1256.2
log(xo-b)= 3.63619
1/a= 0.13316

Result of GUMBEL Method
64820000 Porto Formosa

Probability Year	Extremal Variate	Expected Value
1000	6.907	%11192.5
500	6.214	%10330.1
200	5.296	9189.2
150	5.007	8830.5
100	4.600	8324.4
80	4.376	8045.4
70	4.241	7878.3
60	4.086	7685.2
50	3.902	7456.4
40	3.676	7175.8
30	3.384	6812.9
20	2.970	6298.1
10	2.250	5403.3
8	2.013	5108.7
7	1.870	4930.2
6	1.702	4721.6
5	1.500	4470.4
4	1.246	4154.6
3	0.903	3728.0
2	0.367	3061.4

$x=xo-1/a\cdot y$

$1/a=([x2]-[x]\cdot[x])/([y2]-[y]\cdot[y])$

$xo=[x]-1/a\cdot[y]$

1/a=%1243.14000
xo=2605.8

64820000 Porto Formosa

				log(x0)	1/a
[1]	Least Square Method	Thomas	All	3.47451	0.21128
[2]			upper10	3.46818	0.20589
[3]		Hazen	All	3.47451	0.19422
[4]			upper10	3.48337	0.17673
[5]	Moment Method	Thomas	All	3.47451	0.21472
[6]			upper10	3.46657	0.20756
[7]		Hazen	All	3.47451	0.19698
[8]			upper10	3.48161	0.17843

Fundamental Equation
$\log(x)=\log(xo)+1/a\cdot u$

Least Squre Method
$1/a=([u]\cdot[X]-[X\cdot u])/([u]\cdot[u]-[u2])$
$\log(xo)=[X]-1/a\cdot[u]$

Moment Method
$1/a=sqr(([X]\cdot[X]-[X2])/([u]\cdot[u]-[u2]))$
$\log(xo)=[X]-1/a\cdot[u]$

Probability Year	Normal Variate	Least Square Method by THOMAS All	Least Square Method by THOMAS 10	Least Square Method by HAZEN All	Least Square Method by HAZEN 10	Moment Method by THOMAS All	Moment Method by THOMAS 10	Moment Method by HAZEN All	Moment Method by HAZEN 10
1000	3.091	%13411.6	%12719.9	%11878.4	%10704.0	%13743.9	%12824.7	%12113.4	%10790.5
500	2.879	%12097.2	%11503.5	%10803.9	9819.2	%12376.2	%11588.8	%11002.9	9890.4
200	2.576	%10442.9	9967.7	9437.8	8682.7	%10658.1	%10030.0	9593.2	8735.3
150	2.475	9941.8	9501.4	9020.7	8332.9	%10138.6	9557.0	9163.4	8380.0
100	2.327	9249.5	8856.0	8441.6	7844.6	9421.5	8902.7	8567.0	7884.4
80	2.242	8875.0	8506.5	8126.9	7578.1	9034.0	8548.6	8243.2	7614.1
70	2.190	8653.1	8299.1	7939.9	7419.3	8804.5	8338.5	8050.9	7453.0
60	2.128	8398.9	8061.4	7725.2	7236.5	8541.6	8097.8	7830.1	7267.6
50	2.054	8100.7	7782.4	7472.7	7021.0	8233.6	7815.3	7570.7	7049.1
40	1.960	7739.4	7443.9	7165.8	6758.1	7860.5	7472.7	7255.4	6782.6
30	1.834	7278.9	7012.1	6772.9	6420.1	7385.5	7035.7	6852.2	6440.3
20	1.645	6639.1	6410.8	6223.7	5944.6	6726.2	6427.7	6288.9	5958.8
10	1.282	5563.1	5396.0	5289.9	5127.2	5619.8	5402.7	5333.1	5132.2
8	1.150	5218.9	5070.4	4988.3	4860.5	5266.6	5074.1	5024.8	4862.7
7	1.068	5012.7	4875.1	4806.9	4699.4	5055.3	4877.1	4839.5	4700.0
6	0.967	4774.1	4648.9	4596.1	4511.6	4810.9	4649.0	4624.4	4510.4
5	0.841	4490.5	4379.5	4344.5	4286.2	4520.5	4377.5	4367.7	4283.0
4	0.674	4139.6	4045.6	4031.4	4004.2	4161.7	4041.2	4048.6	3998.6
3	0.430	3676.4	3603.9	3614.8	3625.9	3689.0	3596.5	3624.7	3617.3
2	0.000	2982.0	2938.9	2982.0	3043.5	2982.0	2928.0	2982.0	3031.2

table-

Data Summary

64830000 Balsa do Santa Maria

Date	Data	No.	Probability Exceedence thomas	hazen	Date	Data
1969 10 3	3108.0	1	0.962	0.980	1982 7 19	6520.0
1970 7 2	2887.5	2	0.923	0.940	1992 5 30	5538.2
1971 1 1	2250.0	3	0.885	0.900	1983 3 6	5516.0
1972 10 10	3297.0	4	0.846	0.860	1993 10 3	5360.6
1973 1 27	3900.0	5	0.808	0.820	1984 1 31	4071.0
1974 8 31	2955.0	6	0.769	0.780	1988 5 24	4042.5
1975 10 6	2217.5	7	0.731	0.740	1973 1 27	3900.0
1976 6 7	3135.0	8	0.692	0.700	1979 5 14	3900.0
1977 1 20	2133.0	9	0.654	0.660	1981 12 8	3900.0
1978 7 26	2685.0	10	0.615	0.620	1990 8 21	3603.0
1979 5 14	3900.0	11	0.577	0.580	1987 5 23	3315.0
1980 9 23	2692.5	12	0.538	0.540	1972 10 10	3297.0
1981 12 8	3900.0	13	0.500	0.500	1976 6 7	3135.0
1982 7 19	6520.0	14	0.462	0.460	1969 10 3	3108.0
1983 3 6	5516.0	15	0.423	0.420	1974 8 31	2955.0
1984 1 31	4071.0	16	0.385	0.380	1970 7 2	2887.5
1985 4 7	2087.5	17	0.346	0.340	1989 8 1	2865.0
1986 5 20	2835.0	18	0.308	0.300	1986 5 20	2835.0
1987 5 23	3315.0	19	0.269	0.260	1991 12 12	2775.0
1988 5 24	4042.5	20	0.231	0.220	1980 9 23	2692.5
1989 8 1	2865.0	21	0.192	0.180	1978 7 26	2685.0
1990 8 21	3603.0	22	0.154	0.140	1971 1 1	2250.0
1991 12 12	2775.0	23	0.115	0.100	1975 10 6	2217.5
1992 5 30	5538.2	24	0.077	0.060	1977 1 20	2133.0
1993 10 3	5360.6	25	0.038	0.020	1985 4 7	2087.5

Result of Iwai Method

64830000 Balsa do Santa Maria

Probability Year	Normal Variate	Expected Value
1000	3.091	9866.3
500	2.879	9079.7
200	2.576	8076.9
150	2.475	7770.1
100	2.327	7343.5
80	2.242	7111.4
70	2.190	6973.4
60	2.128	6814.8
50	2.054	6628.3
40	1.960	6401.2
30	1.834	6110.3
20	1.645	5702.9
10	1.282	5008.3
8	1.150	4783.3
7	1.068	4647.9
6	0.967	4490.4
5	0.841	4302.1
4	0.674	4067.4
3	0.430	3754.5
2	0.000	3277.6

$\log(x-b)=\log(xo-b)+1/a\cdot u$

$\log(xo-b)=[Y]$

$1/a=sqr((N/(N-1))\cdot([Y2]-[Y]\cdot[Y]))$

b=-970.6

log(xo-b)= 3.36305

1/a= 0.18965

Result of GUMBEL Method

64830000 Balsa do Santa Maria

Probability Year	Extremal Variate	Expected Value
1000	6.907	%10185.6
500	6.214	9458.7
200	5.296	8496.9
150	5.007	8194.6
100	4.600	7767.9
80	4.376	7532.7
70	4.241	7391.8
60	4.086	7229.1
50	3.902	7036.2
40	3.676	6799.7
30	3.384	6493.8
20	2.970	6059.6
10	2.250	5305.5
8	2.013	5057.2
7	1.870	4906.7
6	1.702	4730.8
5	1.500	4519.1
4	1.246	4252.9
3	0.903	3893.3
2	0.367	3331.3

$x=xo+1/a\cdot y$

$1/a=([x2]-[x]\cdot[x])/([y2]-[y]\cdot[y])$

$xo=[x]-1/a\cdot[y]$

1/a=%1047.93000

xo=2947.3

Results of Ordered Probability Method

64830000 Balsa do Santa Maria

				log(x0)	1/a
[1]	Least Square Method	Thomas	All	3.52367	0.14535
[2]			upper10	3.49827	0.18040
[3]		Hazen	All	3.52367	0.13218
[4]			upper10	3.50958	0.15497
[5]	Moment Method	Thomas	All	3.52367	0.14841
[6]			upper10	3.49049	0.18922
[7]		Hazen	All	3.52367	0.13517
[8]			upper10	3.50189	0.16303

Fundamental Equation

$\log(x)=\log(xo)+1/a\cdot u$

Least Squre Method

$1/a=([u]\cdot[X]-[X\cdot u])/([u]\cdot[u]-[u2])$

$\log(xo)=[X]-1/a\cdot[u]$

Moment Method

$1/a=sqr(([X]\cdot[X]-[X2])/([u]\cdot[u]-[u2]))$

$\log(xo)=[X]-1/a\cdot[u]$

Probability Year	Normal Variate	Least Square Method by THOMAS All	Least Square Method by THOMAS 10	Least Square Method by HAZEN All	Least Square Method by HAZEN 10	Moment Method by THOMAS All	Moment Method by THOMAS 10	Moment Method by HAZEN All	Moment Method by HAZEN 10
1000	3.091	9394.9	%11371.2	8554.2	9739.1	9601.6	%11892.5	8738.3	%10133.1
500	2.879	8751.3	%10412.6	8019.7	9029.5	8930.5	%10843.2	8180.3	9357.9
200	2.576	7909.3	9183.9	7314.8	8106.2	8054.1	9505.2	7445.8	8354.0
150	2.475	7646.2	8806.3	7093.2	7819.1	7780.6	9095.7	7215.2	8043.0
100	2.327	7275.8	8279.9	6780.0	7415.9	7395.9	8526.3	6889.5	7607.3
80	2.242	7071.8	7992.9	6607.0	7194.5	7184.3	8216.5	6709.8	7368.5
70	2.190	6949.7	7821.9	6503.1	7062.1	7057.7	8032.3	6602.0	7225.9
60	2.128	6808.6	7625.2	6382.9	6909.3	6911.4	7820.6	6477.2	7061.5
50	2.054	6641.3	7393.5	6240.2	6728.5	6738.1	7571.5	6329.1	6867.3
40	1.960	6436.1	7111.0	6064.6	6507.0	6525.5	7268.3	6147.0	6629.7
30	1.834	6170.2	6748.2	5836.3	6220.8	6250.4	6879.8	5910.5	6323.3
20	1.645	5791.7	6238.3	5509.8	5814.9	5859.2	6335.7	5572.6	5889.9
10	1.282	5128.3	5364.1	4932.8	5107.5	5174.8	5407.8	4976.5	5138.7
8	1.150	4907.8	5079.4	4739.6	4873.8	4947.8	5107.1	4777.3	4891.6
7	1.068	4773.6	4907.6	4621.5	4731.8	4809.7	4926.1	4655.7	4741.8
6	0.967	4616.2	4707.4	4482.7	4565.6	4647.7	4715.6	4512.7	4566.7
5	0.841	4425.7	4467.6	4314.2	4365.0	4452.0	4463.9	4339.2	4355.9
4	0.674	4184.7	4167.7	4100.0	4112.1	4204.6	4150.1	4119.1	4090.8
3	0.430	3856.7	3766.1	3806.7	3769.4	3868.4	3731.7	3818.0	3732.9
2	0.000	3339.4	3149.7	3339.4	3232.8	3339.4	3093.8	3339.4	3176.1

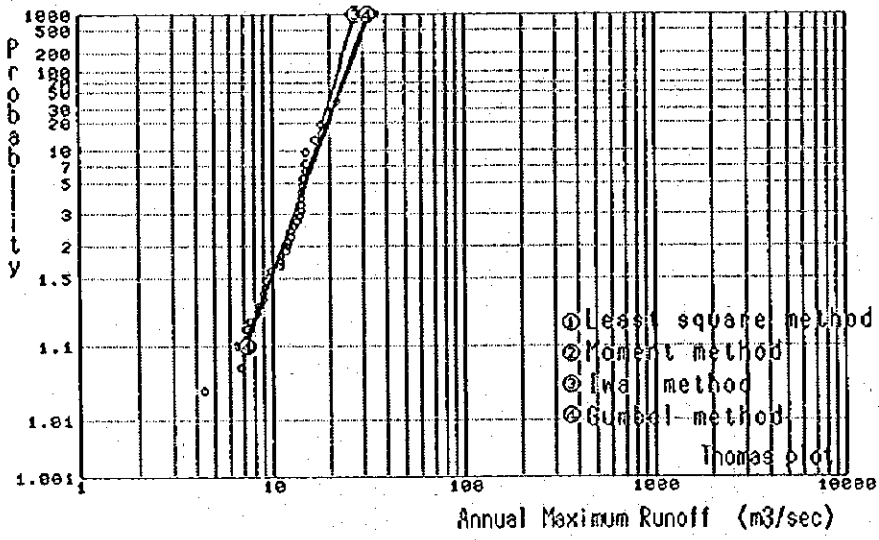


Fig. Log normal curve paper 65010000 Fazendinha

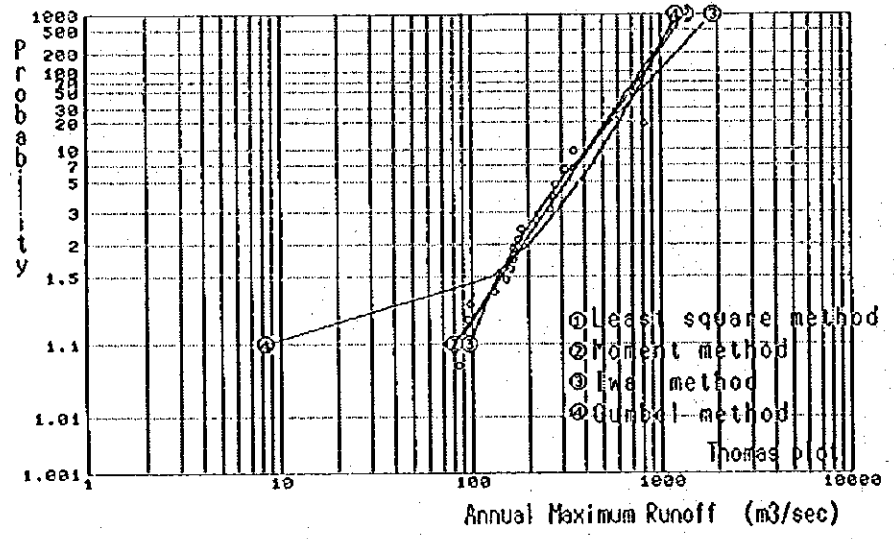


Fig. Log normal curve paper 65025000 Guajuvira

table-
65010000 Fazendinha

Data Summary

Date	Data	No.	Probability Exeedence thomas	Probability Exeedence hazen	Date	Data
1955 6 30	11.0	1	0.974	0.986	1983 7 9	22.0
1956 1 25	9.9	2	0.947	0.959	1989 1 6	17.9
1957 8 2	13.5	3	0.921	0.932	1958 11 2	16.9
1958 11 2	16.9	4	0.895	0.905	1982 6 26	15.0
1959 4 27	4.4	5	0.868	0.878	1970 12 24	13.0
1960 4 23	9.3	6	0.842	0.851	1977 10 8	13.0
1963 12 9	8.4	7	0.816	0.824	1981 11 1	14.5
1964 6 14	9.2	8	0.789	0.797	1972 12 25	14.5
1965 2 1	7.2	9	0.763	0.770	1976 1 11	14.2
1966 2 14	7.2	10	0.737	0.743	1971 1 6	14.2
1967 10 24	8.9	11	0.711	0.716	1975 10 4	14.2
1968 1 21	6.9	12	0.684	0.689	1990 7 21	14.2
1969 5 29	8.3	13	0.658	0.662	1980 12 22	14.0
1970 12 24	13.0	14	0.632	0.635	1957 8 2	13.5
1971 1 6	14.2	15	0.605	0.608	1993 9 24	13.0
1972 12 25	14.5	16	0.579	0.581	1992 2 4	12.4
1973 8 29	12.0	17	0.553	0.554	1987 5 21	12.4
1974 3 18	11.0	18	0.526	0.527	1986 12 20	12.0
1975 10 4	14.2	19	0.500	0.500	1973 8 29	12.0
1976 1 11	14.2	20	0.474	0.473	1979 5 14	11.8
1977 10 8	13.0	21	0.447	0.446	1955 6 30	11.0
1978 1 30	7.6	22	0.421	0.419	1974 3 18	11.0
1979 5 14	11.8	23	0.395	0.392	1984 6 15	11.0
1980 12 22	14.0	24	0.368	0.365	1956 1 25	9.9
1981 11 1	14.5	25	0.342	0.338	1988 5 25	9.6
1982 6 26	13.0	26	0.316	0.311	1960 4 23	9.3
1983 7 9	22.0	27	0.289	0.284	1964 6 14	9.2
1984 6 15	11.0	28	0.263	0.257	1985 2 21	8.9
1985 2 21	8.9	29	0.237	0.230	1967 10 24	8.9
1986 12 20	12.0	30	0.211	0.203	1963 12 9	8.4
1987 5 21	12.4	31	0.184	0.176	1969 5 29	8.3
1988 5 25	9.6	32	0.158	0.149	1978 1 30	7.6
1989 1 6	17.9	33	0.132	0.122	1966 2 14	7.2
1990 7 21	14.2	34	0.105	0.095	1965 2 1	7.2
1991 11 7	6.8	35	0.079	0.068	1968 1 21	6.9
1992 2 4	12.4	36	0.053	0.041	1991 11 7	6.8
1993 9 24	13.0	37	0.026	0.014	1959 4 27	4.4

Results of Ordered Probability Method
65010000 Fazendinha

				log(x0)	1/a
[1]	Least	Thomas	All	1.04804	0.15016
[2]	Square		upper10	1.04326	0.13564
[3]	Method	Hazen	All	1.04804	0.14028
[4]			upper10	1.05437	0.11831
[5]	Moment	Thomas	All	1.04804	0.15370
[6]	Method		upper10	1.03303	0.14462
[7]		Hazen	All	1.04804	0.14321
[8]			upper10	1.04790	0.12365

Fundamental Equation

$$\log(x) = \log(xo) + 1/a \cdot u$$

Least Squre Method

$$1/a = ([u]\cdot[X] - [X\cdot u])/([u]\cdot[u] - [u2])$$

$$\log(xo) = [X] - 1/a \cdot [u]$$

Moment Method

$$1/a = sqr(([X]\cdot[X] - [X2])/([u]\cdot[u] - [u2]))$$

$$\log(xo) = [X] - 1/a \cdot [u]$$

Probability Year	Normal Variate	Least Square Method by THOMAS All	Least Square Method by THOMAS 10	Least Square Method by HAZEN All	Least Square Method by HAZEN 10	Moment Method by THOMAS All	Moment Method by THOMAS 10	Moment Method by HAZEN All	Moment Method by HAZEN 10
1000	3.091	32.5	29.0	30.3	26.3	33.3	30.2	30.9	26.9
500	2.879	30.2	27.1	28.3	24.8	30.9	28.1	28.9	25.3
200	2.576	27.2	24.7	25.7	22.9	27.8	25.4	26.1	23.3
150	2.475	26.3	23.9	24.8	22.2	26.8	24.6	25.3	22.6
100	2.327	25.0	22.8	23.7	21.4	25.4	23.4	24.1	21.7
80	2.242	24.2	22.3	23.0	20.9	24.7	22.8	23.4	21.1
70	2.190	23.8	21.9	22.7	20.6	24.2	22.4	23.0	20.8
60	2.128	23.3	21.5	22.2	20.2	23.7	21.9	22.5	20.3
50	2.054	22.7	21.0	21.7	19.8	23.1	21.4	22.0	20.0
40	1.960	22.0	20.4	21.0	19.3	22.4	20.7	21.3	19.5
30	1.834	21.1	19.6	20.2	18.7	21.4	19.9	20.5	18.8
20	1.645	19.7	18.5	19.0	17.7	20.0	18.7	19.2	17.8
10	1.282	17.4	16.5	16.9	16.1	17.6	16.5	17.0	16.1
8	1.150	16.6	15.8	16.2	15.5	16.8	15.8	16.3	15.5
7	1.068	16.2	15.4	15.8	15.2	16.3	15.4	15.9	15.1
6	0.967	15.6	14.9	15.3	14.8	15.7	14.9	15.4	14.7
5	0.841	14.9	14.4	14.7	14.3	15.0	14.3	14.7	14.2
4	0.674	14.1	13.6	13.9	13.6	14.2	13.5	14.0	13.5
3	0.430	13.0	12.6	12.8	12.7	13.0	12.5	12.9	12.6
2	0.000	11.2	11.0	11.2	11.3	11.2	10.8	11.2	11.2

Result of Iwai Method
65010000 Fazendinha

Probability Year	Normal Variate	Expected Value
1000	3.091	27.5
500	2.879	26.0
200	2.576	23.9
150	2.475	23.3
100	2.327	22.4
80	2.242	21.9
70	2.190	21.6
60	2.128	21.2
50	2.054	20.8
40	1.960	20.2
30	1.834	19.5
20	1.645	18.5
10	1.282	16.7
8	1.150	16.1
7	1.068	15.7
6	0.967	15.2
5	0.841	14.7
4	0.674	14.0
3	0.430	13.0
2	0.000	11.3

$$\log(x+b) = \log(xo+b) + 1/a \cdot u$$

$$\log(xo+b) = [Y]$$

$$1/a = sqr((N/(N-1)) \cdot ([Y2] - [Y] \cdot [Y]))$$

b= 4.6
log(xo+b)= 1.20223
1/a= 0.09822

Result of GUMBEL Method
65010000 Fazendinha

Probability Year	Extremal Variate	Expected Value
1000	6.907	31.8
500	6.214	29.6
200	5.296	26.7
150	5.007	25.8
100	4.600	24.5
80	4.376	23.8
70	4.241	23.4
60	4.085	22.9
50	3.902	22.3
40	3.676	21.6
30	3.384	20.7
20	2.970	19.4
10	2.250	17.1
8	2.015	16.4
7	1.870	15.9
6	1.702	15.4
5	1.500	14.8
4	1.246	14.0
3	0.903	12.9
2	0.367	11.2

$$x = xo + 1/a \cdot y$$

$$1/a = ([x2] - [x] \cdot [x])/([y2] - [y] \cdot [y])$$

$$xo = [x] - 1/a \cdot [y]$$

1/a= 5.15368
xo= 10.0

table= Data Summary
65025000 Guajuvira

Date	Data	No.	Probability Exeedence thomas	hazen	Date	Data
1976 10 10	85.0	1	0.947	0.972	1990 7 26	812.5
1977 2 9	153.7	2	0.895	0.917	1982 6 29	348.0
1978 9 10	98.4	3	0.842	0.861	1987 5 23	315.0
1979 5 17	178.6	4	0.789	0.806	1992 6 2	281.5
1980 12 25	259.0	5	0.737	0.750	1993 10 2	272.5
1981 1 1	132.0	6	0.684	0.694	1980 12 25	259.0
1982 6 29	348.0	7	0.632	0.639	1983 6 29	222.2
1983 6 29	222.2	8	0.579	0.583	1989 9 15	183.4
1984 6 19	169.0	9	0.526	0.528	1979 5 17	178.6
1985 2 25	94.6	10	0.474	0.472	1984 6 19	169.0
1986 12 23	160.6	11	0.421	0.417	1988 5 27	169.0
1987 5 23	315.0	12	0.368	0.361	1986 12 23	160.6
1988 5 27	169.0	13	0.316	0.306	1977 2 9	153.7
1989 9 15	183.4	14	0.263	0.250	1981 1 1	132.0
1990 7 26	812.5	15	0.211	0.194	1978 9 10	98.4
1991 6 25	95.2	16	0.158	0.139	1991 6 25	95.2
1992 6 2	281.5	17	0.105	0.083	1985 2 25	94.6
1993 10 2	272.5	18	0.053	0.028	1976 10 10	85.0

Result of Iwai Method
65025000 Guajuvira

Probability Year	Normal Variate	Expected Value
1000	3.091	1917.9
500	2.879	1589.7
200	2.576	1219.7
150	2.473	1117.2
100	2.327	982.9
80	2.242	914.0
70	2.190	874.3
60	2.128	829.9
50	2.054	779.4
40	1.960	720.3
30	1.834	648.5
20	1.645	555.3
10	1.282	415.9
8	1.150	375.9
7	1.068	353.1
6	0.967	327.7
5	0.841	298.9
4	0.674	265.5
3	0.430	225.1
2	0.000	172.6

$\log(x+b)=\log(xo+b)+1/a \cdot u$

$\log(xo+b)=[Y]$

$1/a=sqr((N/(N-1)) \cdot ([Y2]-[Y] \cdot [Y]))$

b= -64.4
log(xo+b)= 2.03422
1/a= 0.39921

Result of GUMBEL Method
65025000 Guajuvira

Probability Year	Extremal Variate	Expected Value
1000	6.907	1211.3
500	6.214	1104.1
200	5.296	962.2
150	5.007	917.6
100	4.600	854.7
80	4.376	820.0
70	4.241	799.2
60	4.086	775.2
50	3.902	746.7
40	3.676	711.8
30	3.384	666.7
20	2.970	602.7
10	2.250	491.4
8	2.013	454.8
7	1.870	432.6
6	1.702	406.6
5	1.500	375.4
4	1.246	336.1
3	0.903	283.1
2	0.367	200.2

$x=xo+1/a \cdot y$

$1/a=([x2]-[x] \cdot [x])/([y2]-[y] \cdot [y])$

$xo=[x]-1/a \cdot [y]$

1/a=154.58500
xo= 143.5

Results of Ordered Probability Method
65025000 Guajuvira

				log(x0)	1/a
[1]	Least Square Method	Thomas	All	2.27531	0.26752
[2]			upper10	2.21449	0.34660
[3]		Hazen	All	2.27531	0.23865
[4]			upper10	2.22025	0.30538
[5]	Moment Method	Thomas	All	2.27531	0.27757
[6]			upper10	2.20151	0.36712
[7]		Hazen	All	2.27531	0.24684
[8]			upper10	2.21115	0.31838

Fundamental Equation
$\log(x)=\log(xo)+1/a \cdot u$

Least Squre Method
$1/a=([u] \cdot [X]-[X \cdot u])/([u] \cdot [u]-[u2])$
$\log(xo)=[X]-1/a \cdot [u]$

Moment Method
$1/a=sqr(([X] \cdot [X]-[X2])/([u] \cdot [u]-[u2]))$
$\log(xo)=[X]-1/a \cdot [u]$

Probability Year	Normal Variate	Least Square Method by THOMAS All	10	by HAZEN All	10	Moment Method by THOMAS All	10	by HAZEN All	10
1000	3.091	1265.0	1930.5	1030.1	1458.9	1358.7	2168.2	1091.9	1567.2
500	2.879	1110.1	1630.0	916.8	1256.8	1186.6	1812.5	967.9	1341.6
200	2.576	921.5	1280.6	776.5	1016.2	978.1	1403.8	815.1	1074.9
150	2.473	865.9	1181.4	734.5	946.5	916.9	1288.8	769.6	998.2
100	2.327	790.3	1049.5	677.0	852.7	834.0	1136.9	707.4	895.3
80	2.242	750.0	980.7	646.2	803.2	789.9	1058.1	674.0	841.2
70	2.190	726.3	940.8	627.9	774.4	764.0	1012.6	654.4	809.7
60	2.128	699.4	895.8	607.1	741.7	734.7	961.4	632.0	774.2
50	2.054	668.1	844.3	582.8	704.0	700.6	902.9	605.8	733.1
40	1.960	630.6	783.4	553.6	659.0	659.9	834.1	574.4	684.4
30	1.834	583.5	708.4	516.5	603.1	608.8	749.8	534.7	624.0
20	1.645	519.3	609.1	465.5	528.0	539.5	639.0	480.2	543.2
10	1.282	415.1	455.8	381.2	408.9	427.6	470.0	390.6	416.1
8	1.150	382.9	410.4	354.7	372.9	393.2	420.6	362.5	377.9
7	1.068	363.8	384.2	338.9	351.8	372.9	392.1	345.8	355.7
6	0.967	342.1	354.6	320.8	327.8	349.8	360.3	326.7	330.5
5	0.841	316.5	320.7	299.3	300.1	322.8	323.9	304.1	301.3
4	0.674	285.3	280.6	273.0	266.8	290.0	281.2	276.5	266.6
3	0.430	245.7	231.0	238.8	224.7	248.2	228.8	240.7	222.9
2	0.000	188.5	163.9	188.5	166.1	188.5	159.0	188.5	162.6

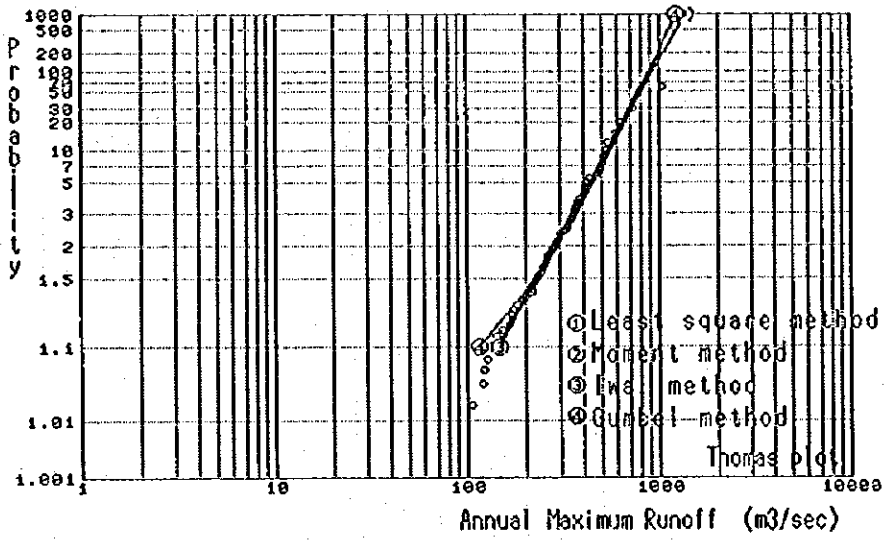


Fig. Log normal curve paper 65035000 Porto Amazonas

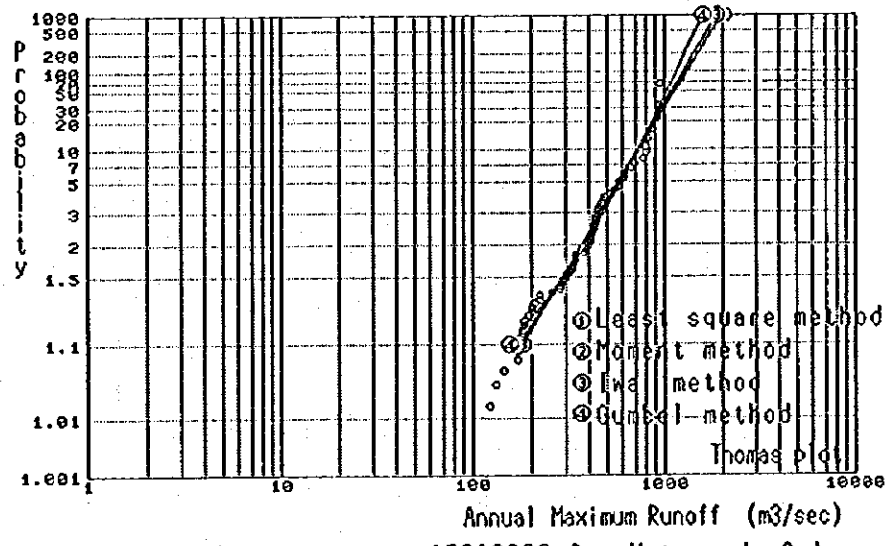


Fig. Log normal curve paper 65060000 Sao Mateus do Sul

table-
65035000 Porto Amazonas

Data Summary

Date	Data	No.	Probability Exeedence thomas	hazen	Date	Data
1935 10 3	622.8	1	0.983	0.992	1983 7 11	1045.5
1936 1 11	271.4	2	0.967	0.975	1992 5 31	725.1
1937 11 17	329.7	3	0.950	0.958	1935 10 3	622.8
1938 5 22	354.1	4	0.933	0.941	1971 1 9	590.0
1939 11 26	217.6	5	0.917	0.924	1987 3 21	533.6
1940 5 2	172.2	6	0.900	0.907	1957 8 1	526.1
1941 10 22	245.2	7	0.883	0.890	1970 12 31	509.8
1942 2 9	354.1	8	0.867	0.873	1993 10 5	508.4
1943 10 15	106.4	9	0.850	0.856	1954 5 18	487.9
1944 3 13	261.1	10	0.833	0.839	1946 2 27	479.3
1945 7 10	274.6	11	0.817	0.822	1972 2 24	427.3
1946 2 27	479.3	12	0.800	0.805	1990 7 25	409.7
1947 9 27	321.4	13	0.783	0.788	1982 6 29	405.7
1948 8 8	294.0	14	0.767	0.771	1949 9 15	403.0
1949 4 3	141.7	15	0.750	0.754	1973 10 3	399.0
1950 3 5	373.5	16	0.733	0.737	1950 3 5	373.5
1951 2 26	255.1	17	0.717	0.720	1980 12 22	369.2
1952 9 18	180.7	18	0.700	0.703	1969 11 14	360.3
1953 1 8	201.6	19	0.683	0.686	1942 2 9	354.1
1954 5 18	487.9	20	0.667	0.669	1938 5 22	354.1
1955 6 23	346.6	21	0.650	0.653	1963 7 4	347.9
1956 8 1	126.0	22	0.633	0.636	1955 6 23	346.6
1957 8 1	526.1	23	0.617	0.619	1964 6 19	330.9
1958 2 27	166.1	24	0.600	0.602	1937 11 17	329.7
1959 1 24	120.3	25	0.583	0.585	1947 9 27	321.4
1960 5 21	170.2	26	0.567	0.568	1988 5 23	301.8
1961 11 2	240.1	27	0.550	0.551	1976 1 17	300.7
1962 10 3	194.4	28	0.533	0.534	1948 8 8	294.0
1963 11 21	225.6	29	0.517	0.517	1973 6 25	285.3
1964 6 19	330.9	30	0.500	0.500	1966 2 21	284.2
1965 7 4	347.9	31	0.483	0.483	1945 7 10	274.6
1966 2 21	284.2	32	0.467	0.466	1936 1 11	271.4
1967 12 10	138.6	33	0.450	0.449	1944 3 13	261.1
1968 1 28	242.3	34	0.433	0.432	1986 12 22	259.0
1969 11 14	360.3	35	0.417	0.415	1951 2 26	255.1
1970 12 31	509.8	36	0.400	0.398	1961 11 2	249.1
1971 1 9	590.0	37	0.383	0.381	1941 10 22	245.2
1972 2 24	427.3	38	0.367	0.364	1968 1 28	242.3
1973 6 25	285.3	39	0.350	0.347	1984 6 19	233.8
1974 3 24	169.5	40	0.333	0.331	1981 1 1	227.4
1975 10 3	399.0	41	0.317	0.314	1963 11 21	225.6
1976 1 17	300.7	42	0.300	0.297	1939 11 26	217.6
1977 2 12	215.9	43	0.283	0.280	1979 5 19	216.7
1978 8 14	138.1	44	0.267	0.263	1977 2 12	215.9
1979 5 19	216.7	45	0.250	0.246	1953 1 6	201.6
1980 12 22	369.2	46	0.233	0.229	1982 10 3	194.4
1981 1 1	227.4	47	0.217	0.212	1952 9 18	180.7
1982 6 29	405.7	48	0.200	0.195	1940 5 2	172.2
1983 7 11	1045.5	49	0.183	0.178	1960 5 21	170.2
1984 6 19	233.8	50	0.167	0.161	1974 3 24	169.5
1985 2 19	123.2	51	0.150	0.144	1958 2 27	166.1
1986 12 22	259.0	52	0.133	0.127	1991 6 23	154.1
1987 3 21	533.6	53	0.117	0.110	1949 4 3	141.7
1988 5 23	301.8	54	0.100	0.093	1967 12 10	138.6
1989 9 13	403.0	55	0.083	0.076	1978 8 14	138.1
1990 7 25	409.7	56	0.067	0.059	1956 8 1	126.0
1991 6 23	154.1	57	0.050	0.042	1985 2 19	123.2
1992 5 31	725.1	58	0.033	0.025	1959 1 24	120.3
1993 10 5	508.4	59	0.017	0.008	1943 10 15	106.4

Results of Ordered Probability Method
65035000 Porto Amazonas

				log(x0)	1/a
[1]	Least Square Method	Thomas	All	2.45001	0.22213
[2]			upper10	2.39180	0.26687
[3]		Hazen	All	2.45001	0.21123
[4]			upper10	2.42633	0.23061
[5]	Moment Method	Thomas	All	2.45001	0.22309
[6]			upper10	2.37378	0.27967
[7]		Hazen	All	2.45001	0.21216
[8]			upper10	2.41658	0.23721

Fundamental Equation

$$\log(x) = \log(x_0) + 1/a \cdot u$$

Least Squre Method

$$1/a = ([u]\cdot[X] - [X\cdot u])/([u]\cdot[u] - [u2])$$

$$\log(x_0) = [X] - 1/a \cdot [u]$$

Moment Method

$$1/a = sqr(([X]\cdot[X] - [X2])/([u]\cdot[u] - [u2]))$$

$$\log(x_0) = [X] - 1/a \cdot [u]$$

Probability Year	Normal Variate	Least Square Method by THOMAS All	by THOMAS 10	by HAZEN All	by HAZEN 10	Moment Method by THOMAS All	by THOMAS 10	by HAZEN All	by HAZEN 10
1000	3.091	1369.3	1646.5	1267.1	1377.4	1378.7	1730.2	1275.5	1411.5
500	2.879	1228.6	1445.4	1142.9	1230.7	1236.5	1509.4	1150.0	1257.1
200	2.576	1052.6	1200.4	986.7	1048.2	1058.6	1242.4	992.1	1065.8
150	2.475	999.6	1128.1	939.3	993.4	1003.1	1164.1	944.3	1008.6
100	2.327	926.5	1029.8	873.9	918.2	931.3	1056.0	878.3	930.1
80	2.242	887.1	977.4	838.6	877.7	891.6	1001.7	842.6	887.0
70	2.190	863.8	946.6	817.6	853.7	868.0	968.7	821.5	863.0
60	2.128	837.2	911.6	793.6	826.4	841.1	931.2	797.2	834.6
50	2.054	805.9	871.0	765.4	794.4	809.6	887.7	768.8	801.4
40	1.960	768.2	822.2	731.3	755.8	771.5	835.7	734.4	761.4
30	1.834	720.2	760.9	687.8	706.9	723.2	770.5	690.5	710.7
20	1.645	653.8	677.4	627.4	639.4	656.2	682.2	629.6	641.0
10	1.282	542.9	541.8	529.7	527.1	544.4	539.8	527.1	525.3
8	1.150	507.6	499.8	493.2	491.6	508.9	496.0	494.4	489.2
7	1.068	486.8	475.0	473.7	470.5	487.7	470.3	474.8	467.5
6	0.967	462.3	446.8	451.2	446.1	463.3	440.9	452.1	442.6
5	0.841	433.4	413.4	424.4	417.2	434.2	406.5	425.1	413.2
4	0.674	397.9	373.0	391.2	381.8	398.5	365.0	391.8	377.1
3	0.430	351.2	321.1	347.5	335.4	351.6	312.0	347.8	330.1
2	0.000	281.8	248.5	281.8	266.9	281.8	236.5	281.8	261.0

Result of Iwai Method
65035000 Porto Amazonas

Probability Year	Normal Variate	Expected Value
1000	3.091	1263.9
500	2.879	1140.6
200	2.576	985.3
150	2.475	938.2
100	2.327	873.2
80	2.242	838.0
70	2.190	817.1
60	2.128	793.2
50	2.054	765.1
40	1.960	731.1
30	1.834	687.8
20	1.645	627.5
10	1.282	526.1
8	1.150	493.6
7	1.068	474.1
6	0.967	451.6
5	0.841	424.6
4	0.674	391.7
3	0.430	347.9
2	0.000	282.1

$$\log(x-b) = \log(x_0-b) + 1/a \cdot u$$

$$\log(x_0-b) = [Y]$$

$$1/a = sqr((N/(N-1)) \cdot ([Y2] - [Y] \cdot [Y]))$$

$b=$ 2.3
$\log(x_0-b) =$ 2.45401
$1/a =$ 0.20984

Result of GUMBEL Method
65035000 Porto Amazonas

Probability Year	Extremal Variate	Expected Value
1000	6.907	1220.0
500	6.214	1121.5
200	5.296	991.2
150	5.007	950.2
100	4.600	892.4
80	4.376	860.5
70	4.241	841.4
60	4.086	819.4
50	3.902	793.2
40	3.676	761.2
30	3.384	719.7
20	2.970	660.9
10	2.250	558.7
8	2.013	525.0
7	1.870	504.6
6	1.702	480.8
5	1.500	452.1
4	1.246	416.0
3	0.902	367.3
2	0.367	291.1

$$x = x_0 + 1/a \cdot y$$

$$1/a = ([X2] - [x]\cdot[x])/([y2] - [y]\cdot[y])$$

$$x_0 = [x] - 1/a \cdot [y]$$

$1/a =$ 142.01700
$x_0 =$ 239.1

table-
65060000 Sao Mateus do Sul

Data Summary

Date	Data	No.	Probability Exeedence thomas	Probability Exeedence hazen	Date	Data
1930 11 6	179.4	1	0.985	0.992	1963 7 23	948.4
1931 12 14	301.8	2	0.969	0.977	1992 8 8	931.2
1932 11 30	468.6	3	0.954	0.961	1954 5 20	918.3
1933 2 24	122.1	4	0.938	0.945	1957 8 4	886.7
1934 12 22	219.0	5	0.923	0.930	1987 5 25	823.7
1935 10 12	777.8	6	0.908	0.914	1971 1 6	802.2
1936 1 11	335.7	7	0.892	0.898	1992 10 7	802.2
1937 11 23	430.4	8	0.877	0.883	1935 10 12	777.8
1938 7 2	441.3	9	0.862	0.867	1955 6 23	687.8
1939 12 6	294.7	10	0.846	0.852	1946 3 3	662.6
1940 5 6	195.4	11	0.831	0.836	1990 1 23	612.2
1941 2 16	280.5	12	0.815	0.820	1982 11 19	605.0
1942 2 16	421.7	13	0.800	0.805	1970 12 31	577.1
1943 9 27	180.3	14	0.785	0.789	1989 9 18	570.9
1944 3 20	330.3	15	0.769	0.773	1975 10 7	539.9
1945 7 15	490.4	16	0.754	0.758	1972 2 28	512.0
1946 3 3	662.6	17	0.738	0.742	1986 12 25	474.8
1947 10 2	462.4	18	0.723	0.727	1932 11 30	468.6
1948 8 13	439.1	19	0.708	0.711	1947 10 2	462.4
1949 4 8	172.6	20	0.692	0.695	1936 7 2	441.3
1950 3 11	399.9	21	0.677	0.680	1948 8 13	439.1
1951 2 13	291.2	22	0.662	0.664	1969 11 23	434.7
1952 9 24	208.3	23	0.646	0.648	1945 7 15	430.4
1953 11 6	219.0	24	0.631	0.633	1937 11 23	430.4
1954 5 20	918.3	25	0.615	0.617	1961 11 7	428.2
1955 6 23	687.8	26	0.600	0.602	1942 2 16	421.7
1956 8 7	184.0	27	0.585	0.586	1981 1 1	419.5
1957 8 4	886.7	28	0.569	0.570	1980 12 31	415.1
1958 9 16	185.0	29	0.554	0.555	1976 6 11	406.4
1959 1 26	133.0	30	0.538	0.539	1965 7 11	402.0
1960 8 9	202.4	31	0.523	0.523	1988 5 30	402.0
1961 11 7	428.2	32	0.508	0.508	1950 3 11	399.9
1962 3 24	312.5	33	0.492	0.492	1973 9 3	391.1
1963 11 28	280.5	34	0.477	0.477	1966 2 27	380.2
1964 6 25	326.8	35	0.462	0.461	1979 5 19	373.7
1965 7 11	402.0	36	0.446	0.445	1984 6 22	337.4
1966 2 27	380.2	37	0.431	0.430	1977 2 15	335.7
1967 3 13	202.4	38	0.415	0.414	1936 1 11	335.7
1968 1 30	323.2	39	0.400	0.398	1944 3 20	330.3
1969 11 23	434.7	40	0.385	0.383	1964 8 25	326.8
1970 12 31	577.1	41	0.369	0.367	1968 1 30	323.2
1971 1 6	802.2	42	0.354	0.352	1962 3 24	312.5
1972 2 28	512.0	43	0.338	0.336	1931 12 14	301.8
1973 9 3	391.1	44	0.323	0.320	1939 12 8	294.7
1974 3 26	169.8	45	0.308	0.305	1951 2 13	291.2
1975 10 7	539.9	46	0.292	0.289	1963 11 28	280.5
1976 6 11	406.4	47	0.277	0.273	1941 2 16	280.5
1977 2 15	335.7	48	0.262	0.258	1991 6 30	257.3
1978 7 29	169.8	49	0.246	0.242	1934 12 22	219.0
1979 5 19	373.7	50	0.231	0.227	1953 11 6	219.0
1980 12 31	415.1	51	0.215	0.211	1952 9 24	208.3
1981 1 1	419.5	52	0.200	0.195	1967 3 13	202.4
1982 11 19	605.0	53	0.185	0.180	1960 8 9	202.4
1983 7 23	948.4	54	0.169	0.164	1940 5 6	195.4
1984 6 22	337.4	55	0.154	0.148	1958 9 16	185.0
1985 4 22	144.2	56	0.138	0.133	1956 8 7	184.0
1986 12 25	474.8	57	0.123	0.117	1943 9 27	180.3
1987 5 25	823.7	58	0.108	0.102	1930 11 6	179.4
1988 5 30	402.0	59	0.092	0.086	1949 4 8	172.6
1989 9 18	570.9	60	0.077	0.070	1974 3 26	169.8
1990 1 23	612.2	61	0.062	0.055	1978 7 29	169.8
1991 6 30	257.3	62	0.046	0.039	1985 4 22	144.2
1992 8 8	931.2	63	0.031	0.023	1959 1 26	133.0
1993 10 7	802.2	64	0.015	0.008	1933 2 24	122.1

Results of Ordered Probability Method
65060000 Sao Mateus do Sul

				log(x0)	1/a
[1]	Least Square Method	Thomas	All	2.56038	0.23787
[2]			upper10	2.72043	0.13203
[3]		Hazen	All	2.56038	0.22626
[4]			upper10	2.74615	0.10697
[5]	Moment Method	Thomas	All	2.56038	0.24001
[6]			upper10	2.70243	0.14443
[7]		Hazen	All	2.56038	0.22892
[8]			upper10	2.72577	0.12235

Fundamental Equation

$$\log(x) = \log(x_0) + 1/a \cdot u$$

Least Squre Method

$$1/a = ([u]\cdot[X] - [X\cdot u])/([u]\cdot[u] - [u2])$$

$$\log(x_0) = [X] - 1/a \cdot [u]$$

Moment Method

$$1/a = sqr(([X]\cdot[X] - [X2])/([u]\cdot[u] - [u2]))$$

$$\log(x_0) = [X] + 1/a \cdot [u]$$

Probability Year	Normal Variate	Least Square Method by THOMAS All	Least Square Method by THOMAS 10	Least Square Method by HAZEN All	Least Square Method by HAZEN 10	Moment Method by THOMAS All	Moment Method by THOMAS 10	Moment Method by HAZEN All	Moment Method by HAZEN 10
1000	3.091	1974.8	1344.2	1818.2	1210.3	2005.1	1408.6	1852.9	1270.3
500	2.879	1758.3	1260.3	1628.1	1147.6	1783.4	1312.7	1657.0	1196.6
200	2.576	1490.0	1149.6	1390.9	1063.8	1509.1	1187.2	1413.0	1098.9
150	2.475	1409.8	1114.9	1319.5	1037.2	1427.1	1147.9	1339.7	1068.1
100	2.327	1299.7	1065.7	1221.4	999.3	1314.7	1092.7	1238.9	1024.3
80	2.242	1240.7	1038.5	1168.5	978.2	1254.4	1062.2	1184.6	1000.1
70	2.190	1205.8	1022.2	1137.2	965.5	1218.9	1044.0	1152.6	985.6
60	2.128	1166.0	1003.3	1101.5	950.8	1178.3	1022.9	1115.9	968.7
50	2.054	1119.5	980.9	1059.7	933.2	1130.9	998.0	1073.1	948.8
40	1.960	1063.4	953.4	1009.1	911.5	1073.7	967.3	1021.3	923.9
30	1.834	992.5	917.5	945.0	883.1	1001.5	927.6	955.6	891.7
20	1.645	894.8	866.2	856.3	842.2	902.1	871.1	865.0	845.4
10	1.282	733.3	775.6	708.6	768.8	737.9	771.9	714.2	763.1
8	1.150	682.4	745.3	661.7	743.9	686.3	738.9	666.4	735.4
7	1.068	652.1	726.7	633.8	728.8	655.6	718.8	637.9	718.4
6	0.967	617.3	704.9	601.5	710.5	620.2	695.3	605.1	698.4
5	0.841	576.2	678.5	563.3	688.4	578.6	666.7	566.2	674.1
4	0.674	525.7	644.8	516.3	660.1	527.5	630.7	518.5	643.1
3	0.430	460.0	598.7	454.7	620.9	461.0	581.5	455.9	600.4
2	0.000	363.4	525.3	363.4	557.4	363.4	504.0	363.4	531.8

Result of Iwai Method
65060000 Sao Mateus do Sul

Probability Year	Normal Variate	Expected Value
1000	3.091	1872.7
500	2.879	1672.4
200	2.576	1423.4
150	2.475	1346.7
100	2.327	1246.1
80	2.242	1191.0
70	2.190	1158.4
60	2.128	1121.2
50	2.054	1077.7
40	1.960	1025.2
30	1.834	958.7
20	1.645	866.9
10	1.282	714.6
8	1.150	666.5
7	1.068	637.8
6	0.967	604.8
5	0.841	563.7
4	0.674	517.7
3	0.430	455.1
2	0.000	362.6

$$\log(x-b) = \log(x_0-b) + 1/a \cdot u$$

$$\log(x_0-b) = [Y]$$

$$1/a = sqr((N/(N-1)) \cdot ([Y2] - [Y]\cdot[Y]))$$

$$b = -5.6$$

$$\log(x_0-b) = 2.55270$$

$$1/a = 0.29248$$

Result of GUMBEL Method
65060000 Sao Mateus do Sul

Probability Year	Extremal Variate	Expected Value
1000	6.907	1573.1
500	6.214	1446.7
200	5.296	1279.4
150	5.007	1226.8
100	4.600	1152.6
80	4.376	1111.7
70	4.241	1087.2
60	4.086	1058.8
50	3.902	1025.3
40	3.676	984.2
30	3.384	930.9
20	2.970	855.5
10	2.250	724.3
8	2.013	681.1
7	1.870	654.9
6	1.702	624.3
5	1.500	587.5
4	1.246	541.2
3	0.903	478.6
2	0.367	380.9

$$x = x_0 + 1/a \cdot y$$

$$1/a = ([xz] - [x]\cdot[z])/([y2] - [y]\cdot[y])$$

$$x_0 = [x] - 1/a \cdot [y]$$

$$1/a = 162.27900$$

$$x_0 = 314.1$$

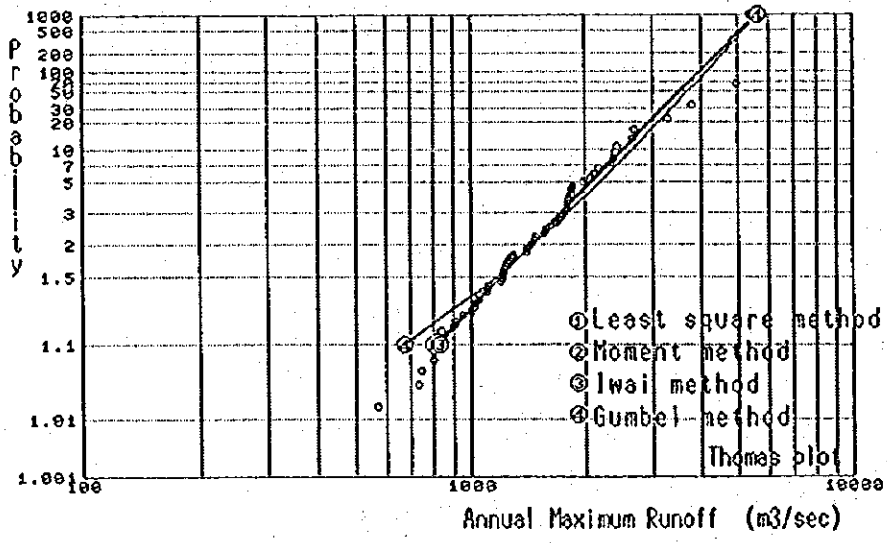


Fig. Log normal curve paper 65310000 Uniao da Vitoria

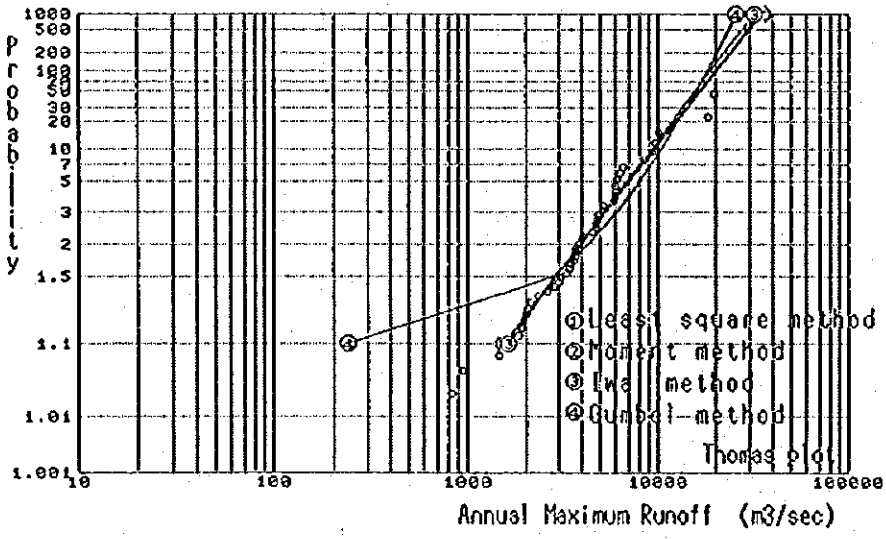


Fig. Log normal curve paper 65895002 Salto Osorio

table-

Data Summary
65310000 Uniao da Vitoria

Date	Data	No.	Probability Exceedance thomas	hazen	Date	Data
1930 10 26	1226.0	1	0.985	0.992	1983 7 18	4979.6
1931 6 13	1453.0	2	0.969	0.977	1992 6 8	3808.5
1932 4 22	1833.2	3	0.954	0.961	1935 10 17	3266.8
1933 10 10	836.3	4	0.938	0.945	1957 8 20	2674.7
1934 3 2	820.0	5	0.923	0.930	1993 10 6	2642.8
1935 10 17	3266.8	6	0.908	0.914	1971 1 13	2428.5
1936 6 9	1242.0	7	0.892	0.898	1954 3 27	2402.5
1937 11 19	1399.0	8	0.877	0.883	1938 7 3	2383.0
1938 7 3	2383.0	9	0.862	0.867	1946 3 4	2333.6
1939 12 6	1716.5	10	0.846	0.852	1982 11 27	2161.2
1940 5 6	568.0	11	0.831	0.836	1990 1 27	2108.2
1941 2 10	1288.0	12	0.815	0.820	1987 5 28	2078.5
1942 2 20	1198.0	13	0.800	0.805	1955 6 28	1985.0
1943 8 5	901.9	14	0.785	0.789	1984 8 9	1850.0
1944 3 18	956.4	15	0.769	0.773	1972 8 30	1833.2
1945 7 20	1218.0	16	0.754	0.758	1932 4 22	1833.2
1946 3 4	2333.6	17	0.738	0.742	1961 1 1	1804.5
1947 10 5	1777.0	18	0.723	0.727	1989 9 25	1801.6
1948 8 18	1443.4	19	0.708	0.711	1980 12 31	1782.5
1949 6 17	804.0	20	0.692	0.695	1961 11 5	1782.5
1950 10 20	1610.0	21	0.677	0.680	1947 10 5	1777.0
1951 10 26	1194.0	22	0.662	0.664	1973 8 31	1760.5
1952 10 20	1093.0	23	0.646	0.648	1939 12 6	1716.5
1953 11 2	1550.0	24	0.631	0.633	1975 12 15	1711.0
1954 3 27	2402.5	25	0.615	0.617	1988 3 25	1678.4
1955 6 28	1985.0	26	0.600	0.602	1950 10 20	1610.0
1956 5 9	1234.0	27	0.585	0.586	1979 3 16	1565.0
1957 8 20	2674.7	28	0.569	0.570	1970 12 31	1560.0
1958 9 16	1030.0	29	0.554	0.555	1953 11 2	1550.0
1959 9 8	804.0	30	0.538	0.539	1965 7 15	1471.8
1960 10 28	1093.0	31	0.523	0.523	1931 6 13	1453.0
1961 11 5	1782.5	32	0.508	0.508	1948 8 18	1443.4
1962 10 20	1002.0	33	0.492	0.492	1976 6 14	1419.4
1963 3 28	1048.0	34	0.477	0.477	1937 11 19	1399.0
1964 8 31	914.4	35	0.462	0.461	1966 2 23	1399.0
1965 7 15	1471.8	36	0.446	0.445	1969 4 8	1286.0
1966 2 23	1399.0	37	0.431	0.430	1941 2 10	1268.0
1967 3 6	1210.0	38	0.415	0.414	1936 6 9	1242.0
1968 1 27	745.0	39	0.400	0.398	1956 5 9	1234.0
1969 4 8	1286.0	40	0.385	0.383	1930 10 26	1226.0
1970 12 31	1560.0	41	0.369	0.367	1945 7 20	1218.0
1971 1 13	2428.5	42	0.354	0.352	1967 3 6	1210.0
1972 8 30	1833.2	43	0.338	0.336	1986 12 29	1206.0
1973 8 31	1760.5	44	0.323	0.320	1942 2 20	1198.0
1974 1 28	1022.0	45	0.308	0.305	1951 10 26	1194.0
1975 12 15	1711.0	46	0.292	0.289	1991 6 24	1105.2
1976 6 14	1419.4	47	0.277	0.273	1960 10 28	1093.0
1977 10 19	1048.0	48	0.262	0.258	1952 10 20	1093.0
1978 7 25	816.0	49	0.246	0.242	1963 3 28	1048.0
1979 3 16	1565.0	50	0.231	0.227	1977 10 19	1048.0
1980 12 31	1782.5	51	0.215	0.211	1958 9 16	1030.0
1981 1 1	1804.5	52	0.200	0.195	1974 1 28	1022.0
1982 11 27	2161.2	53	0.185	0.180	1962 10 20	1002.0
1983 7 18	4979.6	54	0.169	0.164	1944 3 18	956.4
1984 8 9	1850.0	55	0.154	0.148	1964 8 31	914.4
1985 4 21	733.6	56	0.138	0.133	1943 8 5	901.9
1986 12 29	1206.0	57	0.123	0.117	1933 10 10	836.3
1987 5 28	2078.5	58	0.108	0.102	1934 3 2	820.0
1988 3 25	1678.4	59	0.092	0.086	1978 7 25	816.0
1989 9 25	1801.6	60	0.077	0.070	1949 6 17	804.0
1990 1 27	2108.2	61	0.062	0.055	1959 9 8	804.0
1991 6 24	1105.2	62	0.046	0.039	1968 1 27	745.0
1992 6 8	3808.5	63	0.031	0.023	1985 4 21	733.6
1993 10 6	2042.8	64	0.015	0.008	1940 5 6	568.0

Results of Ordered Probability Method
65310000 Uniao da Vitoria

				log(x0)	1/a
(1)	Least Square Method	Thomas	All	3.15881	0.18930
(2)			upper10	3.00648	0.30466
(3)		Hazen	All	3.15881	0.18085
(4)			upper10	3.05190	0.26059
(5)	Moment Method	Thomas	All	3.15881	0.19116
(6)			upper10	2.99469	0.31278
(7)		Hazen	All	3.15881	0.18233
(8)			upper10	3.04524	0.26496

Fundamental Equation

$$\log(x)=\log(x_0)+1/a\cdot u$$

Least Squre Method

$$1/a=([u]\cdot[X]-[X\cdot u])/([u]\cdot[u]-[u2])$$

$$\log(x_0)=[X]-1/a\cdot[u]$$

Moment Method

$$1/a=\mathrm{sqr}(([X]\cdot[X]-[X2])/([u]\cdot[u]-[u2]))$$

$$\log(x_0)=[X]-1/a\cdot[u]$$

Probability Year	Normal Variate	Least Square Method by THOMAS All	Least Square Method by THOMAS 10	Least Square Method by HAZEN All	Least Square Method by HAZEN 10	Moment Method by THOMAS All	Moment Method by THOMAS 10	Moment Method by HAZEN All	Moment Method by HAZEN 10
1000	3.091	5544.3	8872.4	5220.8	7198.8	5618.3	9148.8	5275.9	7313.3
500	2.879	5054.9	7648.2	4779.6	6338.9	5117.7	7853.0	4826.6	6426.0
200	2.576	4430.9	6185.2	4214.3	5287.4	4480.1	6316.7	4251.4	5343.8
150	2.473	4239.9	5761.9	4040.8	4976.3	4285.2	5873.3	4074.7	5024.2
100	2.327	3974.4	5192.3	3798.5	4552.4	4014.3	5278.0	3828.7	4589.4
80	2.242	3829.9	4892.0	3666.5	4326.2	3867.0	4964.8	3694.5	4357.6
70	2.190	3744.0	4716.5	3587.9	4193.1	3779.4	4782.1	3614.7	4221.4
60	2.128	3645.3	4518.0	3497.4	4041.7	3678.7	4575.6	3522.8	4066.4
50	2.054	3529.1	4286.6	3390.9	3865.5	3560.4	4337.2	3414.6	3886.2
40	1.960	3387.8	4015.5	3261.0	3653.9	3416.4	4053.9	3282.8	3670.1
30	1.834	3206.6	3675.6	3094.2	3387.7	3232.0	3702.0	3113.6	3398.4
20	1.645	2952.9	3218.9	2859.9	3024.5	2973.8	3230.6	2875.9	3028.0
10	1.282	2520.2	2494.4	2456.2	2431.7	2534.1	2486.5	2468.9	2425.8
8	1.150	2380.1	2275.0	2327.4	2247.5	2391.8	2262.2	2336.5	2239.0
7	1.068	2295.7	2146.5	2248.5	2138.5	2306.2	2131.2	2256.6	2128.7
6	0.967	2197.5	2000.8	2156.3	2013.7	2206.7	1982.7	2163.7	2002.4
5	0.841	2080.2	1831.6	2046.4	1867.1	2087.7	1810.9	2052.3	1854.4
4	0.674	1933.9	1628.9	1908.7	1668.8	1939.5	1605.3	1913.1	1674.5
3	0.430	1738.9	1377.7	1724.4	1458.9	1742.1	1346.7	1726.9	1443.0
2	0.000	1441.5	1015.0	1441.5	1126.9	1441.5	987.9	1441.5	1109.8

Result of Iwai Method
65310000 Uniao da Vitoria

Probability Year	Normal Variate	Expected Value
1000	3.091	5627.6
500	2.879	5105.3
200	2.576	4445.7
150	2.473	4245.4
100	2.327	3968.2
80	2.242	3818.1
70	2.190	3729.0
60	2.128	3626.9
50	2.054	3507.1
40	1.960	3361.7
30	1.834	3176.1
20	1.645	2917.8
10	1.282	2481.8
8	1.150	2341.8
7	1.068	2257.9
6	0.967	2160.7
5	0.841	2044.9
4	0.674	1901.4
3	0.430	1711.8
2	0.000	1425.7

$$\log(x-b)=\log(x_0-b)+1/a\cdot u$$

$$\log(x_0-b)=[Y]$$

$$1/a=\mathrm{sqr}((N/(N-1))\cdot([Y2]-[Y]\cdot[Y]))$$

b=-161.2

log(xo-b)= 3.10190

1/a= 0.20572

Result of GUMBEL Method
65310000 Uniao da Vitoria

Probability Year	Extremal Variate	Expected Value
1000	6.907	5625.1
500	6.214	5183.4
200	5.296	4599.0
150	5.007	4415.3
100	4.600	4156.1
80	4.376	4013.2
70	4.241	3927.6
60	4.086	3828.7
50	3.902	3711.5
40	3.676	3567.8
30	3.384	3381.9
20	2.970	3118.3
10	2.250	2659.9
8	2.013	2509.1
7	1.870	2417.6
6	1.702	2310.8
5	1.500	2182.1
4	1.246	2020.4
3	0.903	1801.9
2	0.367	1460.4

$$x=x_0-1/a\cdot y$$

$$1/a=([x2]-[x]\cdot[x])/([y2]-[y]\cdot[y])$$

$$x_0=[x]-1/a\cdot[y]$$

1/a=%636.72000

xo=1227.1

table- Data Summary
65895002 Salto Osorio

Date	Data	No.	Probability Exceedence thomas	hazen	Date	Data
1940 12 31	833.4	1	0.976	0.969	1992 5 20	%19743.0
1941 2 18	3724.0	2	0.957	0.967	1987 5 28	%18320.0
1942 4 3	2124.5	3	0.935	0.944	1957 8 20	9968.0
1943 10 16	1893.5	4	0.913	0.922	1989 9 13	9680.0
1944 3 20	1703.2	5	0.891	0.900	1993 5 14	9320.0
1945 7 10	2639.2	6	0.870	0.878	1972 9 28	8450.0
1946 10 20	4780.0	7	0.848	0.856	1955 6 20	6515.0
1947 9 28	4888.0	8	0.826	0.833	1990 8 27	6333.0
1948 10 29	3282.4	9	0.804	0.811	1971 6 9	6125.0
1949 5 5	1848.4	10	0.783	0.789	1988 5 24	6008.0
1950 10 21	5116.0	11	0.761	0.767	1954 5 18	5956.0
1951 10 26	4024.0	12	0.739	0.744	1952 10 9	5930.0
1952 10 9	5930.0	13	0.717	0.722	1965 10 2	5865.0
1953 11 1	4504.0	14	0.696	0.700	1950 10 21	5116.0
1954 5 18	5956.0	15	0.674	0.678	1973 6 25	5116.0
1955 6 20	6515.0	16	0.652	0.656	1947 9 28	4888.0
1956 5 6	3494.0	17	0.630	0.633	1946 10 20	4780.0
1957 8 20	9968.0	18	0.609	0.611	1963 10 28	4708.0
1958 9 25	3678.0	19	0.587	0.589	1970 7 2	4696.0
1959 2 7	2522.0	20	0.565	0.567	1953 11 1	4504.0
1960 10 27	7994.0	21	0.543	0.544	1951 10 26	4024.0
1961 9 13	3448.0	22	0.522	0.522	1966 2 22	4012.6
1962 10 21	3816.0	23	0.500	0.500	1962 10 21	3816.0
1963 10 28	4708.0	24	0.478	0.478	1941 2 18	3724.0
1964 8 29	3705.6	25	0.457	0.456	1964 8 29	3705.6
1965 10 2	5865.0	26	0.435	0.433	1958 9 25	3678.0
1966 2 22	4012.0	27	0.413	0.411	1969 4 6	3613.6
1967 3 6	3086.0	28	0.391	0.389	1956 5 6	3494.0
1968 12 25	1932.0	29	0.370	0.367	1961 9 13	3448.0
1969 4 6	3613.6	30	0.348	0.344	1948 10 29	3282.4
1970 7 2	4696.0	31	0.326	0.322	1967 3 6	3086.0
1971 6 9	6125.0	32	0.304	0.300	1960 10 27	2994.0
1972 9 28	8450.0	33	0.283	0.278	1945 7 10	2639.2
1973 6 25	5116.0	34	0.261	0.256	1974 9 2	2592.6
1974 9 2	2592.6	35	0.239	0.233	1959 2 7	2522.0
1975 1 12	1457.8	36	0.217	0.211	1942 4 3	2124.5
1985 7 30	942.0	37	0.196	0.189	1991 12 28	2062.9
1986 5 1	2001.3	38	0.174	0.167	1986 5 1	2001.3
1987 5 28	%18320.0	39	0.152	0.144	1968 12 25	1932.0
1988 5 24	6008.0	40	0.130	0.122	1943 10 16	1893.5
1989 9 13	9680.0	41	0.109	0.100	1949 5 5	1848.4
1990 8 27	6333.0	42	0.087	0.078	1944 3 20	1703.2
1991 12 28	2062.9	43	0.065	0.056	1975 1 12	1457.8
1992 5 20	%19743.0	44	0.043	0.033	1985 7 30	942.0
1993 5 14	9320.0	45	0.022	0.011	1940 12 31	833.4

Results of Ordered Probability Method
65895002 Salto Osorio

				log(x0)	1/a
[1]	Least Square Method	Thomas	All	3.59182	0.30370
[2]			upper10	3.38842	0.45649
[3]		Hazen	All	3.59182	0.28644
[4]			upper10	3.44600	0.38820
[5]	Moment Method	Thomas	All	3.59182	0.30757
[6]			upper10	3.36925	0.47175
[7]		Hazen	All	3.59182	0.28927
[8]			upper10	3.42776	0.40192

Fundamental Equation
log(x)=log(xo)+1/a*u

Least Squre Method
1/a=([u]*[X]-[X*u])/([u]*[u]-[u2])
log(xo)=[X]-1/a*[u]

Moment Method
1/a=sqr(([X]*[X]-[X2])/([u]*[u]-[u2]))
log(xo)=[X]-1/a*[u]

Probability Year	Normal Variate	Least Square Method by THOMAS All	Least Square Method by THOMAS 10	Least Square Method by HAZEN All	Least Square Method by HAZEN 10	Moment Method by THOMAS All	Moment Method by THOMAS 10	Moment Method by HAZEN All	Moment Method by HAZEN 10
1000	3.091	%33916.6	%62980.2	%29997.5	%44232.2	%34864.5	%67171.7	%30607.3	%46763.1
500	2.879	%29243.1	%50399.0	%26082.9	%36596.1	%30003.6	%53354.3	%26578.3	%38431.8
200	2.576	%23671.4	%36680.7	%21368.3	%27931.4	%24221.6	%38421.4	%21729.8	%29053.6
150	2.475	%22056.0	%32983.6	%19990.3	%25518.6	%22548.3	%34426.4	%20315.0	%26459.2
100	2.327	%19882.2	%28220.6	%18126.6	%22348.9	%20299.2	%29301.9	%18403.3	%23064.4
80	2.242	%18735.7	%25810.3	%17139.0	%20714.9	%19114.1	%26719.4	%17391.0	%21320.8
70	2.190	%18065.9	%24436.1	%16560.6	%19773.2	%18422.3	%25250.5	%16798.4	%20318.1
60	2.128	%17307.8	%22911.2	%15904.3	%18718.8	%17639.6	%23623.8	%16126.3	%19197.4
50	2.054	%16431.3	%21100.0	%15143.7	%17516.0	%16735.4	%21792.2	%15347.7	%17921.8
40	1.960	%15386.4	%19200.6	%14235.3	%16107.4	%15659.8	%19681.3	%14418.2	%16431.7
30	1.834	%14089.8	%16817.7	%13099.5	%14390.8	%14322.2	%17162.5	%13256.9	%14622.2
20	1.645	%12344.4	%13786.0	%11563.3	%12152.7	%12526.9	%13975.5	%11687.9	%12274.5
10	1.282	9573.8	9408.3	9098.4	8781.5	9683.8	9416.6	9174.7	8768.3
8	1.150	8733.9	8195.6	8343.7	7809.1	8824.0	8165.1	8406.4	7765.1
7	1.068	8242.3	7512.1	7900.0	7251.7	8321.2	7462.4	7955.1	7192.0
6	0.967	7684.4	6761.0	7394.7	6630.5	7751.0	6892.6	7441.4	6554.9
5	0.841	7036.8	5922.9	6805.4	5924.6	7089.8	5837.1	6842.8	5833.9
4	0.674	6260.0	4968.0	6094.5	5101.8	6297.7	4867.4	6121.3	4997.3
3	0.430	5276.4	3844.5	5188.9	4102.4	5298.7	3734.5	5203.5	3987.6
2	0.000	3906.8	2445.8	3906.8	2792.8	3906.8	2340.2	3906.8	2677.7

Result of Iwai Method
65895002 Salto Osorio

Probability Year	Normal Variate	Expected Value
1000	3.091	%31654.4
500	2.879	%27379.7
200	2.576	%22267.0
150	2.475	%20780.9
100	2.327	%18777.9
80	2.242	%17719.8
70	2.190	%17101.2
60	2.128	%16400.5
50	2.054	%15589.9
40	1.960	%14623.8
30	1.834	%13419.6
20	1.645	%11797.9
10	1.282	9214.5
8	1.150	8429.0
7	1.068	7968.5
6	0.967	7445.3
5	0.841	6837.2
4	0.674	6106.4
3	0.430	5180.5
2	0.000	3881.4

log(x+b)=log(xo-b)+1/a*u

log(xo-b)=[Y]
1/a=sqr((N/(N-1))*([Y2]-[Y]*[Y]))

b=-101.9
log(xo-b)= 3.57743
1/a= 0.29820

Result of GUMBEL Method
65895002 Salto Osorio

Probability Year	Extremal Variate	Expected Value
1000	6.907	%25638.4
500	6.214	%23374.3
200	5.298	%20378.7
150	5.007	%19437.0
100	4.600	%18108.1
80	4.376	%17375.6
70	4.241	%16936.8
60	4.086	%16429.8
50	3.902	%15829.2
40	3.676	%15092.5
30	3.384	%14139.6
20	2.970	%12788.0
10	2.250	%10438.5
8	2.013	9665.2
7	1.870	9196.5
6	1.702	8648.6
5	1.500	7989.2
4	1.246	7160.0
3	0.903	6039.9
2	0.367	4269.7

x=xo+1/a*y

1/a=([x2]-[x]*[x])/([y2]-[y]*[y])
xo=[x]-1/a*[y]

1/a=%3263.94000
xo=3093.5

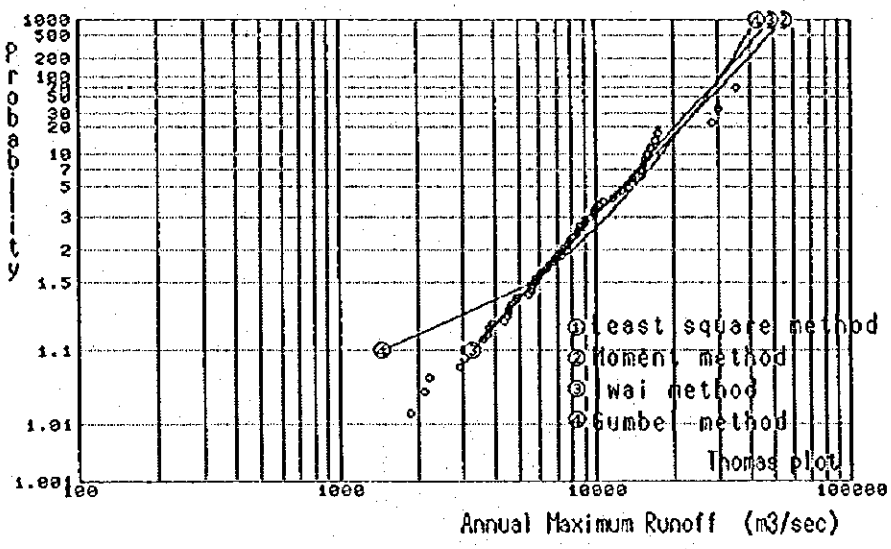


Fig. Log normal curve paper 65993000 Salto Cataratas

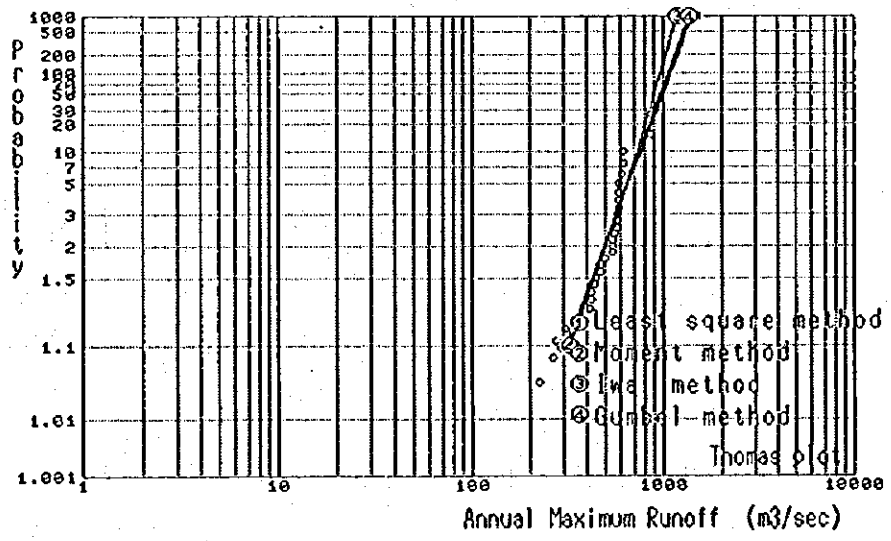


Fig. Log normal curve paper 65175000 Divisa

table-

Data Summary
65993000 Salto Cataratas

Date	Data	No.	Probability Exeedence thomas	Probability Exeedence Hazen	Date	Data
1926 6 10	7484.0	1	0.986	0.993	1983 7 11	%35600.0
1927 11 10	8434.0	2	0.971	0.976	1992 3 30	%30000.0
1928 10 20	%17540.0	3	0.957	0.963	1936 6 10	%28628.0
1929 10 17	6484.0	4	0.942	0.949	1928 10 20	%17540.0
1930 10 30	7066.0	5	0.928	0.934	1982 7 19	%17150.0
1931 5 3	%12600.0	6	0.913	0.919	1987 3 22	%16333.3
1932 10 5	%15204.0	7	0.899	0.904	1957 8 20	%15866.7
1933 10 12	2216.5	8	0.884	0.890	1938 7 3	%15540.0
1934 4 28	3770.0	9	0.870	0.875	1932 10 3	%15204.0
1935 10 18	%13860.0	10	0.855	0.860	1993 10 2	%15050.0
1936 6 10	%28628.0	11	0.841	0.846	1972 8 30	%14980.0
1937 11 19	9960.0	12	0.826	0.831	1935 10 16	%13860.0
1938 7 2	%15540.0	13	0.812	0.816	1969 9 14	%13790.0
1939 12 6	9540.0	14	0.797	0.801	1990 6 4	%13580.0
1940 3 4	3095.0	15	0.783	0.787	1931 5 3	%12600.0
1941 2 11	8546.0	16	0.768	0.772	1955 6 22	%12110.0
1942 4 16	4872.0	17	0.754	0.757	1984 6 16	%11607.5
1943 6 2	3886.0	18	0.739	0.743	1971 6 10	%10790.0
1944 3 21	1876.0	19	0.725	0.728	1979 11 1	%10242.5
1945 7 11	3506.0	20	0.710	0.713	1937 11 19	9960.0
1946 7 15	7712.0	21	0.696	0.699	1952 10 10	9792.0
1947 9 29	6476.0	22	0.681	0.684	1988 5 25	9765.0
1948 10 31	6077.5	23	0.667	0.669	1939 12 6	9540.0
1949 6 19	2920.0	24	0.652	0.654	1965 10 3	9025.0
1950 10 21	6800.0	25	0.638	0.640	1975 10 4	9025.0
1951 10 28	5409.6	26	0.623	0.625	1981 4 28	8562.5
1952 10 10	9792.0	27	0.609	0.610	1941 2 11	8546.0
1953 11 2	8092.0	28	0.594	0.596	1963 11 10	8470.0
1954 5 19	7867.5	29	0.580	0.581	1927 11 10	8434.0
1955 6 22	%12110.0	30	0.565	0.566	1953 11 2	8092.0
1956 4 8	7092.5	31	0.551	0.551	1954 5 19	7867.5
1957 8 20	%13866.7	32	0.536	0.537	1969 4 6	7712.5
1958 9 26	6427.0	33	0.522	0.522	1945 7 15	7712.0
1959 2 9	4474.0	34	0.507	0.507	1926 6 10	7484.0
1960 10 28	4595.0	35	0.493	0.493	1973 6 27	7370.0
1961 10 23	5605.0	36	0.478	0.478	1956 4 8	7092.5
1962 10 20	5672.5	37	0.464	0.463	1930 10 30	7066.0
1963 11 10	8470.0	38	0.449	0.449	1947 9 29	6876.0
1964 8 30	5740.0	39	0.435	0.434	1950 10 21	6800.0
1965 10 3	9025.0	40	0.420	0.419	1929 10 17	6484.0
1966 2 23	5605.0	41	0.406	0.404	1958 9 26	6427.0
1967 3 7	4353.0	42	0.391	0.390	1960 9 15	6280.0
1968 12 27	4334.5	43	0.377	0.375	1948 10 31	6077.5
1969 4 6	7712.5	44	0.362	0.360	1976 6 7	6010.0
1970 7 3	5740.0	45	0.348	0.346	1970 7 3	5740.0
1971 6 10	%10730.0	46	0.333	0.331	1964 8 30	5740.0
1972 8 30	%14980.0	47	0.319	0.316	1962 10 20	5672.5
1973 6 27	7370.0	48	0.304	0.301	1966 2 23	5605.0
1974 9 3	4353.0	49	0.290	0.287	1961 10 23	5605.0
1975 10 4	9025.0	50	0.275	0.272	1951 10 28	5409.6
1976 6 7	6010.0	51	0.261	0.257	1942 4 16	4872.0
1977 10 19	3722.5	52	0.246	0.243	1978 7 24	4776.5
1978 7 24	4776.5	53	0.232	0.228	1960 10 28	4595.0
1979 11 1	%10242.5	54	0.217	0.213	1974 9 3	4353.0
1980 9 15	6280.0	55	0.203	0.199	1968 12 27	4334.5
1981 4 28	8562.5	56	0.188	0.184	1959 2 9	4474.0
1982 7 19	%17150.0	57	0.174	0.169	1967 3 7	4353.0
1983 7 11	%35600.0	58	0.159	0.154	1943 6 2	3886.0
1984 6 16	%11607.5	59	0.145	0.140	1934 4 28	3770.0
1985 4 19	2109.0	60	0.130	0.125	1977 10 19	3722.5
1986 6 1	3348.0	61	0.116	0.110	1945 7 11	3596.0
1987 5 22	%16333.3	62	0.101	0.096	1986 6 1	3348.0
1988 5 25	9765.0	63	0.087	0.081	1940 5 4	3095.0
1989 9 14	%13790.0	64	0.072	0.068	1991 6 24	3027.0
1990 6 4	%13580.0	65	0.058	0.051	1949 6 19	2920.0
1991 6 24	3027.0	66	0.043	0.037	1933 10 12	2216.5
1992 3 30	%30000.0	67	0.029	0.022	1985 4 19	2109.0
1993 10 2	%13050.0	68	0.014	0.007	1944 3 21	1876.0

Results of Ordered Probability Method
65993000 Salto Cataratas

				log(a0)	1/a
[1]	Least Square Method	Thomas	All	3.87349	0.28019
[2]			upper10	3.73785	0.37409
[3]		Hazen	All	3.87349	0.26798
[4]			upper10	3.80036	0.31682
[5]	Moment Method	Thomas	All	3.87349	0.28137
[6]			upper10	3.70501	0.39623
[7]		Hazen	All	3.87349	0.26912
[8]			upper10	3.77136	0.33535

Fundamental Equation
log(x)=log(xo)+1/a*u

Least Squre Method
1/a=([u]*[X]-[X*u])/([u]*[u]-[u2])
log(xo)=[X]-1/a*[u]

Moment Method
1/a=sqr(([X]*[X]-[X2])/([u]*[u]-[u2]))
log(xo)=[X]-1/a*[u]

Probability Year	Normal Variate	Least Square Method by THOMAS All	Least Square Method by THOMAS 10	Least Square Method by HAZEN All	Least Square Method by HAZEN 10	Moment Method by THOMAS All	Moment Method by THOMAS 10	Moment Method by HAZEN All	Moment Method by HAZEN 10
1000	3.091	%54882.5	%78343.3	%50313.0	%60188.2	%53424.8	%83031.1	%50724.6	%64264.6
500	2.879	%47866.2	%65266.2	%44143.3	%51583.2	%48306.5	%70076.1	%44479.7	%54539.7
200	2.576	%39365.3	%50304.8	%36632.2	%41359.2	%39709.4	%53186.3	%36881.9	%43202.1
150	2.475	%36898.9	%46110.3	%34417.4	%38419.3	%37190.6	%48501.0	%34642.7	%39958.6
100	2.327	%33530.5	%40578.1	%31406.2	%34477.9	%33779.6	%42380.4	%31599.5	%35632.9
80	2.242	%31742.4	%37715.1	%29802.6	%32406.3	%31969.7	%39201.6	%29979.3	%33370.8
70	2.190	%30694.1	%36061.4	%28860.6	%31198.8	%30908.7	%37383.4	%29027.7	%32056.1
60	2.128	%29503.8	%34206.6	%27789.3	%29834.2	%29794.3	%35349.9	%27945.7	%30574.0
50	2.054	%28122.9	%32085.9	%26544.0	%28260.2	%28307.3	%33033.0	%26688.2	%28869.3
40	1.960	%26471.6	%29595.6	%25051.4	%26391.2	%26637.2	%30323.9	%25181.2	%26852.4
30	1.834	%24403.7	%26550.0	%23176.5	%24072.3	%24546.6	%27029.1	%23288.9	%24361.5
20	1.645	%21600.7	%22558.9	%20623.9	%20970.2	%21714.1	%22745.6	%20715.5	%21051.6
10	1.282	%17085.3	%16494.6	%16480.3	%16085.6	%17155.1	%16325.8	%16536.1	%15899.8
8	1.150	%15697.7	%14730.8	%15197.8	%14616.6	%15755.3	%14482.8	%15244.0	%14366.9
7	1.068	%14880.7	%13716.2	%14440.5	%13758.4	%14931.4	%13428.5	%14481.2	%13476.6
6	0.967	%13948.9	%12581.7	%13574.5	%12789.2	%13991.9	%12255.0	%13609.1	%12472.9
5	0.841	%12860.8	%11288.5	%12559.8	%11666.9	%12893.1	%10925.1	%12587.7	%11317.4
4	0.674	%11345.0	9773.8	%11328.2	%10326.7	%11569.8	9378.8	%11348.3	9946.1
3	0.430	9864.1	7921.8	9745.4	8643.5	9877.6	7507.7	9736.5	8238.6
2	0.000	7473.0	5468.3	7473.0	6314.8	7473.0	5070.1	7473.0	5909.7

Result of Iwai Method
65993000 Salto Cataratas

Probability Year	Normal Variate	Expected Value
1000	3.091	%48906.9
500	2.879	%43058.1
200	2.576	%35902.6
150	2.475	%33784.3
100	2.327	%30897.4
80	2.242	%29356.4
70	2.190	%28450.1
60	2.128	%27418.1
50	2.054	%26217.1
40	1.960	%24775.2
30	1.834	%22940.1
20	1.645	%20481.4
10	1.282	%16436.9
8	1.150	%15178.9
7	1.068	%14434.5
6	0.967	%13561.7
5	0.841	%12580.4
4	0.674	%11361.6
3	0.430	9749.2
2	0.000	7517.1

log(x+b)=log(xo+b)+1/a*u

log(xo+b)=[Y]
1/a=sqr((N/(N-1))*([Y2]-[Y]*[Y]))

b= 220.2
log(xo+b)= 3.88909
1/a= 0.25960

Result of GUMBEL Method
65993000 Salto Cataratas

Probability Year	Extremal Variate	Expected Value
1000	6.907	%42866.2
500	6.214	%39175.5
200	5.296	%34292.2
150	5.007	%32757.2
100	4.600	%30590.9
80	4.376	%29396.9
70	4.241	%28681.6
60	4.086	%27855.0
50	3.902	%26876.0
40	3.676	%25675.2
30	3.384	%24121.6
20	2.970	%21918.5
10	2.250	%18088.6
8	2.013	%16827.9
7	1.870	%16063.9
6	1.702	%15170.9
5	1.500	%14095.9
4	1.246	%12744.2
3	0.903	%10916.3
2	0.367	8065.4

x=xo+1/a*y

1/a=(x2-[x]*[x])/([y2]-[y]*[y])
xo=[x]-1/a*[y]

1/a=%5320.61000
xo=6115.3

table-
65175000 Divisa

Data Summary

Date	Data	No.	Probability Exeedence thomas	hazen	Date	Data
1964 9 14	308.9	1	0.967	0.983	1983 7 16	909.0
1963 7 13	466.1	2	0.933	0.948	1992 6 4	862.2
1966 2 22	443.6	3	0.900	0.914	1971 1 8	621.7
1967 3 9	392.4	4	0.867	0.879	1984 8 14	620.6
1968 11 2	275.6	5	0.833	0.845	1993 10 9	607.4
1969 4 11	415.0	6	0.800	0.810	1981 1 2	589.8
1970 12 31	545.6	7	0.767	0.776	1987 5 27	587.6
1971 1 8	621.7	8	0.733	0.741	1980 12 31	585.4
1972 10 10	557.3	9	0.700	0.707	1990 1 25	581.0
1973 9 4	578.8	10	0.667	0.672	1973 9 4	578.8
1974 1 26	423.2	11	0.633	0.638	1982 11 22	578.8
1975 12 10	544.6	12	0.600	0.603	1989 9 20	575.5
1976 6 16	468.2	13	0.567	0.569	1972 10 10	557.3
1977 2 14	422.2	14	0.533	0.534	1988 5 30	548.8
1978 8 16	267.7	15	0.500	0.500	1970 12 31	545.6
1979 5 20	492.6	16	0.467	0.466	1975 12 10	544.6
1980 12 31	585.4	17	0.433	0.431	1979 5 20	492.6
1981 1 2	589.8	18	0.400	0.397	1976 6 16	468.2
1982 11 22	578.8	19	0.367	0.362	1965 7 13	466.1
1983 7 16	909.0	20	0.333	0.328	1966 2 22	443.6
1984 8 14	620.6	21	0.300	0.293	1986 12 26	433.4
1985 4 20	223.3	22	0.267	0.259	1974 1 26	423.2
1986 12 26	433.4	23	0.233	0.224	1977 2 14	422.2
1987 5 27	587.6	24	0.200	0.190	1969 4 11	415.0
1988 5 30	548.8	25	0.167	0.155	1967 3 9	392.4
1989 9 20	575.5	26	0.133	0.121	1964 9 14	308.9
1990 1 25	581.0	27	0.100	0.086	1968 11 2	275.6
1992 6 4	862.2	28	0.067	0.052	1978 8 16	267.7
1993 10 9	607.4	29	0.033	0.017	1985 4 20	223.3

Result of Iwai Method
65175000 Divisa

Probability Year	Normal Variate	Expected Value
1000	3.091	1181.1
500	2.879	1117.4
200	2.576	1031.7
150	2.475	1004.3
100	2.327	965.3
80	2.242	943.5
70	2.190	930.4
60	2.128	915.1
50	2.054	896.9
40	1.960	874.4
30	1.834	844.8
20	1.645	802.0
10	1.282	724.8
8	1.150	698.4
7	1.068	682.2
6	0.967	662.9
5	0.841	639.4
4	0.674	609.1
3	0.430	567.0
2	0.000	498.2

$\log(x+b)=\log(xo+b)+1/a\cdot u$

$\log(xo+b)=[Y]$
$1/a=sqr((N/(N-1))*([YZ]-[Y]*[Y]))$

b= 169.6

Result of GUMBEL Method
65175000 Divisa

Probability Year	Extremal Variate	Expected Value
1000	6.907	1374.2
500	6.214	1280.6
200	5.296	1156.8
150	5.007	1117.9
100	4.600	1063.0
80	4.376	1032.7
70	4.241	1014.6
60	4.086	993.8
50	3.902	968.8
40	3.676	938.4
30	3.384	899.0
20	2.970	843.1
10	2.250	746.0
8	2.013	714.1
7	1.870	694.7
6	1.702	672.1
5	1.500	644.8
4	1.246	610.6
3	0.903	564.3
2	0.367	491.9

$x=xo+1/a\cdot y$

$1/a=([x2]-[x]\cdot[x])/([y2]-[y]\cdot[y])$
$xo=[x]-1/a\cdot[y]$

1/a=%134.88800

Results of Ordered Probability Method
65175000 Divisa

				log(x0)	1/a
[1]	Least Square Method	Thomas	All	2.69189	0.14299
[2]			upper10	2.66813	0.14395
[3]		Hazen	All	2.69189	0.13210
[4]			upper10	2.67678	0.12586
[5]	Moment Method	Thomas	All	2.69189	0.14997
[6]			upper10	2.64961	0.16276
[7]		Hazen	All	2.69189	0.13787
[8]			upper10	2.66203	0.13982

Fundamental Equation
$\log(x)=\log(xo)+1/a\cdot u$

Least Squre Method
$1/a=([u]\cdot[X]-[X\cdot u])/([u]\cdot[u]-[u2])$
$\log(xo)=[X]-1/a\cdot[u]$

Moment Method
$1/a=sqr(([X]\cdot[X]-[X2])/([u]\cdot[u]-[u2]))$
$\log(xo)=[X]-1/a\cdot[u]$

Probability Year	Normal Variate	Least Square Method by THOMAS All	by THOMAS 10	by HAZEN All	by HAZEN 10	Moment Method by THOMAS All	by THOMAS 10	by HAZEN All	by HAZEN 10
1000	3.091	1360.9	1297.2	1259.4	1163.5	1430.1	1421.1	1312.1	1242.0
500	2.879	1269.1	1209.2	1180.7	1094.1	1329.2	1312.6	1226.7	1160.1
200	2.576	1148.9	1093.9	1077.0	1002.4	1197.4	1172.0	1114.5	1052.5
150	2.475	1111.3	1057.9	1044.4	973.4	1156.4	1128.4	1079.3	1018.8
100	2.327	1058.3	1007.1	998.3	932.5	1098.6	1067.4	1029.6	971.3
80	2.242	1029.1	979.1	972.9	909.8	1066.9	1034.0	1002.2	945.1
70	2.190	1011.6	962.4	957.6	896.2	1047.8	1014.0	985.8	929.4
60	2.128	991.4	943.0	939.9	880.4	1025.9	990.9	966.8	911.2
50	2.054	967.4	920.1	918.9	861.6	999.9	963.7	944.3	889.7
40	1.960	938.0	891.9	893.0	838.5	968.0	930.4	916.6	863.2
30	1.834	899.9	853.4	859.4	808.4	926.8	887.5	880.6	828.9
20	1.645	845.6	803.4	811.4	765.3	868.2	826.8	829.3	779.9
10	1.282	750.2	712.3	726.5	688.8	765.8	721.5	738.9	693.8
8	1.150	718.4	681.9	698.0	663.1	731.8	686.8	708.8	665.1
7	1.068	699.1	663.5	680.6	647.4	711.2	665.9	690.4	647.6
6	0.967	676.4	641.8	660.2	628.8	687.0	641.3	668.7	627.0
5	0.841	649.0	615.5	635.4	606.3	657.8	611.7	642.5	602.1
4	0.674	614.2	582.3	603.9	577.6	620.9	574.6	609.3	570.5
3	0.430	566.8	537.1	560.7	538.2	570.7	524.4	563.9	527.5
2	0.000	491.9	465.7	491.9	475.1	491.9	446.3	491.9	459.2

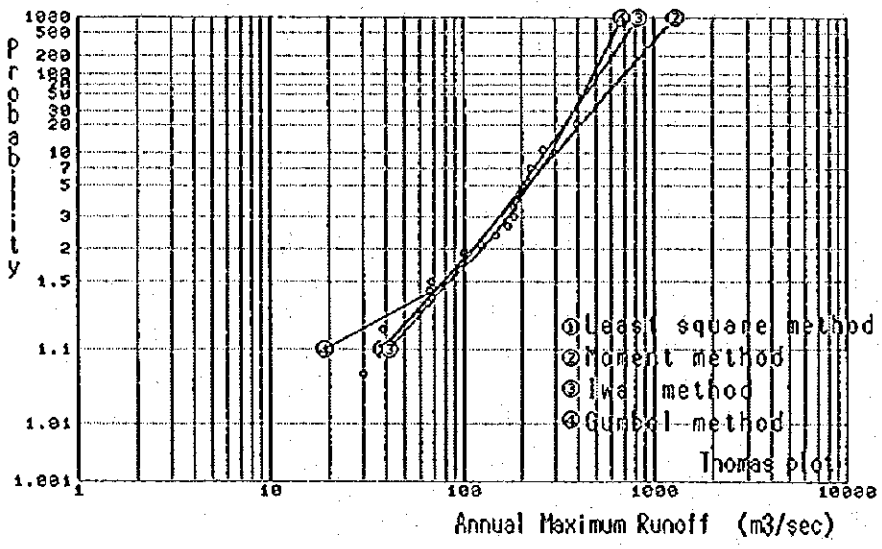


Fig. Log normal curve paper 65260000 Foz do Cachoeira

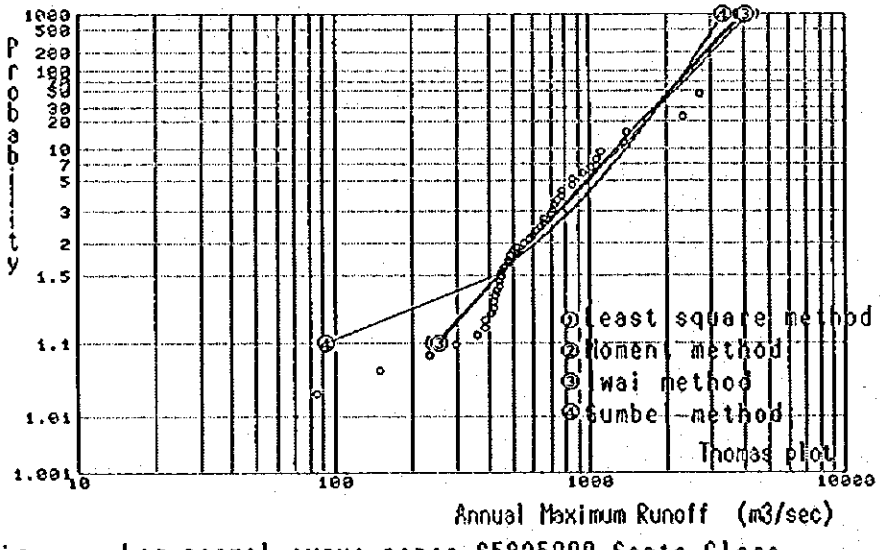


Fig. Log normal curve paper 65825000 Santa Clara

table- Data Summary
65260000 Foz do Cachoeira

Date	Data	No.	Probability Exeedence thomas	hazen	Date	Data
1974 1 28	37.6	1	0.952	0.975	1992 5 28	393.2
1975 12 23	100.3	2	0.905	0.925	1988 5 23	260.8
1976 5 20	123.3	3	0.857	0.875	1980 12 23	226.3
1977 10 19	38.6	4	0.810	0.825	1989 9 13	215.0
1978 7 25	30.0	5	0.762	0.775	1990 8 19	192.6
1979 5 17	57.6	6	0.714	0.725	1991 10 6	184.4
1980 12 23	226.3	7	0.667	0.675	1983 7 18	183.3
1981 1 1	66.4	8	0.619	0.625	1993 10 4	169.8
1982 11 20	97.3	9	0.571	0.575	1987 5 21	146.0
1983 7 18	183.3	10	0.524	0.525	1976 5 20	123.3
1984 8 9	68.1	11	0.476	0.475	1975 12 23	100.3
1985 11 4	65.4	12	0.429	0.425	1982 11 20	97.3
1986 4 7	90.0	13	0.381	0.375	1986 4 7	90.0
1987 5 21	146.0	14	0.333	0.325	1984 8 9	68.1
1988 5 23	260.8	15	0.286	0.275	1981 1 1	66.4
1989 9 13	215.0	16	0.238	0.225	1985 11 4	65.4
1990 8 19	192.6	17	0.190	0.175	1979 5 17	57.6
1991 10 6	184.4	18	0.143	0.125	1977 10 19	38.6
1992 5 28	393.2	19	0.095	0.075	1974 1 28	37.6
1993 10 4	169.8	20	0.048	0.025	1978 7 25	30.0

Result of Iwai Method
65260000 Foz do Cachoeira

Probability Year	Normal Variate	Expected Value
1000	3.091	837.6
500	2.879	733.6
200	2.576	606.9
150	2.475	569.6
100	2.327	518.7
80	2.242	491.6
70	2.190	475.7
60	2.128	457.6
50	2.054	436.6
40	1.960	411.3
30	1.834	379.6
20	1.645	336.4
10	1.282	266.2
8	1.150	244.4
7	1.068	231.6
6	0.967	216.9
5	0.841	199.7
4	0.674	176.8
3	0.430	151.9
2	0.000	113.2

$\log(x+b)=\log(xo+b)+1/a\cdot u$

$\log(xo+b)=[Y]$
$1/a=sqr((N/(N-1))\cdot([Y2]-[Y]\cdot[Y])$

b= 14.9
log(xo+b)= 2.10738
1/a= 0.26639

Result of GUMBEL Method
65260000 Foz do Cachoeira

Probability Year	Extremal Variate	Expected Value
1000	6.907	676.5
500	6.214	617.9
200	5.296	540.4
150	5.007	516.0
100	4.600	481.6
80	4.376	462.7
70	4.241	451.3
60	4.086	438.2
50	3.902	422.6
40	3.676	403.6
30	3.384	378.9
20	2.970	343.9
10	2.250	283.1
8	2.013	263.1
7	1.870	251.0
6	1.702	236.8
5	1.500	219.8
4	1.246	198.3
3	0.903	169.3
2	0.367	124.0

$x=xo+1/a\cdot y$

$1/a=([x2]-[x]\cdot[x])/([y2]-[y]\cdot[y])$
$xo=[x]-1/a\cdot[y]$

1/a=84.45880
xo= 93.1

Results of Ordered Probability Method
65260000 Foz do Cachoeira

				log(x0)	1/a
[1]	Least	Thomas	All	2.04054	0.34308
[2]	Square		upper10	2.11201	0.26169
[3]	Method	Hazen	All	2.04054	0.30687
[4]			upper10	2.12056	0.22789
[5]	Moment	Thomas	All	2.04054	0.34701
[6]	Method		upper10	2.10663	0.26921
[7]		Hazen	All	2.04054	0.31113
[8]			upper10	2.11654	0.23300

Fundamental Equation
$\log(x)=\log(xo)+1/a\cdot u$

Least Squre Method
$1/a=([u]\cdot[X]-[X\cdot u])/([u]\cdot[u]-[u2])$
$\log(xo)=[X]-1/a\cdot[u]$

Moment Method
$1/a=sqr(([X]\cdot[X]-[X2])/([u]\cdot[u]-[u2]))$
$\log(xo)=[X]-1/a\cdot[u]$

Probability Year	Normal Variate	Least Square Method by THOMAS All	10	by HAZEN All	10	Moment Method by THOMAS All	10	by HAZEN All	10
1000	3.091	1261.3	833.3	974.8	668.1	1297.1	868.2	1004.9	686.5
500	2.879	1066.8	733.3	839.2	597.8	1095.0	761.3	863.2	612.7
200	2.576	840.2	611.2	677.8	510.1	860.0	631.2	695.2	521.0
150	2.475	775.7	575.1	631.1	483.7	793.3	592.9	646.6	493.5
100	2.327	689.9	525.9	568.3	447.5	704.6	540.8	581.4	455.7
80	2.242	645.2	499.7	535.2	428.0	658.4	513.0	547.1	435.4
70	2.190	619.2	484.2	515.8	416.5	631.6	496.7	527.1	423.4
60	2.128	589.9	466.7	494.0	403.3	601.4	478.2	504.4	409.7
50	2.054	556.3	446.3	468.7	387.9	566.7	456.7	478.3	393.7
40	1.960	516.5	421.7	438.6	369.2	525.8	430.9	447.2	374.4
30	1.834	467.6	390.9	401.3	345.6	475.4	398.5	408.6	349.9
20	1.645	402.7	348.8	351.1	313.0	408.7	354.4	356.8	316.1
10	1.282	302.2	280.2	271.6	258.6	305.7	282.9	275.0	260.1
8	1.150	272.4	258.9	247.5	241.4	275.3	260.8	250.3	242.4
7	1.068	255.2	246.3	233.4	231.1	257.6	247.8	235.9	231.9
6	0.967	235.7	231.8	217.5	219.3	237.8	232.8	219.5	219.8
5	0.841	213.4	214.9	199.0	205.3	215.0	215.4	200.6	205.4
4	0.674	187.0	194.3	176.8	188.0	188.1	194.1	178.0	187.8
3	0.430	154.2	167.7	148.8	165.4	154.8	166.9	149.4	164.7
2	0.000	109.8	129.4	109.8	132.0	109.8	127.8	109.8	130.8

table-

Data Summary

65825000 Santa Clara

Date	Data	No.	Probability Exceedence thomas	hazen	Date	Data
1949 12 30	85.6	1	0.978	0.989	1983 7 9	2717.0
1950 10 19	476.5	2	0.957	0.967	1992 5 29	2337.5
1951 10 26	446.7	3	0.935	0.944	1987 5 21	1412.5
1952 10 8	550.2	4	0.913	0.922	1957 9 4	1362.5
1953 11 2	480.7	5	0.891	0.900	1982 7 18	1116.3
1954 5 17	1065.0	6	0.870	0.878	1954 5 17	1065.0
1955 6 20	1008.3	7	0.848	0.856	1955 6 20	1008.3
1956 8 1	511.1	8	0.826	0.833	1993 5 14	944.0
1957 9 4	1362.5	9	0.804	0.811	1979 10 31	860.0
1958 9 23	425.5	10	0.783	0.789	1980 9 13	850.0
1959 6 24	404.2	11	0.761	0.767	1985 5 14	780.0
1960 9 15	596.5	12	0.739	0.744	1984 6 15	780.0
1961 3 19	459.5	13	0.717	0.722	1975 10 2	746.5
1962 10 19	442.5	14	0.696	0.700	1972 8 28	724.0
1963 10 28	429.7	15	0.674	0.678	1971 7 5	710.5
1964 8 29	417.0	16	0.652	0.656	1973 1 25	706.0
1965 5 14	780.0	17	0.630	0.633	1988 5 25	660.2
1966 10 9	485.0	18	0.609	0.611	1990 1 25	655.3
1967 6 6	296.2	19	0.587	0.589	1980 1 25	640.6
1968 10 31	150.0	20	0.565	0.567	1970 7 3	611.2
1969 5 26	360.0	21	0.543	0.544	1960 9 15	596.5
1970 7 3	611.2	22	0.522	0.522	1991 6 25	581.8
1971 7 5	710.5	23	0.500	0.500	1952 10 8	550.2
1972 8 28	724.0	24	0.478	0.478	1956 8 1	511.1
1973 1 25	706.0	25	0.457	0.456	1978 7 24	498.0
1974 2 18	446.7	26	0.435	0.433	1986 10 9	485.0
1975 10 2	746.5	27	0.413	0.411	1953 11 2	480.7
1976 5 29	438.2	28	0.391	0.389	1950 10 19	476.5
1977 1 5	234.0	29	0.370	0.367	1951 3 19	459.5
1978 7 24	498.0	30	0.348	0.344	1951 10 26	446.7
1979 10 31	860.0	31	0.328	0.322	1974 2 18	446.7
1980 1 25	640.6	32	0.304	0.300	1962 10 19	442.5
1981 4 26	384.0	33	0.283	0.278	1976 5 29	438.2
1982 7 18	1110.3	34	0.261	0.256	1963 10 28	429.7
1983 7 9	2717.0	35	0.239	0.233	1958 9 25	425.5
1984 6 15	780.0	36	0.217	0.211	1986 5 19	417.0
1985 4 7	384.0	37	0.196	0.189	1964 8 29	417.0
1986 5 19	417.0	38	0.174	0.167	1959 6 24	404.2
1987 5 21	1412.5	39	0.152	0.144	1981 4 26	384.0
1988 5 25	660.2	40	0.130	0.122	1985 4 7	384.0
1989 9 13	830.0	41	0.109	0.100	1969 5 26	360.0
1990 1 23	655.3	42	0.087	0.078	1967 6 6	296.2
1991 6 23	581.8	43	0.065	0.056	1977 1 5	234.0
1992 5 29	2337.5	44	0.043	0.033	1966 10 31	150.0
1993 5 14	944.0	45	0.022	0.011	1949 12 30	85.6

Results of Ordered Probability Method

65825000 Santa Clara

				log(x0)	1/a
[1]	Least	Thomas	All	2.76031	0.27015
[2]	Square		upper10	2.53852	0.43110
[3]	Method	Hazen	All	2.76031	0.25617
[4]			upper10	2.61100	0.36804
[5]	Moment	Thomas	All	2.76031	0.28145
[6]	Method		upper10	2.54569	0.44131
[7]		Hazen	All	2.76031	0.26470
[8]			upper10	2.60044	0.37599

Fundamental Equation

log(x)=log(x0)+1/a*u

Least Squre Method

1/a=([u]*[X]-[X*u])/([u]*[u]-[u2])

log(x0)=[X]-1/a*[u]

Moment Method

1/a=sqr(([X]*[X]-[X2])/([u]*[u]-[u2]))

log(x0)=[X]-1/a*[u]

Probability Year	Normal Variate	Least Square Method by THOMAS All	Least Square Method by THOMAS 10	Least Square Method by HAZEN All	Least Square Method by HAZEN 10	Moment Method by THOMAS All	Moment Method by THOMAS 10	Moment Method by HAZEN All	Moment Method by HAZEN 10
1000	3.091	3937.4	7777.6	3564.7	5603.1	4287.1	8120.2	3787.7	5786.7
500	2.879	3450.9	6301.5	3145.6	4681.7	3719.3	6546.4	3328.5	4816.3
200	2.576	2859.4	4668.1	2631.9	3623.7	3057.6	4815.1	2768.5	3707.4
150	2.475	2685.2	4222.4	2479.6	3326.2	2863.8	4343.1	2603.1	3396.7
100	2.327	2448.4	3644.2	2271.8	2932.2	2601.2	3737.0	2378.0	2987.3
80	2.242	2322.4	3349.5	2160.8	2729.5	2461.9	3428.0	2258.0	2775.5
70	2.190	2248.4	3180.8	2095.5	2611.7	2380.2	3251.4	2187.5	2653.2
60	2.128	2164.3	2993.0	2021.0	2479.5	2287.5	3055.0	2107.3	2516.0
50	2.054	2066.6	2780.2	1934.4	2328.2	2180.0	2832.8	2014.0	2359.3
40	1.960	1949.4	2533.1	1830.3	2150.3	2051.4	2575.3	1902.1	2175.3
30	1.834	1802.4	2235.1	1699.1	1932.4	1890.5	2265.7	1761.4	1950.4
20	1.645	1602.4	1852.6	1519.7	1646.5	1672.4	1869.6	1569.6	1653.8
10	1.282	1278.1	1291.4	1226.5	1209.8	1321.5	1292.2	1257.7	1208.8
8	1.150	1177.9	1133.6	1135.1	1082.4	1213.7	1136.8	1161.0	1078.9
7	1.068	1116.7	1044.1	1080.9	1009.1	1150.2	1039.5	1103.8	1004.2
6	0.967	1051.1	945.3	1018.9	926.9	1077.9	936.9	1038.4	920.8
5	0.841	971.9	834.2	946.0	833.1	993.4	826.1	961.7	825.7
4	0.674	875.9	706.6	857.1	723.0	891.4	697.0	868.5	714.4
3	0.430	752.6	554.6	742.2	588.0	761.1	544.0	748.5	576.4
2	0.000	575.9	361.8	575.9	406.3	575.9	351.3	575.9	398.5

Result of Iwai Method

65825000 Santa Clara

Probability Year	Normal Variate	Expected Value
1000	3.091	4061.2
500	2.879	3559.8
200	2.576	2930.2
150	2.475	2745.7
100	2.327	2496.0
80	2.242	2361.4
70	2.190	2285.7
60	2.128	2197.5
50	2.054	2095.2
40	1.960	1973.0
30	1.834	1819.9
20	1.645	1612.5
10	1.282	1278.7
8	1.150	1176.3
7	1.068	1116.0
6	0.967	1047.2
5	0.841	966.9
4	0.674	869.9
3	0.430	746.1
2	0.000	570.1

log(x+b)=log(xo+b)+1/a*u

log(xo+b)=[Y]

1/a=sqr((N/(N-1))*([Y2]-[Y]*[Y]))

b= -23.5

log(xo+b)= 2.73766

1/a= 0.28171

Result of GUMBEL Method

65825000 Santa Clara

Probability Year	Extremal Variate	Expected Value
1000	6.907	3369.4
500	6.214	3077.3
200	5.296	2690.8
150	5.007	2569.3
100	4.600	2397.9
80	4.376	2303.4
70	4.241	2246.7
60	4.086	2181.3
50	3.902	2103.8
40	3.676	2008.8
30	3.384	1885.8
20	2.970	1711.5
10	2.250	1408.5
8	2.013	1308.5
7	1.870	1248.1
6	1.702	1177.4
5	1.500	1092.3
4	1.246	985.3
3	0.903	840.8
2	0.367	615.0

x=xo+1/a*y

1/a=([x2]-[x]*[x])/([y2]-[y]*[y])

xo=[x]-1/a*[y]

1/a=421.11600

xo= 460.7

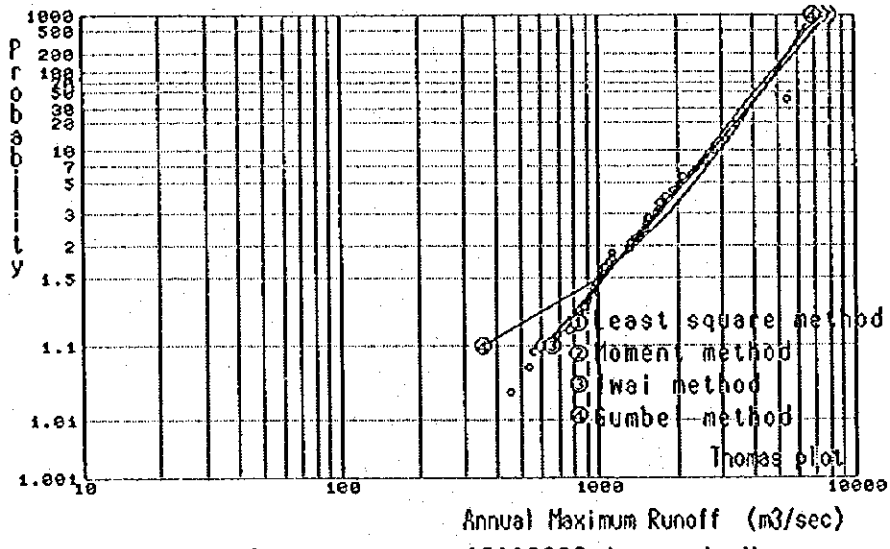


Fig. Log normal curve paper 65960000 Aguas do Vere

table-
Data Summary
65960000 Aguas do Vere

Date	Data	No.	Probability Exeedence thomas	hazen	Date	Data
1956 9 27	533.6	1	0.974	0.987	1983 7 9	5466.0
1937 6 19	2792.8	2	0.949	0.961	1990 6 3	3428.8
1958 7 30	1003.6	3	0.923	0.934	1992 5 29	3117.6
1959 6 24	556.5	4	0.897	0.908	1957 8 19	2792.8
1960 8 19	845.5	5	0.872	0.882	1989 9 14	2581.2
1961 3 14	1377.5	6	0.846	0.855	1972 8 28	2365.2
1962 9 21	1103.1	7	0.821	0.829	1987 5 21	2100.0
1963 11 9	1530.0	8	0.795	0.803	1979 5 14	2050.0
1964 8 26	767.0	9	0.769	0.776	1975 10 3	1920.0
1965 10 2	1506.7	10	0.744	0.750	1982 11 14	1806.0
1966 2 16	982.0	11	0.718	0.724	1984 6 15	1716.0
1967 3 6	950.2	12	0.692	0.697	1993 5 14	1716.0
1968 12 26	1134.0	13	0.667	0.671	1971 6 9	1662.7
1969 9 30	1524.0	14	0.641	0.645	1980 11 9	1550.0
1970 7 8	902.8	15	0.615	0.618	1989 9 30	1524.0
1971 6 9	1662.7	16	0.590	0.592	1965 10 2	1506.7
1972 8 28	2365.2	17	0.564	0.566	1988 5 24	1454.7
1973 1 10	1309.5	18	0.538	0.539	1961 3 14	1377.5
1974 9 2	1048.9	19	0.513	0.513	1991 6 23	1335.0
1975 10 3	1920.0	20	0.487	0.487	1973 1 10	1309.5
1976 5 30	845.5	21	0.462	0.461	1968 12 26	1134.0
1977 11 13	895.7	22	0.436	0.434	1981 4 28	1126.3
1978 7 23	938.8	23	0.410	0.408	1962 9 21	1103.1
1979 5 14	2050.0	24	0.385	0.382	1986 5 31	1048.9
1980 8 27	874.0	25	0.359	0.355	1974 9 2	1048.9
1981 4 28	1126.3	26	0.333	0.329	1958 7 30	1003.6
1982 11 14	1806.0	27	0.308	0.303	1966 2 16	982.0
1983 7 9	5466.0	28	0.282	0.276	1967 3 6	950.2
1984 6 15	1716.0	29	0.256	0.250	1978 7 23	938.8
1985 11 5	451.2	30	0.231	0.224	1970 7 8	902.8
1986 5 31	1048.9	31	0.205	0.197	1980 8 27	874.0
1987 5 21	2100.0	32	0.179	0.171	1976 5 30	845.5
1988 5 24	1454.7	33	0.154	0.145	1960 8 19	845.5
1989 9 14	2581.2	34	0.128	0.118	1964 8 26	767.0
1990 6 3	3428.8	35	0.103	0.092	1977 11 13	695.7
1991 6 23	1335.0	36	0.077	0.066	1959 6 24	556.5
1992 5 29	3117.6	37	0.051	0.039	1956 9 27	533.6
1993 5 14	1716.0	38	0.026	0.013	1985 11 5	451.2

Results of Ordered Probability Method
65960000 Aguas do Vere

				log(XU)	1/a
[1]	Least Square	Thomas	All	3.12367	0.24818
[2]			upper10	3.02008	0.34351
[3]	Method	Hazen	All	3.12367	0.23203
[4]			upper10	3.05375	0.29370
[5]	Moment Method	Thomas	All	3.12367	0.25040
[6]			upper10	3.01445	0.34638
[7]		Hazen	All	3.12367	0.23365
[8]			upper10	3.05127	0.29771

Fundamental Equation
log(x)=log(xo)+1/a·u

Least Squre Method
1/a=([u]·[X]-[X·u])/([u]·[u]-[u2])
log(xo)=[X]-1/a·[u]

Moment Method
1/a=sqr(([X]·[X]-[X2])/([u]·[u]-[u2]))
log(xo)=[X]-1/a·[u]

Probability Year	Normal Variate	Least Square Method by THOMAS All	Least Square Method by THOMAS 10	Least Square Method by HAZEN All	Least Square Method by HAZEN 10	Moment Method by THOMAS All	Moment Method by THOMAS 10	Moment Method by HAZEN All	Moment Method by HAZEN 10
1000	3.091	7774.5	%12070.0	6930.6	9281.3	7900.0	%12334.6	7010.8	9361.9
500	2.879	6887.4	%10206.5	6188.4	8033.7	6990.9	%10405.5	6255.1	8095.5
200	2.576	5794.7	8036.1	5265.3	6539.4	5872.6	8163.0	5316.3	6580.4
150	2.475	5469.5	7418.6	4988.7	6104.3	5540.1	7529.1	5034.9	6139.9
100	2.327	5024.9	6597.1	4608.5	5517.9	5085.6	6684.3	4648.6	5546.1
80	2.242	4786.8	6168.4	4404.0	5207.8	4842.7	6244.0	4440.9	5232.4
70	2.190	4646.5	5919.6	4283.2	5026.5	4699.5	5988.6	4318.3	5049.0
60	2.128	4486.6	5639.4	4145.2	4821.0	4536.3	5701.3	4178.2	4841.2
50	2.054	4300.1	5317.6	3983.9	4583.2	4346.1	5371.4	4014.5	4600.8
40	1.960	4075.6	4937.4	3789.2	4299.7	4117.3	4982.1	3816.9	4314.3
30	1.834	3792.3	4468.8	3542.4	3946.0	3828.6	4502.9	3566.6	3957.1
20	1.645	3403.9	3847.9	3201.9	3469.3	3433.0	3869.1	3221.6	3476.9
10	1.282	2765.5	2886.5	2636.8	2706.7	2783.9	2890.5	2649.4	2709.3
8	1.150	2565.6	2601.7	2458.2	2477.0	2580.9	2601.6	2466.7	2476.1
7	1.068	2446.9	2438.7	2351.7	2341.2	2460.5	2434.3	2361.1	2339.4
6	0.967	2310.7	2251.0	2229.1	2186.8	2322.3	2246.2	2237.1	2184.1
5	0.841	2150.3	2037.6	2084.1	2007.1	2159.7	2030.5	2090.6	2003.5
4	0.674	1934.3	1785.1	1905.9	1791.1	1961.1	1775.5	1910.7	1786.4
3	0.430	1700.0	1471.9	1673.1	1517.0	1703.8	1460.0	1675.7	1511.4
2	0.000	1329.4	1047.5	1329.4	1131.8	1329.4	1033.8	1329.4	1125.3

Result of Iwai Method
65960000 Aguas do Vere

Probability Year	Normal Variate	Expected Value
1000	3.091	7334.7
500	2.879	6506.5
200	2.576	5486.5
150	2.475	5182.8
100	2.327	4767.7
80	2.242	4545.5
70	2.190	4414.5
60	2.128	4265.1
50	2.054	4091.0
40	1.960	3881.5
30	1.834	3617.0
20	1.645	3254.4
10	1.282	2654.4
8	1.150	2471.7
7	1.068	2361.0
6	0.967	2233.8
5	0.841	2084.1
4	0.674	1901.1
3	0.430	1683.7
2	0.000	1317.8

log(x-b)=log(xo-b)+1/a·u

log(xo-b)=[Y]
1/a=sqr((N/(N-1))·([Y2]-[Y]·[Y]))

b= -76.7
log(xo-b)= 3.09378
1/a= 0.24819

Result of GUMBEL Method
65960000 Aguas do Vere

Probability Year	Extremal Variate	Expected Value
1000	6.907	6870.8
500	6.214	6290.0
200	5.296	5521.6
150	5.007	5280.0
100	4.600	4939.2
80	4.376	4751.3
70	4.241	4638.7
60	4.086	4508.7
50	3.902	4354.6
40	3.676	4165.6
30	3.384	3921.2
20	2.970	3574.5
10	2.250	2971.8
8	2.013	2773.5
7	1.870	2653.2
6	1.702	2512.7
5	1.500	2343.6
4	1.248	2130.9
3	0.900	1843.5
2	0.367	1394.6

x=xo+1/a·y

1/a=([x2]-[x]·[x])/([y2]-[y]·[y])
xo=[x]-1/a·[y]

1/a=837.23800
xo=1087.7

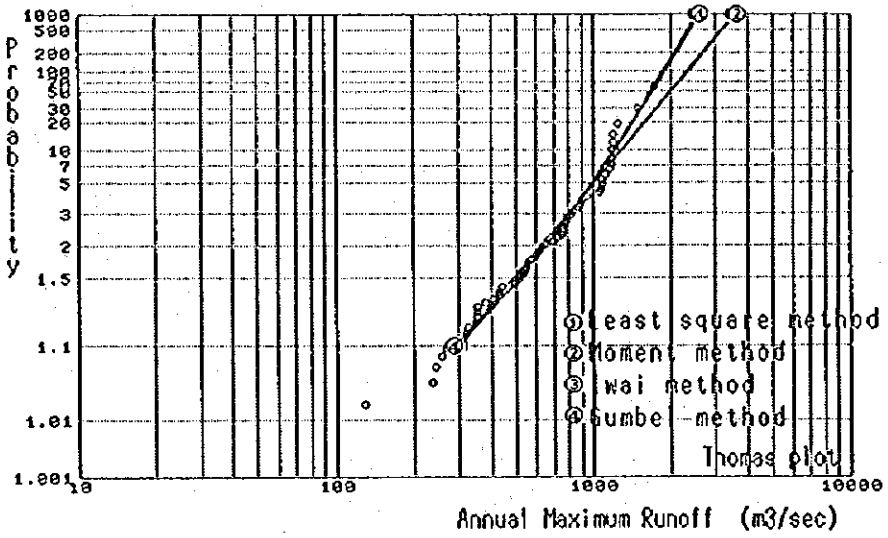


Fig. Log normal curve paper 81200000 Capela do Ribeira

table- Data Summary
01200000 Capela do Ribeira

Date	Data	No.	Probability Exeedance thomas	hazen	Date	Data
1936 12 3	319.0	1	0.933	0.991	1983 5 20	1736.4
1937 11 16	1183.0	2	0.966	0.974	1968 5 15	1482.5
1938 7 1	404.0	3	0.949	0.957	1980 12 30	1249.8
1939 1 22	427.8	4	0.932	0.940	1980 12 22	1198.6
1940 1 8	255.4	5	0.915	0.922	1972 2 20	1196.0
1941 2 7	763.8	6	0.898	0.905	1937 11 16	1183.0
1942 2 4	556.0	7	0.881	0.888	1957 7 18	1170.5
1943 10 15	244.5	8	0.864	0.871	1987 6 16	1168.0
1944 2 25	324.4	9	0.847	0.853	1954 5 19	1165.5
1945 2 27	634.5	10	0.831	0.836	1973 8 27	1109.0
1946 10 19	1086.5	11	0.814	0.819	1946 10 19	1086.5
1947 9 25	820.7	12	0.797	0.802	1963 1 19	1084.0
1948 8 8	594.6	13	0.780	0.784	1982 6 25	1081.5
1949 4 2	129.4	14	0.763	0.767	1988 5 23	1059.0
1950 3 6	783.9	15	0.746	0.750	1971 1 7	939.0
1951 1 26	442.2	16	0.729	0.733	1966 2 13	903.5
1952 6 17	786.5	17	0.712	0.716	1992 5 31	892.0
1953 1 7	351.4	18	0.695	0.698	1961 4 5	885.1
1954 5 19	1165.5	19	0.678	0.681	1990 1 10	832.2
1955 6 21	514.8	20	0.661	0.664	1947 9 25	820.7
1956 8 1	513.0	21	0.644	0.647	1952 6 17	788.5
1957 7 18	1170.5	22	0.627	0.629	1950 3 6	783.9
1958 2 28	355.0	23	0.610	0.612	1976 5 29	777.0
1959 2 17	301.0	24	0.593	0.595	1975 2 27	766.0
1960 1 11	656.0	25	0.576	0.578	1941 2 7	763.8
1961 4 5	885.1	26	0.559	0.560	1974 3 18	755.0
1962 9 21	267.3	27	0.542	0.543	1993 10 5	725.4
1963 1 19	1084.0	28	0.525	0.526	1969 11 14	701.2
1964 2 26	355.0	29	0.508	0.509	1960 1 11	656.0
1965 5 15	1482.5	30	0.492	0.491	1945 2 27	634.5
1966 2 13	903.5	31	0.475	0.474	1970 5 8	624.0
1967 3 6	550.0	32	0.458	0.457	1986 12 19	602.0
1968 2 18	540.0	33	0.441	0.440	1948 8 8	594.6
1969 11 14	701.2	34	0.424	0.422	1979 12 16	573.2
1970 5 8	624.0	35	0.407	0.405	1942 2 4	556.0
1971 1 7	939.0	36	0.390	0.388	1967 3 6	550.0
1972 2 20	1196.0	37	0.373	0.371	1968 2 18	540.0
1973 8 27	1109.0	38	0.356	0.353	1984 9 27	531.0
1974 3 18	755.0	39	0.339	0.336	1955 6 21	514.8
1975 2 27	766.0	40	0.322	0.319	1958 8 1	513.0
1976 5 29	777.0	41	0.305	0.302	1981 2 8	491.4
1977 1 19	346.0	42	0.288	0.284	1951 1 26	442.2
1978 9 5	427.8	43	0.271	0.267	1978 9 5	427.8
1979 12 16	573.2	44	0.254	0.250	1939 1 22	427.8
1980 12 22	1198.6	45	0.237	0.233	1938 7 1	404.0
1981 2 8	491.4	46	0.220	0.216	1991 3 7	379.2
1982 6 25	1061.5	47	0.203	0.198	1964 2 26	355.0
1983 5 20	1736.4	48	0.186	0.181	1958 2 28	355.0
1984 9 27	531.0	49	0.169	0.164	1953 1 7	351.4
1985 2 22	237.0	50	0.153	0.147	1977 1 19	346.0
1986 12 19	602.0	51	0.136	0.129	1944 2 25	324.4
1987 6 16	1168.0	52	0.119	0.112	1936 12 3	319.0
1988 5 23	1059.0	53	0.102	0.095	1959 2 17	301.0
1989 12 30	1249.6	54	0.085	0.078	1962 9 21	267.3
1990 1 10	832.2	55	0.068	0.060	1940 1 8	255.4
1991 3 7	379.2	56	0.051	0.043	1943 10 15	244.5
1992 5 31	892.0	57	0.034	0.026	1985 2 22	237.0
1993 10 5	725.4	58	0.017	0.009	1949 4 2	129.4

Results of Ordered Probability Method
01200000 Capela do Ribeira

				log(x0)	1/a
[1]	Least Square Method	Thomas	All	2.79428	0.24544
[2]			upper10	2.89182	0.14769
[3]		Hazen	All	2.79428	0.23319
[4]			upper10	2.91003	0.12810
[5]	Moment Method	Thomas	All	2.79428	0.24884
[6]			upper10	2.87395	0.16046
[7]		Hazen	All	2.79428	0.23649
[8]			upper10	2.89822	0.13613

Fundamental Equation
log(X)=log(xo)+1/a*u

Least Squre Method
1/a=([u]*[X]-[X*u])/([u]*[u]-[u2])
log(xo)=[X]-1/a*[u]

Moment Method
1/a=sqr(([X]*[X]-[X2])/([u]*[u]-[u2]))
log(xo)=[X]-1/a*[u]

Probability Year	Normal Variate	Least Square Method by THOMAS All	Least Square Method by THOMAS 10	Least Square Method by HAZEN All	Least Square Method by HAZEN 10	Moment Method by THOMAS All	Moment Method by THOMAS 10	Moment Method by HAZEN All	Moment Method by HAZEN 10
1000	3.091	3571.2	2229.7	3273.1	2022.7	3658.8	2343.4	3351.0	2084.2
500	2.879	3167.9	2074.6	2920.9	1900.1	3240.3	2166.9	2985.6	1950.2
200	2.576	2670.5	1871.9	2483.3	1738.0	2725.0	1937.9	2532.3	1773.9
150	2.475	2522.2	1808.7	2352.1	1686.9	2571.7	1866.9	2396.9	1718.6
100	2.327	2319.3	1719.7	2172.0	1614.7	2362.1	1767.3	2210.8	1640.5
80	2.242	2210.6	1670.7	2075.2	1574.7	2249.9	1712.7	2110.9	1597.4
70	2.190	2146.5	1641.4	2018.0	1550.8	2183.7	1680.1	2051.9	1571.5
60	2.128	2073.4	1607.6	1952.6	1523.0	2108.4	1642.4	1984.5	1541.6
50	2.054	1988.2	1567.4	1876.3	1490.0	2020.5	1598.0	1905.6	1506.1
40	1.960	1885.5	1518.2	1784.1	1449.3	1914.8	1543.5	1810.9	1462.5
30	1.834	1755.9	1454.5	1667.3	1396.4	1781.2	1473.3	1690.8	1405.8
20	1.645	1577.9	1363.8	1506.4	1320.6	1598.4	1375.9	1525.3	1324.9
10	1.282	1284.9	1205.3	1239.3	1186.4	1297.9	1201.2	1251.4	1182.2
8	1.150	1193.0	1152.7	1154.9	1141.3	1203.8	1144.3	1165.1	1134.6
7	1.068	1138.4	1120.7	1104.7	1113.8	1148.0	1109.8	1113.7	1105.5
6	0.967	1075.7	1083.1	1046.8	1081.3	1083.9	1069.5	1054.5	1071.3
5	0.841	1001.9	1037.7	978.4	1041.9	1008.5	1020.9	984.6	1029.8
4	0.674	911.5	980.4	894.3	991.7	916.3	959.7	898.9	977.2
3	0.430	794.1	902.3	784.6	922.9	796.8	877.0	787.1	905.3
2	0.000	622.7	779.5	622.7	812.9	622.7	748.1	622.7	791.1

Result of Iwai Method
01200000 Capela do Ribeira

Probability Year	Normal Variate	Expected Value
1000	3.091	2543.5
500	2.879	2336.3
200	2.576	2066.9
150	2.475	1983.2
100	2.327	1865.7
80	2.242	1801.2
70	2.190	1762.7
60	2.128	1718.2
50	2.054	1665.5
40	1.960	1601.1
30	1.834	1517.8
20	1.645	1399.8
10	1.282	1194.3
8	1.150	1126.4
7	1.068	1085.2
6	0.967	1037.0
5	0.841	978.8
4	0.674	905.5
3	0.430	806.3
2	0.000	651.1

log(x+b)=log(xo+b)+1/a*u

log(xo+b)=[Y]
1/a=sqr((N/(N-1))*([Y2]-[Y]*[Y]))

b= 274.8
log(xo+b)= 2.96656
1/a= 0.15643

Result of GUMBEL Method
01200000 Capela do Ribeira

Probability Year	Extremal Variate	Expected Value
1000	6.907	2601.3
500	6.214	2395.0
200	5.296	2122.0
150	5.007	2036.2
100	4.600	1915.1
80	4.376	1848.3
70	4.241	1808.4
60	4.086	1762.2
50	3.902	1707.4
40	3.676	1640.3
30	3.384	1553.5
20	2.970	1430.3
10	2.250	1216.2
8	2.013	1145.8
7	1.870	1103.1
6	1.702	1053.1
5	1.500	993.0
4	1.246	917.5
3	0.903	815.4
2	0.367	685.9

x=xo+1/a*y

1/a=([x2]-[x]*[x])/([y2]-[y]*[y])
xo=[x]-1/a*[y]

1/a=%297.41200
xo= 546.9

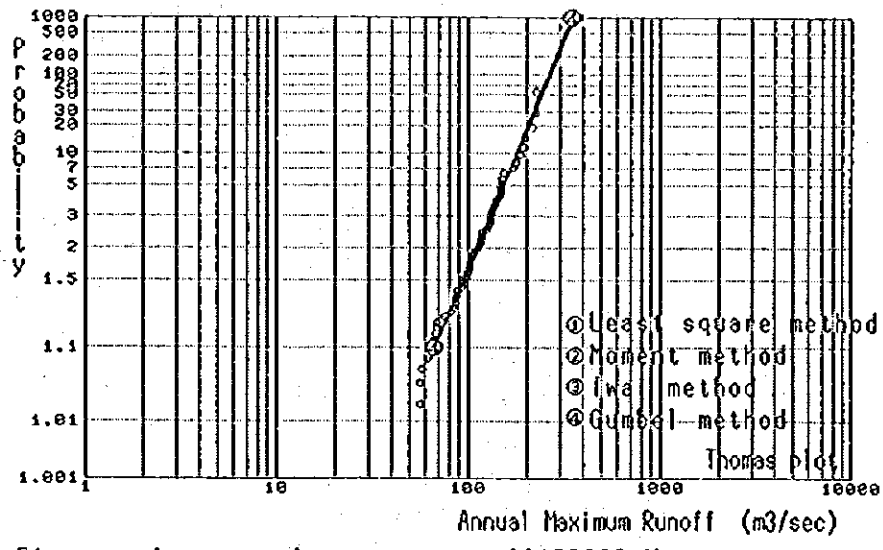


Fig. Log normal curve paper 82170000 Morretes

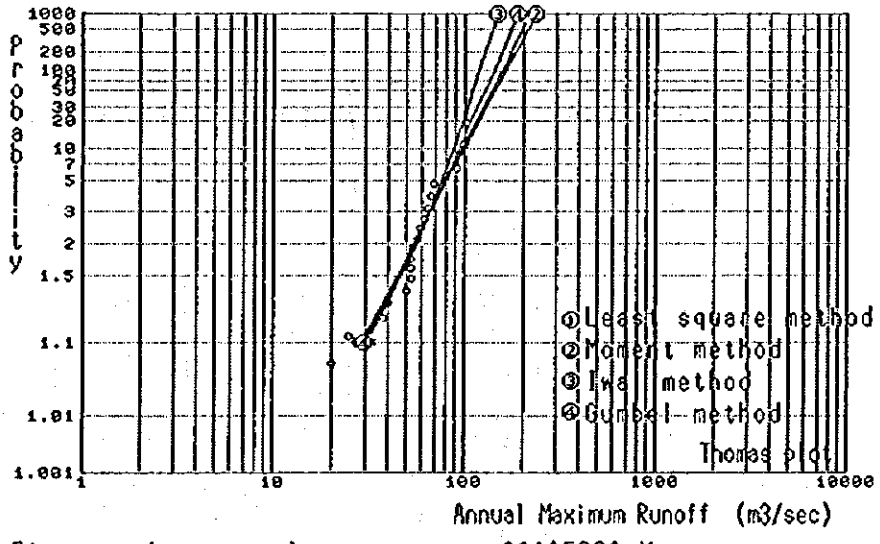


Fig. Log normal curve paper 82195002 Morretes

table=
82170000 Morretes

Data Summary

Date	Data	No.	Probability Exceedence thomas	Probability Exceedence Hazen	Date	Data
1938 10 17	76.5	1	0.982	0.991	1969 11 13	224.7
1939 10 23	177.0	2	0.965	0.973	1946 2 15	224.0
1940 10 21	102.0	3	0.947	0.955	1960 11 28	217.0
1941 5 6	56.9	4	0.930	0.936	1949 3 26	197.0
1942 4 19	111.5	5	0.912	0.920	1952 2 2	194.6
1943 10 5	151.0	6	0.895	0.902	1972 12 23	187.4
1944 12 4	171.5	7	0.877	0.884	1939 10 23	177.0
1945 10 7	137.0	8	0.860	0.866	1944 12 4	171.5
1946 2 24	145.0	9	0.842	0.848	1961 2 17	154.0
1947 2 18	127.5	10	0.825	0.830	1943 10 5	151.0
1948 2 15	224.0	11	0.807	0.813	1951 2 17	149.2
1949 3 26	197.0	12	0.789	0.795	1958 10 31	148.0
1950 11 28	86.6	13	0.772	0.777	1970 10 25	146.8
1951 2 17	149.2	14	0.754	0.759	1946 2 24	145.0
1952 2 2	194.6	15	0.737	0.741	1983 2 9	140.0
1953 12 2	129.0	16	0.719	0.723	1945 10 7	137.0
1954 4 2	114.5	17	0.702	0.705	1973 2 19	133.5
1955 12 28	116.0	18	0.684	0.688	1959 3 24	132.5
1956 10 12	104.0	19	0.667	0.670	1965 1 27	130.0
1957 12 9	86.8	20	0.649	0.652	1953 12 2	129.0
1958 10 31	148.0	21	0.632	0.634	1964 12 23	128.5
1959 3 24	132.5	22	0.614	0.616	1947 2 18	127.5
1960 11 28	217.0	23	0.596	0.598	1976 5 15	125.0
1961 2 17	154.0	24	0.579	0.580	1991 11 3	117.5
1962 3 2	98.0	25	0.561	0.563	1981 1 10	117.0
1963 10 1	107.0	26	0.544	0.545	1955 12 26	116.0
1964 12 23	128.5	27	0.526	0.527	1974 3 17	116.0
1965 1 27	130.0	28	0.509	0.509	1954 4 2	114.5
1966 2 13	100.4	29	0.491	0.491	1942 4 19	111.5
1967 2 12	106.0	30	0.474	0.473	1963 10 1	107.0
1968 12 1	101.2	31	0.456	0.455	1967 2 12	106.0
1969 11 13	224.7	32	0.439	0.438	1956 10 12	104.0
1970 10 25	146.8	33	0.421	0.420	1989 1 5	102.5
1971 3 3	85.1	34	0.404	0.402	1940 10 21	102.0
1972 12 23	187.4	35	0.386	0.384	1968 12 1	101.2
1973 2 19	133.5	36	0.368	0.366	1966 2 13	100.4
1974 3 17	116.0	37	0.351	0.348	1962 3 2	98.0
1975 1 6	68.9	38	0.333	0.330	1982 2 5	93.0
1976 5 15	125.0	39	0.316	0.313	1977 10 6	92.5
1977 10 6	92.5	40	0.298	0.295	1986 2 13	92.5
1978 11 5	68.0	41	0.281	0.277	1950 11 28	88.6
1979 1 13	61.5	42	0.263	0.259	1990 4 21	88.0
1980 1 17	65.1	43	0.246	0.241	1957 12 9	86.8
1981 1 10	117.0	44	0.228	0.223	1993 9 21	86.8
1982 2 5	93.0	45	0.211	0.205	1971 3 3	85.1
1983 2 9	140.0	46	0.193	0.188	1988 5 23	81.2
1984 11 4	56.3	47	0.175	0.170	1938 10 17	76.5
1985 11 4	68.6	48	0.158	0.152	1975 1 6	68.9
1986 2 13	92.5	49	0.140	0.134	1985 11 4	68.6
1987 6 15	57.6	50	0.123	0.116	1978 11 5	68.0
1988 5 23	81.2	51	0.105	0.098	1992 7 16	65.1
1989 1 5	102.5	52	0.088	0.080	1980 1 17	65.1
1990 4 21	88.0	53	0.070	0.063	1979 1 13	61.5
1991 11 3	117.5	54	0.053	0.045	1987 6 15	57.6
1992 7 16	65.1	55	0.035	0.027	1941 5 6	56.9
1993 9 21	88.8	56	0.018	0.009	1984 11 4	56.3

Results of Ordered Probability Method
82170000 Morretes

				log(X0)	1/a
[1]	Least Square Method	Thomas	All	2.04511	0.16515
[2]			upper10	2.05999	0.15336
[3]		Hazen	All	2.04511	0.15634
[4]			upper10	2.08767	0.12860
[5]	Moment Method	Thomas	All	2.04511	0.16599
[6]			upper10	2.04367	0.16574
[7]		Hazen	All	2.04511	0.15754
[8]			upper10	2.07011	0.14069

Fundamental Equation
log(x)=log(xo)+1/a·u

Least Squre Method
1/a=([u]·[X]-[X·u])/([u]·[u]-[u2])
log(xo)=[X]-1/a·[u]

Moment Method
1/a=sqr(([X]·[X]-[X2])/([u]·[u]-[u2]))
log(xo)=[X]-1/a·[u]

Probability Year	Normal Variate	Least Square Method by THOMAS All	Least Square Method by THOMAS 10	Least Square Method by HAZEN All	Least Square Method by HAZEN 10	Moment Method by THOMAS All	Moment Method by THOMAS 10	Moment Method by HAZEN All	Moment Method by HAZEN 10
1000	3.091	359.3	346.8	337.5	305.6	361.5	361.3	340.4	319.8
500	2.879	331.5	321.5	312.7	287.0	333.4	333.2	315.2	298.6
200	2.576	295.5	288.6	280.5	262.4	297.0	296.9	282.5	270.8
150	2.475	284.4	278.3	270.5	254.7	285.7	285.7	272.3	262.0
100	2.327	268.8	263.9	256.4	243.7	270.0	270.0	258.0	249.7
80	2.242	260.2	256.0	248.7	237.7	261.4	261.4	250.2	243.0
70	2.190	255.1	251.3	244.0	234.0	256.2	256.2	245.5	238.9
60	2.128	249.2	245.8	238.7	229.8	250.1	250.3	240.1	234.2
50	2.054	242.3	239.4	232.4	224.8	243.3	243.3	233.7	228.6
40	1.960	233.8	231.5	224.7	218.7	234.7	234.7	225.9	221.8
30	1.834	222.9	221.3	214.7	210.6	223.7	223.7	215.8	212.9
20	1.645	207.4	206.8	200.6	199.2	208.1	208.1	201.5	200.3
10	1.282	180.6	181.6	176.0	178.9	181.1	181.2	176.6	178.0
8	1.150	171.8	173.3	167.9	172.0	172.2	172.3	168.4	170.4
7	1.068	166.5	168.2	162.9	167.9	166.8	167.0	163.4	166.1
6	0.967	160.3	162.3	157.2	163.0	160.6	160.7	157.6	160.8
5	0.841	152.8	155.1	150.2	157.0	153.0	153.2	150.5	154.3
4	0.674	143.4	146.1	141.4	149.4	143.6	143.7	141.7	146.2
3	0.430	130.7	133.9	129.5	139.0	130.8	130.9	129.7	135.1
2	0.000	110.9	114.8	110.9	122.4	110.9	111.1	110.9	117.5

Result of Iwai Method
82170000 Morretes

Probability Year	Normal Variate	Expected Value
1000	3.091	345.6
500	2.879	319.3
200	2.576	285.4
150	2.475	274.9
100	2.327	260.2
80	2.242	252.1
70	2.190	247.3
60	2.128	241.7
50	2.054	235.2
40	1.960	227.1
30	1.834	216.8
20	1.645	202.2
10	1.282	176.8
8	1.150	168.5
7	1.068	163.4
6	0.967	157.5
5	0.841	150.4
4	0.674	141.5
3	0.430	129.4
2	0.000	110.7

log(x+b)=log(xo+b)+1/a·u

log(xo+b)=[Y]
1/a=sqr((N/(N-1))·([Y2]-[Y]·[Y]))

b= -4.2
log(xo+b)= 2.02718
1/a= 0.16374

Result of GUMBEL Method
82170000 Morretes

Probability Year	Extremal Variate	Expected Value
1000	6.907	350.7
500	6.214	325.4
200	5.296	291.8
150	5.007	281.2
100	4.600	266.4
80	4.376	258.1
70	4.241	253.2
60	4.086	247.6
50	3.902	240.8
40	3.676	232.6
30	3.384	221.9
20	2.970	206.7
10	2.250	180.4
8	2.013	171.8
7	1.870	166.5
6	1.702	160.4
5	1.500	153.0
4	1.246	143.7
3	0.903	131.1
2	0.367	111.5

x=xo+1/a·y

1/a=([x2]-[x]·[x])/([y2]-[y]·[y])
xo=[x]-1/a·[y]

1/a=36.57170
xo= 98.1

table-
82195002 Morretes

Data Summary

Date	Data	No.	Probability Exeedence thomas	hazen	Date	Data
1975 11 1	37.6	1	0.947	0.972	1977 10 6	101.7
1976 5 15	53.6	2	0.895	0.917	1981 10 30	96.1
1977 10 6	101.7	3	0.842	0.861	1989 12 18	90.9
1978 12 26	67.2	4	0.789	0.806	1979 5 14	68.7
1979 5 14	68.7	5	0.737	0.750	1978 12 26	67.2
1980 3 16	52.3	6	0.684	0.694	1991 11 3	64.6
1981 10 30	96.1	7	0.632	0.639	1982 6 24	61.6
1982 6 24	61.6	8	0.579	0.583	1992 9 11	59.1
1983 5 28	56.3	9	0.526	0.528	1983 5 28	56.3
1984 12 18	52.3	10	0.474	0.472	1976 5 15	53.6
1985 11 4	20.2	11	0.421	0.417	1984 12 18	52.3
1986 2 13	24.8	12	0.368	0.361	1980 3 16	52.3
1988 10 11	39.6	13	0.316	0.306	1990 10 19	52.1
1989 12 18	90.9	14	0.263	0.250	1993 11 2	49.7
1990 10 19	52.1	15	0.211	0.194	1988 10 11	39.6
1991 11 3	64.6	16	0.158	0.139	1975 11 1	37.6
1992 9 11	59.1	17	0.105	0.083	1986 2 13	24.8
1993 11 2	49.7	18	0.053	0.028	1985 11 4	20.2

Result of Iwai Method
82195002 Morretes

Probability Year	Normal Variate	Expected Value
1000	3.091	146.2
500	2.879	138.3
200	2.576	127.6
150	2.475	124.1
100	2.327	119.1
80	2.242	116.3
70	2.190	114.6
60	2.128	112.7
50	2.054	110.3
40	1.960	107.4
30	1.834	103.5
20	1.645	97.9
10	1.282	87.6
8	1.150	84.1
7	1.068	81.9
6	0.967	79.3
5	0.841	76.1
4	0.674	71.9
3	0.430	66.1
2	0.000	56.4

$\log(x-b)=\log(xo-b)+1/a \cdot u$

$\log(xo-b)=[Y]$

$1/a=sqr((N/(N-1)) \cdot ([Y2]-[Y] \cdot [Y]))$

b= 62.1
log(xo-b)= 2.07377
1/a= 0.07930

Result of GUMBEL Method
82195002 Morretes

Probability Year	Extremal Variate	Expected Value
1000	6.907	188.1
500	6.214	174.0
200	5.296	155.3
150	5.007	149.5
100	4.600	141.2
80	4.376	136.6
70	4.241	133.9
60	4.086	130.7
50	3.902	127.0
40	3.676	122.4
30	3.384	116.5
20	2.970	108.0
10	2.250	93.4
8	2.013	88.6
7	1.870	85.7
6	1.702	82.3
5	1.500	78.2
4	1.246	73.0
3	0.903	66.0
2	0.367	55.1

$x=xo+1/a \cdot y$

$1/a=([x2]-[x] \cdot [x])/([y2]-[y] \cdot [y])$

$xo=[x]-1/a \cdot [y]$

1/a=20.32530
xo= 47.7

Results of Ordered Probability Method
82195002 Morretes

				log(x0)	1/a
[1]	Least Square Method	Thomas	All	1.73264	0.19691
[2]			upper10	1.73238	0.18008
[3]		Hazen	All	1.73264	0.17593
[4]			upper10	1.73758	0.15531
[5]	Moment Method	Thomas	All	1.73264	0.20561
[6]			upper10	1.72900	0.18542
[7]		Hazen	All	1.73264	0.18285
[8]			upper10	1.73387	0.16080

Fundamental Equation

$\log(x)=\log(xo)+1/a \cdot u$

Least Squre Method

$1/a=([u] \cdot [X]-[X \cdot u])/([u] \cdot [u]-[u2])$

$\log(xo)=[X]-1/a \cdot [u]$

Moment Method

$1/a=sqr(([X] \cdot [X]-[X2])/([u] \cdot [u]-[u2]))$

$\log(xo)=[X]-1/a \cdot [u]$

Probability Year	Normal Variate	Least Square Method by THOMAS All	by THOMAS 10	by HAZEN All	by HAZEN 10	Moment Method by THOMAS All	by THOMAS 10	by HAZEN All	by HAZEN 10
1000	3.091	219.4	194.5	189.0	165.3	233.4	200.5	198.5	170.2
500	2.879	199.3	178.1	173.4	153.2	211.1	183.1	181.5	157.3
200	2.576	173.8	157.1	153.4	137.5	183.0	160.9	159.8	140.7
150	2.475	166.0	150.7	147.3	132.6	174.4	154.2	153.2	135.5
100	2.327	155.2	141.7	138.7	125.7	162.6	144.7	143.9	128.2
80	2.242	149.3	136.8	134.0	122.0	156.2	139.5	138.9	124.3
70	2.190	145.8	133.9	131.2	119.7	152.4	136.5	135.8	121.9
60	2.128	141.8	130.5	128.0	117.1	148.0	132.9	132.4	119.2
50	2.054	137.1	126.6	124.2	114.0	142.9	128.8	128.3	115.9
40	1.960	131.4	121.7	119.5	110.3	136.7	123.7	123.3	112.0
30	1.834	124.1	115.5	113.6	105.4	128.8	117.3	117.0	106.9
20	1.645	113.9	106.8	105.2	98.5	117.7	108.2	108.0	99.6
10	1.282	96.6	91.9	90.8	86.5	99.1	92.6	92.7	87.1
8	1.150	91.0	87.0	86.1	82.5	93.1	87.6	87.7	83.0
7	1.068	87.7	84.1	83.3	80.1	89.6	84.5	84.7	80.5
6	0.967	83.8	80.6	80.0	77.3	85.4	81.0	81.2	77.5
5	0.841	79.1	76.5	76.0	73.9	80.5	76.7	77.0	74.0
4	0.674	73.3	71.4	71.0	69.6	74.3	71.5	71.8	69.5
3	0.430	65.7	64.5	64.3	63.8	66.2	64.4	64.8	63.5
2	0.000	54.0	54.0	54.0	54.6	54.0	53.6	54.0	54.2