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CLIMATE AND IRRIGATION REQUIREMENTS FOR BRAZIL

by Frederick H. Hargreaves

UTAH STATE UNIVERSITY

January 1970

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George H. Hargreaves

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Department of Agricultural and Irrigation Engineering
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Logan, Utah

1976

CLIMATE AND IRRIGATION REQUIREMENTS FOR BRAZIL

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George H. Hargreaves

INTRODUCTION

Several methods have been used to estimate potential evapotranspiration and irrigation requirements. Few are applicable to a wide range of climatic conditions. By making maximum use of climatic interrelationships the estimation of irrigation requirements can be simplified and made more universal and accurate.

Data published by Ministerio da Agricultura (9)[1] were used to tabulate mean monthly values of temperature, relative humidity and precipitation for 155 locations in Brazil. For some locations, hours of bright sunshine (insolation) were also available. These data were used to present a comparison of climatic conditions and to estimate potential evapotranspiration and irrigation requirements at each of the 155 locations.

Methodology is presented that requires a minimum of data and enables agriculturalists and engineers to estimate water requirements and water use for other locations. Theoretical discussion and detail are kept at a minimum. Reference is made to other sources giving more complete coverage of the various elements and factors influencing water application, production functions, and irrigation scheduling.

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[1]Numerals in parentheses refer to corresponding items in Appendix I - References.

EQUATIONS

Potential evapotranspiration, ETP, as used herein is the amount of water evaporated and transpired from an actively growing short grass with a full plant cover and a continuously adequate moisture supply. Crop evapotranspiration is estimated by multiplying ETP times a crop coefficient, K. ETP in mm per month can be approximately estimated from mean temperature in degrees Farenheit, TF, and incident solar radiation in Langleys per day, RS. The equation can be written:

$$ETP = 0.004 \times TF \times RS \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

A more exact estimation is obtained by correcting for the number of days in the month, DM, and the latent heat of vaporization, L. The equation for L is

$$L = 595.9 - 0.55 \times TC \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (2)$$

in which TC is mean temperature in degrees Centigrade. Temperature in degrees Centigrade, TC, is converted to degrees Fahrenheit, TF, by the equation

$$TF = 32 + 1.8 \times TC \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (3)$$

Solar radiation in equivalent mm of evaporation per month, RSM, is given by the equation

$$RSM = DM \times 10 \times RS/L \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (4)$$

Incident solar radiation is not generally available in Brazil. It can, however, be estimated from the percentage of possible sunshine, S, and extraterrestrial radiation in equivalent mm of evaporation per month, RMM, Table 1. The equation can be written

$$RSM = 0.075 \times RMM \times S^{1/2} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (5)$$

Equation 5 gives good results in most climates where irrigation is required. It frequently overestimates radiation in areas where fog or smog are prevalent. In some cases, this overestimation can be in the order of 10 to 15 percent. It appears to somewhat overestimate radiation in the high rainfall jungle areas of Brazil.

Data for percentage of possible sunshine or numbers of sunshine hours per month are available for only a limited number of locations. Percentage of possible sunshine, S, was plotted as a function of mean monthly relative humidity, HM, resulting in the equation

$$S = 11.5 \times (100 - HM)^{1/2} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (6)$$

The equation for potential evapotranspiration in mm per month can be written

$$ETP = 0.0075 \times RSM \times TF \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (7)$$

This equation has been evaluated by comparison with lysimeter evapotranspiration data at many locations and by comparison with the Penman and other equations. Addition of corrections for humidity, wind or other measured weather elements does not significantly improve the accuracy of computation. Equation 7 appears to be more universally applicable and accurate than other equations.

Since radiation data are not generally available in Brazil it is necessary to estimate radiation from Equations 5 and 6. There is significant scatter in the relationship used in Equation 6. However, since Equation 5 uses the square root of percentage of possible sunshine, errors in estimating radiation introduced by errors in estimating sunshine are about half the magnitude of those in estimating S.

PREVIOUS STUDIES

Hargreaves (2) proposed a procedure for estimating ETP based on a best fit relationship of grass lysimeter data from various parts of the world. The equation can be written

$$ETP = MF \times TF \times CH \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (8)$$

in which MF is a monthly factor based on latitude and CH is a coefficient for mean monthly relative humidity. Equation 8 was used by Hargreaves (3) to calculate potential evapotranspiration at 156 locations in Northeast Brazil. Hargreaves (4) then used the calculated values to estimate values at each of 723 locations in Northeast Brazil for which monthly precipitation data are available for a significant period of years.

Potential evapotranspiration was compared with the 75 percent probability of precipitation occurrance (that amount equaled or exceeded during three years out of four based upon the available record).

The data presented in "Normais Climatologicas" (9) were used with Equation 8 to prepare a tabular presentation for 155 locations in Brazil by computer print out. The tables presented by Hargreaves (5) show monthly and annual values of mean temperature, mean relative humidity, precipitation, potential evapotranspiration and mean precipitation deficits.

ESTIMATING CROP EVAPOTRANSPIRATION

The rate of evapotranspiration for a specific crop varies significantly with crop variety, frequency of irrigation, plant density, rate of growth and management factors. Crop factors, K, presented herein are typical for good management on experiment stations. Crop evapotranspiration, ETC, can be estimated from the equation

$$ETC = K \times ETP \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (9)$$

A publication by the ASCE Irrigation Requirements Committee (1) gives crop coefficients for a variety of crops. The most complete summary is for eight crops. The coefficients given are based upon potential evapotranspiration as defined by alfalfa. The Committee (1) defines potential evapotranspiration from grass as 80 to 87 percent of potential evapotranspiration from alfalfa. For this reason the values were multiplied by 1.20 in order to produce crop coefficients applicable to ETP as

defined by Equation 7. Crop coefficients presented by the ASCE Committee (1) times 1.20 are given in Table 2. Table 3 reproduced from Hargreaves (2), summarizes generalized crop coefficients, K, based upon experimental data available from several states and countries.

A summary of crop coefficients to be used with Class A pan evaporation from well standardized irrigated area conditions is given by Middleton, Pruitt, Crandell and Jensen (8). The coefficients are for full crop cover conditions. Modifications have been made in order to use ETP as a base in place of pan evaporation. The modified crop coefficients for use with ETP from Equation 7 are presented as Table 4.

ESTIMATION OF DEPENDABLE PRECIPITATION

The 75 percent probability of precipitation occurrence was selected as an index for comparing moisture available from rainfall in one area with that in another. The precipitation equaled or exceeded three years out of four is used in computing a moisture availability index, MAI.

For most agricultural crops a severe deficiency in any given month with a probability of occurrence one year in four would not be seriously limiting on agricultural development. For a drought sensitive crop such as bananas, however, this probability would be most undesirable. For such crops either high values of MAI or a different rainfall probability should be used. MAI is proposed principally as a means of comparing moisture available in one area or at one location with that for another.

Areas with higher average precipitation usually have a greater dependability of precipitation. Regression analyses were made between

mean monthly rainfall, PM and the 75 percent probability of precipitation occurrence, PD. Equations and R^2 values for various locations in Brazil are given as follows:

Station	Lat.	Long.	Equation	R^2
Boa Vista	2-49 N	60-40 W	PD = -42 + 0.87 x PM	0.98
Uapes	0-08 S	67-05 W	PD = -6 + 0.77 x PM	0.90
Belem	1-28 S	48-29 W	PD = -23 + 0.87 x PM	0.99
Turiacu	1-41 S	45-22 W	PD = -14 + 0.75 x PM	0.98
Santarem	2-25 S	54-43 W	PD = -49 + 1.11 x PM	0.90
Manaus	3-08 S	60-01 W	PD = -15 + 0.81 x PM	0.98
Benjamin Constant	4-22 S	70-02 W	PD = -9 + 0.79 x PM	0.98
Coari	4-05 S	63-08 W	PD = -27 + 0.89 x PM	0.99
Barra do Corda	5-30 S	45-16 W	PD = -11 + 0.74 x PM	0.99
Quixeramobim	5-12 S	39-18 W	PD = -8 + 0.62 x PM	0.94
Natal	5-55 S	35-15 W	PD = -14 + 0.67 x PM	0.94
Cruzeiro do Sul	7-38 S	72-40 W	PD = -21 + 0.87 x PM	0.98
Alto Tapajos	7-21 S	57-31 W	PD = -9 + 0.86 x PM	0.96
Porto Velho	8-46 S	63-55 W	PD = -20 + 0.86 x PM	0.98
Concecao do Araguaia	8-16 S	49-17 W	PD = -27 + 0.86 x PM	0.97
Olinda (Recife)	8-09 S	34-55 W	PD = -15 + 0.67 x PM	0.96
Remanso	9-41 S	42-04 W	PD = -16 + 0.59 x PM	0.71
Puerto Nacional	10-42 S	48-25 W	PD = -18 + 0.76 x PM	0.97
Aracaju	10-55 S	37-03 W	PD = -16 + 0.72 x PM	0.94
Salvador	12-54 S	38-20 W	PD = -7 + 0.68 x PM	0.84
Caetite	14-04 S	42-28 W	PD = -9 + 0.55 x PM	0.88
Cuiaba	15-36 S	56-06 W	PD = -18 + 0.80 x PM	0.99
Santa Cruz (Meruri)	15-43 S	52-45 W	PD = -29 + 0.84 x PM	0.96
Formosa	15-32 S	47-20 W	PD = -21 + 0.75 x PM	0.95
Caravelas	17-38 S	39-15 W	PD = -12 + 0.66 x PM	0.81
Corumba	19-00 S	57-39 W	PD = -21 + 0.77 x PM	0.96
Belo Horizonte	19-51 S	43-57 W	PD = -13 + 0.67 x PM	0.98
Rio de Janeiro	22-54 S	43-10 W	PD = -1 + 0.58 x PM	0.88
Sao Paulo	23-37 S	46-39 W	PD = -2 + 0.60 x PM	0.92
Curitiba	25-31 S	49-10 W	PD = -49 + 1.07 x PM	0.97
Alegrete	29-47 S	55-47 W	PD = 6 + 0.53 x PM	0.59
Porto Alegre	30-00 S	51-11 W	PD = -18 + 0.71 x PM	0.68
Santa Victoria do Palmar	33-31 S	53-22 W	PD = 1 + 0.52 x PM	0.42

Using the precipitation probability analysis by Hargreaves (6) the data from the 723 stations in Northeast Brazil were used to obtain average regression relationships by states. Regression equations are given as follows:

State	Regression Equation	R^2
Piaui	PD = - 42 + 0.74 x PM	0.90
Ceara - North	PD = - 36 + 0.70 x PM	0.89
Ceara - South	PD = - 31 + 0.66 x PM	0.80
R. G. Do Norte	PD = - 25 + 0.56 x PM	0.65
Paraiba	PD = - 15 + 0.52 x PM	0.67
Pernambuco	PD = - 21 + 0.61 x PM	0.81
Alagoas	PD = - 18 + 0.67 x PM	0.87
Sergipe	PD = - 17 + 0.64 x PM	0.86
Bahia	PD = - 6 + 0.42 x PM	0.62
Minas Gerais	PD = - 26 + 0.62 x PM	0.69

Ceara was divided into two portions along the line of 5° 00 South latitude.

For areas where the equation predicts a high percentage of the variance (high values of R^2) it is assumed that the climate is fairly uniform. Low values of R^2 are to be anticipated for states or areas having more than one type of climate or one portion significantly more rainy than another.

The above regression equations demonstrate that mean precipitation is not a uniform or reliable index of dependability. For any given area rainfall probabilities of occurrence can be calculated or if one probability is used, the 75 percent, or values of dependable precipitation, PD, an equation can be selected from those given above. Care should be taken to determine that the climate is similar to that for which the equation was derived.

CLIMATE, ETP, AND PRECIPITATION DEFICITS FOR BRAZIL

Mean monthly values of temperature, relative humidity, sunshine hours (for some locations) and precipitation are given in Normais Climatologicas (9). Data from 155 locations were used to estimate potential evapotranspiration, ETP, using Equation 7. The percentage of possible sunshine, S, and incident solar radiation in Langleys per day were also calculated for each of the stations.

Table 5 presents climatic data, potential evapotranspiration and precipitation deficits for Brazil. The headings and description of the values printed out are as follows:

Heading	Description
MEAN TEMP	Mean temperature in degrees Centigrade
MEAN RH	Mean relative humidity in percent
PCT SUN	Percent of possible sunshine (Eq. 6 or from sunshine hours where available)
MEAN RS	Incident solar radiation in Langleys per day (Eq. 5 converted to Langleys)
PRECIP	Mean precipitation in mm for the period of record, PM
POT ET	Potential evapotranspiration, ETP (Eq. 7)
PREC DEF	Precipitation deficit (ETP - PM)

For arid climates in Northeast Brazil the mean rainfall may be no more than a 25 percent probability of occurrence, mean monthly rainfall being equaled or exceeded during about one year in four. Precipitation deficits shown in Table 5 are mean deficits and need to be modified taking into consideration the dependability of precipitation. This can be accomplished by use of the regression equations shown above.

A comparison was made of the values of ETP in Table 5 with those previously calculated by Hargreaves (5) using Equation 8. ETP in Table 5 (Equation 7 and procedure given above) averages 1.14 times ETP previously calculated using Equation 8. The difference is greatest in the high rainfall areas.

The computer program for producing Table 5 is given as Appendix II - Computer Program Used.

CONCLUSION

The methods and equations presented for summarizing climate and calculating irrigation requirements have been widely tested, provide a good level of accuracy and are applicable to a wide range of climatic and conditions. They require an absolute minimum of data availability.

Theoretical discussion, derivation and other details relative to irrigation application are largely omitted. Those wishing such detail are referred to a publication by Hargreaves (7), "Water Requirements Manual for Irrigated Crops and Rainfed Agriculture."

The climatic data and calculation of moisture relationships for 155 locations in Brazil provide a fairly reliable index of conditions in most parts of Brazil. There exists, however, large areas in the central west of Brazil where data are not available. An example of this is the Araguaia-Tocantins River basin which is reported to have outstanding resources for water resource and agricultural development. In various potential areas having good resources for expanded agricultural development additional density of data coverage is highly desirable. A minimum of data suggested for collection consists of temperature, relative humidity, sunshine hours and precipitation.

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TABLE 1 EXTRATERRESTRIAL RADIATION, RMM, IN EQUIVALENT MM OF EVAPORATION PER MONTH

NORTH LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
					MONTH							
5	441.	419.	482.	467.	468.	442.	462.	477.	469.	472.	434.	434.
4	447.	422.	483.	465.	464.	438.	458.	475.	469.	475.	439.	439.
3	452.	426.	484.	464.	461.	433.	453.	472.	469.	478.	444.	445.
2	457.	429.	485.	462.	457.	429.	449.	469.	469.	481.	448.	451.
1	462.	432.	486.	460.	453.	424.	444.	467.	469.	483.	453.	456.
0	467.	435.	487.	458.	449.	419.	440.	464.	468.	485.	457.	462.
SOUTH LAT												
1	472.	438.	488.	456.	444.	414.	435.	460.	468.	488.	461.	467.
2	477.	440.	488.	454.	440.	409.	430.	457.	467.	490.	465.	472.
3	481.	443.	488.	451.	436.	404.	425.	454.	466.	492.	469.	477.
4	486.	445.	488.	449.	431.	399.	420.	450.	465.	493.	473.	482.
5	490.	448.	488.	446.	427.	393.	415.	447.	464.	495.	477.	487.
6	494.	450.	488.	443.	422.	388.	410.	443.	463.	496.	480.	492.
7	499.	452.	488.	441.	417.	383.	404.	439.	461.	498.	484.	497.
8	503.	454.	487.	438.	412.	377.	399.	435.	460.	499.	487.	501.
9	506.	455.	487.	434.	407.	371.	393.	431.	458.	500.	490.	505.
10	510.	457.	486.	431.	401.	365.	388.	426.	456.	501.	493.	510.
11	514.	459.	485.	428.	396.	360.	382.	422.	454.	501.	496.	514.
12	517.	460.	484.	424.	391.	354.	376.	418.	452.	502.	499.	518.
13	520.	461.	483.	420.	385.	347.	370.	413.	450.	502.	502.	522.
14	523.	462.	481.	417.	380.	341.	364.	408.	447.	503.	504.	525.
15	526.	463.	480.	413.	374.	335.	359.	403.	445.	503.	507.	529.
16	529.	464.	478.	409.	368.	329.	352.	398.	442.	503.	509.	532.
17	532.	465.	476.	405.	362.	322.	345.	393.	439.	502.	511.	536.
18	535.	466.	474.	400.	356.	316.	339.	388.	436.	502.	513.	539.
19	537.	466.	472.	396.	350.	310.	332.	383.	433.	502.	515.	542.
20	539.	466.	470.	391.	344.	303.	326.	377.	430.	501.	517.	545.
21	542.	467.	468.	387.	337.	296.	319.	372.	427.	500.	518.	547.
22	544.	467.	465.	382.	331.	290.	312.	366.	423.	499.	520.	550.
23	546.	467.	462.	377.	325.	283.	306.	360.	420.	498.	521.	553.
24	547.	466.	460.	372.	318.	276.	299.	355.	416.	497.	522.	555.
25	549.	466.	457.	367.	311.	269.	292.	349.	412.	496.	523.	557.
26	551.	466.	454.	362.	305.	262.	285.	343.	408.	494.	524.	559.
27	552.	465.	450.	357.	298.	255.	278.	337.	404.	492.	525.	561.
28	553.	464.	447.	351.	291.	248.	271.	330.	400.	491.	525.	563.
29	554.	463.	443.	346.	284.	241.	264.	324.	395.	489.	526.	565.
30	555.	462.	440.	340.	277.	234.	257.	318.	391.	487.	526.	566.
31	556.	461.	436.	334.	270.	227.	249.	311.	386.	484.	526.	568.
32	557.	460.	432.	329.	263.	220.	242.	305.	382.	482.	526.	569.
33	557.	459.	428.	323.	256.	213.	235.	298.	377.	480.	526.	570.
34	558.	457.	424.	317.	249.	205.	227.	291.	372.	477.	526.	571.
35	558.	456.	420.	311.	242.	198.	220.	285.	367.	474.	526.	572.

Table 2. Crop Coefficients, K, at Various Growth Stages

Crop	Planting to Effective Cover in Percent									
	10	20	30	40	50	60	70	80	90	100
Small Grains	0.19	0.22	0.30	0.44	0.61	0.80	0.98	1.13	1.23	1.25
Beans	0.24	0.28	0.36	0.47	0.61	0.76	0.91	1.05	1.18	1.28
Peas	0.24	0.29	0.37	0.48	0.61	0.76	0.90	1.04	1.16	1.26
Potatoes	0.12	0.16	0.24	0.36	0.49	0.64	0.78	0.91	1.02	1.09
Sugar beets	0.12	0.16	0.24	0.36	0.49	0.64	0.78	0.91	1.02	1.09
Corn	0.24	0.28	0.35	0.46	0.59	0.73	0.86	0.98	1.09	1.15
Alfalfa	0.43	0.56	0.70	0.82	0.94	1.08	1.20	1.20	1.20	1.20
Pasture	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
	Days After Effective Cover									
	10	20	30	40	50	60	70	80	90	100
Small Grains	1.25	1.13	0.89	0.59	0.23	0.12	0.12	0.12	0.12	0.12
Beans	1.22	1.15	1.02	0.88	0.71	0.54	0.37	0.23	0.12	0.12
Peas	1.18	1.22	1.19	0.91	0.24	0.12	0.12	0.12	0.12	0.12
Potatoes	1.08	1.02	0.90	0.72	0.46	0.12	0.12	0.12	0.12	0.12
Sugar beets	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08
Corn	1.18	1.18	1.12	0.98	0.82	0.65	0.48	0.34	0.24	0.20
Alfalfa	0.90	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
Pasture	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05

Table 3. Generalized Crop Coefficients, K, for Estimating ETC.

Crop	* Average K for Full Crop Cover	** Average Seasonal K
Field and oil crops including beans, castor beans, corn, cotton, flax, peanuts, potatoes, safflower, soybeans, sorghum, sugar beets, tomatoes and wheat	1.15	.90
Fruits, nuts and grapes		
Citrus fruits (oranges, lemons and grapefruits)	.75	.75
Deciduous fruits (peaches, plums and walnuts	.90	.70
Deciduous fruits with cover crop	1.25	1.00
Grapes	.75	.60
Hay, forage and cover crops		
Alfalfa	1.35	1.00
Short grass	1.00	1.00
Clover pasture	1.15	
Green manure	1.10	.95
Sugar cane	1.25	1.00
Summer vegetables	1.15	.85

* Recommended for designing system capacity

** To be used in estimating seasonal requirements and for economic analysis. Provides satisfactory results for irrigation scheduling for most soils with good capacity to store readily available moisture.

Table 4. Crop Coefficients, K, to be used with ETP

Crop	K	Crop	K
Apples, Delicious	1.31	Potatoes, White Rose (early)	1.21
Alfalfa, Ranger (arid)	1.19	Potatoes, Neted Gem (late)	1.16
Beans, Red Mexican	1.11	Sorghum, NK 140	1.09
Soybeans	1.13	Sorghum d.d. yellow Sooner	0.96
Sugar Beets	1.11	Wheat, Marfed (spring)	1.15
Clover, Ladino	1.15	Wheat, Omar (winter)	1.13
Corn (field)	0.96	Grapes, Concord (no cover)	0.86
Pear, Dark Perfection	1.25	Alfalfa, DuPuits (humid)	1.16
Peaches, Elberta (no cover)	1.00	Raspberries, Payallup	1.24
Peaches, Elberta (alfalfa cover)	1.25	Strawberries, Northwest	0.48

TABLE 5 CLIMATIC, POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFICITS FOR BRAZIL

82.704 CRUZEIRO DO SUL ACRE LAT 7 38 LON 72 40 170 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.4	24.6	24.4	24.2	24.1	23.4	22.9	23.8	24.5	24.6	24.7	24.6	24.2
MEAN R.H.	89.	90.	90.	90.	89.	89.	86.	84.	85.	88.	89.	89.	88.
PCT SUN	38.	37.	36.	36.	38.	39.	43.	45.	44.	40.	39.	38.	39.
MEAN RS	437.	430.	412.	383.	359.	345.	370.	416.	446.	445.	443.	434.	410.
PRECIP.	246.	244.	269.	240.	138.	104.	47.	85.	147.	251.	216.	241.	2229.
POT ET	133.	118.	125.	112.	108.	99.	108.	124.	131.	137.	131.	132.	1458.
PREC DEF	-114.	-126.	-144.	-129.	-30.	-5.	61.	39.	-16.	-115.	-85.	-109.	-771.

82.113 BARCELOS AMAZONAS LAT 0 59 LON 62 55 40 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.1	26.2	26.3	25.0	25.6	25.5	25.4	26.0	26.0	26.4	26.5	26.6	26.0
MEAN R.H.	86.	85.	84.	89.	88.	87.	86.	85.	84.	85.	84.	85.	86.
PCT SUN	43.	45.	45.	40.	39.	41.	43.	45.	45.	45.	45.	45.	43.
MEAN RS	438.	457.	465.	421.	394.	389.	402.	439.	461.	462.	459.	442.	435.
PRECIP.	172.	145.	174.	256.	272.	234.	169.	118.	105.	118.	111.	125.	2001.
POT ET	138.	131.	148.	125.	123.	117.	125.	138.	141.	147.	140.	141.	1619.
PREC DEF	-34.	-14.	-27.	-131.	-149.	-117.	-44.	20.	35.	29.	29.	17.	-386.

82.425 COARI AMAZONAS LAT 4 5 LON 63 8 49 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.2	25.2	25.4	25.2	25.3	25.3	25.4	26.0	26.0	25.9	25.9	25.6	25.5
MEAN R.H.	89.	89.	90.	90.	90.	89.	87.	85.	85.	87.	87.	88.	88.
PCT SUN	37.	38.	37.	37.	37.	39.	41.	44.	44.	42.	41.	39.	40.
MEAN RS	421.	428.	420.	397.	369.	362.	382.	421.	450.	453.	443.	429.	415.
PRECIP.	316.	274.	280.	288.	226.	134.	80.	75.	99.	158.	188.	222.	2348.
POT ET	130.	119.	131.	119.	115.	109.	119.	133.	137.	143.	135.	134.	1522.
PREC DEF	-186.	-155.	-150.	-169.	-111.	-26.	31.	57.	39.	-16.	-53.	-88.	-826.

82.212 FONTE BOA AMAZONAS LAT 2 32 LON 66 10 56 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.8	24.9	24.9	24.8	24.7	24.5	24.3	24.9	25.2	25.3	25.3	25.2	24.8
MEAN R.H.	89.	89.	89.	89.	90.	89.	89.	88.	87.	88.	88.	89.	89.
PCT SUN	38.	38.	38.	38.	37.	38.	38.	40.	41.	39.	39.	39.	38.
MEAN RS	416.	426.	427.	408.	375.	365.	373.	408.	436.	435.	427.	419.	410.
PRECIP.	298.	237.	278.	336.	314.	238.	175.	149.	150.	198.	186.	247.	2301.
POT ET	127.	118.	131.	121.	115.	107.	113.	125.	130.	135.	128.	129.	1480.
PREC DEF	-171.	-119.	-147.	-215.	-199.	-131.	-62.	-24.	-20.	-53.	-58.	-117.	-1321.

82.727 HUMAITA AMAZONAS LAT 7 31 LON 63 0 50 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.2	25.3	25.4	25.4	25.5	25.2	25.2	26.4	26.3	26.3	26.0	25.7	25.7
MEAN R.H.	88.	88.	88.	88.	85.	83.	78.	75.	78.	81.	83.	86.	84.
PCT SUN	40.	40.	40.	41.	44.	48.	54.	57.	54.	48.	48.	43.	46.
MEAN RS	448.	446.	437.	409.	389.	384.	418.	467.	493.	487.	420.	461.	444.
PRECIP.	341.	308.	348.	265.	134.	48.	25.	39.	103.	184.	222.	295.	2316.
POT ET	138.	125.	136.	123.	121.	115.	129.	149.	152.	155.	150.	144.	1636.
PREC DEF	-203.	-183.	-212.	-142.	-13.	67.	104.	110.	48.	-32.	-72.	-151.	-679.

82.067 IAUARETE AMAZONAS LAT 0 18 LON 68 54 122 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.2	25.2	25.3	25.1	24.9	24.4	24.1	24.5	25.1	25.3	25.5	25.3	25.0
MEAN R.H.	88.	88.	88.	89.	90.	90.	90.	88.	87.	88.	88.	88.	89.
PCT SUN	37.	33.	32.	30.	30.	31.	32.	39.	43.	46.	40.	38.	35.
MEAN RS	401.	392.	392.	363.	349.	339.	350.	409.	450.	434.	422.	405.	392.
PRECIP.	259.	246.	295.	363.	369.	356.	350.	278.	266.	237.	227.	237.	3505.
POT ET	124.	109.	122.	108.	107.	99.	105.	124.	134.	135.	127.	126.	1422.
PREC DEF	-135.	-137.	-174.	-255.	-282.	-257.	-245.	-154.	-132.	-102.	-100.	-112.	-2084.

TABLE 5 CLIMATE, POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFICITS FOR BRAZIL

82.331 MANAUS AMAZONAS LAT 3 8 LON 60 1 48 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.9	25.8	25.8	25.8	26.4	26.6	26.9	27.5	27.9	27.7	27.3	26.7	26.7
MEAN R.H.	88.	88.	88.	88.	86.	83.	80.	77.	77.	79.	82.	85.	84.
PCT SUN	32.	33.	30.	33.	46.	59.	67.	69.	62.	55.	49.	40.	48.
MEAN RS	384.	398.	377.	378.	417.	451.	491.	534.	538.	516.	479.	430.	450.
PRECIP.	276.	277.	301.	287.	193.	98.	61.	41.	62.	112.	165.	228.	2101.
POT ET	121.	113.	118.	115.	133.	140.	158.	175.	172.	169.	151.	138.	1701.
PREC DEF	-155.	-164.	-183.	-173.	-61.	41.	97.	134.	110.	58.	-14.	-90.	-399.

82.103 TARACUA AMAZONAS LAT 0 4 LON 68 14 105 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.2	25.3	25.3	25.2	24.9	24.5	24.1	24.7	25.3	25.4	25.4	25.2	25.0
MEAN R.H.	88.	88.	88.	89.	90.	90.	90.	88.	86.	87.	88.	88.	89.
PCT SUN	39.	39.	39.	37.	35.	36.	36.	39.	43.	41.	40.	39.	39.
MEAN RS	414.	426.	431.	409.	378.	367.	375.	411.	447.	442.	425.	410.	411.
PRECIP.	320.	268.	326.	422.	429.	350.	315.	250.	237.	215.	247.	275.	3652.
POT ET	128.	119.	134.	122.	116.	108.	113.	126.	134.	138.	128.	127.	1492.
PREC DEF	-192.	-149.	-192.	-300.	-313.	-242.	-202.	-124.	-103.	-77.	-119.	-148.	-2160.

82.106 UAUPES AMAZONAS LAT 0 8 LON 67 5 85 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.4	25.5	25.6	25.3	25.0	23.5	24.3	24.8	25.4	25.6	25.9	25.5	25.1
MEAN R.H.	89.	87.	87.	89.	90.	91.	90.	88.	86.	86.	87.	88.	88.
PCT SUN	44.	46.	44.	40.	41.	41.	44.	50.	55.	51.	50.	47.	46.
MEAN RS	438.	462.	457.	424.	406.	392.	412.	465.	508.	492.	473.	448.	448.
PRECIP.	275.	250.	285.	267.	317.	250.	246.	195.	148.	173.	202.	305.	2915.
POT ET	136.	130.	143.	127.	125.	113.	125.	142.	153.	154.	144.	140.	1631.
PREC DEF	-138.	-120.	-143.	-140.	-193.	-138.	-121.	-53.	5.	-19.	-58.	-166.	-1284.

82.741 ALTO TAPAJOS PARA LAT 7 20 LON 57 30 140 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.1	25.2	25.3	25.5	25.5	24.9	24.4	25.5	25.8	25.6	25.5	25.3	25.5
MEAN R.H.	92.	92.	92.	92.	89.	86.	83.	81.	87.	90.	91.	92.	89.
PCT SUN	26.	28.	28.	36.	52.	68.	73.	71.	48.	42.	34.	28.	45.
MEAN RS	361.	377.	368.	388.	424.	459.	488.	520.	468.	455.	416.	374.	425.
PRECIP.	408.	375.	435.	285.	129.	26.	11.	33.	138.	235.	315.	329.	2719.
POT ET	111.	105.	114.	117.	132.	136.	140.	162.	142.	142.	126.	116.	1552.
PREC DEF	-297.	-270.	-321.	-168.	4.	110.	137.	130.	5.	-93.	-189.	-213.	-1166.

82.191 BELEM PARA LAT 1 28 LON 48 27 24 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.6	25.5	25.4	25.7	26.0	26.0	25.9	26.0	26.0	26.2	26.5	26.3	25.9
MEAN R.H.	89.	91.	91.	90.	87.	84.	83.	83.	84.	83.	82.	85.	86.
PCT SUN	42.	33.	27.	37.	53.	67.	73.	72.	65.	66.	61.	57.	54.
MEAN RS	434.	397.	362.	403.	456.	493.	522.	552.	552.	563.	529.	501.	480.
PRECIP.	318.	407.	436.	382.	264.	165.	161.	116.	120.	105.	90.	197.	2762.
POT ET	136.	112.	112.	122.	144.	150.	164.	174.	169.	178.	163.	159.	1783.
PREC DEF	-182.	-295.	-324.	-260.	-121.	-14.	3.	58.	49.	74.	73.	-38.	-978.

82.243 SANTAREMITAPERINHA PARA LAT 2 25 LON 54 42 20 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.8	25.5	25.5	25.6	25.6	25.4	25.4	26.2	26.7	27.0	26.9	26.5	26.0
MEAN R.H.	85.	87.	88.	88.	89.	88.	86.	83.	80.	78.	79.	80.	84.
PCT SUN	38.	31.	29.	33.	40.	50.	58.	66.	62.	62.	54.	50.	48.
MEAN RS	417.	387.	371.	380.	391.	420.	462.	524.	537.	545.	500.	475.	451.
PRECIP.	179.	275.	358.	362.	293.	174.	112.	50.	39.	46.	85.	123.	2096.
POT ET	131.	109.	116.	115.	122.	127.	144.	166.	167.	176.	156.	152.	1678.
PREC DEF	-49.	-166.	-242.	-247.	-171.	-48.	32.	116.	128.	130.	71.	28.	-418.

TABLE 5 CLIMATE, POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFICITS FOR BRAZIL

82.571 BARRA DO CORDA MARANHAO LAT 5 30 LON 45 16 81 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.7	25.6	25.5	25.6	25.2	24.6	24.3	25.6	27.7	27.9	27.3	26.5	26.0
MEAN R.H.	83.	85.	87.	86.	84.	78.	72.	66.	64.	67.	72.	78.	77.
PCT SUN	47.	45.	46.	54.	65.	76.	82.	80.	67.	57.	53.	51.	60.
MEAN RS	478.	472.	469.	480.	482.	500.	528.	562.	555.	529.	509.	492.	505.
PRECIP.	186.	174.	228.	156.	53.	14.	5.	4.	16.	42.	75.	118.	1072.
POT ET	150.	133.	146.	145.	149.	147.	160.	176.	176.	174.	160.	157.	1873.
PREC DEF	-36.	-41.	-82.	-11.	96.	133.	155.	172.	160.	132.	84.	39.	802.

82.765 CAROLINA MARANHAO LAT 7 20 LON 47 28 183 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.6	25.6	25.8	26.1	26.4	26.1	26.3	27.7	28.3	27.1	26.4	26.1	26.5
MEAN R.H.	84.	84.	84.	82.	74.	64.	55.	49.	61.	73.	80.	82.	73.
PCT SUN	47.	46.	45.	49.	58.	69.	77.	82.	72.	60.	52.	49.	59.
MEAN RS	483.	478.	465.	449.	449.	463.	500.	561.	572.	545.	510.	492.	497.
PRECIP.	243.	226.	294.	166.	47.	8.	10.	5.	40.	119.	190.	217.	1564.
POT ET	151.	135.	146.	137.	143.	142.	159.	184.	184.	177.	157.	155.	1870.
PREC DEF	-92.	-91.	-148.	-29.	96.	134.	149.	180.	144.	58.	-33.	-62.	306.

82.476 CAXIAS MARANHAO LAT 4 52 LON 43 21 77 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.8	26.2	26.1	26.2	26.3	25.9	25.7	26.7	28.1	28.7	28.4	27.6	26.9
MEAN R.H.	77.	82.	84.	84.	81.	75.	69.	63.	60.	60.	65.	71.	73.
PCT SUN	50.	46.	44.	52.	67.	75.	80.	84.	77.	71.	64.	56.	64.
MEAN RS	490.	476.	459.	469.	494.	498.	526.	581.	594.	589.	556.	515.	521.
PRECIP.	169.	243.	288.	203.	72.	19.	8.	3.	13.	29.	66.	95.	1288.
POT ET	157.	136.	145.	144.	157.	152.	165.	186.	190.	197.	179.	169.	1977.
PREC DEF	-11.	-107.	-143.	-133.	85.	133.	157.	183.	177.	168.	113.	73.	690.

82.568 GRAJAU MARANHAO LAT 5 48 LON 46 27 154 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.4	25.3	25.5	25.6	25.4	25.0	24.9	25.8	27.2	27.0	26.5	25.9	25.8
MEAN R.H.	85.	87.	87.	86.	83.	78.	72.	67.	68.	73.	77.	82.	79.
PCT SUN	39.	37.	38.	48.	61.	72.	75.	72.	60.	50.	45.	42.	53.
MEAN RS	436.	426.	427.	451.	468.	484.	502.	531.	526.	494.	471.	448.	472.
PRECIP.	170.	212.	281.	168.	68.	15.	8.	4.	28.	70.	142.	153.	1320.
POT ET	136.	119.	133.	136.	146.	144.	154.	167.	165.	159.	145.	141.	1746.
PREC DEF	-34.	-93.	-147.	-32.	77.	129.	147.	163.	137.	89.	4.	-12.	426.

82.564 IMPERATRIZ MARANHAO LAT 5 32 LON 47 30 39 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.2	25.1	25.2	25.4	25.4	24.8	24.5	25.3	26.3	26.4	26.1	25.6	25.4
MEAN R.H.	85.	86.	86.	85.	82.	77.	73.	67.	70.	73.	78.	82.	79.
PCT SUN	45.	43.	42.	44.	49.	55.	60.	66.	63.	59.	53.	49.	52.
MEAN RS	466.	460.	450.	433.	420.	422.	451.	510.	539.	540.	512.	483.	474.
PRECIP.	241.	256.	309.	219.	89.	19.	10.	6.	40.	92.	152.	198.	1630.
POT ET	144.	128.	139.	130.	131.	125.	137.	158.	166.	172.	157.	151.	1738.
PREC DEF	-97.	-128.	-170.	-89.	42.	106.	128.	152.	126.	80.	5.	-47.	108.

82.279 SAO BENTO MARANHAO LAT 2 41 LON 44 43 11 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.4	26.1	26.1	26.2	26.4	26.3	26.1	26.4	26.6	26.9	27.0	26.9	26.4
MEAN R.H.	81.	85.	86.	87.	86.	83.	82.	79.	76.	74.	74.	76.	81.
PCT SUN	50.	44.	42.	41.	44.	47.	49.	53.	56.	59.	59.	56.	50.
MEAN RS	482.	461.	449.	426.	409.	406.	424.	469.	512.	532.	525.	505.	467.
PRECIP.	172.	260.	327.	353.	293.	138.	85.	21.	8.	6.	31.	79.	1773.
POT ET	153.	131.	142.	131.	130.	125.	134.	149.	158.	171.	164.	163.	1751.
PREC DEF	-19.	-128.	-185.	-223.	-163.	-13.	49.	128.	150.	165.	133.	84.	-22.

TABLE 5 CLIMATIC POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFICITS FOR BRAZIL

82.280 SAO LUIZ MARANHAO LAT 2 32 LON 44 17 32 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.8	26.4	26.3	26.3	26.3	26.4	26.2	26.6	27.0	27.2	27.3	27.2	26.7
MEAN R.H.	82.	85.	86.	87.	87.	84.	32.	79.	76.	75.	76.	78.	81.
PCT SUN	56.	41.	41.	45.	55.	70.	78.	83.	83.	76.	71.	69.	64.
MEAN RS	508.	445.	445.	444.	461.	496.	536.	586.	622.	604.	577.	558.	523.
PRECIP.	156.	269.	415.	416.	318.	155.	111.	36.	7.	4.	20.	46.	1953.
POT ET	163.	128.	141.	136.	146.	153.	170.	187.	194.	196.	182.	181.	1977.
PREC DEF	7.	-141.	-274.	-280.	-171.	-2.	59.	151.	187.	132.	162.	135.	24.

82.198 TURIACU MARANHAO LAT 1 43 LON 45 24 18 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	27.0	26.3	26.1	26.1	26.3	26.2	26.1	26.6	27.0	27.3	27.5	27.5	26.7
MEAN R.H.	80.	84.	86.	87.	86.	84.	83.	79.	76.	75.	75.	76.	81.
PCT SUN	53.	40.	34.	35.	44.	57.	64.	72.	72.	71.	67.	64.	56.
MEAN RS	488.	436.	404.	391.	413.	452.	490.	551.	581.	581.	557.	532.	490.
PRECIP.	140.	260.	446.	425.	320.	221.	181.	69.	17.	10.	20.	59.	2178.
POT ET	157.	125.	128.	119.	131.	139.	155.	176.	181.	189.	176.	174.	1851.
PREC DEF	17.	-135.	-318.	-306.	-197.	-83.	-27.	107.	164.	179.	156.	114.	-327.

82.578 TEREZINA PIAUI LAT 5 5 LON 42 49 79 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	27.2	26.5	26.2	26.3	26.6	26.4	26.5	27.6	29.1	29.5	29.2	28.2	27.4
MEAN R.H.	77.	83.	85.	82.	81.	74.	65.	57.	55.	57.	61.	68.	71.
PCT SUN	51.	49.	45.	53.	69.	79.	84.	88.	81.	75.	68.	58.	67.
MEAN RS	498.	489.	462.	477.	501.	512.	539.	592.	612.	605.	576.	523.	532.
PRECIP.	175.	235.	311.	254.	91.	15.	8.	6.	9.	25.	60.	105.	1237.
POT ET	162.	141.	146.	146.	160.	158.	172.	194.	201.	207.	189.	174.	2049.
PREC DEF	-13.	-95.	-165.	-107.	70.	143.	164.	188.	191.	179.	129.	68.	752.

82.397 FORTALEZA CEARA LAT 3 46 LON 38 33 26 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	27.2	27.2	26.8	26.8	26.7	26.1	26.0	26.0	26.4	26.8	26.9	27.2	26.7
MEAN R.H.	77.	80.	82.	82.	80.	78.	75.	73.	74.	73.	74.	75.	77.
PCT SUN	63.	55.	45.	47.	61.	66.	73.	78.	77.	78.	75.	70.	66.
MEAN RS	545.	518.	461.	452.	476.	476.	508.	564.	598.	616.	599.	572.	532.
PRECIP.	82.	158.	299.	306.	192.	100.	31.	14.	17.	9.	17.	30.	1256.
POT ET	177.	152.	148.	140.	153.	145.	160.	178.	184.	198.	187.	186.	2008.
PREC DEF	95.	-6.	-151.	-166.	-40.	45.	129.	164.	167.	189.	169.	156.	752.

82.487 GUARAMIRANGA CEARA LAT 4 17 LON 39 0 872 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	21.3	21.2	20.9	20.8	20.4	19.7	19.6	19.9	20.4	20.8	21.1	21.3	20.6
MEAN R.H.	87.	91.	92.	93.	93.	92.	88.	85.	84.	84.	85.	86.	88.
PCT SUN	47.	38.	31.	34.	41.	47.	58.	65.	66.	62.	59.	55.	50.
MEAN RS	470.	429.	386.	384.	390.	400.	450.	513.	550.	552.	533.	506.	464.
PRECIP.	132.	209.	321.	332.	254.	152.	81.	38.	34.	33.	39.	55.	1691.
POT ET	132.	108.	107.	103.	107.	104.	120.	138.	146.	153.	144.	142.	1502.
PREC DEF	-0.	-101.	-214.	-229.	-147.	-49.	39.	100.	111.	110.	105.	87.	-189.

82.686 IGUATU CEARA LAT 6 22 LON 39 18 213 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	28.4	27.4	26.6	26.3	26.0	25.8	26.0	27.0	28.2	29.0	29.2	29.1	27.4
MEAN R.H.	61.	69.	76.	77.	73.	66.	59.	54.	50.	50.	52.	55.	62.
PCT SUN	57.	50.	48.	57.	66.	67.	73.	79.	77.	72.	67.	63.	65.
MEAN RS	532.	501.	480.	487.	484.	462.	494.	556.	593.	595.	575.	554.	526.
PRECIP.	79.	141.	207.	167.	67.	27.	12.	8.	7.	15.	18.	39.	784.
POT ET	177.	147.	153.	150.	153.	140.	156.	179.	190.	201.	189.	188.	2023.
PREC DEF	98.	6.	-50.	-18.	85.	113.	144.	171.	183.	186.	171.	148.	1240.

TABLE 1 CLIMATIC, EVAPORATIVE, SUN DURATION AND PRECIPITATION DATA FOR BRAZIL

82.406 QUIXADA CEARA LAT 4 58 LON 39 1 180 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	27.4	27.0	26.6	26.4	26.2	26.0	26.1	26.5	27.0	27.3	27.5	27.5	26.8
MEAN R.H.	63.	67.	69.	70.	71.	69.	66.	64.	62.	60.	61.	62.	65.
PCT SUN	70.	66.	64.	63.	62.	64.	67.	69.	71.	72.	71.	71.	68.
MEAN RS	579.	572.	552.	518.	477.	461.	481.	526.	572.	595.	589.	580.	542.
PRECIP.	52.	96.	172.	173.	96.	40.	18.	3.	1.	1.	7.	17.	677.
POT ET	189.	166.	176.	160.	151.	141.	152.	168.	179.	194.	186.	190.	2051.
PREC DEF	137.	70.	4.	-14.	55.	101.	134.	165.	178.	193.	179.	173.	1374.

82.586 QUIXERAMOBIM CEARA LAT 5 12 LON 39 18 205 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	29.0	28.4	27.6	27.1	26.7	26.5	26.9	27.7	28.3	28.6	28.7	29.1	27.9
MEAN R.H.	56.	63.	70.	73.	72.	65.	56.	51.	51.	51.	52.	53.	59.
PCT SUN	61.	58.	54.	58.	63.	66.	73.	81.	79.	78.	71.	67.	68.
MEAN RS	542	535.	508.	495.	470.	468.	501.	567.	602.	620.	590.	567.	539.
PRECIP.	45.	98.	171.	160.	101.	40.	20.	9.	4.	2.	6.	16.	660.
POT ET	183.	161.	166.	155.	153.	144.	161.	186.	194.	208.	191.	192.	2096.
PREC DEF	141.	73.	-5.	-5.	52.	105.	141.	177.	189.	205.	185.	176.	1435.

82.392 SOBRAL CEARA LAT 3 42 LON 40 21 63 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.7	27.9	26.7	26.9	26.9	27.3	27.6	28.1	28.7	29.0	29.1	28.9	28.0
MEAN R.H.	67.	75.	81.	82.	79.	72.	66.	62.	60.	60.	61.	63.	69.
PCT SUN	49.	46.	41.	45.	52.	57.	64.	71.	70.	67.	60.	54.	56.
MEAN RS	481.	473.	441.	439.	440.	442.	476.	539.	571.	569.	535.	500.	492.
PRECIP.	60.	135.	211.	188.	100.	28.	9.	1.	1.	2.	4.	19.	759.
POT ET	161.	141.	141.	137.	142.	139.	156.	178.	185.	193.	176.	168.	1917.
PREC DEF	102.	5.	-70.	-51.	41.	111.	147.	177.	184.	191.	171.	149.	1158.

82.597 MACAIBA RIO G DO NORTE LAT 5 49 LON 35 20 24 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.6	26.7	26.5	26.0	25.3	24.2	23.6	23.7	24.4	25.3	25.9	26.4	25.4
MEAN R.H.	73.	76.	78.	82.	83.	83.	82.	80.	77.	73.	73.	73.	78.
PCT SUN	59.	57.	54.	49.	47.	47.	48.	51.	55.	60.	60.	60.	54.
MEAN RS	538.	531.	507.	454.	411.	399.	403.	450.	503.	543.	543.	538.	484.
PRECIP.	41.	84.	141.	132.	184.	195.	129.	78.	30.	15.	14.	28.	1121.
POT ET	172.	154.	162.	139.	127.	114.	120.	134.	148.	169.	165.	171.	1773.
PREC DEF	131.	69.	21.	-43.	-57.	-81.	-10.	56.	118.	154.	151.	143.	653.

82.598 NATAL RIO G DO NORTE LAT 5 46 LON 35 12 18 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	27.2	27.3	27.3	26.7	26.0	24.9	24.4	24.5	25.5	26.3	26.7	27.0	26.1
MEAN R.H.	76.	76.	77.	80.	81.	82.	80.	78.	75.	74.	74.	74.	77.
PCT SUN	72.	68.	62.	57.	58.	56.	60.	67.	73.	79.	79.	77.	67.
MEAN RS	592.	582.	543.	492.	455.	425.	450.	514.	578.	624.	623.	611.	541.
PRECIP.	43.	86.	189.	255.	263.	224.	208.	124.	47.	15.	14.	20.	1547.
POT ET	192.	171.	177.	153.	144.	126.	136.	156.	174.	198.	193.	197.	2018.
PREC DEF	149.	85.	-12.	-102.	-119.	-157.	-71.	32.	127.	183.	180.	177.	471.

82.696 AREIA PARAIBA LAT 6 58 LON 35 41 624 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	22.8	23.0	22.8	22.3	21.5	20.2	19.6	19.6	20.5	21.6	22.2	22.6	21.6
MEAN R.H.	81.	82.	85.	88.	90.	91.	90.	88.	85.	82.	81.	81.	85.
PCT SUN	49.	48.	45.	40.	36.	34.	36.	39.	45.	50.	51.	50.	44.
MEAN RS	496.	491.	462.	410.	353.	324.	342.	388.	452.	496.	503.	497.	435.
PRECIP.	55.	94.	159.	157.	205.	237.	185.	142.	54.	25.	28.	38.	1379.
POT ET	144.	130.	135.	114.	99.	85.	91.	104.	120.	140.	140.	144.	1447.
PREC DEF	90.	36.	-24.	-43.	-106.	-152.	-94.	-38.	66.	115.	112.	107.	68.

TABLE 5 CLIMATIC POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFICITS FOR BRAZIL

82.795 CAMPINA GRANDE PARAIBA LAT 7 13 LON 35 53 527 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.3	24.4	24.4	23.8	22.6	21.4	20.6	20.7	21.9	22.9	23.7	24.0	22.9
MEAN R.H.	70.	72.	75.	79.	84.	85.	85.	81.	75.	71.	70.	70.	76.
PCT SUN	63.	61.	57.	53.	46.	44.	45.	50.	57.	62.	63.	62.	55.
MEAN RS	559.	553.	521.	468.	400.	369.	382.	439.	510.	555.	563.	557.	490.
PRECIP.	27.	43.	74.	94.	117.	118.	84.	58.	24.	13.	16.	19.	688.
POT ET	169.	152.	158.	135.	116.	100.	105.	121.	141.	162.	163.	167.	1689.
PREC DEF	142.	109.	84.	41.	-2.	-18.	21.	63.	116.	149.	147.	148.	1000.

82.697 GUARABIRA PARAIBA LAT 6 51 LON 35 29 101 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.9	27.0	27.0	26.3	25.4	24.2	23.6	23.5	24.6	25.6	26.3	26.7	25.6
MEAN R.H.	75.	76.	77.	79.	82.	84.	84.	83.	79.	75.	75.	75.	79.
PCT SUN	57.	57.	55.	52.	49.	46.	46.	48.	52.	57.	57.	58.	53.
MEAN RS	533.	533.	514.	466.	413.	391.	389.	430.	489.	531.	535.	533.	479.
PRECIP.	42.	63.	98.	123.	151.	203.	88.	56.	22.	12.	20.	46.	923.
POT ET	171.	155.	166.	143.	129.	111.	116.	128.	144.	166.	165.	171.	1764.
PREC DEF	130.	92.	68.	20.	-22.	-92.	28.	72.	122.	154.	145.	125.	841.

82.798 JOAO PESSOA PARAIBA LAT 7 6 LON 34 52 28 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.6	26.8	26.8	26.3	25.3	24.3	23.7	23.7	24.7	25.6	26.1	26.4	25.5
MEAN R.H.	76.	77.	79.	81.	84.	84.	84.	82.	79.	76.	76.	76.	80.
PCT SUN	70.	69.	62.	60.	57.	55.	58.	63.	66.	75.	76.	73.	65.
MEAN RS	589.	587.	542.	499.	447.	415.	433.	494.	548.	609.	616.	603.	532.
PRECIP.	62.	79.	173.	227.	301.	348.	190.	132.	61.	23.	31.	41.	1668.
POT ET	188.	170.	174.	153.	139.	121.	129.	147.	162.	190.	188.	192.	1955.
PREC DEF	127.	91.	1.	-73.	-163.	-227.	-61.	16.	101.	167.	158.	151.	287.

82.779 UMBUZEIRO PARAIBA LAT 7 42 LON 35 42 497 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	23.9	24.0	23.9	23.2	22.1	20.9	20.2	20.2	21.2	22.4	23.2	23.5	22.4
MEAN R.H.	74.	75.	77.	81.	86.	87.	86.	84.	80.	75.	73.	74.	79.
PCT SUN	59.	57.	55.	50.	43.	41.	42.	46.	51.	57.	59.	59.	52.
MEAN RS	545.	537.	512.	452.	382.	356.	368.	418.	481.	533.	548.	542.	473.
PRECIP.	25.	43.	77.	106.	137.	151.	119.	82.	32.	19.	17.	21.	830.
POT ET	163.	146.	154.	129.	109.	96.	100.	114.	130.	154.	156.	161.	1611.
PREC DEF	138.	103.	77.	22.	-28.	-55.	-19.	32.	98.	135.	139.	140.	781.

82.893 GARANHUNS PERNAMBUCO LAT 8 53 LON 36 31 927 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	21.9	21.9	21.9	21.2	19.8	18.8	17.8	17.9	19.2	20.6	21.5	22.0	20.4
MEAN R.H.	75.	76.	77.	81.	87.	90.	91.	89.	83.	78.	76.	75.	82.
PCT SUN	57.	56.	55.	50.	41.	37.	35.	38.	47.	54.	57.	58.	49.
MEAN RS	542.	534.	509.	450.	369.	331.	330.	378.	460.	517.	539.	543.	459.
PRECIP.	39.	55.	111.	134.	224.	231.	213.	155.	66.	30.	36.	39.	1333.
POT ET	154.	137.	145.	122.	99.	84.	84.	96.	118.	142.	147.	155.	1484.
PREC DEF	116.	82.	34.	-12.	-125.	-147.	-129.	-59.	52.	112.	111.	116.	151.

82.799 GOIANA PERNAMBUCO LAT 7 33 LON 34 59 11 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.0	26.0	25.9	25.4	24.8	23.8	23.3	23.3	24.3	25.2	25.7	25.9	25.0
MEAN R.H.	75.	75.	76.	77.	79.	82.	83.	83.	80.	78.	76.	75.	78.
PCT SUN	57.	57.	57.	55.	53.	49.	47.	47.	51.	54.	56.	57.	53.
MEAN RS	537.	538.	519.	476.	425.	399.	389.	426.	480.	520.	532.	533.	480.
PRECIP.	87.	151.	232.	326.	361.	398.	259.	175.	92.	51.	52.	76.	2251.
POT ET	169.	153.	163.	143.	130.	113.	115.	125.	140.	161.	161.	168.	1742.
PREC DEF	82.	2.	-68.	-182.	-231.	-275.	-144.	-50.	48.	109.	109.	91.	-509.

TABLE 1 CLIMATIC POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFICITS FOR BRAZIL

82.781 NAZARE DA MATA PERNAMBUCO LAT 7 44 LON 35 15 87 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.4	26.5	26.2	25.6	24.7	23.5	22.9	22.9	23.7	24.8	25.6	26.1	24.9
MEAN R.H.	74.	76.	79.	82.	85.	86.	85.	83.	80.	76.	74.	74.	80.
PCT SUN	67.	63.	60.	58.	52.	50.	53.	56.	65.	71.	71.	71.	61.
MEAN RS	582.	564.	535.	490.	424.	391.	411.	462.	541.	594.	597.	595.	515.
PRECIP.	38.	64.	109.	151.	197.	197.	128.	77.	39.	21.	27.	33.	1083.
POT ET	185.	162.	169.	148.	129.	112.	120.	135.	156.	182.	181.	188.	1868.
PREC DEF	148.	99.	60.	-3.	-67.	-85.	-8.	58.	117.	160.	153.	155.	786.

82.898 RECIFE (OLINDA) PERNAMBUCO LAT 8 1 LON 34 51 56 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	27.0	27.1	27.0	26.6	25.6	24.7	24.2	24.2	25.0	25.9	26.4	26.7	25.9
MEAN R.H.	76.	77.	79.	81.	82.	83.	82.	80.	78.	76.	76.	76.	79.
PCT SUN	73.	70.	63.	60.	56.	54.	55.	59.	68.	74.	77.	76.	65.
MEAN RS	608.	594.	548.	496.	435.	404.	419.	472.	554.	607.	625.	618.	532.
PRECIP.	40.	89.	197.	248.	335.	318.	224.	146.	62.	37.	25.	40.	1763.
POT ET	196.	174.	177.	153.	136.	119.	127.	142.	165.	191.	192.	198.	1971.
PREC DEF	155.	85.	-20.	-95.	-199.	-199.	-97.	-4.	103.	154.	168.	158.	208.

82.994 MACEIO ALAGOAS LAT 9 40 LON 35 42 46 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.5	26.7	26.6	26.1	25.3	24.3	23.7	23.7	24.5	25.3	25.9	26.3	25.4
MEAN R.H.	76.	77.	79.	81.	83.	82.	81.	78.	77.	76.	76.	76.	79.
PCT SUN	73.	71.	64.	61.	54.	54.	56.	59.	64.	71.	75.	75.	65.
MEAN RS	614.	602.	551.	494.	420.	396.	412.	464.	534.	596.	625.	623.	528.
PRECIP.	58.	63.	135.	225.	245.	264.	216.	134.	86.	59.	31.	38.	1654.
POT ET	196.	174.	176.	151.	130.	116.	123.	138.	157.	185.	190.	198.	1935.
PREC DEF	137.	111.	41.	-74.	-214.	-148.	-93.	4.	71.	126.	160.	160.	281.

83.096 ARACAJU SERGIPE LAT 10 55 LON 37 5 6 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.5	26.8	26.9	26.4	25.4	24.5	23.9	23.7	24.5	25.4	25.8	26.2	25.5
MEAN R.H.	77.	77.	78.	79.	81.	80.	80.	78.	77.	77.	78.	78.	78.
PCT SUN	65.	65.	50.	61.	53.	54.	51.	56.	60.	64.	66.	58.	60.
MEAN RS	585.	580.	531.	487.	409.	388.	385.	446.	513.	567.	588.	601.	507.
PRECIP.	43.	45.	107.	162.	263.	177.	161.	104.	54.	50.	49.	38.	1253.
POT ET	187.	168.	171.	150.	127.	114.	115.	133.	151.	176.	178.	190.	1862.
PREC DEF	144.	123.	64.	-12.	-135.	-63.	-46.	29.	97.	126.	129.	152.	609.

83.195 ITABAIANINHA SERGIPE LAT 11 17 LON 37 49 225 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.1	25.4	25.2	24.5	23.1	22.0	21.2	21.2	22.1	23.4	24.4	25.0	23.5
MEAN R.H.	77.	77.	79.	82.	86.	87.	88.	86.	83.	81.	79.	78.	82.
PCT SUN	55.	55.	53.	48.	43.	42.	41.	44.	48.	50.	53.	54.	49.
MEAN RS	542.	534.	500.	433.	368.	339.	343.	393.	458.	502.	529.	535.	456.
PRECIP.	41.	41.	91.	112.	160.	106.	131.	86.	55.	53.	72.	51.	1000.
POT ET	167.	150.	155.	127.	108.	94.	96.	110.	127.	149.	155.	164.	1601.
PREC DEF	126.	109.	64.	15.	-52.	-13.	-35.	24.	71.	95.	83.	114.	601.

83.097 PROPRIA SERGIPE LAT 10 12 LON 36 52 34 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	27.2	27.9	27.8	26.8	25.2	23.8	23.0	22.9	24.3	25.8	26.8	27.4	25.7
MEAN R.H.	70.	70.	71.	76.	82.	84.	84.	83.	78.	74.	71.	70.	76.
PCT SUN	63.	63.	62.	56.	49.	46.	45.	48.	53.	59.	62.	63.	56.
MEAN RS	573.	569.	540.	471.	396.	361.	368.	416.	486.	543.	570.	572.	489.
PRECIP.	30.	24.	47.	90.	158.	123.	111.	80.	40.	25.	36.	22.	787.
POT ET	184.	169.	178.	146.	122.	104.	108.	121.	142.	170.	177.	186.	1812.
PREC DEF	156.	145.	131.	56.	-36.	-19.	-4.	42.	102.	146.	141.	165.	1025.

TABLE 5 CLIMATE, POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFICITS FOR BRAZIL

83.179 BARRA BAHIA LAT 11 5 LON 43 10 408 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.7	26.8	26.6	26.4	25.5	24.5	24.1	25.0	27.2	28.6	27.5	26.9	26.3
MEAN R.H.	65.	67.	68.	66.	60.	55.	53.	48.	46.	48.	60.	68.	59.
PCT SUN	69.	73.	68.	79.	84.	89.	90.	91.	81.	75.	65.	62.	77.
MEAN RS	605.	612.	567.	555.	513.	496.	512.	570.	595.	615.	587.	572.	567.
PRECIP.	89.	93.	119.	62.	16.	0.	0.	0.	8.	32.	118.	147.	683.
POT ET	194.	178.	181.	171.	160.	146.	154.	175.	187.	206.	186.	182.	2119.
PREC DEF	105.	85.	63.	109.	144.	146.	154.	175.	179.	174.	68.	35.	1437.

83.339 CAETITE BAHIA LAT 14 4 LON 42 29 872 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	22.0	22.3	22.4	21.6	20.4	19.2	18.7	19.5	21.6	22.8	22.2	22.1	21.2
MEAN R.H.	77.	76.	77.	77.	75.	73.	71.	66.	62.	64.	74.	78.	73.
PCT SUN	53.	59.	56.	58.	63.	66.	67.	73.	68.	59.	43.	45.	59.
MEAN RS	538.	557.	508.	466.	426.	405.	421.	434.	540.	546.	485.	497.	490.
PRECIP.	134.	92.	127.	63.	19.	11.	12.	10.	13.	59.	185.	164.	888.
POT ET	154.	145.	146.	127.	117.	104.	110.	132.	147.	159.	135.	142.	1617.
PREC DEF	20.	52.	20.	64.	97.	93.	98.	122.	135.	100.	-50.	-22.	729.

83.498 CARAVELAS BAHIA LAT 17 44 LON 39 15 4 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.5	25.7	25.4	24.5	22.9	21.7	20.8	21.2	22.2	23.5	24.2	23.0	23.4
MEAN R.H.	81.	81.	83.	84.	84.	85.	84.	82.	81.	81.	83.	82.	83.
PCT SUN	50.	50.	48.	46.	46.	44.	46.	49.	50.	51.	48.	48.	48.
MEAN RS	534.	518.	463.	400.	342.	308.	325.	384.	453.	506.	519.	529.	440.
PRECIP.	125.	97.	183.	218.	141.	113.	119.	81.	98.	144.	239.	170.	1729.
POT ET	167.	146.	144.	118.	100.	34.	30.	107.	126.	150.	152.	155.	1539.
PREC DEF	42.	49.	-39.	-100.	-42.	-28.	-29.	27.	27.	6.	-87.	-15.	-190.

83.076 IBIPETUBA BAHIA LAT 11 1 LON 44 31 434 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.6	24.6	24.6	24.5	23.4	21.9	21.5	22.3	24.9	26.3	25.5	24.8	24.1
MEAN R.H.	78.	79.	80.	78.	74.	69.	65.	60.	58.	61.	72.	78.	71.
PCT SUN	54.	53.	51.	54.	59.	64.	68.	73.	75.	71.	61.	54.	61.
MEAN RS	534.	523.	491.	458.	429.	422.	447.	511.	573.	600.	566.	533.	507.
PRECIP.	125.	145.	136.	73.	11.	1.	1.	1.	7.	53.	158.	198.	909.
POT ET	163.	144.	150.	135.	127.	116.	126.	147.	170.	190.	171.	163.	1802.
PREC DEF	38.	-1.	14.	61.	115.	115.	124.	146.	163.	138.	13.	-35.	892.

83.348 ILHEUS BAHIA LAT 14 47 LON 39 3 44 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.9	26.1	25.9	25.2	23.8	22.7	22.0	22.4	23.4	24.4	24.9	25.5	24.3
MEAN R.H.	83.	83.	84.	86.	86.	87.	86.	84.	83.	83.	85.	84.	84.
PCT SUN	64.	64.	58.	57.	60.	57.	57.	62.	59.	58.	51.	57.	59.
MEAN RS	593.	582.	518.	459.	411.	372.	383.	449.	499.	543.	529.	563.	492.
PRECIP.	149.	162.	254.	270.	170.	105.	191.	130.	97.	124.	188.	152.	2083.
POT ET	187.	166.	163.	137.	123.	105.	109.	130.	143.	165.	157.	176.	1759.
PREC DEF	37.	4.	-91.	-133.	-47.	-91.	-82.	-0.	46.	48.	-31.	24.	-324.

83.186 JACOBINA BAHIA LAT 11 11 LON 40 31 470 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.3	25.7	25.3	24.3	22.7	21.6	20.8	21.2	23.0	24.6	25.1	25.1	23.7
MEAN R.H.	68.	67.	69.	72.	77.	77.	78.	74.	68.	64.	67.	67.	71.
PCT SUN	65.	66.	64.	60.	55.	55.	54.	59.	65.	69.	66.	66.	62.
MEAN RS	589.	584.	547.	482.	416.	390.	397.	457.	533.	587.	591.	590.	514.
PRECIP.	80.	74.	129.	97.	73.	61.	75.	54.	34.	38.	111.	104.	922.
POT ET	183.	165.	170.	141.	121.	107.	110.	128.	151.	179.	176.	182.	1812.
PREC DEF	103.	91.	41.	44.	47.	46.	35.	74.	117.	149.	65.	78.	889.

TABLE 5 CLIMATIC POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DATA FOR CITIES FOR BRAZIL

83.090 MONTE SANTO BAHIA LAT 10 27 S LON 39 18 495 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.4	25.5	25.1	24.1	22.4	21.1	20.2	20.5	22.3	24.0	24.9	25.3	23.4
MEAN R.H.	64.	64.	66.	71.	78.	78.	80.	76.	70.	69.	69.	69.	70.
PCT SUN	69.	69.	67.	62.	54.	54.	51.	57.	63.	69.	69.	69.	63.
MEAN RS	602.	597.	561.	493.	415.	389.	391.	453.	530.	590.	600.	600.	518.
PRECIP.	55.	43.	70.	72.	64.	48.	54.	35.	16.	16.	70.	71.	616.
POT ET	187.	168.	173.	144.	120.	105.	106.	124.	148.	177.	178.	186.	1816.
PREC DEF	132.	125.	103.	71.	55.	57.	52.	89.	131.	161.	108.	115.	1200.

83.229 ONDINA BAHIA LAT 13 0 S LON 38 31 45 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.2	26.6	26.6	26.0	24.9	24.1	23.3	23.3	23.9	24.8	25.2	25.7	25.0
MEAN R.H.	80.	79.	80.	82.	83.	82.	81.	80.	80.	81.	83.	82.	81.
PCT SUN	70.	69.	65.	59.	53.	58.	56.	63.	62.	65.	59.	61.	62.
MEAN RS	614.	602.	550.	473.	395.	389.	393.	462.	516.	572.	563.	578.	509.
PRECIP.	76.	85.	153.	291.	293.	137.	209.	97.	83.	51.	135.	104.	1805.
POT ET	195.	174.	176.	144.	121.	113.	116.	136.	150.	175.	168.	181.	1849.
PREC DEF	118.	89.	23.	-147.	-172.	-74.	-33.	39.	66.	24.	33.	77.	44.

83.238 PARATINGA BAHIA LAT 12 41 S LON 43 11 422 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.8	25.7	25.8	25.9	25.1	24.4	24.3	25.6	27.5	29.3	26.4	25.6	25.9
MEAN R.H.	72.	72.	73.	70.	63.	58.	57.	53.	52.	57.	68.	74.	64.
PCT SUN	61.	70.	58.	74.	79.	82.	80.	85.	70.	65.	54.	57.	70.
MEAN RS	572.	603.	522.	530.	488.	463.	469.	540.	553.	572.	538.	555.	534.
PRECIP.	107.	129.	115.	40.	11.	0.	1.	0.	8.	42.	149.	153.	756.
POT ET	180.	171.	164.	161.	150.	136.	142.	169.	175.	150.	166.	173.	1977.
PREC DEF	73.	42.	49.	121.	139.	136.	141.	168.	167.	148.	16.	21.	1221.

82.979 REMANSO BAHIA LAT 9 41 S LON 42 4 411 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	27.5	27.5	27.1	27.3	27.0	26.0	25.6	26.0	27.2	28.3	28.0	27.5	27.1
MEAN R.H.	50.	51.	51.	51.	50.	50.	50.	48.	46.	45.	47.	48.	49.
PCT SUN	81.	80.	80.	80.	81.	81.	81.	83.	84.	85.	84.	83.	82.
MEAN RS	648.	640.	616.	567.	515.	484.	497.	550.	613.	654.	660.	654.	592.
PRECIP.	92.	65.	108.	35.	10.	1.	1.	0.	4.	10.	78.	93.	497.
POT ET	212.	189.	199.	178.	166.	148.	155.	174.	192.	217.	211.	214.	2256.
PREC DEF	120.	124.	92.	144.	156.	147.	154.	174.	189.	207.	133.	120.	1759.

83.223 SAO FRANCISCO DO CONDE BAHIA LAT 12 37 S LON 38 40 80 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.7	26.0	25.8	25.0	23.8	22.0	22.2	22.3	23.2	24.2	24.9	25.5	24.3
MEAN R.H.	82.	82.	84.	87.	89.	88.	89.	87.	86.	84.	83.	82.	85.
PCT SUN	49.	49.	46.	42.	39.	39.	38.	41.	43.	46.	47.	48.	44.
MEAN RS	512.	504.	462.	400.	342.	319.	325.	375.	432.	478.	502.	511.	430.
PRECIP.	77.	74.	139.	228.	239.	153.	216.	113.	89.	84.	135.	92.	1714.
POT ET	160.	143.	145.	119.	102.	90.	93.	108.	123.	145.	149.	159.	1538.
PREC DEF	84.	69.	6.	-109.	-137.	-72.	-123.	-6.	34.	56.	14.	67.	-176.

83.248 SALVADOR BAHIA LAT 12 57 S LON 38 30 8 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.0	26.3	26.3	25.8	24.8	23.3	23.0	22.9	23.6	24.5	25.2	25.6	24.8
MEAN R.H.	79.	78.	80.	82.	82.	81.	80.	79.	80.	81.	80.	80.	80.
PCT SUN	66.	66.	59.	56.	51.	57.	53.	59.	58.	61.	57.	61.	59.
MEAN RS	596.	586.	525.	462.	389.	383.	382.	449.	501.	554.	554.	577.	496.
PRECIP.	74.	78.	163.	219.	298.	133.	206.	111.	85.	55.	141.	98.	1832.
POT ET	188.	158.	167.	140.	119.	111.	112.	131.	144.	158.	166.	180.	1794.
PREC DEF	114.	90.	3.	-149.	-179.	-83.	-94.	20.	59.	74.	25.	82.	-38.

TABLE 5. CLIMATIC POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFECITS FOR BRAZIL

83.442 ARACUAI MINAS GERAIS LAT 16 51 LON 41 59 264 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.6	26.1	25.7	24.3	22.6	21.1	20.9	22.2	24.3	25.9	25.1	25.1	24.1
MEAN R.H.	75.	71.	73.	73.	71.	70.	67.	63.	59.	59.	72.	77.	69.
PCT SUN	57.	62.	60.	59.	61.	63.	66.	70.	73.	74.	61.	56.	64.
MEAN RS	571.	572.	522.	457.	402.	376.	398.	467.	551.	611.	582.	564.	506.
PRECIP.	146.	83.	92.	55.	11.	6.	5.	3.	17.	63.	159.	189.	830.
POT ET	178.	163.	163.	134.	117.	101.	110.	134.	161.	192.	174.	174.	1802.
PREC DEF	32.	80.	71.	78.	106.	95.	105.	132.	144.	129.	15.	-15.	972.

83.689 BARBACENA MINAS GERAIS LAT 21 15 LON 43 46 1126 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	19.9	19.9	19.1	17.5	15.9	14.8	14.4	15.6	16.9	17.9	18.4	19.0	17.4
MEAN R.H.	81.	81.	83.	83.	82.	81.	78.	74.	75.	79.	81.	83.	80.
PCT SUN	42.	43.	45.	48.	58.	61.	60.	63.	44.	39.	39.	32.	48.
MEAN RS	500.	477.	445.	391.	361.	335.	349.	415.	411.	439.	471.	436.	419.
PRECIP.	237.	212.	186.	64.	31.	21.	13.	19.	58.	134.	185.	289.	1450.
POT ET	135.	116.	117.	95.	87.	75.	80.	99.	98.	112.	118.	115.	1248.
PREC DEF	-102.	-96.	-69.	31.	56.	54.	67.	80.	40.	-22.	-67.	-175.	-202.

83.587 BELO HORIZONTE MINAS GERAIS LAT 19 56 LON 43 56 915 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	22.8	22.9	22.3	21.1	19.1	18.0	17.7	19.0	20.8	21.5	21.7	21.6	20.7
MEAN R.H.	76.	74.	76.	74.	73.	72.	67.	61.	63.	69.	74.	80.	72.
PCT SUN	47.	49.	55.	63.	70.	77.	76.	75.	56.	47.	44.	35.	58.
MEAN RS	525.	512.	492.	455.	407.	339.	403.	463.	470.	487.	501.	455.	463.
PRECIP.	268.	194.	165.	77.	22.	10.	6.	9.	38.	113.	215.	354.	1473.
POT ET	153.	135.	141.	123.	107.	96.	102.	122.	126.	137.	137.	128.	1508.
PREC DEF	-115.	-59.	-24.	46.	85.	86.	96.	112.	88.	24.	-78.	-226.	35.

83.589 CONCEICAO DO MATO DENTRO MINAS GERAIS LAT 19 2 LON 43 26 675 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	22.9	22.8	22.3	20.6	18.4	16.8	16.4	17.3	19.6	21.0	21.8	22.2	20.2
MEAN R.H.	77.	78.	79.	81.	81.	80.	78.	72.	71.	73.	76.	79.	77.
PCT SUN	45.	45.	43.	42.	50.	52.	51.	59.	42.	32.	32.	31.	44.
MEAN RS	511.	491.	438.	376.	348.	326.	337.	416.	409.	402.	427.	424.	409.
PRECIP.	261.	211.	193.	104.	37.	15.	15.	8.	44.	141.	287.	435.	1752.
POT ET	149.	129.	126.	100.	90.	78.	82.	104.	106.	112.	117.	122.	1316.
PREC DEF	-112.	-82.	-67.	-4.	53.	63.	67.	96.	.	-30.	-169.	-313.	-436.

83.536 CURVELO MINAS GERAIS LAT 18 46 LON 44 26 609 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.1	24.1	23.7	22.2	20.1	18.5	18.3	19.8	22.0	23.4	23.5	23.3	21.9
MEAN R.H.	79.	78.	81.	78.	76.	74.	72.	67.	66.	73.	79.	82.	75.
PCT SUN	53.	53.	51.	54.	56.	59.	61.	66.	67.	59.	52.	49.	57.
MEAN RS	551.	534.	476.	427.	372.	349.	370.	442.	520.	547.	544.	536.	472.
PRECIP.	235.	164.	163.	68.	19.	7.	5.	6.	35.	97.	190.	317.	1306.
POT ET	166.	145.	142.	119.	101.	88.	95.	119.	144.	162.	156.	158.	1594.
PREC DEF	-70.	-19.	-21.	50.	82.	81.	91.	113.	109.	65.	-34.	-159.	288.

83.538 DIAMANTINA MINAS GERAIS LAT 18 15 LON 43 36 1261 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	20.3	20.5	20.0	18.7	17.0	15.9	15.3	16.6	18.1	19.1	19.3	19.4	18.3
MEAN R.H.	77.	77.	79.	80.	77.	75.	73.	67.	68.	73.	79.	83.	76.
PCT SUN	45.	50.	48.	49.	60.	64.	64.	69.	54.	43.	35.	30.	51.
MEAN RS	509.	518.	464.	410.	389.	367.	382.	455.	468.	466.	443.	417.	441.
PRECIP.	251.	170.	173.	107.	35.	12.	9.	12.	42.	112.	265.	363.	1552.
POT ET	139.	128.	126.	103.	97.	85.	90.	112.	116.	123.	114.	111.	1344.
PREC DEF	-112.	-41.	-48.	-4.	62.	73.	81.	100.	74.	11.	-151.	-253.	-209.

TABLE 5 CLIMATE, POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFICITS FOR BRAZIL

83.574 FRUTAL MINAS GERAIS LAT 20 2 LON 48 56 563 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.6	24.6	24.4	22.9	20.8	19.4	19.6	21.9	23.5	24.5	24.6	24.5	22.9
MEAN R.H.	80.	80.	79.	75.	72.	69.	62.	55.	59.	67.	73.	78.	71.
PCT SUN	51.	51.	52.	57.	61.	64.	71.	77.	74.	66.	59.	54.	61.
MEAN RS	545.	521.	480.	433.	380.	353.	387.	469.	540.	578.	582.	565.	486.
PRECIP.	268.	238.	199.	86.	43.	25.	11.	12.	56.	132.	203.	254.	1529.
POT ET	166.	144.	146.	122.	105.	91.	104.	133.	155.	176.	172.	172.	1684.
PREC DEF	-102.	-94.	-53.	36.	62.	66.	92.	121.	99.	44.	-31.	-83.	155.

83.439 GRAO MOGOL MINAS GERAIS LAT 16 30 LON 42 47 819 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	22.7	23.1	22.3	21.2	19.5	18.4	18.0	18.9	21.1	22.2	21.9	22.0	20.9
MEAN R.H.	76.	75.	78.	79.	78.	77.	74.	68.	67.	69.	78.	80.	75.
PCT SUN	57.	57.	53.	52.	53.	56.	58.	65.	66.	64.	54.	51.	57.
MEAN RS	565.	552.	494.	430.	377.	355.	376.	452.	523.	569.	548.	541.	482.
PRECIP.	161.	117.	151.	83.	22.	10.	9.	6.	30.	76.	225.	276.	1168.
POT ET	164.	146.	142.	116.	101.	89.	96.	119.	141.	163.	151.	155.	1583.
PREC DEF	3.	29.	-9.	33.	79.	79.	87.	112.	111.	89.	-75.	-122.	415.

83.590 ITABIRA MINAS GERAIS LAT 19 37 LON 43 13 826 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	22.2	22.3	21.6	20.0	18.0	16.4	15.7	17.0	18.7	20.3	21.1	21.2	19.5
MEAN R.H.	78.	79.	80.	81.	79.	78.	76.	72.	72.	75.	78.	82.	78.
PCT SUN	54.	53.	52.	51.	53.	54.	56.	61.	60.	57.	54.	48.	54.
MEAN RS	558.	533.	479.	409.	355.	329.	347.	419.	490.	536.	554.	535.	462.
PRECIP.	233.	192.	174.	36.	29.	16.	8.	11.	45.	104.	223.	358.	1495.
POT ET	160.	138.	135.	107.	91.	78.	83.	104.	124.	146.	149.	149.	1465.
PREC DEF	-73.	-54.	-39.	12.	62.	62.	75.	93.	73.	37.	-74.	-209.	-30.

83.735 ITAJUBA MINAS GERAIS LAT 21 26 LON 45 28 840 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	22.2	22.0	21.5	19.5	16.9	15.3	15.1	17.1	19.1	20.5	21.2	21.6	19.3
MEAN R.H.	79.	80.	79.	78.	78.	76.	72.	67.	67.	71.	74.	78.	75.
PCT SUN	53.	51.	53.	54.	54.	56.	61.	66.	66.	62.	58.	54.	57.
MEAN RS	558.	523.	480.	415.	349.	321.	349.	424.	504.	559.	579.	571.	469.
PRECIP.	237.	228.	164.	65.	41.	30.	22.	27.	67.	118.	164.	252.	1416.
POT ET	160.	135.	135.	107.	86.	73.	82.	106.	129.	153.	157.	161.	1484.
PREC DEF	-77.	-93.	-29.	42.	46.	43.	60.	78.	61.	35.	-8.	-91.	68.

83.386 JANUARIA MINAS GERAIS LAT 15 30 LON 44 21 439 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.1	25.3	25.2	24.6	23.3	22.2	22.0	23.4	25.5	26.4	25.2	24.7	24.4
MEAN R.H.	79.	77.	78.	75.	72.	69.	64.	57.	57.	63.	75.	81.	71.
PCT SUN	57.	62.	61.	67.	73.	76.	76.	79.	68.	56.	44.	43.	64.
MEAN RS	564.	573.	531.	493.	448.	422.	439.	504.	536.	533.	491.	495.	503.
PRECIP.	147.	105.	103.	52.	11.	1.	1.	1.	16.	57.	165.	217.	877.
POT ET	174.	161.	164.	145.	132.	117.	125.	149.	162.	170.	147.	151.	1797.
PREC DEF	27.	56.	61.	33.	121.	116.	125.	147.	146.	112.	-18.	-65.	921.

83.687 LAVRAS MINAS GERAIS LAT 21 14 LON 45 0 842 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	21.9	21.9	21.3	19.3	16.9	15.6	15.4	17.4	19.1	20.5	20.9	21.2	19.3
MEAN R.H.	82.	83.	82.	80.	80.	79.	74.	68.	70.	74.	77.	83.	78.
PCT SUN	41.	44.	50.	58.	61.	60.	65.	68.	51.	45.	42.	33.	52.
MEAN RS	491.	487.	468.	430.	371.	335.	363.	432.	445.	476.	489.	448.	436.
PRECIP.	260.	194.	176.	58.	35.	20.	9.	18.	58.	129.	164.	208.	1411.
POT ET	140.	125.	131.	110.	92.	77.	86.	109.	114.	131.	131.	125.	1370.
PREC DEF	-121.	-68.	-45.	52.	56.	57.	77.	90.	55.	1.	-33.	-163.	-41.

TABLE 5 CLIMATE, POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFECITS FOR BRAZIL

83.693 LEOPOLDINA MINAS GERAIS LAT 21 32 LON 42 38 268 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.4	25.7	24.8	22.9	20.8	19.6	19.1	20.2	21.6	22.7	23.6	24.3	22.6
MEAN R.H.	78.	78.	79.	80.	80.	81.	77.	74.	73.	76.	77.	80.	78.
PCT SUN	41.	46.	46.	47.	53.	56.	58.	57.	36.	30.	32.	30.	44.
MEAN RS	489.	498.	448.	384.	345.	319.	339.	393.	371.	390.	432.	426.	403.
PRECIP.	201.	174.	135.	68.	34.	25.	14.	17.	43.	123.	159.	272.	1266.
POT ET	152.	141.	137.	109.	95.	83.	89.	107.	101.	113.	124.	129.	1381.
PREC DEF	-49.	-33.	2.	41.	61.	57.	76.	90.	58.	-10.	-35.	-143.	115.

83.524 MONTE ALEGRE DE MINAS MINAS GERAIS LAT 18 52 LON 48 52 756 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	23.4	23.3	22.8	21.5	19.4	17.7	17.7	20.1	22.5	23.4	23.1	23.1	21.5
MEAN R.H.	81.	82.	81.	80.	77.	76.	71.	64.	63.	71.	79.	82.	76.
PCT SUN	50.	49.	50.	52.	55.	57.	62.	69.	70.	62.	53.	49.	56.
MEAN RS	539.	512.	473.	417.	368.	342.	370.	451.	531.	557.	547.	535.	470.
PRECIP.	237.	182.	185.	73.	36.	11.	10.	9.	44.	126.	167.	231.	1311.
POT ET	159.	136.	138.	114.	98.	84.	94.	122.	149.	165.	155.	157.	1571.
PREC DEF	-78.	-45.	-47.	41.	62.	73.	84.	114.	105.	38.	-12.	-74.	259.

83.694 MURIAE MINAS GERAIS LAT 21 8 LON 42 22 240 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.5	25.6	24.8	22.8	20.8	19.1	18.7	19.9	21.6	23.0	23.7	24.3	22.5
MEAN R.H.	79.	80.	81.	83.	83.	83.	81.	77.	77.	77.	79.	82.	80.
PCT SUN	52.	52.	50.	47.	47.	48.	50.	55.	56.	55.	53.	49.	51.
MEAN RS	553.	526.	467.	308.	327.	299.	318.	390.	464.	524.	551.	542.	446.
PRECIP.	230.	184.	135.	79.	37.	31.	19.	13.	54.	122.	191.	285.	1382.
POT ET	173.	149.	143.	109.	90.	76.	83.	105.	127.	153.	159.	164.	1532.
PREC DEF	-57.	-36.	8.	31.	53.	45.	64.	93.	72.	31.	-32.	-121.	149.

83.637 OLIVEIRA MINAS GERAIS LAT 20 41 LON 44 49 962 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	21.7	21.6	21.0	19.7	18.0	16.1	15.6	17.5	19.2	20.3	20.4	20.7	19.3
MEAN R.H.	78.	78.	79.	76.	72.	71.	67.	60.	64.	71.	75.	80.	73.
PCT SUN	54.	54.	53.	57.	61.	62.	66.	72.	69.	62.	57.	51.	60.
MEAN RS	564.	535.	482.	428.	370.	343.	370.	449.	518.	559.	574.	552.	479.
PRECIP.	270.	217.	189.	72.	23.	18.	13.	15.	60.	135.	212.	328.	1553.
POT ET	160.	136.	134.	111.	95.	90.	88.	113.	133.	152.	152.	152.	1508.
PREC DEF	-110.	-81.	-55.	39.	72.	62.	76.	98.	73.	18.	-60.	-175.	-45.

83.479 PARACATU MINAS GERAIS LAT 17 13 LON 46 52 698 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	23.6	23.4	23.3	22.4	20.1	18.7	18.8	20.8	23.2	24.2	23.4	22.9	22.1
MEAN R.H.	76.	76.	76.	74.	72.	72.	69.	65.	65.	68.	75.	81.	72.
PCT SUN	45.	46.	50.	60.	72.	75.	76.	69.	46.	41.	37.	30.	54.
MEAN RS	507.	493.	476.	455.	432.	406.	425.	462.	436.	458.	454.	418.	452.
PRECIP.	502.	439.	328.	171.	32.	26.	3.	4.	52.	196.	438.	658.	2851.
POT ET	151.	132.	140.	127.	117.	103.	111.	128.	124.	138.	130.	122.	1523.
PREC DEF	-351.	-308.	-188.	-44.	85.	77.	108.	124.	72.	-58.	-308.	-536.	-1328.

83.737 PASSA QUATRO MINAS GERAIS LAT 22 23 LON 44 58 920 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	21.3	21.2	20.5	18.3	15.7	14.0	13.4	15.0	17.4	19.0	19.8	20.3	18.0
MEAN R.H.	79.	79.	80.	78.	78.	78.	74.	71.	71.	74.	76.	79.	76.
PCT SUN	40.	40.	47.	56.	58.	62.	66.	64.	49.	44.	43.	34.	50.
MEAN RS	485.	461.	450.	417.	354.	329.	356.	413.	430.	468.	496.	454.	426.
PRECIP.	267.	226.	166.	58.	42.	27.	14.	21.	63.	110.	174.	268.	1437.
POT ET	116.	116.	123.	104.	84.	72.	79.	97.	105.	123.	129.	124.	1293.
PREC DEF	-131.	-109.	-43.	46.	42.	45.	65.	75.	42.	13.	-45.	-144.	-144.

TABLE 1 CLIMATIC, POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFICITS FOR BRAZIL

83.393 PEDRA AZUL MINAS GERAIS LAT 16 0 LON 41 17 583 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.3	24.6	24.1	22.9	20.8	19.4	18.7	19.8	21.6	23.3	23.2	23.6	22.2
MEAN R.H.	72.	71.	73.	76.	78.	78.	78.	76.	73.	71.	73.	74.	74.
PCT SUN	49.	51.	50.	43.	43.	46.	43.	53.	50.	41.	35.	36.	45.
MEAN RS	526.	522.	476.	393.	343.	325.	328.	411.	457.	458.	441.	455.	428.
PRECIP.	126.	101.	107.	31.	28.	20.	23.	11.	22.	34.	216.	242.	1071.
POT ET	159.	144.	143.	111.	95.	84.	86.	111.	125.	135.	125.	135.	1452.
PREC DEF	33.	43.	36.	20.	66.	64.	63.	100.	103.	51.	-91.	-107.	381.

83.483 PIRAPORA MINAS GERAIS LAT 17 21 LON 44 57 412 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.7	24.9	24.7	23.5	21.3	19.9	19.7	21.5	24.1	25.3	24.9	24.4	23.2
MEAN R.H.	78.	78.	78.	77.	74.	72.	69.	61.	58.	64.	74.	79.	72.
PCT SUN	49.	56.	57.	57.	78.	79.	80.	82.	62.	51.	47.	38.	62.
MEAN RS	527.	546.	508.	481.	449.	417.	434.	501.	504.	509.	513.	469.	488.
PRECIP.	220.	143.	127.	63.	11.	3.	3.	1.	19.	75.	202.	278.	1145.
POT ET	161.	151.	155.	138.	126.	109.	116.	141.	147.	158.	152.	142.	1697.
PREC DEF	-59.	8.	28.	75.	115.	106.	113.	140.	128.	83.	-49.	-135.	552.

83.585 PITANGUI MINAS GERAIS LAT 19 41 LON 44 46 704 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	23.3	23.3	22.8	21.0	18.9	17.7	17.7	19.4	21.4	22.9	27.9	22.7	21.2
MEAN R.H.	78.	79.	81.	81.	79.	76.	73.	68.	68.	73.	77.	81.	76.
PCT SUN	53.	52.	50.	50.	53.	56.	60.	65.	65.	59.	55.	50.	56.
MEAN RS	557.	528.	473.	406.	355.	334.	358.	432.	507.	547.	561.	542.	467.
PRECIP.	250.	193.	182.	75.	33.	10.	6.	8.	44.	36.	181.	310.	1389.
POT ET	164.	141.	138.	109.	93.	82.	91.	115.	138.	160.	159.	157.	1546.
PREC DEF	-86.	-52.	-44.	34.	60.	72.	85.	107.	94.	63.	-23.	-152.	157.

83.681 POCOS DE CALDAS MINAS GERAIS LAT 21 47 LON 46 34 1189 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	20.3	20.4	19.8	17.8	15.1	13.6	13.6	15.6	17.5	19.0	19.4	19.8	17.7
MEAN R.H.	83.	82.	82.	80.	79.	78.	76.	70.	71.	75.	79.	82.	78.
PCT SUN	35.	39.	49.	60.	63.	67.	66.	69.	54.	48.	44.	38.	53.
MEAN RS	457.	456.	461.	432.	373.	348.	361.	432.	453.	452.	501.	480.	437.
PRECIP.	317.	248.	218.	82.	54.	30.	26.	24.	69.	142.	201.	284.	1695.
POT ET	125.	113.	124.	106.	87.	75.	81.	103.	111.	129.	129.	129.	1312.
PREC DEF	-192.	-135.	-94.	24.	33.	46.	55.	78.	42.	-13.	-72.	-155.	-384.

83.690 SANTOS DUMONT MINAS GERAIS LAT 21 27 LON 43 33 908 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	21.3	21.3	20.7	18.7	16.8	15.7	15.2	16.2	17.5	18.7	19.3	20.0	18.4
MEAN R.H.	83.	83.	85.	85.	84.	83.	81.	77.	79.	81.	83.	85.	83.
PCT SUN	40.	41.	44.	44.	52.	55.	56.	59.	40.	33.	30.	27.	43.
MEAN RS	488.	470.	436.	375.	340.	317.	333.	402.	391.	405.	415.	404.	398.
PRECIP.	273.	244.	223.	92.	32.	24.	18.	16.	59.	142.	203.	335.	1660.
POT ET	137.	119.	120.	95.	84.	73.	78.	97.	95.	106.	106.	109.	1221.
PREC DEF	-136.	-125.	-103.	2.	52.	50.	61.	81.	37.	-36.	-97.	-226.	-439.

83.385 SAO FRANCISCO MINAS GERAIS LAT 15 57 LON 44 52 440 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.1	24.4	24.1	23.3	21.6	19.8	20.0	21.7	24.2	25.7	24.6	24.2	23.1
MEAN R.H.	81.	81.	82.	80.	76.	74.	69.	62.	60.	64.	76.	82.	74.
PCT SUN	49.	50.	49.	52.	56.	59.	64.	71.	73.	69.	56.	49.	58.
MEAN RS	527.	516.	471.	431.	389.	370.	398.	474.	552.	591.	556.	527.	484.
PRECIP.	208.	137.	159.	67.	14.	3.	2.	1.	27.	63.	195.	278.	1156.
POT ET	159.	141.	142.	123.	110.	96.	108.	134.	161.	185.	164.	159.	1682.
PREC DEF	-49.	5.	-17.	56.	96.	93.	106.	133.	134.	122.	-31.	-119.	526.

TABLE 5 CLIMATE, POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFICITS FOR BRAZIL

83.688 SAO JOAO DEL REI MINAS GERAIS LAT 21 8 LON 44 16 907 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	21.9	22.2	21.2	19.5	17.1	15.7	15.5	17.2	18.7	20.1	20.5	21.0	19.2
MEAN R.H.	77.	77.	79.	78.	77.	75.	72.	68.	69.	73.	76.	79.	75.
PCT SUN	41.	43.	46.	52.	57.	59.	64.	65.	45.	40.	38.	32.	49.
MEAN RS	492.	481.	450.	405.	358.	332.	359.	425.	419.	450.	464.	440.	423.
PRECIP.	236.	204.	190.	67.	31.	22.	12.	10.	50.	125.	191.	297.	1437.
POT ET	140.	125.	126.	105.	89.	77.	85.	106.	106.	122.	123.	122.	1326.
PREC DEF	-96.	-80.	-65.	37.	58.	55.	73.	96.	56.	-3.	-68.	-174.	-111.

83.541 SAO JOAO EVANGELISTA MINAS GERAIS LAT 18 25 LON 42 47 662 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	21.6	21.7	21.4	19.8	17.5	15.8	15.1	15.7	17.9	20.0	20.8	21.4	19.1
MEAN R.H.	84.	84.	86.	85.	85.	84.	83.	81.	80.	81.	84.	86.	84.
PCT SUN	45.	45.	44.	44.	45.	46.	47.	51.	52.	50.	45.	43.	46.
MEAN RS	511.	492.	443.	387.	335.	310.	326.	389.	458.	500.	506.	500.	430.
PRECIP.	205.	147.	160.	89.	32.	16.	17.	8.	42.	106.	223.	315.	1360.
POT ET	144.	126.	124.	101.	85.	72.	76.	93.	113.	135.	135.	140.	1345.
PREC DEF	-61.	-21.	-36.	12.	52.	56.	60.	85.	71.	29.	-88.	-175.	-16.

83.736 SAO LOURENCO MINAS GERAIS LAT 22 6 LON 45 1 873 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	21.9	21.7	21.0	18.8	15.6	13.9	13.4	15.2	17.7	19.6	20.5	21.1	18.4
MEAN R.H.	79.	80.	80.	79.	80.	79.	75.	70.	69.	72.	74.	78.	76.
PCT SUN	42.	43.	50.	55.	58.	56.	63.	64.	48.	43.	43.	39.	50.
MEAN RS	499.	482.	463.	414.	355.	317.	349.	415.	428.	400.	407.	489.	431.
PRECIP.	261.	244.	180.	66.	41.	25.	16.	20.	57.	134.	171.	279.	1501.
POT ET	142.	123.	129.	105.	84.	69.	78.	98.	105.	125.	132.	136.	1325.
PREC DEF	-119.	-121.	-57.	38.	44.	44.	62.	78.	48.	-9.	-39.	-143.	-175.

83.684 TRES CORACOES MINAS GERAIS LAT 21 42 LON 45 15 893 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	22.3	22.3	21.2	19.5	16.8	14.9	15.1	16.9	18.9	20.3	20.9	21.4	19.2
MEAN R.H.	79.	81.	80.	79.	79.	77.	75.	69.	71.	73.	76.	80.	77.
PCT SUN	52.	51.	51.	52.	52.	56.	58.	64.	62.	60.	56.	52.	55.
MEAN RS	557.	520.	470.	405.	340.	318.	338.	416.	489.	547.	568.	559.	460.
PRECIP.	259.	221.	182.	52.	36.	19.	13.	18.	68.	129.	181.	272.	1452.
POT ET	160.	135.	131.	104.	84.	72.	79.	103.	124.	145.	152.	157.	1451.
PREC DEF	-99.	-86.	-51.	52.	48.	52.	66.	85.	56.	21.	-29.	-115.	-0.

83.691 UBA MINAS GERAIS LAT 21 7 LON 42 57 349 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.8	24.9	24.1	22.1	19.7	18.2	17.7	18.9	20.7	22.4	23.2	23.8	21.7
MEAN R.H.	80.	80.	81.	81.	82.	82.	80.	76.	75.	77.	78.	82.	80.
PCT SUN	52.	51.	50.	50.	49.	49.	52.	56.	57.	56.	54.	49.	52.
MEAN RS	551.	524.	466.	398.	334.	302.	324.	394.	471.	520.	555.	542.	449.
PRECIP.	205.	166.	143.	57.	31.	20.	13.	14.	43.	119.	173.	288.	1273.
POT ET	169.	145.	140.	110.	89.	75.	82.	103.	126.	152.	158.	162.	1513.
PREC DEF	-36.	-21.	-2.	53.	58.	55.	69.	89.	82.	33.	-15.	-126.	240.

83.646 CACHOEIRO DE ITAPEMIRIM ESPIRITO SANTO LAT 20 51 LON 41 6 40 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.0	26.4	25.5	23.7	21.9	20.6	19.9	20.5	21.7	23.0	23.7	24.8	23.1
MEAN R.H.	77.	76.	80.	82.	82.	81.	80.	78.	78.	78.	81.	81.	80.
PCT SUN	55.	56.	52.	49.	49.	49.	51.	54.	54.	53.	50.	50.	52.
MEAN RS	566.	546.	475.	396.	334.	306.	323.	389.	461.	518.	538.	546.	450.
PRECIP.	115.	75.	104.	84.	49.	42.	29.	24.	45.	98.	126.	189.	970.
POT ET	178.	157.	148.	114.	95.	81.	87.	107.	126.	152.	155.	167.	1569.
PREC DEF	64.	82.	44.	31.	46.	39.	58.	83.	81.	54.	30.	-22.	599.

TABLE 3. CLIMATIC POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFECITS FOR BRAZIL

83.548 CONCEICAO DA BARRA ESPIRITO SANTO LAT 18 37 LON 39 40 4 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.9	26.1	25.8	24.6	23.1	22.0	21.3	21.6	22.6	23.6	24.3	25.1	23.8
MEAN R.H.	83.	83.	84.	84.	84.	85.	84.	82.	82.	84.	85.	85.	84.
PCT SUN	47.	47.	46.	46.	46.	44.	45.	48.	48.	47.	45.	45.	46.
MEAN RS	521.	500.	453.	393.	336.	302.	319.	378.	441.	485.	502.	513.	429.
PRECIP.	118.	97.	150.	133.	89.	78.	83.	58.	67.	133.	196.	205.	1408.
POT ET	164.	143.	142.	116.	99.	83.	89.	107.	124.	144.	147.	158.	1516.
PREC DEF	46.	46.	-8.	-17.	10.	5.	6.	49.	56.	11.	-49.	-46.	108.

83.648 VITORIA ESPIRITO SANTO LAT 20 19 LON 40 20 31 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.7	26.0	25.7	24.3	22.9	21.9	21.0	21.4	22.2	23.0	23.7	24.7	23.5
MEAN R.H.	80.	79.	80.	80.	80.	80.	79.	78.	78.	80.	81.	81.	80.
PCT SUN	58.	63.	58.	57.	62.	64.	60.	64.	50.	43.	38.	41.	55.
MEAN RS	583.	592.	505.	429.	382.	351.	354.	425.	441.	462.	467.	497.	457.
PRECIP.	115.	80.	134.	118.	84.	62.	55.	46.	78.	124.	178.	206.	1280.
POT ET	183.	166.	158.	126.	111.	97.	98.	119.	123.	135.	135.	152.	1603.
PREC DEF	67.	85.	24.	8.	28.	35.	43.	74.	44.	11.	-43.	-54.	322.

83.788 ANGRA DOS REIS RIO DE JANEIRO LAT 23 1 LON 44 19 2 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.5	25.7	25.2	23.3	21.5	20.2	19.7	20.1	20.6	21.6	22.5	23.9	22.5
MEAN R.H.	79.	80.	81.	82.	82.	82.	82.	81.	82.	83.	82.	81.	81.
PCT SUN	52.	52.	51.	49.	49.	49.	49.	50.	48.	47.	48.	50.	50.
MEAN RS	558.	527.	466.	386.	321.	290.	304.	302.	427.	485.	529.	552.	434.
PRECIP.	292.	277.	280.	137.	148.	105.	97.	116.	143.	208.	234.	287.	2385.
POT ET	174.	149.	144.	110.	90.	76.	81.	98.	114.	137.	148.	166.	1487.
PREC DEF	-118.	-128.	-136.	-87.	-58.	-29.	-15.	-18.	-29.	-71.	-86.	-121.	-898.

83.699 BARRA DO ITABAPOANA RIO DE JANEIRO LAT 21 18 LON 40 59 4 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.9	25.3	25.0	23.8	22.2	20.9	20.3	20.8	21.5	22.6	23.4	24.2	22.9
MEAN R.H.	83.	83.	83.	82.	82.	82.	80.	79.	80.	81.	82.	83.	82.
PCT SUN	47.	47.	48.	48.	49.	49.	51.	53.	51.	49.	49.	47.	49.
MEAN RS	524.	503.	458.	392.	331.	302.	321.	381.	444.	498.	530.	531.	434.
PRECIP.	93.	62.	86.	85.	60.	41.	29.	23.	56.	35.	132.	172.	924.
POT ET	161.	141.	141.	113.	95.	81.	88.	105.	121.	144.	152.	160.	1502.
PREC DEF	67.	79.	54.	28.	35.	39.	59.	83.	65.	60.	20.	-12.	578.

83.747 CABO FRIO RIO DE JANEIRO LAT 22 53 LON 42 2 2 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.0	25.3	25.1	23.8	22.4	21.3	20.7	20.8	21.1	22.0	23.0	24.1	22.9
MEAN R.H.	83.	84.	84.	83.	83.	83.	82.	82.	84.	84.	83.	84.	83.
PCT SUN	57.	59.	59.	60.	63.	68.	67.	65.	46.	44.	48.	46.	57.
MEAN RS	583.	562.	505.	427.	364.	341.	354.	411.	417.	466.	525.	528.	457.
PRECIP.	82.	73.	82.	88.	70.	41.	37.	36.	48.	64.	91.	104.	817.
POT ET	179.	158.	156.	124.	105.	92.	98.	114.	112.	133.	149.	159.	1578.
PREC DEF	97.	85.	74.	35.	35.	51.	61.	78.	65.	69.	58.	55.	761.

83.698 CAMPOS RIO DE JANEIRO LAT 21 45 LON 41 20 11 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.7	26.1	25.5	23.8	21.9	20.8	20.1	20.7	21.5	22.6	23.5	24.6	23.1
MEAN R.H.	80.	79.	80.	82.	82.	82.	81.	79.	79.	80.	81.	82.	81.
PCT SUN	55.	58.	54.	54.	59.	64.	61.	62.	41.	38.	37.	38.	52.
MEAN RS	571.	558.	484.	414.	362.	342.	348.	411.	396.	436.	464.	480.	439.
PRECIP.	134.	101.	109.	100.	56.	31.	31.	23.	54.	97.	151.	199.	1084.
POT ET	179.	159.	151.	120.	103.	91.	95.	113.	108.	126.	133.	146.	1525.
PREC DEF	45.	59.	42.	20.	47.	60.	64.	90.	54.	29.	-18.	-52.	440.

TABLE 5 CLIMATIC POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFECITS FOR BRAZIL

83.807 CARMO RIO DE JANEIRO LAT 21 55 LON 42 37 341 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.6	24.9	24.1	22.1	20.1	18.8	18.2	19.5	20.8	22.2	22.8	23.5	21.8
MEAN R.H.	77.	77.	77.	79.	78.	78.	76.	72.	73.	75.	77.	80.	76.
PCT SUN	55.	56.	55.	53.	53.	54.	56.	61.	60.	58.	55.	52.	56.
MEAN RS	571.	545.	487.	408.	343.	311.	332.	405.	400.	537.	565.	560.	462.
PRECIP.	207.	109.	144.	68.	36.	24.	17.	17.	51.	106.	157.	273.	1270.
POT ET	174.	151.	147.	113.	93.	79.	85.	108.	129.	154.	159.	166.	1558.
PREC DEF	-33.	-18.	2.	45.	57.	54.	69.	91.	78.	49.	2.	-106.	289.

83.695 ITAPERUNA RIO DE JANEIRO LAT 21 11 LON 41 53 127 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.8	26.0	25.1	23.2	20.9	19.8	19.4	20.5	21.8	23.2	23.9	24.7	22.9
MEAN R.H.	78.	78.	79.	81.	82.	82.	79.	74.	74.	75.	79.	81.	79.
PCT SUN	54.	54.	52.	50.	49.	49.	53.	59.	59.	57.	53.	51.	53.
MEAN RS	561.	538.	477.	399.	333.	301.	328.	403.	477.	539.	550.	551.	454.
PRECIP.	156.	123.	144.	75.	37.	23.	16.	15.	48.	101.	166.	247.	1153.
POT ET	176.	153.	147.	114.	92.	78.	87.	111.	131.	157.	159.	168.	1575.
PREC DEF	20.	30.	3.	39.	55.	55.	71.	95.	83.	56.	-6.	-79.	422.

83.749 MACAE RIO DE JANEIRO LAT 22 21 LON 41 48 3 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.2	25.2	24.8	23.3	21.7	20.4	20.0	20.3	20.9	22.1	22.9	24.1	22.6
MEAN R.H.	83.	84.	84.	83.	83.	83.	82.	82.	83.	84.	84.	84.	83.
PCT SUN	47.	46.	47.	47.	47.	48.	49.	49.	48.	47.	46.	46.	47.
MEAN RS	530.	498.	448.	302.	320.	290.	306.	361.	427.	482.	517.	530.	424.
PRECIP.	131.	105.	100.	100.	77.	41.	51.	49.	71.	104.	144.	189.	1164.
POT ET	164.	139.	137.	109.	91.	77.	83.	99.	115.	138.	146.	160.	1456.
PREC DEF	32.	34.	37.	9.	14.	36.	31.	49.	44.	34.	2.	-29.	293.

83.803 NITEROI RIO DE JANEIRO LAT 22 53 LON 43 5 14 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.4	26.5	25.7	23.6	21.5	20.2	19.6	20.5	21.4	22.6	23.6	25.0	23.0
MEAN R.H.	75.	76.	77.	79.	81.	81.	79.	76.	76.	77.	77.	77.	78.
PCT SUN	48.	50.	50.	46.	43.	42.	47.	52.	39.	38.	40.	39.	45.
MEAN RS	534.	518.	464.	376.	301.	270.	297.	370.	385.	432.	402.	408.	410.
PRECIP.	147.	137.	149.	124.	90.	56.	52.	50.	59.	89.	116.	139.	1208.
POT ET	170.	149.	145.	108.	85.	71.	80.	102.	105.	125.	139.	150.	1428.
PREC DEF	23.	13.	-4.	-16.	-5.	15.	27.	51.	45.	37.	23.	11.	221.

83.745 NOVA FRIBURGO RIO DE JANEIRO LAT 22 17 LON 42 32 849 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	21.3	21.2	20.4	18.3	15.9	14.3	13.8	14.9	16.7	18.2	19.2	20.2	17.9
MEAN R.H.	82.	83.	84.	84.	85.	85.	84.	81.	80.	81.	81.	83.	83.
PCT SUN	35.	38.	34.	41.	44.	44.	45.	47.	31.	30.	34.	29.	38.
MEAN RS	458.	451.	381.	358.	308.	279.	295.	355.	343.	387.	443.	421.	373.
PRECIP.	257.	211.	209.	89.	41.	28.	23.	23.	50.	93.	180.	329.	1534.
POT ET	128.	114.	104.	89.	74.	62.	66.	83.	82.	100.	113.	115.	1130.
PREC DEF	-129.	-98.	-105.	-0.	33.	34.	43.	59.	32.	6.	-67.	-214.	-405.

83.804 PETROPOLIS RIO DE JANEIRO LAT 22 31 LON 43 11 895 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	20.9	21.0	20.1	18.1	16.4	15.0	14.7	15.7	16.8	17.6	18.3	19.4	17.9
MEAN R.H.	83.	84.	85.	86.	85.	82.	81.	79.	80.	83.	86.	86.	83.
PCT SUN	46.	45.	46.	48.	57.	63.	64.	62.	43.	37.	35.	31.	48.
MEAN RS	521.	490.	447.	384.	351.	333.	349.	404.	402.	420.	448.	434.	416.
PRECIP.	299.	238.	256.	177.	107.	76.	66.	80.	102.	100.	193.	317.	2071.
POT ET	144.	123.	121.	95.	86.	77.	81.	97.	96.	100.	112.	115.	1255.
PREC DEF	-155.	-115.	-134.	-82.	-21.	0.	15.	17.	-6.	-52.	-81.	-201.	-815.

TABLE 5 CLIMATE, POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFICITS FOR BRAZIL

83.762 RIO DOURO RIO DE JANEIRO LAT 22 37 LON 43 28 127 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.7	24.9	24.1	22.1	20.3	19.3	18.7	19.4	20.2	21.3	22.1	23.4	21.7
MEAN R.H.	82.	82.	84.	85.	85.	83.	81.	80.	82.	83.	83.	83.	83.
PCT SUN	49.	49.	46.	44.	44.	47.	50.	52.	49.	47.	48.	47.	48.
MEAN RS	541.	510.	447.	367.	308.	285.	308.	369.	431.	486.	526.	538.	426.
PRECIP.	306.	263.	260.	161.	104.	74.	68.	83.	115.	175.	233.	308.	2151.
POT ET	165.	141.	135.	102.	84.	73.	80.	98.	113.	136.	146.	159.	1432.
PREC DEF	-141.	-122.	-126.	-59.	-20.	-1.	13.	15.	-2.	-39.	-87.	-149.	-718.

83.738 PEZENDE RIO DE JANEIRO LAT 22 29 LON 44 28 439 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.0	24.0	23.3	21.5	19.3	17.6	17.2	18.5	20.0	21.3	22.0	22.9	21.0
MEAN R.H.	78.	80.	80.	80.	79.	78.	75.	71.	72.	75.	76.	79.	77.
PCT SUN	43.	43.	47.	50.	53.	56.	59.	60.	44.	38.	38.	36.	47.
MEAN RS	505.	479.	450.	392.	337.	313.	337.	399.	409.	438.	472.	467.	416.
PRECIP.	272.	249.	212.	87.	37.	24.	16.	23.	52.	120.	166.	247.	1504.
POT ET	152.	130.	133.	107.	89.	76.	84.	103.	107.	123.	130.	136.	1371.
PREC DEF	-120.	-119.	-79.	20.	52.	53.	68.	81.	55.	3.	-36.	-110.	-134.

83.744 TERESOPOLIS RIO DE JANEIRO LAT 22 27 LON 42 56 874 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	21.2	21.2	20.3	18.0	15.7	14.3	13.7	14.7	16.4	17.9	18.7	20.0	17.7
MEAN R.H.	82.	83.	85.	86.	86.	85.	84.	82.	82.	83.	84.	84.	84.
PCT SUN	42.	44.	43.	48.	51.	56.	57.	57.	39.	36.	32.	32.	45.
MEAN RS	497.	484.	431.	384.	332.	313.	330.	387.	387.	429.	433.	438.	403.
PRECIP.	271.	216.	207.	98.	65.	42.	36.	44.	73.	116.	192.	310.	1672.
POT ET	139.	122.	118.	95.	79.	69.	74.	90.	91.	109.	109.	119.	1213.
PREC DEF	-133.	-93.	-90.	-3.	14.	27.	38.	46.	18.	-9.	-83.	-191.	-459.

83.742 VASSOURAS RIO DE JANEIRO LAT 22 24 LON 43 40 446 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	23.7	23.9	23.1	21.1	19.1	18.0	17.4	18.5	19.6	20.6	21.3	22.4	20.7
MEAN R.H.	80.	81.	83.	83.	82.	81.	78.	74.	77.	79.	80.	82.	80.
PCT SUN	47.	48.	52.	53.	58.	63.	66.	63.	44.	39.	39.	37.	51.
MEAN RS	528.	509.	474.	405.	355.	333.	356.	409.	409.	442.	475.	475.	431.
PRECIP.	222.	196.	159.	66.	43.	25.	17.	22.	48.	109.	128.	190.	1210.
POT ET	157.	138.	139.	109.	94.	82.	89.	106.	106.	122.	129.	137.	1408.
PREC DEF	-65.	-48.	-19.	43.	51.	58.	73.	84.	57.	17.	1.	-53.	198.

83.764 XEREM RIO DE JANEIRO LAT 22 35 LON 43 18 143 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.5	24.5	23.6	21.7	19.6	18.4	17.9	18.8	19.8	21.1	21.9	23.1	21.2
MEAN R.H.	85.	85.	86.	83.	80.	80.	80.	85.	86.	86.	86.	86.	87.
PCT SUN	45.	44.	41.	39.	38.	39.	42.	45.	43.	43.	43.	42.	42.
MEAN RS	518.	487.	418.	345.	286.	262.	284.	344.	403.	452.	501.	507.	402.
PRECIP.	349.	328.	321.	192.	120.	50.	74.	95.	125.	202.	282.	391.	2570.
POT ET	157.	134.	124.	95.	76.	66.	72.	90.	105.	129.	138.	149.	1335.
PREC DEF	-191.	-194.	-196.	-97.	-44.	-25.	-2.	-5.	-20.	-73.	-144.	-242.	-1234.

83.790 BANGU GUANABARA LAT 22 52 LON 43 27 40 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.5	26.6	25.7	23.7	21.7	20.5	19.8	20.7	21.5	22.7	23.6	25.1	23.2
MEAN R.H.	78.	77.	79.	80.	81.	79.	79.	77.	79.	79.	78.	79.	79.
PCT SUN	45.	51.	51.	51.	52.	57.	56.	54.	41.	37.	39.	38.	48.
MEAN RS	520.	522.	468.	396.	333.	312.	325.	377.	393.	430.	478.	480.	419.
PRECIP.	193.	164.	184.	120.	79.	44.	34.	42.	61.	90.	115.	154.	1281.
POT ET	166.	151.	146.	114.	94.	83.	87.	104.	107.	125.	138.	148.	1463.
PREC DEF	-28.	-13.	-38.	-6.	15.	39.	53.	61.	46.	35.	23.	-6.	182.

TABLE 5 CLIMATIC POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFICITS FOR BRAZIL

83.743 PRACA 15 DE NOVEMBRO GUANABARA LAT 22 54 LON 43 10 30 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.9	26.1	25.5	23.9	22.3	21.3	20.7	21.1	21.5	22.3	23.1	24.5	23.2
MEAN R.H.	78.	78.	79.	79.	79.	78.	77.	76.	78.	78.	79.	79.	78.
PCT SUN	52.	54.	56.	55.	57.	59.	60.	59.	43.	40.	43.	42.	52.
MEAN RS	559.	539.	489.	411.	347.	319.	337.	392.	403.	449.	501.	507.	438.
PRECIP.	136.	137.	133.	116.	73.	43.	42.	43.	53.	74.	97.	127.	1076.
POT ET	176.	154.	152.	119.	100.	86.	93.	109.	110.	129.	142.	154.	1525.
PREC DEF	39.	17.	19.	3.	27.	43.	50.	66.	56.	55.	45.	27.	449.

83.526 CATALAO GOIAS LAT 18 10 LON 47 58 857 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	22.3	22.6	22.3	21.4	19.8	18.8	18.7	20.9	22.7	23.0	22.6	22.1	21.4
MEAN R.H.	79.	79.	78.	75.	70.	64.	58.	49.	51.	64.	75.	81.	69.
PCT SUN	46.	49.	55.	68.	76.	82.	83.	82.	63.	53.	47.	39.	62.
MEAN RS	511.	508.	498.	482.	439.	416.	436.	495.	508.	519.	514.	479.	484.
PRECIP.	315.	234.	229.	82.	28.	9.	5.	4.	36.	142.	240.	341.	1665.
POT ET	147.	133.	143.	131.	118.	105.	114.	137.	143.	132.	144.	137.	1605.
PREC DEF	-168.	-101.	-86.	49.	90.	97.	109.	133.	106.	9.	-95.	-204.	-60.

83.379 FORMOSA GOIAS LAT 15 32 LON 47 18 912 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	22.0	22.1	21.9	21.5	20.1	19.0	18.9	20.7	22.8	22.9	21.9	21.6	21.3
MEAN R.H.	80.	81.	81.	77.	71.	66.	59.	50.	52.	66.	79.	84.	71.
PCT SUN	45.	45.	50.	64.	77.	84.	86.	85.	66.	52.	37.	34.	61.
MEAN RS	504.	490.	478.	479.	461.	445.	465.	523.	527.	515.	454.	436.	481.
PRECIP.	252.	204.	227.	93.	17.	3.	5.	3.	30.	127.	255.	342.	1558.
POT ET	144.	127.	136.	130.	125.	113.	122.	144.	149.	150.	125.	123.	1589.
PREC DEF	-108.	-77.	-90.	38.	108.	110.	117.	142.	119.	23.	-130.	-219.	31.

83.423 GOIANIA GOIAS LAT 16 41 LON 49 17 729 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	22.8	23.0	22.8	22.2	20.4	18.9	18.8	21.2	23.2	23.6	23.0	22.7	21.8
MEAN R.H.	81.	82.	82.	78.	72.	68.	62.	52.	54.	68.	78.	82.	71.
PCT SUN	44.	46.	50.	67.	77.	93.	84.	84.	59.	54.	46.	40.	61.
MEAN RS	501.	495.	478.	485.	451.	432.	450.	513.	495.	522.	508.	479.	484.
PRECIP.	234.	210.	198.	110.	30.	5.	10.	3.	36.	143.	237.	271.	1487.
POT ET	146.	131.	139.	135.	123.	110.	118.	143.	141.	155.	144.	139.	1624.
PREC DEF	-88.	-80.	-59.	24.	94.	104.	108.	140.	105.	13.	-93.	-132.	136.

83.427 LUZIANIA GOIAS LAT 16 15 LON 47 56 958 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	21.9	22.0	21.7	21.1	19.4	19.3	18.1	20.0	22.1	22.3	21.9	21.6	20.9
MEAN R.H.	81.	81.	82.	79.	75.	69.	63.	56.	58.	65.	79.	84.	73.
PCT SUN	51.	51.	49.	53.	57.	64.	69.	76.	75.	64.	52.	46.	59.
MEAN RS	533.	518.	471.	434.	391.	383.	413.	491.	557.	555.	535.	513.	469.
PRECIP.	228.	201.	229.	96.	16.	7.	4.	5.	27.	130.	215.	316.	1475.
POT ET	152.	134.	134.	117.	104.	96.	106.	133.	154.	164.	149.	145.	1586.
PREC DEF	-76.	-67.	-95.	21.	88.	89.	102.	128.	127.	34.	-67.	-172.	111.

83.376 PIRENOPOLIS GOIAS LAT 15 51 LON 48 58 740 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	22.6	22.5	22.5	22.2	20.7	19.4	19.4	21.6	23.4	23.4	22.6	22.3	21.9
MEAN R.H.	83.	84.	83.	81.	76.	72.	67.	61.	64.	74.	82.	86.	76.
PCT SUN	43.	43.	48.	63.	76.	83.	84.	82.	60.	48.	41.	31.	59.
MEAN RS	489.	479.	471.	476.	454.	439.	458.	511.	502.	457.	477.	418.	472.
PRECIP.	245.	250.	241.	135.	27.	5.	2.	5.	45.	164.	238.	337.	1696.
POT ET	142.	125.	136.	132.	125.	113.	122.	144.	143.	145.	134.	120.	1582.
PREC DEF	-103.	-125.	-105.	-3.	98.	108.	119.	139.	98.	-19.	-104.	-217.	-114.

TABLE 5 CLIMATE, POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEF CITS FOR BRAZ

83.064 PORTO NACIONAL GOIAS LAT 10 31 LON 48 43 237 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.3	25.3	25.4	26.0	25.8	24.8	24.8	26.4	27.9	27.0	25.9	25.5	25.8
MEAN R.H.	84.	85.	85.	81.	75.	67.	62.	53.	57.	73.	81.	84.	74.
PCT SUN	42.	40.	40.	57.	77.	85.	89.	87.	66.	52.	42.	38.	60.
MEAN RS	471.	452.	435.	474.	497.	489.	513.	559.	540.	510.	468.	447.	488.
PRECIP.	274.	229.	272.	150.	36.	1.	2.	3.	35.	142.	233.	284.	1663.
POT ET	146.	127.	135.	145.	156.	145.	157.	178.	172.	164.	142.	139.	1808.
PREC DEF	-128.	-103.	-137.	-5.	119.	144.	155.	175.	137.	23.	-91.	-144.	145.

83.235 TAGUATINGA GOIAS LAT 12 16 LON 45 54 660 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	23.8	23.7	23.8	24.3	23.9	23.2	22.9	24.4	26.1	25.7	24.2	23.5	24.1
MEAN R.H.	76.	78.	78.	72.	62.	54.	49.	43.	46.	59.	73.	78.	64.
PCT SUN	56.	53.	54.	61.	71.	78.	82.	87.	85.	73.	60.	54.	68.
MEAN RS	548.	527.	503.	484.	465.	455.	479.	549.	607.	609.	565.	537.	527.
PRECIP.	281.	244.	265.	132.	20.	0.	1.	2.	29.	113.	251.	330.	1669.
POT ET	164.	142.	150.	142.	139.	129.	140.	167.	186.	190.	165.	159.	1873.
PREC DEF	-118.	-102.	-115.	10.	120.	129.	138.	165.	156.	77.	-86.	-170.	205.

83.608 AQUIDAUANA MATO GROSSO LAT 20 28 LON 55 48 152 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.5	26.4	25.9	23.9	21.7	20.4	19.9	21.7	24.0	25.5	26.1	26.5	24.0
MEAN R.H.	79.	80.	79.	79.	79.	79.	75.	69.	68.	70.	72.	76.	76.
PCT SUN	52.	51.	52.	52.	53.	53.	57.	64.	65.	63.	60.	56.	57.
MEAN RS	554.	522.	480.	412.	350.	313.	346.	424.	505.	561.	587.	573.	470.
PRECIP.	234.	193.	150.	116.	98.	57.	44.	30.	71.	139.	137.	198.	1467.
POT ET	177.	150.	151.	119.	99.	84.	93.	120.	147.	175.	180.	185.	1681.
PREC DEF	-57.	-43.	1.	4.	2.	28.	50.	90.	75.	36.	42.	-14.	214.

83.405 CACERES MATO GROSSO LAT 16 3 LON 57 41 117 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.4	26.4	26.2	25.3	23.5	22.1	21.5	23.9	26.1	26.8	26.6	26.6	25.1
MEAN R.H.	84.	85.	85.	83.	82.	80.	75.	67.	65.	72.	78.	82.	78.
PCT SUN	41.	41.	45.	52.	58.	61.	67.	65.	48.	49.	45.	41.	51.
MEAN RS	430.	466.	452.	432.	396.	374.	408.	454.	450.	497.	502.	480.	449.
PRECIP.	215.	206.	171.	77.	48.	20.	11.	7.	36.	74.	157.	197.	1238.
POT ET	153.	134.	143.	130.	118.	104.	115.	136.	138.	160.	155.	153.	1637.
PREC DEF	-62.	-72.	-28.	52.	70.	84.	103.	129.	102.	66.	-2.	-43.	399.

83.611 CAMPO GRANDE MATO GROSSO LAT 20 27 LON 54 37 566 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.3	24.2	23.8	22.0	20.3	19.3	19.1	21.1	22.8	23.5	24.0	24.5	22.4
MEAN R.H.	80.	81.	80.	76.	76.	73.	68.	59.	62.	69.	72.	75.	73.
PCT SUN	52.	50.	52.	54.	56.	60.	65.	74.	71.	64.	61.	57.	60.
MEAN RS	551.	517.	477.	419.	362.	339.	369.	455.	520.	566.	589.	584.	480.
PRECIP.	229.	199.	140.	101.	80.	50.	36.	28.	62.	162.	164.	191.	1442.
POT ET	167.	141.	143.	116.	99.	87.	97.	127.	148.	168.	171.	177.	1641.
PREC DEF	-62.	-58.	3.	15.	18.	37.	62.	98.	87.	6.	7.	-13.	199.

83.552 CORUMBA MATO GROSSO LAT 19 0 LON 57 39 139 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	27.1	26.9	26.4	24.7	23.1	21.6	21.4	23.4	25.4	26.4	27.0	27.4	25.1
MEAN R.H.	79.	80.	80.	78.	77.	76.	70.	61.	63.	67.	71.	74.	73.
PCT SUN	53.	53.	57.	63.	63.	59.	67.	68.	59.	59.	59.	58.	60.
MEAN RS	551.	532.	506.	459.	392.	349.	385.	448.	486.	544.	579.	584.	485.
PRECIP.	170.	158.	119.	71.	62.	35.	29.	20.	52.	83.	118.	145.	1063.
POT ET	178.	155.	161.	136.	115.	95.	108.	132.	146.	173.	181.	191.	1771.
PREC DEF	9.	-4.	42.	64.	53.	60.	79.	112.	95.	90.	63.	45.	708.

TABLE 5 CLIMATE, POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFICITS FOR BRAZIL

83.361 CUIABA MATO GROSSO LAT 15 36 LON 56 6 172 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.5	26.5	26.2	25.5	24.3	23.2	22.8	25.0	27.0	27.2	26.8	26.6	25.6
MEAN R.H.	81.	82.	82.	81.	77.	73.	65.	56.	58.	69.	76.	79.	73.
PCT SUN	42.	43.	47.	57.	66.	71.	75.	70.	56.	51.	49.	43.	56.
MEAN RS	484.	477.	463.	455.	426.	408.	435.	473.	483.	508.	520.	492.	469.
PRECIP.	216.	198.	232.	115.	52.	14.	6.	12.	39.	130.	165.	194.	1375.
POT ET	154.	137.	147.	137.	129.	116.	127.	146.	151.	165.	161.	157.	1727.
PREC DEF	-62.	-60.	-85.	22.	77.	102.	120.	133.	111.	35.	-3.	-37.	352.

83.367 MERURI MATO GROSSO LAT 15 43 LON 51 44 416 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.2	24.3	24.3	23.6	21.8	20.0	19.6	21.7	24.3	25.2	24.7	24.3	23.2
MEAN R.H.	84.	85.	85.	82.	78.	75.	70.	61.	62.	72.	80.	84.	77.
PCT SUN	45.	45.	45.	49.	53.	57.	63.	71.	71.	60.	51.	46.	55.
MEAN RS	503.	486.	454.	418.	382.	366.	397.	478.	544.	552.	530.	509.	468.
PRECIP.	290.	253.	214.	95.	32.	9.	4.	5.	52.	130.	212.	273.	1570.
POT ET	152.	133.	137.	120.	109.	96.	106.	136.	159.	171.	157.	154.	1629.
PREC DEF	-138.	-120.	-76.	25.	76.	87.	102.	131.	107.	41.	-55.	-119.	59.

83.365 PRESIDENTE HURTINHO MATO GROSSO LAT 15 38 LON 53 55 552 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	23.2	23.3	23.4	22.8	20.8	18.8	18.4	20.6	22.9	23.8	23.4	23.3	22.1
MEAN R.H.	86.	87.	87.	84.	81.	77.	72.	65.	66.	76.	83.	86.	79.
PCT SUN	43.	42.	42.	45.	50.	55.	60.	68.	67.	56.	47.	44.	52.
MEAN RS	489.	471.	439.	404.	369.	358.	389.	466.	532.	534.	511.	496.	455.
PRECIP.	311.	271.	261.	126.	43.	9.	6.	7.	55.	161.	250.	276.	1777.
POT ET	144.	125.	130.	114.	102.	91.	101.	128.	150.	160.	146.	146.	1536.
PREC DEF	-167.	-146.	-131.	-13.	59.	82.	94.	121.	95.	-1.	-104.	-129.	-240.

83.618 TRES LAGOAS MATO GROSSO LAT 20 47 LON 51 42 313 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.8	25.8	25.3	23.1	20.2	18.9	18.5	21.1	23.2	24.6	25.3	25.8	23.1
MEAN R.H.	79.	80.	79.	78.	79.	79.	74.	66.	65.	69.	72.	75.	75.
PCT SUN	49.	54.	60.	67.	72.	72.	74.	73.	54.	56.	57.	52.	62.
MEAN RS	537.	536.	511.	465.	405.	370.	391.	452.	461.	531.	574.	560.	483.
PRECIP.	234.	202.	139.	92.	63.	41.	24.	19.	47.	108.	128.	205.	1303.
POT ET	168.	152.	159.	132.	110.	94.	102.	126.	131.	162.	172.	176.	1684.
PREC DEF	-66.	-50.	20.	40.	48.	53.	78.	107.	84.	53.	44.	-30.	381.

83.773 AVARE SAO PAULO LAT 23 6 LON 48 55 760 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	22.4	22.3	21.7	19.5	17.5	16.4	16.3	17.3	18.6	19.8	20.9	21.8	19.5
MEAN R.H.	80.	81.	81.	79.	79.	78.	74.	69.	72.	75.	76.	78.	77.
PCT SUN	51.	50.	50.	52.	53.	54.	58.	64.	60.	57.	57.	54.	55.
MEAN RS	553.	516.	462.	398.	334.	302.	330.	406.	476.	534.	574.	577.	455.
PRECIP.	204.	199.	113.	60.	70.	60.	54.	41.	70.	125.	130.	171.	1297.
POT ET	159.	134.	131.	103.	84.	71.	80.	102.	120.	144.	154.	164.	1446.
PREC DEF	-44.	-65.	18.	42.	14.	12.	27.	61.	50.	19.	24.	-7.	150.

83.711 BANDEIRANTES SAO PAULO LAT 22 36 LON 44 28 545 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	23.5	23.5	22.8	20.9	18.8	17.5	17.2	18.4	19.8	21.0	21.6	22.4	20.6
MEAN R.H.	78.	80.	80.	80.	79.	77.	74.	70.	72.	75.	77.	79.	77.
PCT SUN	53.	52.	51.	51.	52.	55.	58.	63.	61.	58.	55.	52.	55.
MEAN RS	563.	527.	469.	398.	335.	309.	333.	406.	482.	536.	564.	565.	457.
PRECIP.	263.	255.	202.	81.	40.	31.	20.	25.	57.	118.	155.	227.	1474.
POT ET	167.	141.	136.	107.	88.	75.	83.	105.	125.	149.	154.	163.	1494.
PREC DEF	-96.	-114.	-56.	26.	48.	44.	64.	80.	68.	31.	-0.	-64.	20.

TABLE 5 CLIMATE, POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFICITS FOR BRAZIL

83.630 FRANCA SAO PAULO LAT 20 33 LON 47 26 1035 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	21.6	21.4	21.2	20.0	18.5	17.3	17.3	19.2	20.5	21.0	21.1	21.0	20.0
MEAN R.H.	80.	81.	79.	75.	70.	67.	61.	54.	58.	68.	75.	81.	71.
PCT SUN	52.	51.	53.	58.	63.	66.	72.	78.	74.	65.	58.	51.	62.
MEAN RS	551.	520.	481.	433.	382.	356.	387.	468.	539.	573.	575.	550.	485.
PRECIP.	250.	220.	187.	81.	40.	22.	16.	11.	64.	131.	206.	270.	1499.
POT ET	156.	132.	134.	113.	99.	86.	97.	124.	143.	159.	155.	153.	1552.
PREC DEF	-95.	-88.	-52.	33.	59.	64.	81.	112.	79.	28.	-51.	-118.	53.

83.821 IGUAPE SAO PAULO LAT 24 43 LON 47 33 3 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.1	25.1	24.5	22.3	19.8	18.4	17.3	18.2	19.2	20.6	22.0	23.9	21.4
MEAN R.H.	83.	85.	85.	85.	85.	88.	88.	88.	87.	86.	83.	81.	85.
PCT SUN	41.	41.	44.	48.	44.	41.	40.	35.	29.	26.	34.	42.	39.
MEAN RS	500.	465.	429.	372.	294.	252.	264.	295.	326.	357.	445.	505.	376.
PRECIP.	231.	245.	191.	155.	121.	98.	89.	86.	123.	127.	111.	150.	1727.
POT ET	154.	130.	130.	104.	79.	63.	66.	76.	84.	98.	123.	153.	1259.
PREC DEF	-77.	-115.	-61.	-51.	-42.	-34.	-23.	-10.	-40.	-29.	12.	3.	-468.

83.782 SANTOS SAO PAULO LAT 23 56 LON 46 20 2 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.2	25.3	24.8	22.8	20.8	19.3	18.5	19.0	19.7	20.9	22.2	23.9	21.9
MEAN R.H.	84.	96.	85.	85.	86.	86.	87.	86.	86.	86.	84.	84.	86.
PCT SUN	40.	39.	47.	48.	52.	54.	52.	45.	34.	30.	35.	37.	43.
MEAN RS	487.	458.	444.	379.	323.	296.	305.	336.	354.	373.	454.	476.	391.
PRECIP.	248.	320.	248.	203.	158.	120.	91.	113.	145.	176.	157.	204.	2183.
POT ET	151.	128.	136.	107.	89.	76.	79.	89.	92.	106.	126.	143.	1321.
PREC DEF	-97.	-192.	-112.	-96.	-69.	-44.	-12.	-25.	-53.	-70.	-31.	-62.	-862.

83.813 CASTRO PARANA LAT 24 47 LON 50 0 990 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	20.6	20.5	19.6	16.8	14.2	12.8	12.2	13.7	15.2	17.0	18.3	19.8	16.7
MEAN R.H.	82.	83.	83.	83.	83.	83.	82.	79.	80.	81.	79.	79.	81.
PCT SUN	49.	47.	47.	48.	47.	47.	49.	53.	51.	50.	53.	53.	50.
MEAN RS	545.	501.	444.	371.	305.	271.	291.	359.	431.	498.	557.	575.	429.
PRECIP.	199.	173.	131.	79.	93.	96.	84.	81.	121.	141.	124.	138.	1461.
POT ET	150.	124.	119.	89.	69.	57.	62.	80.	98.	124.	139.	154.	1266.
PREC DEF	-49.	-49.	-17.	9.	-24.	-39.	-22.	-1.	-23.	-18.	15.	16.	-195.

83.842 CURITIBA PARANA LAT 25 26 LON 49 16 947 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	20.1	20.1	19.2	16.8	14.5	13.2	12.5	14.0	14.8	16.2	17.4	18.9	16.5
MEAN R.H.	82.	84.	84.	84.	83.	83.	80.	78.	80.	82.	80.	81.	82.
PCT SUN	43.	43.	46.	48.	52.	52.	57.	54.	40.	38.	43.	45.	47.
MEAN RS	508.	480.	439.	369.	316.	281.	308.	359.	377.	432.	499.	527.	408.
PRECIP.	198.	173.	124.	78.	85.	88.	81.	83.	119.	120.	135.	147.	1413.
POT ET	138.	118.	116.	88.	73.	60.	66.	81.	85.	105.	121.	138.	1189.
PREC DEF	-61.	-56.	-8.	10.	-12.	-28.	-15.	-2.	-35.	-26.	16.	-9.	-224.

83.834 GUARAPUAVA PARANA LAT 25 24 LON 51 28 1116 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	20.3	20.0	19.1	16.3	14.3	12.9	12.6	14.3	15.3	16.9	18.3	19.6	16.7
MEAN R.H.	79.	80.	80.	80.	80.	79.	75.	70.	74.	75.	73.	75.	77.
PCT SUN	45.	48.	51.	55.	58.	46.	60.	62.	45.	47.	54.	54.	52.
MEAN RS	524.	508.	460.	394.	332.	264.	316.	387.	404.	482.	561.	583.	434.
PRECIP.	188.	141.	134.	112.	119.	136.	102.	112.	157.	162.	157.	153.	1675.
POT ET	143.	124.	121.	93.	76.	56.	68.	88.	92.	115.	140.	156.	1277.
PREC DEF	-45.	-17.	-13.	-20.	-44.	-81.	-33.	-24.	-65.	-43.	-17.	3.	-398.

TABLE 5 CLIMATIC POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFICITS FOR BRAZIL

83.811 IVAI — PARANA — LAT 24 24 LON 50 50 — 776 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	21.9	21.7	20.9	17.9	15.3	13.8	13.5	15.3	16.8	18.5	19.8	21.4	18.1
MEAN R.H.	80.	81.	81.	81.	82.	84.	80.	76.	77.	77.	74.	76.	79.
PCT SUN	52.	50.	50.	50.	48.	46.	51.	57.	55.	55.	59.	57.	52.
MEAN RS	559.	514.	459.	383.	310.	270.	299.	376.	450.	523.	585.	593.	443.
PRECIP.	186.	150.	120.	97.	115.	121.	99.	90.	141.	149.	127.	129.	1522.
POT ET	159.	132.	127.	94.	73.	59.	67.	89.	108.	136.	152.	166.	1361.
PREC DEF	-27.	-18.	7.	-2.	-42.	-62.	-32.	-1.	-34.	-13.	25.	38.	-161.

83.814 JAGUARIAIVA — PARANA — LAT 24 15 LON 49 42 — 891 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	21.3	21.1	20.4	17.8	15.2	13.6	13.2	14.9	16.4	18.1	19.3	20.5	17.6
MEAN R.H.	79.	81.	80.	80.	80.	81.	77.	73.	74.	74.	74.	75.	78.
PCT SUN	40.	44.	51.	57.	59.	61.	64.	63.	44.	45.	47.	45.	52.
MEAN RS	493.	484.	461.	409.	344.	313.	335.	397.	404.	474.	526.	527.	431.
PRECIP.	219.	172.	118.	80.	82.	80.	65.	59.	99.	128.	130.	137.	1369.
POT ET	138.	122.	126.	101.	81.	68.	74.	92.	95.	122.	135.	145.	1298.
PREC DEF	-81.	-50.	8.	20.	-1.	-12.	9.	34.	-4.	-7.	5.	8.	-71.

83.844 PARANAGUA — PARANA — LAT 25 31 LON 48 31 — 10 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.9	24.8	24.2	22.0	19.7	18.1	17.1	17.7	18.5	20.0	21.6	23.4	21.0
MEAN R.H.	84.	85.	85.	85.	86.	87.	86.	86.	86.	85.	83.	83.	85.
PCT SUN	40.	42.	43.	44.	50.	48.	48.	40.	28.	28.	37.	38.	40.
MEAN RS	491.	471.	424.	355.	309.	268.	283.	308.	317.	370.	465.	486.	379.
PRECIP.	281.	331.	250.	168.	115.	92.	59.	79.	131.	162.	145.	175.	1988.
POT ET	151.	130.	128.	98.	83.	67.	71.	78.	80.	100.	127.	144.	1255.
PREC DEF	-130.	-201.	-122.	-70.	-33.	-26.	11.	-1.	-51.	-62.	-18.	-31.	-733.

83.837 PONTA GROSSA — PARANA — LAT 25 6 LON 50 10 — 868 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	21.4	21.1	20.3	17.4	15.2	13.9	13.5	15.1	16.2	17.8	19.2	20.5	17.6
MEAN R.H.	78.	81.	80.	80.	80.	80.	77.	73.	75.	76.	74.	75.	78.
PCT SUN	44.	45.	48.	51.	55.	52.	59.	58.	45.	44.	49.	48.	50.
MEAN RS	516.	492.	448.	385.	326.	283.	317.	375.	404.	465.	537.	546.	424.
PRECIP.	167.	162.	114.	80.	92.	96.	81.	80.	121.	140.	123.	145.	1402.
POT ET	145.	124.	122.	93.	77.	62.	70.	88.	95.	118.	137.	150.	1281.
PREC DEF	-22.	-38.	8.	14.	-16.	-34.	-11.	8.	-27.	-22.	15.	5.	-121.

83.867 RIO NEGRO — PARANA — LAT 26 6 LON 49 48 — 847 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	20.5	20.3	19.5	16.3	14.0	12.4	11.9	13.2	14.4	16.4	17.9	19.5	16.4
MEAN R.H.	84.	86.	86.	86.	87.	87.	85.	83.	84.	83.	82.	83.	85.
PCT SUN	46.	43.	43.	43.	41.	41.	44.	47.	45.	47.	49.	48.	45.
MEAN RS	530.	481.	423.	346.	277.	246.	268.	331.	402.	479.	534.	548.	405.
PRECIP.	162.	145.	110.	74.	82.	92.	77.	92.	98.	118.	103.	119.	1271.
POT ET	145.	119.	113.	81.	63.	51.	56.	73.	89.	117.	132.	146.	1185.
PREC DEF	-16.	-27.	3.	8.	-20.	-41.	-21.	-19.	-9.	-1.	29.	27.	-86.

83.921 ARARANGUA — SANTA CATARINA — LAT 28 53 LON 49 31 — 12 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	23.3	23.1	22.3	19.6	16.7	14.9	14.3	15.0	16.4	18.5	20.3	22.1	18.9
MEAN R.H.	81.	84.	83.	83.	84.	85.	83.	82.	83.	81.	80.	79.	82.
PCT SUN	50.	47.	47.	48.	46.	45.	47.	48.	47.	50.	52.	53.	48.
MEAN RS	556.	496.	431.	350.	275.	237.	257.	319.	398.	491.	553.	580.	412.
PRECIP.	147.	136.	117.	102.	76.	91.	78.	99.	127.	109.	87.	82.	1252.
POT ET	164.	131.	124.	91.	68.	53.	59.	75.	94.	127.	146.	166.	1298.
PREC DEF	17.	-5.	7.	-11.	-8.	-38.	-19.	-24.	-33.	18.	59.	84.	46.

TABLE 5 CLIMATIC POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFICITS FOR BRAZIL

83.898 CAMBORIU SANTA CATARINA LAT 27 0 LON 48 38 8 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	23.8	23.9	22.9	20.4	17.6	16.0	15.1	15.7	17.2	19.0	20.7	22.5	19.6
MEAN R.H.	85.	86.	86.	86.	87.	88.	88.	87.	87.	85.	84.	84.	86.
PCT SUN	44.	43.	43.	43.	41.	40.	40.	41.	42.	44.	46.	46.	43.
MEAN RS	519.	480.	418.	341.	271.	235.	250.	304.	382.	464.	522.	540.	394.
PRECIP.	178.	203.	158.	130.	102.	78.	76.	94.	111.	144.	108.	130.	1513.
POT ET	155.	130.	122.	90.	68.	55.	59.	73.	92.	122.	139.	156.	1262.
PREC DEF	-23.	-73.	-36.	-40.	-34.	-23.	-18.	-21.	-19.	-22.	31.	25.	-252.

83.897 FLORIANOPOLIS SANTA CATARINA LAT 27 35 LON 48 35 46 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.4	24.3	23.8	21.3	19.3	17.6	16.5	16.8	17.8	19.3	20.8	22.8	20.4
MEAN R.H.	82.	83.	83.	82.	84.	85.	84.	84.	84.	83.	81.	81.	83.
PCT SUN	46.	46.	49.	51.	54.	52.	55.	51.	39.	38.	43.	48.	48.
MEAN RS	529.	494.	446.	369.	306.	265.	287.	336.	369.	426.	501.	551.	407.
PRECIP.	172.	164.	140.	133.	107.	79.	74.	88.	105.	121.	112.	107.	1403.
POT ET	160.	135.	133.	100.	81.	65.	70.	83.	91.	113.	134.	161.	1326.
PREC DEF	-12.	-29.	-7.	-33.	-25.	-14.	-4.	-5.	-14.	-8.	22.	54.	-77.

83.891 LAGES SANTA CATARINA LAT 27 49 LON 50 20 926 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	20.4	20.1	18.9	16.0	13.2	11.5	10.9	12.3	13.9	15.6	17.4	19.3	15.8
MEAN R.H.	77.	80.	80.	82.	83.	84.	82.	80.	80.	79.	75.	74.	80.
PCT SUN	51.	49.	51.	48.	47.	48.	52.	51.	41.	43.	51.	54.	49.
MEAN RS	557.	510.	453.	358.	284.	253.	278.	336.	374.	454.	551.	586.	416.
PRECIP.	143.	135.	109.	100.	97.	96.	88.	127.	133.	142.	98.	117.	1384.
POT ET	152.	125.	119.	83.	63.	51.	57.	72.	82.	108.	134.	155.	1200.
PREC DEF	9.	-10.	10.	-17.	-35.	-45.	-32.	-55.	-51.	-34.	36.	39.	-184.

83.924 LAGUNA SANTA CATARINA LAT 28 29 LON 48 48 34 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	23.6	23.7	23.1	20.7	18.1	16.5	15.7	16.0	17.1	18.6	20.2	22.2	19.6
MEAN R.H.	82.	82.	83.	81.	82.	83.	83.	84.	85.	83.	81.	80.	82.
PCT SUN	51.	49.	53.	53.	54.	51.	56.	50.	41.	44.	51.	55.	51.
MEAN RS	558.	507.	458.	373.	300.	256.	283.	326.	371.	458.	548.	589.	419.
PRECIP.	125.	155.	138.	142.	104.	97.	93.	123.	142.	138.	102.	92.	1448.
POT ET	166.	137.	134.	99.	77.	61.	67.	79.	89.	119.	144.	169.	1342.
PREC DEF	41.	-18.	-4.	-43.	-27.	-37.	-26.	-44.	-53.	-15.	43.	77.	-106.

83.874 SAO FRANCISCO DO SUL SANTA CATARINA LAT 26 15 LON 48 39 43 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.5	24.4	23.9	21.5	19.5	18.0	16.6	17.1	18.1	19.6	21.2	23.0	20.6
MEAN R.H.	86.	88.	87.	87.	88.	88.	87.	89.	88.	87.	85.	85.	87.
PCT SUN	41.	41.	44.	46.	48.	44.	47.	39.	29.	29.	38.	40.	41.
MEAN RS	500.	465.	427.	359.	297.	253.	274.	303.	320.	379.	469.	500.	379.
PRECIP.	228.	282.	236.	150.	122.	86.	78.	94.	126.	155.	134.	136.	1827.
POT ET	152.	127.	128.	98.	79.	63.	67.	76.	79.	101.	127.	146.	1243.
PREC DEF	-76.	-155.	-108.	-52.	-43.	-23.	-10.	-19.	-46.	-54.	-7.	11.	-583.

83.923 URUSSANGA SANTA CATARINA LAT 28 31 LON 49 19 130 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	23.6	23.3	22.4	19.4	16.9	15.2	14.5	15.6	17.1	18.9	20.6	22.3	19.1
MEAN R.H.	79.	83.	82.	82.	83.	84.	81.	80.	80.	78.	77.	76.	81.
PCT SUN	53.	48.	48.	49.	47.	45.	50.	52.	52.	54.	55.	56.	51.
MEAN RS	569.	503.	438.	355.	279.	241.	266.	332.	418.	507.	570.	598.	423.
PRECIP.	177.	192.	151.	110.	87.	81.	73.	93.	123.	119.	105.	116.	1438.
POT ET	169.	134.	126.	91.	69.	55.	61.	79.	101.	133.	152.	172.	1343.
PREC DEF	-17.	-58.	-25.	-19.	-18.	-26.	-12.	-14.	-22.	14.	46.	56.	-96.

TABLE 5 CLIMATIC POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFICITS FOR BRAZIL

83.865 VALOES SANTA CATARINA LAT 26 15 LON 50 48 777 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	20.8	20.6	19.5	16.0	13.2	11.5	10.7	12.5	14.4	16.7	18.3	20.0	16.2
MEAN R.H.	80.	82.	82.	82.	86.	86.	84.	80.	81.	79.	77.	77.	81.
PCT SUN	51.	49.	49.	48.	44.	42.	46.	51.	50.	53.	55.	55.	49.
MEAN RS	556.	509.	447.	366.	283.	248.	272.	345.	422.	509.	569.	588.	426.
PRECIP.	159.	148.	133.	106.	110.	122.	88.	107.	143.	153.	115.	128.	1513.
POT ET	154.	126.	119.	85.	62.	50.	55.	74.	94.	125.	142.	159.	1247.
PREC DEF	-6.	-21.	-14.	-21.	-48.	-72.	-33.	-33.	-49.	-27.	28.	31.	-266.

83.858 XANXERE SANTA CATARINA LAT 26 51 LON 52 24 791 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	20.7	20.4	19.1	15.5	13.2	11.9	10.8	12.7	14.4	16.2	18.0	19.7	16.0
MEAN R.H.	82.	84.	85.	86.	86.	87.	85.	81.	82.	82.	80.	80.	83.
PCT SUN	48.	45.	45.	43.	43.	41.	45.	49.	49.	49.	52.	52.	47.
MEAN RS	543.	491.	428.	345.	279.	241.	264.	336.	412.	489.	553.	570.	413.
PRECIP.	233.	207.	194.	193.	193.	235.	171.	191.	224.	250.	163.	180.	2436.
POT ET	150.	121.	113.	79.	61.	49.	54.	73.	91.	119.	137.	153.	1200.
PREC DEF	-83.	-86.	-81.	-114.	-132.	-186.	-118.	-118.	-133.	-132.	-27.	-27.	-1236.

83.931 ALEGRETE RIO GRANDE DO SUL LAT 29 46 LON 55 47 104 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.7	24.2	22.2	18.2	15.2	13.3	12.9	14.1	15.9	18.7	20.9	23.3	18.6
MEAN R.H.	67.	70.	73.	77.	81.	84.	80.	76.	75.	74.	68.	66.	74.
PCT SUN	67.	69.	65.	63.	58.	48.	57.	60.	56.	58.	68.	70.	62.
MEAN RS	642.	602.	503.	397.	300.	240.	276.	350.	427.	526.	634.	668.	464.
PRECIP.	145.	109.	121.	165.	149.	129.	109.	108.	128.	191.	133.	123.	1610.
POT ET	196.	164.	144.	99.	71.	51.	60.	79.	99.	137.	170.	197.	1468.
PREC DEF	51.	55.	23.	-66.	-78.	-77.	-49.	-28.	-29.	-54.	37.	74.	-142.

83.980 BAGE RIO GRANDE DO SUL LAT 31 20 LON 54 6 216 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.2	23.5	21.7	17.8	14.9	12.9	12.2	13.3	14.9	17.5	20.1	22.8	18.0
MEAN R.H.	64.	67.	72.	75.	78.	82.	79.	76.	76.	73.	67.	64.	73.
PCT SUN	59.	60.	58.	56.	52.	45.	51.	50.	48.	52.	60.	61.	54.
MEAN RS	605.	558.	467.	363.	273.	220.	249.	309.	389.	495.	597.	627.	429.
PRECIP.	108.	96.	97.	120.	120.	119.	104.	112.	125.	134.	75.	77.	1286.
POT ET	183.	150.	132.	89.	63.	46.	53.	68.	88.	125.	157.	183.	1337.
PREC DEF	75.	54.	35.	-31.	-57.	-73.	-51.	-44.	-37.	-9.	82.	106.	51.

83.942 CAXIAS DO SUL RIO GRANDE DO SUL LAT 29 10 LON 51 12 760 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	20.6	20.2	19.0	15.6	13.4	12.1	11.5	12.8	13.9	15.6	17.5	19.4	16.0
MEAN R.H.	76.	79.	80.	81.	82.	83.	79.	76.	79.	79.	75.	73.	78.
PCT SUN	55.	54.	57.	56.	56.	53.	58.	58.	47.	51.	58.	57.	55.
MEAN RS	500.	535.	475.	378.	300.	255.	283.	350.	397.	491.	587.	604.	436.
PRECIP.	142.	138.	126.	133.	141.	157.	138.	122.	165.	152.	106.	131.	1651.
POT ET	159.	132.	125.	87.	67.	52.	59.	76.	87.	117.	143.	161.	1264.
PREC DEF	17.	-6.	-1.	-46.	-75.	-104.	-79.	-46.	-78.	-35.	37.	29.	-387.

83.912 CRUZ ALTA RIO GRANDE DO SUL LAT 28 38 LON 53 36 473 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	23.8	23.1	21.7	18.1	15.9	14.2	13.4	15.0	16.3	18.1	20.6	22.8	18.6
MEAN R.H.	70.	74.	74.	75.	77.	80.	76.	72.	74.	72.	68.	65.	73.
PCT SUN	58.	57.	58.	56.	55.	47.	52.	52.	45.	51.	60.	61.	54.
MEAN RS	597.	551.	478.	381.	300.	244.	272.	333.	389.	497.	596.	621.	438.
PRECIP.	148.	126.	123.	154.	154.	168.	124.	126.	158.	186.	120.	139.	1725.
POT ET	178.	146.	135.	95.	72.	54.	60.	78.	92.	128.	159.	181.	1377.
PREC DEF	30.	20.	12.	-59.	-81.	-114.	-64.	-48.	-66.	-58.	39.	41.	-348.

TABLE 5 CLIMATIC POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFICITS FOR BRAZIL

83.934 ENCRUZILHADA DO SUL RIO GRANDE DO SUL LAT 30 32 LON 52 31 418 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	21.7	21.3	20.2	16.7	14.3	12.5	11.7	12.3	14.0	15.7	18.3	20.3	16.6
MEAN R.H.	74.	77.	77.	79.	80.	82.	81.	78.	79.	78.	74.	72.	78.
PCT SUN	58.	59.	58.	54.	50.	41.	49.	50.	48.	53.	60.	59.	53.
MEAN RS	601.	556.	474.	363.	273.	216.	249.	315.	392.	498.	594.	618.	429.
PRECIP.	120.	120.	94.	136.	150.	147.	137.	132.	143.	144.	73.	90.	1487.
POT ET	170.	141.	129.	87.	62.	45.	52.	67.	86.	119.	148.	169.	1275.
PREC DEF	50.	20.	35.	-50.	-88.	-102.	-84.	-64.	-58.	-25.	75.	79.	-213.

83.881 IRAI RIO GRANDE DO SUL LAT 27 12 LON 53 18 227 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.1	23.6	22.1	18.4	16.1	14.7	13.3	14.9	16.0	19.2	21.3	23.3	19.0
MEAN R.H.	79.	81.	83.	87.	88.	90.	88.	85.	84.	81.	78.	76.	83.
PCT SUN	52.	53.	54.	52.	48.	40.	48.	49.	40.	47.	52.	58.	49.
MEAN RS	563.	529.	468.	375.	291.	234.	270.	332.	375.	480.	553.	605.	423.
PRECIP.	157.	149.	166.	143.	157.	82.	146.	110.	168.	176.	139.	140.	1732.
POT ET	169.	142.	134.	94.	70.	52.	60.	77.	90.	127.	150.	179.	1344.
PREC DEF	12.	-7.	-72.	-49.	-86.	-29.	-87.	-32.	-79.	-49.	11.	39.	-388.

83.914 PASSO FUNDO RIO GRANDE DO SUL LAT 28 16 LON 52 24 676 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	22.4	21.8	20.3	17.0	14.7	12.2	13.3	13.8	15.6	18.1	19.5	21.8	17.6
MEAN R.H.	72.	76.	76.	78.	80.	82.	78.	74.	75.	73.	68.	67.	75.
PCT SUN	60.	56.	61.	57.	54.	51.	57.	54.	46.	52.	60.	62.	56.
MEAN RS	605.	545.	4[illegible].	387.	300.	257.	287.	341.	396.	500.	594.	630.	444.
PRECIP.	144.	147.	12[illegible].	129.	140.	149.	132.	132.	160.	162.	110.	133.	1658.
POT ET	174.	140.	134.	93.	70.	55.	64.	77.	91.	128.	153.	179.	1358.
PREC DEF	31.	-7.	14.	-36.	-71.	-94.	-68.	-55.	-69.	-34.	43.	46.	-301.

83.985 PELOTAS RIO GRANDE DO SUL LAT 31 45 LON 52 21 7 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	23.0	22.6	21.7	17.9	15.1	12.9	11.9	13.0	14.5	16.7	18.8	21.4	17.5
MEAN R.H.	77.	80.	82.	83.	85.	86.	86.	84.	84.	81.	78.	77.	82.
PCT SUN	55.	51.	49.	48.	45.	43.	43.	46.	46.	50.	53.	56.	49.
MEAN RS	583.	515.	427.	334.	252.	211.	225.	294.	381.	481.	563.	600.	405.
PRECIP.	131.	138.	110.	110.	110.	132.	113.	138.	141.	128.	67.	76.	1394.
POT ET	171.	135.	121.	82.	59.	45.	47.	64.	85.	119.	142.	169.	1238.
PREC DEF	39.	-3.	11.	-28.	-51.	-87.	-65.	-73.	-56.	-10.	75.	92.	-156.

83.967 PORTO ALEGRE RIO GRANDE DO SUL LAT 30 2 LON 51 13 10 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.7	24.5	23.3	19.7	17.1	15.0	14.3	15.3	16.8	19.1	21.3	23.4	19.5
MEAN R.H.	70.	74.	75.	77.	81.	83.	81.	78.	77.	75.	70.	68.	76.
PCT SUN	62.	60.	60.	57.	53.	47.	52.	53.	44.	53.	61.	66.	56.
MEAN RS	616.	560.	483.	374.	287.	235.	261.	328.	378.	510.	599.	649.	439.
PRECIP.	118.	104.	88.	103.	115.	141.	128.	114.	124.	117.	75.	88.	1317.
POT ET	188.	154.	142.	97.	71.	53.	60.	77.	90.	132.	162.	192.	1419.
PREC DEF	70.	50.	54.	-6.	-43.	-87.	-68.	-37.	-33.	13.	87.	103.	102.

83.995 RIO GRANDE RIO GRANDE DO SUL LAT 32 2 LON 52 6 2 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	23.3	23.3	22.3	19.0	16.1	13.3	12.6	13.4	14.9	17.1	19.3	21.7	18.1
MEAN R.H.	76.	78.	79.	81.	84.	86.	86.	84.	83.	81.	77.	75.	81.
PCT SUN	63.	61.	59.	58.	55.	47.	48.	49.	47.	53.	62.	65.	55.
MEAN RS	624.	563.	469.	365.	275.	219.	238.	301.	382.	488.	604.	650.	432.
PRECIP.	83.	99.	101.	97.	101.	111.	99.	119.	123.	98.	67.	59.	1162.
POT ET	184.	150.	135.	93.	66.	48.	51.	67.	81.	122.	155.	184.	1342.
PREC DEF	96.	51.	34.	-4.	-34.	-63.	-47.	-53.	-37.	24.	89.	125.	180.

TABLE 5 CLIMATIC POTENTIAL EVAPOTRANSPIRATION AND PRECIPITATION DEFICITS FOR BRAZIL

83.936 SANTA MARIA RIO GRANDE DO SUL LAT 29 41 LON 53 43 139 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	24.9	24.3	22.9	19.9	16.5	14.6	14.1	15.4	16.7	18.9	21.3	23.7	19.3
MEAN R.H.	74.	77.	79.	80.	82.	84.	81.	78.	81.	79.	75.	73.	78.
PCT SUN	57.	56.	54.	53.	47.	40.	46.	45.	44.	49.	57.	60.	51.
MEAN RS	591.	545.	460.	362.	271.	218.	247.	303.	381.	484.	582.	621.	422.
PRECIP.	141.	141.	109.	142.	163.	164.	143.	126.	151.	177.	111.	122.	1691.
POT ET	181.	149.	134.	92.	66.	49.	56.	72.	91.	127.	156.	185.	1359.
PREC DEF	41.	8.	25.	-50.	-97.	-116.	-87.	-55.	-60.	-50.	47.	63.	-332.

83.997 SANTA VITORIA DO PALMAR RIO GRANDE DO SUL LAT 33 31 LON 53 22 5 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	22.2	21.0	20.0	17.1	14.2	12.0	11.3	11.9	13.2	15.7	17.9	20.5	16.5
MEAN R.H.	74.	77.	79.	82.	84.	86.	85.	83.	83.	81.	77.	73.	80.
PCT SUN	62.	63.	58.	59.	53.	46.	47.	51.	50.	53.	61.	62.	55.
MEAN RS	620.	569.	460.	360.	259.	218.	225.	299.	385.	495.	559.	637.	426.
PRECIP.	92.	87.	128.	124.	106.	113.	97.	109.	119.	100.	70.	80.	1230.
POT ET	178.	146.	126.	86.	50.	43.	46.	63.	82.	116.	149.	175.	1271.
PREC DEF	86.	59.	-1.	-37.	-47.	-76.	-51.	-46.	-36.	16.	79.	94.	41.

83.945 SAO FRANCISCO DE PAULA RIO GRANDE DO SUL LAT 29 20 LON 50 21 912 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	18.8	18.5	17.6	14.4	12.4	10.9	10.3	11.3	12.4	13.9	15.6	17.5	14.5
MEAN R.H.	83.	85.	86.	86.	86.	86.	83.	82.	84.	84.	82.	80.	84.
PCT SUN	42.	44.	44.	43.	42.	44.	47.	49.	41.	46.	49.	51.	45.
MEAN RS	542.	492.	412.	328.	261.	221.	254.	320.	391.	464.	539.	571.	400.
PRECIP.	202.	197.	191.	186.	184.	206.	176.	173.	212.	202.	144.	177.	2252.
POT ET	142.	112.	104.	72.	50.	40.	50.	66.	81.	104.	124.	144.	1105.
PREC DEF	-66.	-84.	-87.	-114.	-129.	-161.	-125.	-107.	-131.	-92.	-20.	-34.	-1147.

82.907 SAO LUIZ GONZAGA RIO GRANDE DO SUL LAT 28 24 LON 54 53 251 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	25.3	24.8	23.2	19.2	16.7	14.8	14.4	16.0	17.5	19.4	22.1	24.5	19.9
MEAN R.H.	69.	72.	74.	79.	81.	84.	79.	74.	75.	73.	68.	66.	74.
PCT SUN	63.	61.	61.	59.	56.	44.	54.	56.	51.	55.	64.	65.	57.
MEAN RS	621.	566.	492.	391.	307.	230.	280.	349.	417.	512.	616.	642.	452.
PRECIP.	135.	122.	127.	177.	149.	154.	111.	114.	136.	197.	110.	132.	1665.
POT ET	193.	156.	145.	100.	75.	54.	64.	84.	102.	136.	171.	195.	1475.
PREC DEF	58.	34.	17.	-77.	-73.	-100.	-47.	-30.	-37.	-64.	60.	63.	-192.

82.927 URUGUAIANA RIO GRANDE DO SUL LAT 29 45 LON 57 5 74 METERS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN TEMP	26.3	25.5	23.6	19.2	16.5	14.2	13.5	15.0	16.9	19.4	22.3	25.1	19.3
MEAN R.H.	66.	68.	70.	75.	78.	80.	77.	74.	74.	72.	68.	65.	72.
PCT SUN	63.	66.	59.	54.	54.	44.	55.	58.	52.	55.	64.	64.	57.
MEAN RS	621.	590.	478.	369.	290.	220.	271.	346.	414.	512.	616.	641.	448.
PRECIP.	119.	110.	127.	165.	117.	105.	68.	68.	102.	165.	109.	114.	1357.
POT ET	197.	166.	142.	94.	71.	51.	60.	81.	99.	136.	171.	199.	1467.
PREC DEF	83.	56.	20.	-71.	-46.	-55.	-8.	13.	-3.	-29.	65.	84.	110.

APPENDIX I - REFERENCES

1. ASCE Technical Committee on Irrigation Water Requirements of the Irrigation and Drainage Division, "Consumptive Use of Water and Irrigation Water Requirements," American Society of Civil Engineers, 1973, 215 p.

2. Hargreaves, George H., "Estimation of Potential and Crop Evapotranspiration," Transactions American Society of Agricultural Engineers (Vol. 17, No. 4), 1974, pp. 701-704.

3. Hargreaves, George H., "Potential Evapotranspiration and Irrigation Requirements for Northeast Brazil" Utah State University, CUSUSWASH 74-A144, 1974, 55 p.

4. Hargreaves, George H., "Precipitation Dependability and Potentials for Agricultural Production in Northeast Brazil," EMBRAPA and Utah State University, CUSUSWASH 74-D155, 1974, 123 p.

5. Hargreaves, George H., "Irrigation Requirements and Precipitation Deficits for Brazil," EMBRAPA and Utah State University, CUSUSWASH 75-D156, 1975, 50 p.

6. Hargreaves, George H., "Monthly Precipitation Probabilities for Northeast Brazil, Utah State University, Dept. of Agricultural and Irrigation Engineering (CUSUSWASH), 1974, 423 p.

7. Hargreaves, George H., "Water Requirements Manual for Irrigated Crops and Rainfed Agriculture," Utah State University, CID 75D-158, 1975, 40 p.

8. Middleton, J. E., W. O. Pruitt, P. C. Crandall and M. C. Jensen, "Central and Western Washington Consumptive Use and Evaporation Data, 1954-62," Extension Bulletin 681, Washington State University Agricultural Experiment Station, 1967, 7 p.

9. Ministerio da Agricultura, Excretorio de Meteorologia, "Normais Climatologicas," Rio de Janeiro, 1969, Vols. I-V.

APPENDIX II - COMPUTER PROGRAM USED

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      REAL INS
      DIMENSION NAME(9),S(13),HM(13),TM (13),DEC(12),ES(12),DM(12),Z(12)
     1,OM(12),DL(13),RLD(12),RMM(12),ETP(13),TC(13),PREC(13),INS(13),RSM
     2(13),PDEF(13),L(12),RS(13)
      DATA (DM(M), M=1,12)/31.,28.,31.,30.,31.,30.,31.,31.,30.,31.,30.,
     131./
C     DM IS NUMBER OF DAYS IN THE MONTH
      DATA (DEC(M),M=1,12)/-.3656,-.2365,-.04682,.1607,.3247,.4017,
     $.3699,.2360,.03995,-.1669,-.3291,-.4021/
C     DEC IS DECLINATION IN RADIANS
      DATA (ES(M),M=1,12)/.97104,.98136,.99653,1.01313,1.02625,1.03241,1
     $.02987,1.01916,1.00347,.98693,.97369,.96812/
C     ES IS MEAN MONTHLY DISTANCE OF THE SUN TO THE EARTH DIVIDED BY THE
C     MEAN ANUAL DIATANCE
    2 JJ=0
      WRITE(6,205)
C     NAME IS STATION AND STATE
C     LD IS LATITUDE IN DEGREES   LDM IS LATITUDE IN MINUTES
C     ALT IS ELEVATION IN METERS
    3 READ(5,100,END=261) NAME,LD,LDM,LO,LOM,ALT
  100 FORMAT(9A6,1X,I2,3I2,2X,I4)
      READ(5,121)(TC(M),M=1,12)
C     TC IS MEAN TEMPERATURE IN DEGREES CENTIGRADE
      READ(5,121)(HM(M),M=1,12)
C     HM IS MEAN RELATIVE HUMIDITY IN PERCENT
      READ(5,121)(PREC(M),M=1,12)
      READ(5,121)(INS(M),M=1,12)
  121 FORMAT(5X,12F5.1)
      JJ=JJ+1
      XLA=(FLOAT(LD)+FLOAT(LDM)/60.)
C     XLA IS LATITUDE IN DEGREES AND DECIMALS
      XLA=-XLA
      XLR=XLA/57.2958
C     XLR IS LATITUDE IN RADIANS
      IF(JJ.EQ.1) WRITE(6,102)
  102 FORMAT(1H1,'TABLE 5 CLIMATE, POTENTIAL EVAPOTRANSPIRATION AND PREC
     1IPITATION DEFECITS FOR BRAZIL       ')
      IF(JJ.EQ.4) WRITE(6,205)
  205 FORMAT(1H0 /////)
      IF(JJ.EQ.1 .OR.JJ.EQ.4) WRITE(6,203)
      PRINT 101,NAME,LD,LDM,LO,LOM,ALT
  101 FORMAT('0'9A6,' LAT',I4,I3,' LON',I4,I3,2X,I4,' METERS'//
     1 '                JAN   FEB   MAR   APR   MAY   JUN   JUL   AUG   SEP
     2  OCT   NOV   DEC   ANNUAL       '/)
      TC(13)=0
      HM(13)=0
      PREC(13)=0
      INS(13)=0
      S (13)=0
      RS(13)=0
      ETP(13)=0
      PDEF(13)=0.
      S(M)=0.
      DO 4 M=1,12
      Z(M)=-TAN(XLR)*TAN(DEC(M))
```

```
      OM(M)=ACOS(Z(M))
      DL(M)=OM(M)/.1309
C     DL IS DAY LENGTH IN HOURS (SUNRISE TO SUNSET)
      RLD(M)=916.732*(OM(M)*SIN(XLR)*SIN(DEC(M))+COS(XLR)*COS(DEC(M))*SI
     1N(OM(M)))/ES(M)
      L(M)=595.9-(.55*TC(M))
      RMM(M)=DM(M)*10.*RLD(M)/L(M)
C     RMM IS EXTRATERRESTRIAL RADIATION IN MM PER MONTH
      TM(M)=32.+1.8*TC(M)
      S(M)=INS(M)*100./(DM(M)*DL(M))
      IF(INS(M).LT.10.)S(M)=11.5*SQRT(100.-HM(M))
      IF(S(M).GT.100.)S(M)=100.
      RSM(M)=.075*RMM(M)*SQRT(S(M))
      RS(M)=(RSM(M)*L(M))/(10.*DM(M))
      ETP(M)=.0075*RSM(M)*TM(M)
C     ETP IS POTENTIAL EVAPOTRANSPIRATION IN MM PER MONTH
      PDEF(M)=ETP(M)-PREC(M)
      S(13)=S(13)+S(M)
      RS(13)=RS(13)+RS(M)
      TC(13)=TC(13)+TC(M)
      HM(13)=HM(13)+HM(M)
      PREC(13)=PREC(13)+PREC(M)
      PDEF(13)=PDEF(13)+PDEF(M)
      ETP(13)=ETP(13)+ETP(M)
    4 CONTINUE
      S(13)=S(13)/12.
      RS(13)=RS(13)/12.
      TC(13)=TC(13)/12.
      HM(13)=HM(13)/12.
      PRINT 106,(TC(M),M=1,13)
  106 FORMAT(' MEAN TEMP', 12F6.1,F8.1)
      PRINT 105,(HM(M),M=1,13)
  105 FORMAT(' MEAN R.H.', 12F6.0,F8.0)
      PRINT 109,(S(M),M=1,13)
  109 FORMAT(' PCT SUN  ', 12F6.0,F9.0)
      PRINT 111,(RS(M),M=1,13)
  111 FORMAT(' MEAN RS  ', 12F6.0,F8.0)
      PRINT 107,(PREC(M),M=1,13)
  107 FORMAT(' PRECIP.  ', 12F6.0,F8.0)
      PRINT 110,(ETP(M),M=1,13)
  110 FORMAT(' POT ET   ', 12F6.0,F8.0)
      PRINT 108,(PDEF(M),M=1,13)
  108 FORMAT(' PREC DEF ', 12F6.0,F8.0)
  203 FORMAT(1H ,'-----------------------------------------------------
     1-----------------------------------------------------------------
      WRITE(6,203)
      IF(JJ.EQ.3) WRITE(6,206)
  206 FORMAT (1H1)
      IF(JJ.EQ.6) GO TO 2
      GO TO 3
  261 STOP
      END
```

END OF COMPILATION: NO DIAGNOSTICS.