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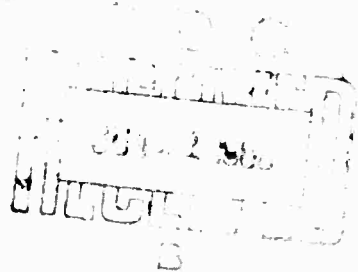
MONTHLY
MICROCLIMATIC SUMMARY

JANUARY 1968

ENVIRONMENTAL DATA BASE
FOR REGIONAL STUDIES IN THE HUMID TROPICS

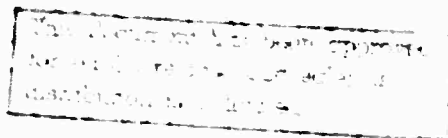
USATECOM Project No. 9-4-0013-01

US ARMY
TROPIC TEST CENTER
Fort Clayton, Canal Zone



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ENVIRONMENTAL DATA BASE
FOR REGIONAL STUDIES IN THE HUMID TROPICS

MONTHLY
MICROCLIMATIC SUMMARY

JANUARY 1968

Prepared by

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USATECOM Project No. 9-4-0013-01

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MONTHLY MICROCLIMATIC SUMMARY

Introduction

Monthly microclimatic data summarized in this series of reports were collected by the US Army Tropic Test Center and the Weather Engineers of Panama Corporation under the project, Environmental Data Base for Regional Studies in the Humid Tropics. The project is sponsored by the Advanced Research Projects Agency of the Department of Defense and by the Army Research Office, Office of the Chief of Research and Development. It is an investigation of microclimatic, air chemistry, vegetation, soils, microbiological, and macrofaunal conditions at selected sites in the principal tropical environments of the Panama Canal Zone and the Rio Hato Military Reservation. The objective of the project is to assemble quantitative environmental data for RDT&E purposes.

Sites. Data summarized in this report were collected at the Albrook Forest and Chiva Chiva sites. Figure 1 shows the site locations within the Isthmus of Panama. Geographic coordinates are shown below:

Albrook Forest	09° 01'N, 79° 33'W
Chiva Chiva	09° 01'N 79° 35'W

The Chiva Chiva open site and the Albrook Forest site are paired for comparative study of environmental conditions in a tropical semideciduous forest and in a large clearing. Both are located in a region where the annual precipitation is approximately 80 inches and there is a pronounced dry season. The other satellite sites were located primarily for soil studies purposes. Albrook and Fort Kobbe have climatic regimes similar to the principal sites.

The Albrook and Chiva Chiva main sites are approximately four kilometers apart. Each has a 46 meter walk-up tower and an air-conditioned building to house the recording equipment and observers. Both sites are approximately 30 meters above sea level. The top of the forest canopy at the Albrook site is about 26.5 meters above the ground.

Instrumentation. A wide range of climatic elements are measured at the Albrook and Chiva Chiva sites. Types of observations and frequencies are shown on Figure 2. The towers at the Albrook and Chiva Chiva sites are similarly oriented. Sensing equipment is mounted at several levels on the towers to provide measurements through the vertical profile. Additional instruments are emplaced in the immediate vicinity on or near the ground. All instrument exposures are duplicated at each site. Figures 3, 4, and 5 show the instrument array at these sites.

Data Reduction and Storage. All data, as applicable, are recorded at or reduced to each full hour and transposed to punch cards. These punch cards, together with all raw data, are stored in the Tropic Test Center Technical Library Annex.

The relative humidity data contained in this report required some adjustment due to the difficult problems in maintaining hair hygrometers in the humid tropics. The hygrometers show saturation at a time when the psychrometer shows a relative humidity well below 100%. For this reason the hourly measurements made by means of a hair hygrometer have been modified on the basis of simultaneous psychrometer readings of other levels. Details will be given in the fourth Semiannual Report. It can be assumed that the means of relative humidity presented in this volume are very close to the true means.

Special Notice. The reduced amounts of instrumentation found in this volume reflect the phasing out of old observational techniques. New automatic data acquisition and recording systems have been installed and are expected to become operational on 1 March 1968.

Publication of these microclimatic summaries are expected to be resumed with the data collected during April 1968.

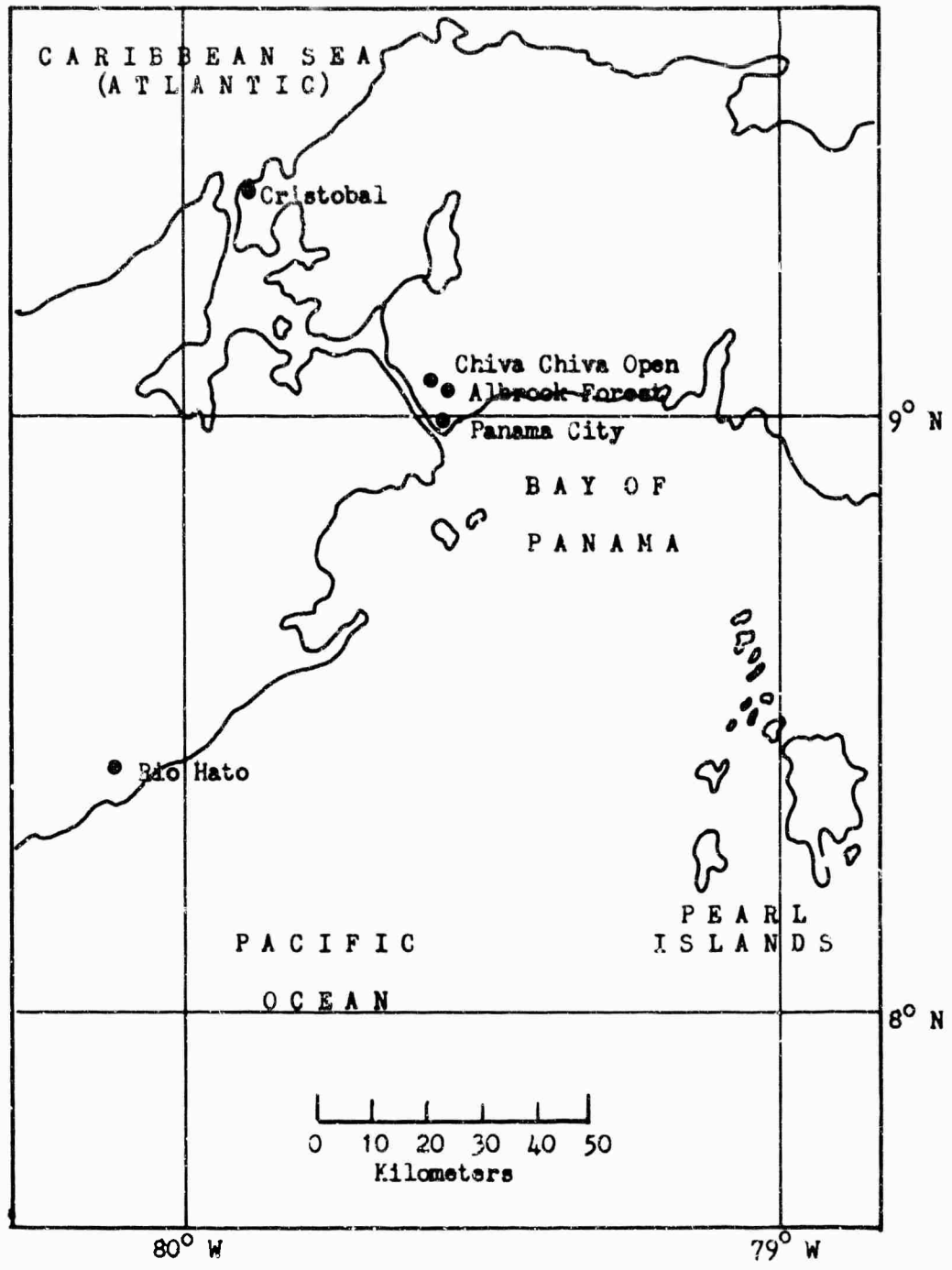


FIGURE 1. LOCATION MAP, ISTHMUS OF PANAMA

FIGURE 2. FREQUENCY OF OBSERVATIONS

# Element	Height (meters)											Frequency		
	0.5	1.0	2.0	4.0	8.0	13.5	26.5	30.0	32.0	39.0	46.0			
<u>Temperature:</u>														
Dry Bulb	-	1	2	-	-	1	2	3	-	-	-	1	Hourly	
Wet Bulb	-	1	2	-	-	-	-	-	-	-	-	-	Hourly	
Grass Minimum	3	-	-	-	-	-	-	-	-	-	-	-	Once Daily	
<u>Relative Humidity</u>														
	-	1	2	2	-	1	2	3	-	-	-	1	Hourly	
<u>Barometric Pressure</u>														
	-	-	1	-	-	-	-	-	-	-	-	-	Continuously	
<u>Evaporation</u>														
	-	1	-	-	-	2	2	-	-	-	-	2	Once Daily	
<u>Precipitation:</u>														
Recording Gage	-	-	1	-	-	-	-	-	-	-	-	-	2	Continuously
Manual Gage	-	-	2	-	-	-	-	-	-	-	-	-	2	4 Times Daily
<u>Wind:</u>														
Direction	-	-	-	3	-	-	-	3	-	2	2	3	Continuously	
Speed	-	-	-	3	-	-	3	-	2	2	-	-	-	

1. Albrook and Chiwa Chiwa
2. Albrook only
3. Chiwa Chiwa only

Instrument descriptions are contained in the Environmental Data Base semiannual reports.

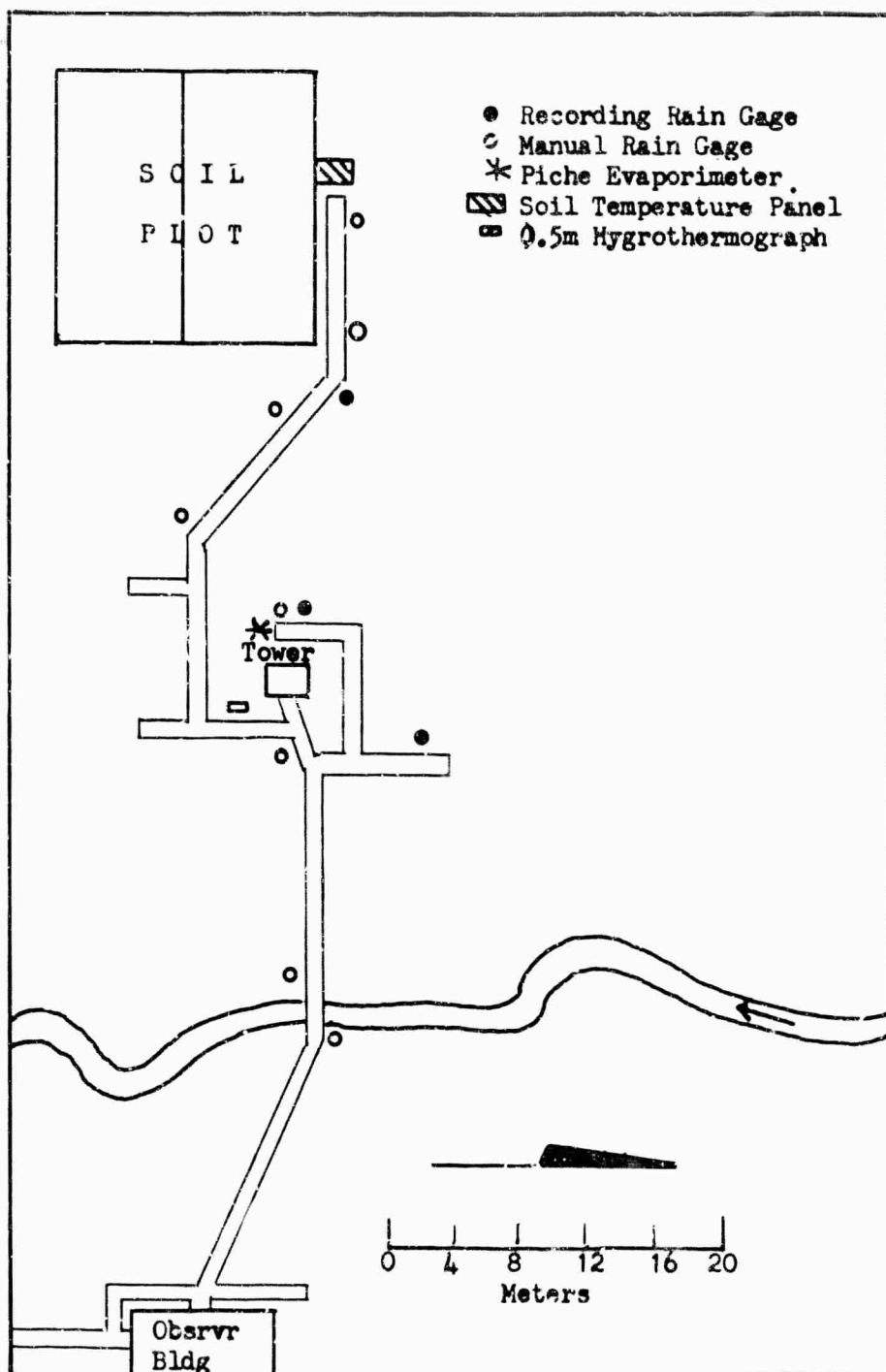


FIGURE 3. ALBROOK FOREST SITE, GENERALIZED PLOT

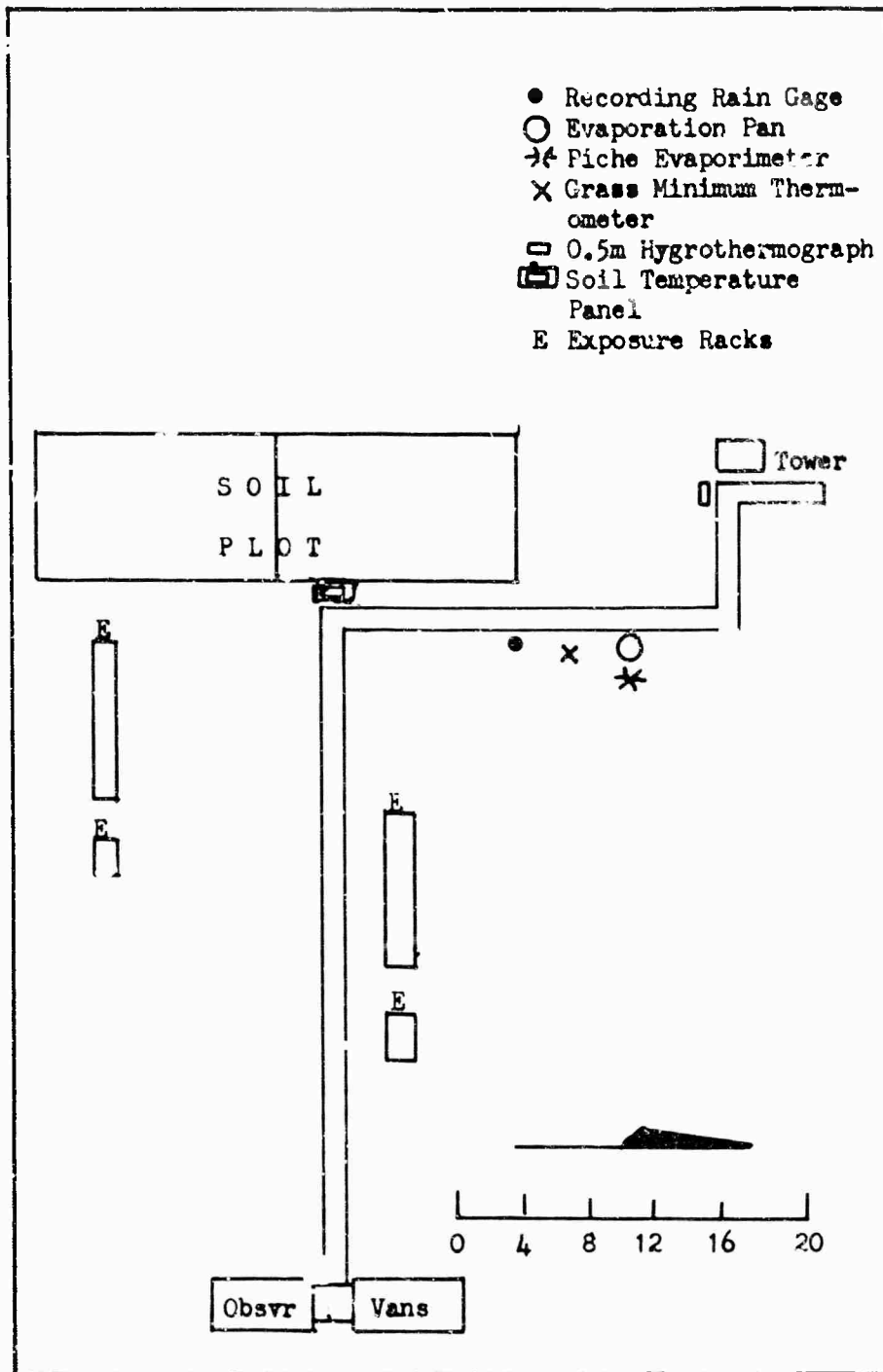


FIGURE 4. CHIVA CHIVA OPEN, GENERALIZED PLOT

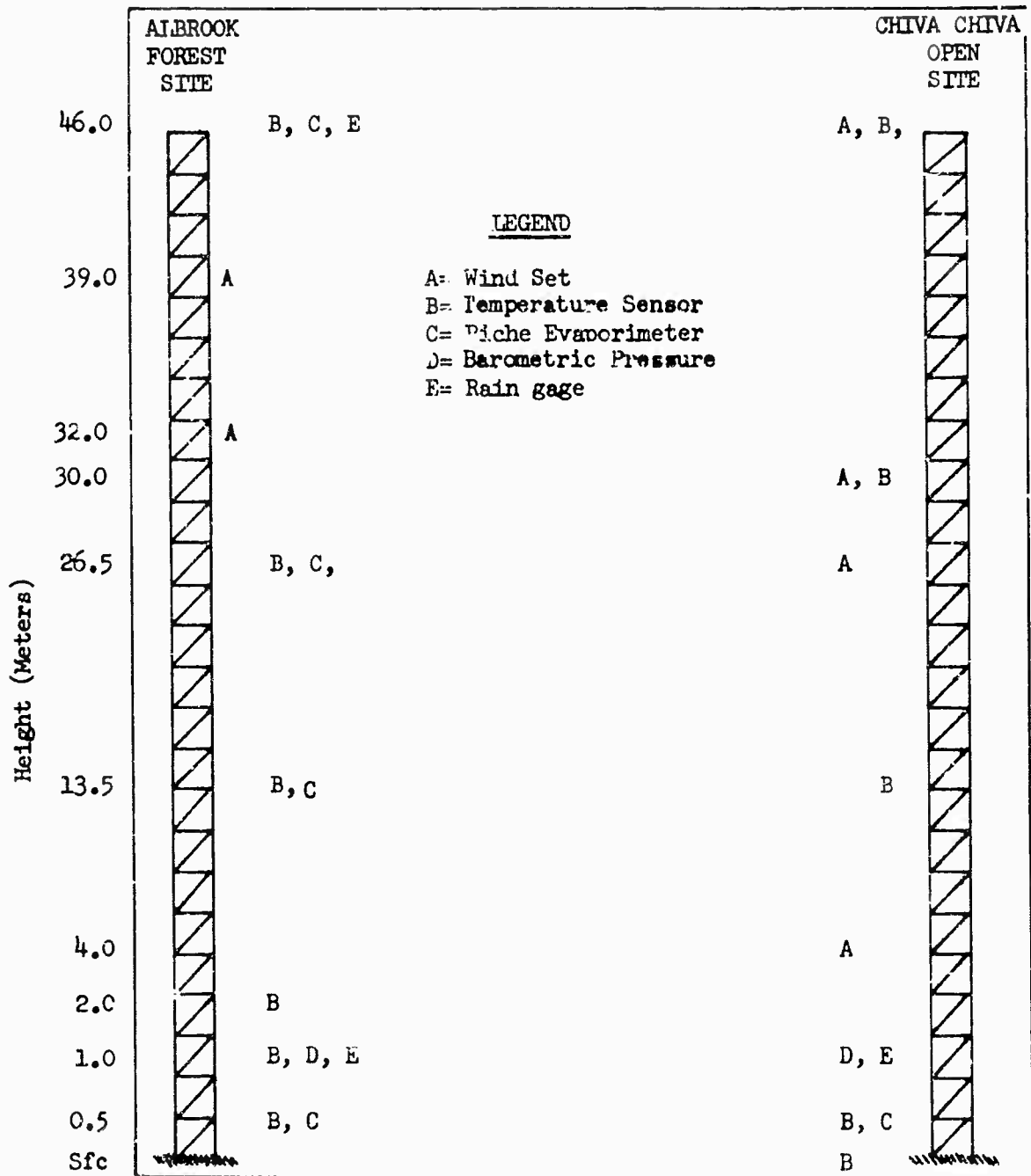


FIGURE 5. INSTRUMENT LOCATION ON TOWERS

SUMMARY OF METEOROLOGICAL OBSERVATIONS
HOURLY DATA
JANUARY 1968

Exposure	Monthly Means of Air Temperature by Hour (°F)																								Monthly Summary						
	Site	Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	No. of Obs.	Min.	Mean	Max.	
Alorok (Forest site)	46.0 m		74.2	74.0	73.7	73.5	73.4	73.6	73.3	76.3	79.8	82.1	83.6	85.1	85.7	85.8	85.1	84.3	82.5	79.8	77.4	76.2	75.3	74.8	74.6	74.4	744	71.0	78.3	88.0	
	28.5 m		This level was not instrumented for air temperature at this time																												
	26.5 m		72.8	72.6	72.0	71.7	71.5	71.3	71.9	75.6	80.6	82.8	84.5	85.6	86.5	86.7	85.1	85.2	82.8	79.6	76.3	75.2	74.1	73.7	73.0	72.8	604	66.7	77.7	88.3	
	13.5 m		71.8	71.7	71.4	71.1	70.7	70.4	70.9	73.4	77.8	80.5	82.1	83.7	84.5	84.7	84.2	83.4	81.6	79.0	76.3	74.7	73.8	73.2	72.6	72.1	723	66.0	76.5	87.8	
	8.0 m		This level was not instrumented for air temperature at this time																												
	4.0 m		This level was not instrumented for air temperature at this time																												
	2.0 m		71.4	71.2	70.8	70.5	70.3	70.2	70.2	70.2	72.4	76.6	79.3	81.4	83.0	84.0	84.3	83.9	82.8	80.7	77.8	75.3	73.9	73.1	72.6	72.0	71.6	744	65.7	75.8	87.0
	1.0 m		71.5	71.4	70.9	70.6	70.3	70.1	70.4	72.5	76.2	78.8	80.8	82.7	83.7	83.8	83.4	82.4	80.3	77.8	75.3	74.1	73.2	72.7	72.1	71.7	744	65.9	75.7	86.9	
	0.5 m		71.6	71.4	71.0	70.7	70.5	70.2	70.5	72.5	75.9	78.5	80.6	82.4	83.2	83.5	83.2	82.2	80.2	77.8	75.4	74.2	73.3	72.8	72.3	71.8	743	65.8	75.7	87.0	
	Chiva Chiva (Open site)	46.0 m		73.7	73.4	73.2	73.0	73.1	72.8	73.4	75.8	78.9	81.1	83.0	84.0	85.2	85.4	85.0	84.0	82.5	79.5	77.3	75.9	75.1	74.6	74.2	74.0	740	70.0	77.8	87.5
30.0 m			73.4	73.0	72.8	72.6	72.7	72.3	72.5	75.2	79.0	81.6	83.4	84.5	85.5	85.8	85.3	84.4	82.6	79.5	77.3	75.8	75.0	74.7	74.1	73.9	740	68.3	77.7	88.1	
13.5 m			72.9	72.5	72.4	72.2	71.9	71.3	71.9	75.9	80.0	82.7	84.3	85.6	86.4	86.9	86.1	85.1	83.2	79.7	77.2	75.7	74.8	74.2	73.8	73.5	740	66.8	77.9	91.3	
0.5 m			71.2	71.0	70.8	70.5	70.3	69.7	71.4	77.9	82.8	85.8	87.4	88.4	89.2	89.8	88.7	87.0	84.0	79.0	76.1	74.5	73.5	72.6	72.4	72.0	730	64.7	78.3	94.0	

SUMMARY OF METEOROLOGICAL OBSERVATIONS
HOURLY DATA
JANUARY 1968

Exposure	Site	Monthly Ranges of Air Temperature by Hour (°F)																								Monthly Summary*
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	16	19	20	21	22	23	24	
46.0 m		4.7	4.8	4.0	5.0	5.3	5.0	4.0	6.0	5.9	6.5	5.3	3.5	6.0	5.0	5.8	6.3	6.0	3.9	2.3	2.9	2.9	3.2	3.9	3.2	
28.5 m		This level was not instrumented for air temperature at this time																								
26.5 m		5.2	5.8	6.6	8.3	7.1	7.1	10.2	9.4	7.6	4.9	3.8	3.7	3.9	3.7	5.8	7.9	7.3	6.8	3.7	3.3	2.5	2.4	5.0	4.2	
13.5 m		7.0	6.6	7.2	9.1	8.7	8.0	8.0	9.0	6.5	6.8	4.9	4.1	4.5	5.8	6.0	6.0	6.0	6.5	5.8	5.4	5.0	5.1	5.5	6.5	
8.0 m		This level was not instrumented for air temperature at this time																								
4.0 m		This level was not instrumented for air temperature at this time																								
2.0 m		5.3	6.7	6.0	8.0	8.0	9.0	8.1	6.7	5.5	6.5	5.5	5.0	5.1	6.0	6.1	5.7	4.9	5.0	5.0	4.3	5.0	4.9	5.3	5.9	
1.0 m		5.3	6.7	5.9	7.2	7.9	8.2	8.1	6.3	4.6	5.2	5.1	6.0	5.5	5.9	6.0	5.9	4.2	4.8	5.0	3.9	4.5	4.5	5.0	4.9	
0.5 m		5.5	6.1	6.0	7.6	8.0	7.9	8.2	6.0	4.5	5.1	5.0	5.5	5.5	7.0	6.0	5.1	4.2	4.5	4.9	3.9	4.5	4.1	5.0	4.3	

* No monthly summary was computed for the ranges.

46.0 m		4.5	4.2	5.0	5.8	3.6	5.0	6.8	8.0	6.5	3.9	4.9	3.4	4.5	5.4	7.0	6.2	6.5	5.0	3.0	2.2	4.1	3.3	3.6	4.2	
30.0 m		5.7	5.9	6.3	7.0	4.2	5.8	7.9	8.2	6.5	4.3	4.6	4.9	4.5	4.9	8.0	7.3	6.6	5.0	2.9	2.4	4.0	5.9	3.7	4.4	
13.5 m		6.6	7.3	7.0	8.1	7.2	7.5	9.3	7.5	6.8	5.1	4.8	5.0	8.3	6.3	7.9	7.7	6.2	4.7	2.3	2.5	4.0	4.2	4.8	5.2	
0.5 m		8.9	8.5	9.1	10.4	9.5	10.6	10.0	7.0	7.7	6.0	5.8	7.2	9.8	7.2	8.7	7.9	5.1	3.2	4.3	6.0	6.7	6.7	7.0	7.5	

SUMMARY OF METEOROLOGICAL OBSERVATIONS
HOURLY DATA
JANUARY 1968

Exposure	Monthly Means of Relative Humidity by Hour (%)																								Monthly Summary																			
	Site	Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	No. of Obs.	Min.	Mean	Max.														
Albrook (Forest site)	46.0 m	82	82	83	83	84	82	82	78	69	62	59	55	53	53	52	53	56	62	68	71	75	76	77	78	697	42	71	97															
	28.5 m								This level was not instrumented for relative humidity at this time																																			
	26.5 m	90	91	91	91	91	91	91	86	75	68	64	62	60	59	59	60	63	60	76	82	87	88	90	90	90	622	52	78	94														
	13.5 m	91	92	92	92	92	93	93	92	80	71	67	63	61	60	61	62	65	70	77	82	86	89	89	90	90	729	47	79	97														
	8.0 m									This level was not instrumented for relative humidity at this time																																		
	4.0 m									This level was not instrumented for relative humidity at this time																																		
	2.0 m	95	95	95	95	96	97	97	97	95	86	78	71	66	63	63	66	72	77	82	87	89	92	92	93	94	739	44	84	100														
	1.0 m	94	94	95	95	96	97	96	95	89	81	75	70	67	66	68	70	75	80	84	88	90	92	92	94	94	740	50	85	100														
	0.5 m	95	96	96	97	97	98	97	96	91	84	78	74	72	72	73	74	70	82	85	88	91	92	92	94	94	732	55	87	100														
	Chiva Chiva (Open site)	46.0 m	84	85	85	85	86	86	86	84	80	72	66	60	58	56	56	58	61	67	74	78	81	81	82	83	727	46	74	95														
30.0 m		85	85	86	87	87	87	87	82	73	66	60	58	55	54	55	57	61	68	74	78	81	82	83	83	740	42	74	98															
13.5 m		86	87	87	87	88	89	89	81	71	63	58	55	53	52	53	55	59	67	73	78	81	82	84	84	740	40	73	98															
0.5 m		92	92	92	93	93	94	94	92	82	72	64	60	58	55	54	55	57	63	71	79	84	88	90	90	684	42	77	100															

SUMMARY OF METEOROLOGICAL OBSERVATIONS
HOURLY DATA
JANUARY 1968

Exposure	Site	Code ¹	Monthly Means ² of other Elements by Hour																								Monthly Summary			
			01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	No. of Obs.	Min.	Max.	
Albrook (Forest site)	WB (2.0 m)		70.3	70.2	69.9	69.6	69.5	69.5	69.7	71.4	73.7	73.9	74.2	74.4	74.1	74.2	74.2	73.9	73.7	72.5	71.7	71.2	70.9	70.9	70.5	70.4	743	65.1	71.8	77.1
			70.7	70.5	70.2	69.9	69.8	69.9	71.8	74.1	74.8	75.3	75.9	76.4	76.3	76.5	75.8	75.0	73.6	72.4	71.8	71.5	71.3	71.0	70.8	733	65.2	72.7	83.0	
	BP	.776	.763	.750	.745	.750	.762	.779	.798	.809	.812	.802	.780	.754	.729	.708	.708	.710	.725	.743	.763	.782	.791	.792	.787	736	.660	.763	.840	
	P1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	
	P2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	
	P4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	

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Chiva Chiva (Open site)	WB (0.5 m)	69.1	69.4	69.2	69.1	69.0	68.6	69.7	73.8	75.7	76.0	76.1	76.4	76.1	76.2	75.7	74.9	74.0	72.1	71.4	71.2	70.9	70.5	70.2	70.0	684	61.5	72.3	86.5
	BP	.873	.858	.846	.842	.847	.862	.882	.899	.913	.914	.903	.882	.855	.826	.811	.806	.810	.825	.845	.865	.884	.892	.890	.885	739	.745	.863	.950
	FS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00

WB - Wet bulb temperature (°F)
BP - Barometric pressure (in. of Hg minus 29.0)

PS - Precipitation at 1.0 m. in open area (in.)
P1 - Precipitation at 46.0 m. above canopy (in.)

P2 - Precipitation under full canopy (in.)
P4 - Precipitation under open canopy (in.)

²Monthly means of precipitation are computed for precipitation days. Precipitation totals are substituted for the mean in the monthly summary.

SUMMARY OF METEOROLOGICAL OBSERVATIONS
HOURLY DATA
JANUARY 1968

Exposure	Site Code ¹	Monthly Ranges ² of other Elements by Hour																								Monthly Summary*
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
A: Brook (Forest site)	WB (2.0 m)	4.0	5.0	5.2	5.4	5.4	6.3	8.0	6.0	3.3	4.1	4.2	6.0	4.7	5.0	7.1	6.0	6.0	5.2	4.2	4.0	3.5	4.2	4.2	4.0	
		4.7	5.1	4.7	5.1	6.2	6.6	8.5	6.0	2.9	5.9	5.0	5.7	7.5	7.4	8.5	9.0	6.0	4.8	3.8	4.1	3.3	3.9	4.7	4.2	
		.070	.070	.080	.080	.080	.080	.130	.075	.070	.060	.095	.110	.110	.120	.090	.180	.105	.100	.090	.105	.100	.095	.080	.070	
		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	P1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	P2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	P4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

* No monthly summary was computed for the ranges.

Chiva Chiva (Open site)	WB (0.5 m)	5.1	5.9	7.1	7.0	7.1	8.3	7.5	4.5	4.0	4.5	5.7	5.0	5.9	6.2	5.0	4.5	5.0	4.0	4.3	5.7	5.4	6.5	4.8	4.7	
		.065	.085	.095	.085	.090	.085	.090	.080	.075	.070	.080	.100	.135	.100	.095	.105	.130	.125	.095	.090	.085	.070	.075	.065	
		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

WB - Wet bulb temperature (°F)
BP - Barometric pressure (in. of Hg minus 29.0)

PS - Precipitation at 1.0 m. in open area (in.)
P1 - Precipitation at 46.0 m. above canopy (in.)

P2 - Precipitation under full canopy (in.)
P4 - Precipitation under open canopy (in.)

² Monthly ranges of precipitation are computed for precipitation days.

SUMMARY OF METEOROLOGICAL OBSERVATIONS
HOURLY DATA

JANUARY 1968

Exposure	Monthly Means of Wind Speed by Hour (miles/hr.)																								Monthly Summary						
	Site	Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	N of Obs.	Min.	Mean	Max.	
		39.0 m	4	4	4	4	4	4	4	4	7	8	9	9	10	10	10	10	8	7	5	5	5	4	4	4	4	474	0	6	17
		32.0 m	4	4	4	3	3	3	3	3	5	6	7	7	8	8	7	7	6	5	4	4	4	4	4	4	4	725	0	5	15
		Albrook (Forest site)																													

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		26.5 m	6	5	5	5	5	4	4	5	7	9	10	10	10	10	9	9	8	7	7	6	6	6	6	6	6	742	0	7	20
		4.0 m	4	4	4	4	4	3	3	5	8	10	12	12	11	12	11	10	8	7	6	6	5	5	5	5	5	742	0	7	18
		Chiva Chiva (Open site)																													

ALBROOK (Forest site) JANUARY 1968

Relative Frequencies* of Wind Directions by Hour at 39.0 m.
(%)

Hr	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N											4.7		4.7											
NNE																								
NE										5.0	4.7	9.6	4.7	13.3	4.5	9.1								
ENE	4.7							4.7	5.0	15.0	4.7	4.7	9.6			13.6	9.1							
E										20.0		4.7	4.7		4.5	4.5	5.1							
ESE	4.7									5.0	4.7	4.7		9.1	9.1		9.1							4.7
SE										5.0	4.7	14.3		4.5	13.6	13.6	9.1							
SSE			4.7							5.0	5.0	9.6		4.5		4.5								
S										15.0	4.7		4.7		4.5	4.5	9.1							
SSW										5.0	9.6		9.6											
SW										10.0	4.7	4.7	4.7	13.6		4.5		9.1	4.5	4.7	9.6			
WSW	4.7									10.0	4.7	4.7	4.7	13.6		4.5		9.1						4.7
W	4.7	14.3	9.6	4.7	4.7			4.7	10.0	5.0	9.6	19.1	23.8		4.5	9.1		5.1	4.7	4.7				
WNW	23.8	14.3	23.8	42.9	19.1	28.7	19.1	23.8	10.0	5.0	4.7	4.7	4.7	13.6	13.6	9.1	4.5	13.6	14.3	14.3	4.7	14.3	23.8	38.2
NW	42.9	47.7	52.5	33.4	62.1	42.9	62.1	42.9	25.0	20.0	14.3	14.3	19.1	13.6	13.6	22.7	31.8	22.7	28.7	28.7	52.5	57.2	33.4	
NNW	14.3	23.8	9.6	4.7	4.7	14.3	9.6	9.6	10.0	5.0	4.7	4.7	5.6	13.6	18.2	4.5		9.1	14.3	19.1	14.3	9.6	9.6	
CALM				4.7	4.7	4.7																		

* Note: Due to rounding, percentage totals do not equal 100%.
This data represents only the last 20 days of the month.
The instrument was installed as of 10 January, 1330 hours.

IMPRESORA, S. A. 1968

CHIVA CHIVA (Open site) JANUARY 1968

Relative Frequencies* of Wind Directions by hour at 46.0 m.
(%)

Hr. Dir.	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N		5.6	5.6										5.0	5.8				5.0	5.0					
NNE							5.6		11.1	6.3		15.0	10.0	11.8	11.8	12.5	5.0	10.0		5.0				
NE							5.6			6.3	18.6	5.0	5.0	5.8		12.5	10.0		5.0					
ENE																6.2	5.0							
E											6.3										5.0			
ESE							5.6		5.6															
SE										6.3		5.0			11.8			10.0	5.0					
SSE								5.6				5.0												
S																								
SSW																								
SW										6.3					5.8				5.0				5.2	
WSW							5.6	5.6						5.8	11.8	12.5		5.0	5.0	5.0				
W	5.6								5.6					11.8	5.8		5.0	5.0		5.0				
WNW	16.6	27.8	61.0	5.6	5.6		22.2		5.6		12.4			11.8	5.8	12.5	10.0	5.0	10.0	5.0		10.5	16.6	16.6
NW	27.8	66.5	33.4	33.4	4.9	35.8	16.6	27.8	22.1	24.9	12.4	30.0	35.0	17.7	17.7		20.0	15.0	15.0	15.0	30.0	26.3	33.3	27.7
NNW	45.9				61.0	4.4	61.0	38.8	61.0	49.5	50.1	40.0	45.0	29.5	29.5	43.9	40.0	35.0	50.0	60.0	65.0	58.0	49.5	55.5
CALM																								

* Note: Due to rounding, percentage totals do not equal 100%.
This data represents only the last 20 days of the month.
The instrument was installed as of 10 January, 1200 hours.

CHIVA CHIVA (Open site) JANUARY 1968

Relative Frequencies* of Wind Directions by Hour at 30.0 m.
(%)

Hr. Dir.	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N	9.7	19.4	29.0	9.7	16.1	16.1	16.1	12.9		12.9	3.2	6.4	6.4	12.9	6.4	3.2	6.4	6.4	3.2	9.7	9.7	9.7	10.1	13.4
NNE	22.6	12.9	6.4	16.1	19.4	19.4	9.7	9.7	16.1	9.7	3.2	6.4	22.6	6.4	12.9	16.1	12.9	19.4	19.4	9.7	19.4	25.8	23.4	23.4
NE	3.2	6.4	3.2	9.7			6.4	9.7	19.4	3.2	16.1	19.4	16.1	12.9	12.9	12.9	22.6	12.9	16.1	19.4	6.4	3.2	3.3	
ENE																								
E				3.2			3.2	3.2		9.7	9.7	4	3.2	3.2	6.4						3.2			
ESE																3.2								
SE			3.2						3.2		3.2													
SSE										3.2														
S		3.2				6.4																		
SSW						3.2	3.2																	
SW						3.2	3.2															3.2		
WSW						3.2																		
W	3.2			3.2	9.7																			3.3
WNW	25.8	32.2	22.6	25.8	25.8	16.1	19.4	29.0	12.9	6.4	9.7	9.7	6.4	9.7	16.1	12.9	6.4	16.1	19.4	19.4	22.6	23.4	26.7	
NW	29.0	19.4	32.2	25.8	25.8	29.0	22.6	25.8	41.9	22.6	32.2	32.2	35.5	22.6	16.1	41.9	29.0	35.5	41.9	38.7	38.7	35.5	30.0	30.0
NNW	6.4	3.2		3.2		3.2	12.9		3.2	25.8	16.1	12.9	3.2	19.4	22.6	16.1	12.9	12.9	3.2	3.2	3.2		6.6	3.3
CALM		3.2		3.2	3.2		3.2			3.2				3.2				3.2					3.2	3.2

* Note: Due to rounding, percentage totals do not equal 100%.

197/88081, B. A. 01115

CHIVA CHIWA (Open site) JANUARY 1968

Relative Frequencies* of Wind Directions by Hour at 4.0 m.
(%)

Hr	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N			5.6	11.1	5.6		5.6		5.6		12.4	5.6						5.0	10.0	5.0	15.0	10.5	5.5	5.5
NNE	5.6			11.1	5.6	5.6	16.6		5.6		18.6	20.0	10.0	17.7	5.8	12.5	20.0				5.0	5.2	5.5	
NE							5.6			6.3		5.0	5.0			6.2			10.0					
ENE	5.6				5.6	5.6				6.3	6.3									10.0				5.5
E				5.6			5.6			12.4					5.8				5.0					
ESE			5.6									5.0		5.8			5.0	10.0		5.0				
SE		5.6		5.6				5.6	5.6	6.3							5.0						5.5	
SSE								16.6					5.0			6.2								
S																								
SSW															5.0		5.0							
SW														5.8	5.8	6.2		5.0			5.0			5.5
WSW									5.6					5.8		6.2		10.0					5.5	
W	5.6									12.4				5.8			10.0	5.0		10.0				
WNW	22.1	5.6	16.6		5.6	16.6						5.0		5.8	11.8	5.2		5.0	10.0		5.0	5.2	5.5	5.5
NW	11.1	44.4	33.4	22.1	49.9	27.8	11.1	38.8	33.4	24.9	31.2	15.0	25.0	11.8	29.5	6.2	10.0	35.0	25.0	20.0	20.0	35.9	27.7	55.5
NNW	44.4	38.8	27.8	44.4	27.8	44.4	38.8	33.4	44.4	31.2	31.2	40.0	50.0	41.0	35.4	50.2	45.0	25.0	40.0	50.0	50.0	42.2	38.8	16.6
CALM	5.6	5.6	11.1				5.6																5.5	5.5

* Note: Due to rounding, percentage totals do not equal 100%.
This data represents only the last 20 days of the month.
The instrument was installed as of 10 January, 1200 hours.

SUMMARY OF NON HOURLY DATA

JANUARY 1968

Summary of Elements with Non-hourly Frequencies of Observation							
Site	Element, Units and Exposure	Description	Number of Obs.	Minimum Value	Mean or Total Value	Maximum Value	
Albrook (Forest site)	Evaporation ³ (in. at 4 levels)	Piche (46.0 m)	26	0.512	16.783*	0.982	
		Piche (26.5 m)	28	0.012	10.923*	0.640	
		Piche (13.5 m)	29	0.043	4.855*	0.281	
		Piche (0.5 m)	26	0.012	2.708*	0.189	
	Precipitation from Raingauge Network ² (in. at 1.0 meters)	Gauge # 1	0	0.00	0.00*	0.00	
		Gauge # 2	0	0.00	0.00*	0.00	
		Gauge # 3	0	0.00	0.00*	0.00	
		Gauge # 4	0	0.00	0.00*	0.00	
		Gauge # 5	0	0.00	0.00*	0.00	
		Gauge # 6	0	0.00	0.00*	0.00	
Gauge # 7		0	0.00	0.00*	0.00		
Gauge # 8		0	0.00	0.00*	0.00		
Chiva Chiva (Open site)	Evaporation ³ (in. at 0.5 meters)	Piche	31	0.317	15.792*	0.683	
		Pan	24	0.041	5.501*	0.362	
	Minimum Grass temp ³ (°F at grass tips)	None		26	39.8	49.3	66.0

2 - Six hourly observations

3 - Daily observations

* Total Values

DOCUMENT CONTROL DATA - R & D

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13. ABSTRACT This report contains detailed microclimatic data for January 1968 from specific sites in the Panama Canal Zone and vicinity. The data are presented in tabular form, summarized for hourly and/or daily observations from surface to 46-meter levels. Elements listed are: temperature, pressure, precipitation, wind speed and direction, relative humidity, and evaporation.			

KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Climate Microclimatology Tropic Environment Humid Tropics Panama Canal Zone Microclimatology Data Base						