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LOW RELATIVE HUMIDITY IN THE ATMOSPHERE

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Research Directorate  
Research, Development, and Engineering Center

January 1989



**U.S. ARMY MISSILE COMMAND**

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19. ABSTRACT (Continue on reverse if necessary and identify by block number) <p>Relative humidities below 3 percent are rare and last less than 24 hours. The limitation on the duration of extreme relative humidities exists because of the diurnal cycle. The lowest relative humidities are associated with high temperatures. When air temperature decreases after sunset, the relative humidity increases because there is not a comparable decrease of water vapor content. On a day with a minimum relative humidity of 3 percent, the maximum in the diurnal cycle should be about 8 percent. When ambient relative humidity is 3 percent, the relative humidity in a hot storage container may be only 1 percent. The maximum in the diurnal cycle in the container should then be about 7 percent.</p> <p>The most extensive areas of low relative humidity are in northern Africa and southwestern Asia. Typical afternoon minima are in the range 10 to 20 percent over a major portion of these deserts in spring and summer. In small areas the average afternoon minimum in the driest months is slightly less than 10 percent. (Continued on page ii)</p>					
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Block 19 (Continued): In some parts of the world, very rapid changes of relative humidity occur in certain weather situations. At coastal stations with well-developed sea breezes, relative humidities may increase from 10 percent to 80 percent in one or two hours. In the lee of mountain ranges, abrupt decreases of a comparable magnitude can occur with chinook (foehn) winds.

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## 1. INTRODUCTION

The Glossary of Meteorology [1] and other standard references [2, 3] define relative humidity as the ratio of the actual vapor pressure of air to its saturation vapor pressure. Tables and formulas for determining vapor pressure and saturation vapor pressure from temperature and dew point may be found in several references [2, 3, 4]. The dew point is the temperature to which a given parcel of air must be cooled at constant pressure and constant water vapor content in order for saturation to occur [1]. Dew points in most standard meteorological data are calculated from measurements with psychrometers to determine wet-bulb and dry-bulb temperatures. Procedures for evaluating psychrometric data are also described in reference books [3, 4].

A few investigators prefer to define relative humidity as the ratio of mixing ratio to saturation mixing ratio [4]. The differences between results of computations with this definition and with the definition using ratios of vapor pressures are usually quite small. At very high and very low relative humidities, differences between the two methods are negligible. Largest differences occur at relative humidities near 50 percent where the two methods give relative humidities which differ by slightly more than two percent if temperatures are high.

Because low relative humidities are the main concern in this report, the method of computation has a particularly small influence on results. Therefore, it is not a problem that the method of computation is not mentioned in many of the references cited. Computations for Section 4 of the present letter report were based on the definition in the Glossary of Meteorology [1].



## 2. VARIATIONS OF RELATIVE HUMIDITY

2.1 Diurnal Variations. The diurnal changes of relative humidity in the lowest few meters depend upon the fluctuations of temperature and water vapor content near the surface.

2.1.1 Temperature. The daily temperature wave can be associated with large differences between relative humidities near sunrise and in the afternoon even if the dew point remains nearly constant throughout the day. Differences of  $17^{\circ}\text{C}$  between maximum and minimum temperatures are not unusual in hot, dry climates in summer [2, 5, 6], and differences of  $15^{\circ}\text{C}$  are common. The saturation vapor pressure of air at  $313^{\circ}\text{K}$  is more than twice as large as the saturation vapor pressure of air at  $298^{\circ}\text{K}$ . Therefore, if a parcel of air at  $313^{\circ}\text{K}$  has the same water vapor content as another parcel at  $298^{\circ}\text{K}$ , the warmer air will have a relative humidity less than half as large as the relative humidity of the cooler air.

2.1.2 Water Vapor Content. The classical pattern of diurnal variation of water vapor content is much more complicated than the pattern of temperature variation [7]. A double oscillation in the daily fluctuation of dew point seldom has a magnitude more than a few degrees Celsius. A minimum dew point coincides with the minimum temperature in the morning. Evaporation of water vapor from the ground after sunrise is accompanied by a decrease in stability with surface heating. Initially this decrease is small enough that the upward transfer of water vapor is confined to a shallow layer near the ground. Accumulation in this layer produces a maximum of water vapor between 0800 and 1000 hours local

time. Continued surface heating produces so much thermal instability that vertical exchange distributes available water vapor through a very deep layer, and the ground becomes dry. A second minimum dew point occurs near the time of the maximum air temperature. Convection diminishes in late afternoon and early evening, and a second maximum dew point occurs a few hours after sunset. During the night there is a flux of water vapor from the air to the cooler ground, and the dew point of the air decreases until sunrise.

The atmosphere does not always follow the classical pattern. In many locations, the afternoon minimum is hardly noticeable. In hot, dry regions the afternoon minimum is often lower than the morning minimum and is the absolute minimum for the 24 hours. The morning minimum may not show up at all in the mean data for very hot seasons [5].

2.1.3 Relative Humidity. Minimum relative humidity occurs near the time of maximum temperature throughout the year at most sites. The diurnal variation is particularly large in hot, dry regions where the hottest part of the day coincides with a significant minimum of water vapor content.

2.2 Sea Breezes. Sea breezes and lake breezes sometimes produce fast changes in temperature and humidity. According to Landsberg [8], this is particularly true at tropical coastal stations where sea breezes occur on more than 70 percent of the days. Typically, temperatures fall 10°C in less than an hour in the middle of the afternoon. Relative humidity may rise from less than 10 percent to more than 80 percent during this time. Landsberg states that sea breezes do not extend more than 50 mi (80 km) inland from the ocean.

Steedman and Ashour [9] studied 11 days with sea breezes in northwestern Saudi Arabia in 1972. Near Badr Hunayn 25 km from the coast, the sea breeze was associated with abrupt changes regularly. On 2 July from 1500 to 1600 the temperature fell from 41°C to 38°C, and the dew point rose from 3°C to 17°C. On a few days the pattern showed two abrupt changes at Badr Hunayn. For example, on 1 July the dew point rose from -9°C to 3°C in two hours and then decreased by about 1°C in the next hour. This was followed by another abrupt increase to 15°C in another hour and a continued rise to 22°C during the next two hours. Temperatures changed more slowly. The relative humidity increased from 5 percent to 57 percent in the six hours from 1500 to 2100 on 1 July 1972 at Badr Hunayn. The explanation of the two different abrupt changes is that part of the air followed a longer trajectory over land.

Steedman and Ashour [9] looked for evidence of sea breezes farther inland in northwestern Saudi Arabia. At 150 km inland near Al Madinah on 26 June 1972, temperature fell from 40°C to 37°C, and the dew point rose from -5°C to 4°C in the 15 minutes from 1845 to 1900. Sea breezes often did not reach 225 km inland near Al Hanakiyah, and when they did, it was late at night. Changes of dew point were only a few degrees, and temperature changes were very small.

2.3 Drylines. Narrow zones in which strong moisture gradients exist are called drylines if they are not associated with a frontal zone. These boundaries separate continental-tropical air with a trajectory over the southwestern United States from maritime-tropical air from the Gulf of Mexico. Drylines usually occur over Texas and Oklahoma in spring and early summer. Dew point gradients normal to a surface dryline may be as large as 3.5°C/km. Temperature gradients are very small, and densities are effectively constant across the dryline [10, 11]. Dew points can thus change 8°C or more within a three-hour period when a dryline passes.

2.4 Topographic Influences. Relative humidities are typically higher on the windward side of mountains than on the leeward side [12]. An example is the difference in humidities at stations on opposite sides of the Cascade Mountains in the state of Washington which is in the the middle latitude westerlies. Mean afternoon relative humidities in July are 24 percent at Yakima and 25 percent at Spokane. The corresponding value is 49 percent at both Olympia and Seattle [13]. Morning mean relative humidities in July are 64 percent and 65 percent at Olympia and Seattle, while they are 38 percent and 35 percent at Spokane and Yakima.

Weather situations with very low relative humidities occasionally occur in association with strong winds in the lee of most mountain ranges. These winds are called foehns in the Alps, but localized names are used in many other areas [1, 14]. They are called chinooks east of the Rocky Mountains in North America. These warm and dry winds may produce temperatures of 15°C to 20°C and relative humidities as low as 10 percent in the middle of winter [8]. Chinooks are expected to be more frequent than once per year in parts of Montana, Wyoming, and Colorado [15] and in Alberta, Canada [16]. An important effect is the melting and evaporating of snow. A foot of snow may disappear within a few hours [1]. Chinooks seldom occur in summer.

Some reports of chinooks in Colorado describe rapid changes and low relative humidities. Riehl's [17] investigation at Fort Collins includes one case where relative humidity dropped from 90 percent to 50 percent in 3 hours and decreased to 22 percent in the next hour. Beran's [18] study in the Denver area contains a case where relative humidity fell below 10 percent in a chinook. The most rapid changes of temperature and humidity are not always associated with the strongest winds.

### 3. GEOGRAPHICAL DISTRIBUTION

3.1 Africa. The Sahara in northern Africa is the largest major desert area in the world. It contains 3.5 million square miles [19, 20]. This is seven times as large as the North American desert area in the United States and Mexico. The Sahara is fifteen times as large as a desert in the southwestern part of Africa.

The central Sahara has average midday relative humidities of 20-30 percent in winter and 10-20 percent in summer according to Howe et al. [21]. A map by Griffiths and Soliman [22] for July shows a large area in the Sahara where mean relative humidities are below 20 percent at 1300 GMT. Rumney's [23] map for April contains two areas in the Sahara where midday relative humidities are less than 10 percent. More than half of the desert has mean relative humidities below 20 percent at midday in April. Extremes below 5 percent can occur occasionally in most parts of the desert at midday [22].

In 1983 the Meteorological Office of Great Britain published statistics for Africa [24]. These statistics include average relative humidities for two times of day for each month. One average relative humidity is usually for a time near sunrise, and the other is for sometime in the middle of the day. The exact time of observation varies from station to station. Times in the tables from the Meteorological Office refer to the nearest meridian which is always in whole multiples of  $7\frac{1}{2}^\circ$  east or west of Greenwich.

Relative humidities less than or equal to 12 percent were extracted from the African data [24] and included in Table 1. Windhoek, Namibia, is the only station from the desert in the southwestern part of Africa. A slightly higher threshold would have included very few additional stations from the southern arid region which generally has higher relative humidities than the northern desert of Africa.

Table 1 shows that very low relative humidities occur throughout northern Africa. Low means occur most frequently in late winter and in spring. Mean relative humidities are only 9 percent in March at 1200 at two stations in Mali. In Nigeria at 1530, 9 percent mean relative humidity occurs at 2 stations in February and at one station in March. It should be remembered that the values in Table 1 depend upon the years in the period of record and the time of the recorded observation. For example, Ouallene, Algeria, has a mean relative humidity of 12 percent at 1200 in June and July according to data published in 1983 [24]. Statistics from earlier data give 7 percent mean relative humidity at 1300 in June and July at Ouallene [22, 25].

3.2 Asia. The areal extent of low relative humidity is smaller in Asia than in Africa, but extremely low values of relative humidity do occur in parts of southwestern Asia [21, 23, 26]. Mean relative humidities for midday are below 10 percent in small north central and south central portions of the Arabian Peninsula in April [23]. Relative humidities of almost zero have been observed in the western desert of Iraq [26]. The Iranian desert is the largest absolutely vegetationless desert in the world [21]. Relative humidities as low as 1 percent have been measured in the Thar desert in India [21].

3.3 Australia The Australian desert covers 1.3 million square miles [19, 20]. Afternoon relative humidities are below 20 percent in much of the interior [21]. Relative humidities in most of the Australian desert are somewhat higher than those in the most arid parts of the Sahara and southwestern Asia. Mean data similar to those used for Africa are available for Australia [27]. Only Mundiwindi (23°52'S, 120°10'E, 1840 ft) in Western Australia has any hourly means as low as 12 percent in this set of data. Mean relative humidities at 1500 at Mundiwindi are 13 percent, 12 percent, 11 percent, and 15 percent in September, October, November, and December, respectively. The mean relative humidity is 15 percent at 1530 in September at Warburton Ranges (26°05'S, 126°36'E, 1200 ft). All other hourly means in the data from the Meteorological Office of Great Britain for Australian stations [27] are above 15 percent.

3.4 North America. Parts of the desert in North America are extremely arid. Midday relative humidity in most of the extremely arid region is within the range 15-30 percent [21]. According to Climates of the States [28], mean relative humidities are lowest at stations in Nevada and Arizona. This publication lists a mean relative humidity of 10 percent for June and 12 percent for May and September at 1600 at Las Vegas. Winslow and Yuma have means of 12 percent at 1700 in June. In May at 1700, the mean is 12 percent at Tucson and 11 percent at Yuma.

Individual humidities are sometimes very low. Gringorten and Sissenwine [25] established a diurnal cycle for Death Valley, California, on days when the maximum reached at least 120°F (48.9°C). This is the upper one-percentile of daily maximum temperatures in Death Valley. On these very hot days the relative humidity is about 8 percent in the early morning, and it gradually falls to 3 percent where it remains for several hours in the afternoon.

Engineering Weather Data [29] gives 1 percent summer design temperatures for air conditioning for stations throughout the United States. These are upper 1 percent thresholds for all temperatures and not just for maximum temperatures such as those discussed in the previous paragraph for Death Valley. Mean coincident wet bulb temperatures are given for each of these 1 percent temperatures. Several stations in the arid region of California have relative humidities  $\leq 10$  percent during the hottest summer hours. The lowest is observed at Bishop where the hottest hours have a mean relative humidity of 4 percent. Tucson, Arizona, has a mean of 10 percent during the hottest hours. Relative humidities average 7 or 8 percent during the hottest hours in Nevada at Las Vegas, Indian Springs, and Desert Rock Camp.



#### 4. DETAILED DATA

4.1 Yuma, Arizona. Yuma has been the subject of much research because it has one of the best sets of observations over a long period of time among hot, dry stations.

The Aerophysics Group here in Research Directorate has also studied data from Yuma (32°39'N, 114°37'W, 63 m elevation). Hourly surface weather data were obtained on magnetic tape from the United States Air Force Environmental Technical Applications Center (ETAC). The period of record was 1 January 1973 to 31 December 1986, and it was found that approximately three percent of these observations were missing or obviously erroneous. When there was doubt, it was usually assumed that an observation was correct.

The 3 percent (of the 122712 observation times) with missing or erroneous data were replaced by interpolation. Simple linear interpolation was used if the gap consisted of only one or two hours. Values in longer gaps were filled in so that a realistic diurnal variation existed in relation to the observed data during the day. Only one entire day was missing, and an interpolation was made between the preceding and following days.

It should be noted that dew points can change more than 10°C within an hour if there is a shift in the direction of wind. Williams' [30] report showed one example where the dew point increased from 25°F (-3.9°C) to 50°F (10°C) within an hour. Within two hours the relative humidity rose from 5 percent to about 30 percent. The rapid rise was caused by advection of moist air from the Gulf of California.

Table 2 contains hourly mean relative humidities for Yuma, Arizona, for each month of the year. These humidities show general agreement with data from other studies of Yuma. An exact correspondence is not expected because of differences in the period of record.

Malcher and Schönwiese [31] have shown that the Yuma record is probably not homogeneous for the last 100 years. Cayan and Douglas [32] examined temperatures from several stations in the southwestern United States. They followed the common practice of defining the mean temperature for each day as the maximum plus the minimum divided by 2. Yuma was much less urbanized than many of the other stations in their study. Nevertheless, positive linear trends of mean temperatures for the years 1933-1980 at Yuma were found to be  $0.009^{\circ}\text{C}/\text{yr}$  in January and  $0.019^{\circ}\text{C}/\text{yr}$  in July according to Cayan and Douglas' Table 5. A study in another part of Arizona revealed that relative humidities have decreased significantly during the years 1896-1984. Observations from Phoenix show that the influence of decreasing dew point is smaller than the influence of increasing temperature [33]. Relative humidity at Phoenix in summer from 1948 to 1984 decreased more at 0200 MST than at 1400 MST [34].

The diurnal variation of mean relative humidity is large at Yuma during every month. Minima occur from 1500 MST to 1700 MST and maxima from 0600 MST to 0800 MST. The lowest mean relative humidity in Table 2 is 13.5 percent which occurs at 1700 MST in June. The hourly mean in June reaches 38.7 percent at 0600 MST. April, May, and June have afternoon mean relative humidities below 20 percent.

Table 3 contains the minimum relative humidity by month and hour at Yuma for the years 1973-1986. Each month had relative humidities below 10 percent. The lowest was 2.8 percent at 1200 MST in June. The minimum at 0800 MST in June was 8.8 percent. This is in good agreement with AR 70-38 [35] which shows that a day with a 3 percent minimum relative humidity is expected to have a maximum of 8 percent. These values of 3 percent and 8 percent relative humidity are associated with operational 1 percent extreme temperatures for the hottest month in the hottest areas [2, 25].

Tables 4-15 are hourly cumulative frequency distributions of relative humidity at Yuma for each month during the years 1973-1986. At 1700 MST, the relative humidity is less than 14 percent almost two-thirds of the time in June and about one-half the time in May. From 1500 MST to 1700 MST in June, one-tenth of relative humidities are below 8 percent. Relative humidities above 40 percent are rare in the afternoon in May and June.

4.2 Western Sahara. Magnetic tapes with data from five stations in the Sahara were obtained from ETAC. This section contains mean and minimum relative humidities for the years 1973-1986 at these five stations. Frequency distributions of relative humidity for the fourteen-year period are given for the month with the lowest afternoon mean relative humidity at each station.

These five African stations have numerous missing observations, especially at night. Even during the day, records are much poorer than the record for the same period at Yuma, Arizona. In Salah, an oasis in Algeria, has the best record of the five stations. Sixteen percent of the observations at In Salah are missing at noon, the hour with the best record for 1973-1986 at this station. Observations are only available every three hours except for a few sporadic reports at other hours. No attempt has been made to interpolate missing observations as was done for Yuma. Because of the large number of missing observations, the diurnal pattern of observed minima in the tables may not be totally realistic. All times in the Tables 16-30 are Greenwich Mean Times (GMT).

July has the lowest mean relative humidity at In Salah, Adrar, and Timimoun in Algeria. These three stations are located in a very arid region where the annual precipitation is less than 25 mm. Less than 1 mm falls in each of the summer months (June, July, and August). The largest amount of rain falls in December. Relative humidities are comparable in December and January, and they are higher in these two months than in the other ten months.

Tables 16 and 17 contain the mean and minimum relative humidities at three-hour time intervals for In Salah (27°15'N, 2°31'E, 268 m). Mean relative humidities at In Salah in July are rather low throughout the day. The highest in July is 22.8 percent at 0600 GMT, and the lowest is 12.2 percent at 1500 GMT. The two highest means in Table 16 are 55.6 percent at 0600 GMT in January and 55.3 percent at 0600 GMT in December.

Table 18 contains frequency distributions of relative humidity for In Salah in July. More than half of these relative humidities are below 20 percent except at 0600 GMT when 41.78 percent of relative humidities are less than or equal to 20 percent. In the afternoon from 1200 to 1800 GMT, more than one-fifth of relative humidities are below 10 percent. At noon, no relative humidities are above 30 percent in July at In Salah.

Tables 19 and 20 are the mean and minimum relative humidities for Adrar (27°53'N, 00°17'W, 262 m). Observations are very sporadic at night, and only the hours from 0600 to 1800 GMT are included in these two tables. Mean afternoon relative humidities are quite low throughout the summer at Adrar. Means at 1800 GMT are 11.7 percent, 10.4 percent, and 12.4 percent in June, July, and August, respectively. The corresponding means for 1500 GMT are 11.8 percent, 11.8 percent, and 12.3 percent. The mean at 0600 GMT at Adrar is only 19.9 percent in July. In winter, means are much higher. The highest is 66.8 percent at 0600 GMT in January.

The frequency distributions of relative humidity for July at Adrar in Table 21 show that Adrar is very dry. At noon, all relative humidities are less than 30 percent, and 97 percent are less than 20 percent. More than half of relative humidities are less than 20 percent at 0600 GMT. More than half are less than 10 percent at 1800 GMT.

Tables 22-24 are for Timimoun (29°15'N, 00°17'E, 312 m). Mean relative humidities are slightly higher at Timimoun than at Adrar. The lowest mean is 11.6 percent at 1500 GMT in July, and the highest is 69.5 percent at 0600 GMT in January. About one-half of relative humidities are below 20 percent at 0600 GMT in July. At 1500 GMT in July, almost 97 percent are below 20 percent, and all are less than or equal to 30 percent.

Timbuktu (16°44'N, 3°00'W, 264 m), Mali, is farther south. It has a climate typical of the equatorial regime [14] with a summer maximum of rainfall. The mean annual rainfall is 206 mm, and the mean for August is 93 mm [24]. The seasonal variation of relative humidity is also different at Timbuktu, as illustrated in Tables 25 and 26. Mean relative humidity is highest in August when the means for 0600 GMT and 1500 GMT are 74.5 percent and 38.0 percent, respectively. Lowest relative humidities are in April when the means for 0600 GMT and 1500 GMT are 27.1 percent and 13.1 percent. Mean afternoon relative humidities are below 20 percent from October through May. There is slight evidence for a double cycle in relative humidity during the year. November means are lower than those in October and December during most of the day.

Table 27 contains frequency distributions of relative humidity at three-hourly intervals for April at Timbuktu. At 1500 GMT almost nine-tenths of relative humidities are below 20 percent. At 0600 GMT relative humidity is below 20 percent less than one-fourth of the time. This driest month at Timbuktu is more humid than the driest month at In Salah, Adrar, and Timimoun.

Tables 28 and 29 show that Atar (20°30'N, 13°03'W, 229 m), Mauritania, has less annual variation of relative humidity than other stations examined in this section. Mean relative humidities at 0600 GMT are approximately twice as high as those at 1500 GMT in all months. The lowest and highest means at 1500 GMT are 15.1 percent in June and 21.6 percent in January. The lowest and highest at 0600 GMT are 30.1 percent in June and 45.8 percent in August. At both hours the variation is much less than the factor of 2 shown in the diurnal variation.

The annual variation of monthly mean relative humidity actually shows a double oscillation at Atar. Means in January and August are higher than those in June and October throughout the day. Mean relative humidities in June are lower than those in October except and 1200 GMT when both are 19.9 percent. Means in May and June are very close to each other, but those in June are slightly lower at most hours.

Table 30 contains frequency distributions at three-hour intervals for June at Atar. Approximately one-sixth of relative humidities are less than 20 percent at 0600 GMT. About five-sixths are less than 20 percent at 1500 GMT and 1800 GMT.

This analysis of five stations in the western Sahara shows that some caution is needed when using Yuma to represent the driest regions of the earth. The three Algerian stations have a bigger percentage of very low relative humidities in July in the afternoon than Yuma has in its least humid month. Furthermore, the diurnal variation during the least humid month is larger at Yuma than it is in the western Sahara.

## 5. ADDITIONAL COMMENTS

If an object is exposed to direct solar radiation or is stored in a container in the sun, the object may become much hotter than the ambient air temperature measured in a meteorological instrument shelter [6, 19, 35]. If there is no source of moisture, the resulting relative humidity will be lower than the relative humidity of the ambient air.

AR 70-38 contains a diurnal cycle of atmospheric conditions for one of the hottest days in a hot, dry climate. The minimum afternoon relative humidity is 3 percent. This cycle is accompanied by a cycle of conditions for storage and transit. A 3 percent ambient relative humidity in the afternoon is associated with a 1 percent relative humidity in storage because of the high induced temperature. This daily cycle shows rapid cooling at night and a maximum relative humidity of 7 percent in the container in the early morning hours.

It can be concluded that although relative humidities near 1 percent occur occasionally in the air and more frequently in storage containers, the durations are only a few hours. Relative humidities are expected to reach at least 7 percent in any 24-hour period.



Table 1. Mean Relative Humidities  $\leq 12\%$  in Africa [24]

Station (Elevation)	Latitude	Longitude	Time	Month	RH
Adrar (263 m)	27°53'N	00°17'W	1200	May	12
				June	12
				July	11
				August	12
Aoulef (289 m)	27°04'N	01°06'E	1200	May	12
				June	11
				July	10
				August	12
In Salah (293 m)	27°12'N	02°28'E	1200	July	11
				August	12
Ouallene (346 m)	24°36'N	01°14'E	1200	June	12
				July	12
Faya-Largeau (234 m)	18°00'N	19°10'E	1330	March	12
				April	12
Mongo (428 m)	12°11'N	18°41'E	1300	February	10
				March	11
Moundou (422 m)	08°37'N	16°04'E	1300	February	12
N'Djamena (295 m)	12°08'N	15°02'E	1300	February	10
				March	11
Pala (420 m)	09°22'N	14°55'E	1300	February	12
Gao (258 m)	16°16'N	00°03'W	1200	February	11
				March	9
				April	10
Hombori (287 m)	15°17'N	01°42'W	1200	March	12
Kayes (46 m)	14°26'N	11°26'W	1100	March	12
Kidal (462 m)	18°26'N	01°21'E	1200	March	11
				April	12
Ménaka (280 m)	15°52'N	02°13'E	1200	February	11
				March	9
				April	11
Mopti (268 m)	14°32'N	04°05'W	1130	March	12
Tessalit (493 m)	20°12'N	00°59'E	1200	April	12
Windhoek (1728 m)	22°34'S	17°06'E	1300	September	11
Agadez (498 m)	16°19'N	07°59'E	1230	March	12
				April	11

Table 1 (Continued)

Bilma (359 m)	18°41'N	12°55'E	1300	March	12
				April	10
				May	11
Maradi (369 m)	13°28'N	07°05'E	1230	January	12
				February	10
				March	10
Niamey (222 m)	13°29'N	02°10'E	1200	February	11
				March	11
Tahoua (386 m)	14°54'N	05°15'E	1230	February	11
				March	10
				November	12
				December	12
Bauchi (609 m)	10°20'N	09°50'E	1530	January	12
				February	10
Jos (1285 m)	09°52'N	08°54'E	1530	February	11
Katsina (517 m)	13°01'N	07°41'E	1530	February	10
				March	9
Nguru (344 m)	12°53'N	10°28'E	1530	February	12
				March	10
Potiskum (414 m)	11°42'N	11°02'E	1530	January	12
				February	9
				March	10
Sokoto (302 m)	13°01'N	05°15'E	1530	January	12
				February	9
				March	11
Atbara (348 m)	17°42'N	33°58'E	1430	March	12
				April	11
				May	11
				June	12
Dongola (228 m)	19°10'N	30°29'E	1400	April	12
El Obeid (575 m)	13°10'N	30°14'E	1400	February	12
				March	10
				April	11
Wadi Halfa (125 m)	21°55'N	31°20'E	1400	April	11
				May	12
				June	12
Dori (288 m)	14°02'N	00°02'W	1200	February	12

Table 2. Mean Relative Humidity by Month and Hour (MST)  
for Yuma, Arizona, during the Years 1973-1986

Hr	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
00	51.0	47.2	44.5	35.3	32.8	28.2	40.2	42.9	44.2	43.4	43.4	49.6
01	52.8	48.9	46.2	37.4	34.6	29.7	41.9	44.7	46.5	45.0	44.7	50.7
02	53.7	49.9	47.9	38.9	36.0	31.3	43.4	46.3	48.7	46.2	45.5	51.8
03	55.3	51.3	48.8	40.4	37.3	32.6	44.6	48.1	50.0	47.6	46.6	52.8
04	56.1	52.6	50.4	42.4	39.5	34.3	46.5	49.5	51.9	49.0	47.2	53.7
05	56.5	53.2	51.5	44.1	42.3	37.1	48.2	51.5	53.3	50.0	47.9	53.8
06	57.1	53.5	52.3	45.2	43.2	38.7	49.6	53.5	54.2	50.9	48.0	53.9
07	57.0	54.5	53.2	45.0	41.5	37.0	49.3	53.9	54.5	51.1	48.2	54.2
08	57.3	53.6	50.1	39.8	37.1	33.7	45.8	49.8	50.3	47.3	47.0	54.1
09	53.4	47.8	43.6	34.1	31.9	29.0	41.0	44.8	45.2	42.1	42.1	49.7
10	47.9	41.7	37.2	28.5	26.7	24.2	36.1	39.6	40.1	36.4	36.7	44.2
11	41.7	35.7	32.0	24.3	22.9	20.9	32.2	34.5	34.9	31.8	31.9	38.8
12	36.4	31.3	28.0	21.4	20.3	18.2	28.9	30.8	31.1	28.1	28.3	34.7
13	33.4	28.1	25.4	19.6	18.5	16.2	26.5	28.0	27.8	25.5	25.9	31.8
14	31.3	26.4	23.9	18.4	17.1	15.0	24.7	26.0	25.8	23.8	24.2	29.7
15	30.1	25.3	23.1	17.5	16.1	14.1	23.5	24.6	23.9	22.7	23.3	28.8
16	29.6	24.7	22.7	17.1	15.6	13.7	23.0	24.1	23.4	22.1	23.1	28.7
17	30.5	25.2	23.1	17.1	15.6	13.5	22.8	24.4	23.9	22.5	24.1	30.1
18	34.2	27.3	24.6	18.0	16.0	14.0	23.6	25.5	25.4	25.1	27.7	34.1
19	38.3	31.7	28.8	21.1	18.4	16.0	26.2	28.6	29.0	29.2	31.2	37.3
20	41.2	35.4	33.0	25.2	22.4	19.6	30.1	32.1	32.6	32.3	34.1	40.4
21	44.8	39.1	36.3	28.1	25.3	22.2	32.9	35.0	36.1	35.4	37.2	43.4
22	47.7	42.0	39.6	30.7	28.6	24.7	35.8	38.0	39.1	38.6	39.4	46.0
23	49.2	44.8	42.2	33.6	31.3	26.7	38.4	40.8	42.1	41.2	41.9	48.0

Table 3. Minimum Relative Humidity by Month and Hour (MST)  
for Yuma, Arizona, during the Years 1973-1986

Hr	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
00	13.9	9.8	10.6	6.5	8.8	6.5	8.8	9.6	12.9	11.7	7.9	12.2
01	13.0	10.6	12.1	10.5	9.9	5.1	8.9	11.6	14.1	12.9	8.1	12.4
02	13.3	10.2	9.8	10.2	9.3	3.8	7.4	12.1	15.3	12.4	10.0	12.4
03	14.2	10.4	12.4	10.4	10.9	3.8	8.6	11.6	16.4	12.7	11.1	11.9
04	15.5	10.7	12.9	11.1	10.9	5.0	9.3	11.0	17.5	13.7	11.1	11.8
05	16.4	10.7	13.4	12.2	10.8	8.4	10.0	14.8	13.4	13.6	11.6	12.2
06	17.1	11.4	14.5	11.9	11.9	7.2	9.3	15.4	16.4	13.0	11.3	11.7
07	17.1	10.0	14.0	11.4	13.1	8.4	10.7	13.4	16.4	13.5	14.0	11.7
08	16.2	12.2	14.9	10.8	11.6	8.8	11.0	12.2	14.9	12.6	14.0	12.2
09	19.4	13.0	12.6	10.9	8.0	6.8	10.5	10.0	14.2	14.2	13.9	11.8
10	16.7	11.9	9.5	8.7	5.5	4.1	4.7	9.9	12.0	12.3	11.1	12.0
11	13.4	9.3	9.4	7.0	3.8	4.0	4.6	7.2	9.9	9.4	9.8	12.4
12	11.3	8.9	7.4	7.0	3.7	2.8	3.9	6.8	7.5	9.2	9.4	7.7
13	10.1	8.1	6.1	5.9	4.5	3.9	6.2	5.8	7.8	7.9	8.0	7.2
14	9.0	7.6	7.1	6.0	3.3	4.0	4.5	4.9	6.8	7.2	6.7	7.3
15	10.1	6.8	6.5	5.2	3.4	3.3	5.3	4.6	6.0	6.9	5.8	7.0
16	8.8	5.1	4.9	5.2	3.4	3.7	4.9	4.3	6.3	7.0	6.2	5.9
17	9.2	5.5	5.0	5.2	3.4	4.0	5.5	5.1	5.6	6.9	6.2	6.5
18	11.3	5.9	4.3	5.5	3.5	4.5	5.8	6.1	6.9	8.7	7.9	8.3
19	11.9	9.2	7.3	5.4	6.9	4.4	5.7	7.0	7.7	9.9	7.8	11.1
20	10.9	9.4	8.5	9.1	7.2	6.3	7.5	8.6	8.9	10.6	8.8	11.8
21	14.5	10.2	11.3	6.2	6.4	5.1	8.3	9.6	11.3	11.5	10.1	12.4
22	12.4	10.4	8.1	8.4	8.5	6.3	8.1	9.4	10.9	11.5	9.6	12.4
23	14.7	9.6	7.6	9.9	9.7	6.3	6.7	8.7	11.9	11.4	8.4	12.2

Table 4. Cumulative Frequency Distribution of Relative Humidity by Hour (MST)  
at Yuma, Arizona, in January during the Years 1973-1986

Hr	Threshold (Percent)																		
	2	4	6	8	10	12	14	16	18	20	30	40	50	60	70	80	90	100	
00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.92	1.61	2.76	14.98	33.18	54.61	69.35	79.95	91.24	96.54	100.00	
01	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.46	1.15	1.61	14.29	29.26	50.92	64.52	76.50	88.94	97.00	100.00	
02	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.46	1.15	1.61	10.60	28.11	49.31	64.98	75.35	87.79	94.47	100.00	
03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	1.15	1.84	11.98	24.42	45.85	62.44	72.58	85.25	94.70	100.00	
04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	1.15	1.84	9.91	25.81	43.55	58.99	73.27	83.87	92.86	100.00	
05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	1.38	9.91	25.12	42.63	58.76	72.12	83.64	93.32	100.00	
06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.92	8.76	22.12	41.47	57.37	71.89	82.26	93.78	100.00	
07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.92	8.53	23.96	41.71	58.29	71.89	82.03	94.47	100.00	
08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.69	8.76	23.27	40.09	57.37	72.12	82.72	93.32	100.00	
09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	10.83	29.72	48.16	64.29	77.19	88.25	95.85	100.00	
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	1.61	20.05	41.24	58.06	75.35	85.25	91.24	98.16	100.00	
11	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.69	2.53	6.22	32.72	53.46	72.12	83.18	90.09	95.16	98.62	100.00	
12	0.00	0.00	0.00	0.00	0.00	0.23	0.69	3.46	7.14	12.90	44.01	65.67	81.34	90.32	94.93	97.00	99.08	100.00	
13	0.00	0.00	0.00	0.00	0.00	0.69	1.84	6.91	11.75	20.51	50.92	73.04	86.41	93.32	96.08	97.24	99.31	100.00	
14	0.00	0.00	0.00	0.00	0.23	0.92	3.92	9.22	17.97	26.50	56.45	75.58	90.09	94.70	96.54	98.39	99.08	100.00	
15	0.00	0.00	0.00	0.00	0.00	1.61	4.84	11.29	21.89	30.18	58.76	79.03	89.40	94.70	97.93	98.39	99.31	100.00	
16	0.00	0.00	0.00	0.00	0.23	1.84	5.30	13.13	22.81	29.49	61.52	80.88	89.63	95.62	97.93	98.39	99.77	100.00	
17	0.00	0.00	0.00	0.00	0.23	1.84	4.15	11.29	19.82	29.49	58.99	79.26	88.71	94.47	96.77	97.70	99.77	100.00	
18	0.00	0.00	0.00	0.00	0.00	0.46	1.84	5.53	10.14	19.12	50.92	72.12	85.48	92.17	95.62	97.47	99.08	100.00	
19	0.00	0.00	0.00	0.00	0.00	0.23	0.46	1.84	4.84	11.29	39.63	61.98	78.80	88.71	93.78	96.31	98.85	100.00	
20	0.00	0.00	0.00	0.00	0.00	0.23	0.69	1.61	3.23	7.37	33.41	55.76	72.12	84.10	92.17	96.08	98.16	100.00	
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.38	2.07	4.15	25.12	49.77	66.59	78.57	87.10	92.63	97.70	100.00	
22	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.46	1.15	2.07	19.59	42.40	61.75	74.88	84.10	91.94	97.70	100.00	
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.69	2.07	15.67	36.64	58.99	73.04	82.72	91.01	97.00	100.00	

Table 5. Cumulative Frequency Distribution of Relative Humidity by Hour (MST)  
at Yuma, Arizona, in February during the Years 1973-1986

Hr	Threshold (Percent)																			
	2	4	6	8	10	12	14	16	18	20	30	40	50	60	70	80	90	100		
00	0.00	0.00	0.00	0.00	0.00	0.25	0.51	1.27	2.28	3.04	4.05	16.96	39.24	58.23	76.71	87.59	95.19	97.72	100.00	
01	0.00	0.00	0.00	0.00	0.00	0.00	0.25	1.52	2.28	3.29	5.06	16.71	35.19	54.94	73.16	84.81	94.94	97.97	100.00	
02	0.00	0.00	0.00	0.00	0.00	0.00	0.51	0.51	2.03	2.78	3.29	15.44	33.16	53.92	70.89	83.54	94.94	98.23	100.00	
03	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.25	1.52	2.03	3.29	13.92	31.39	48.35	68.35	80.00	92.66	97.97	100.00	
04	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.51	1.52	2.53	2.78	12.66	28.10	48.35	65.32	76.46	91.39	97.72	100.00	
05	0.00	0.00	0.00	0.00	0.00	0.00	0.51	0.51	1.01	1.77	2.53	12.15	30.89	47.34	62.28	75.44	89.62	98.23	100.00	
06	0.00	0.00	0.00	0.00	0.00	0.00	0.76	1.01	1.52	2.03	2.03	12.15	29.62	45.82	61.01	75.19	91.14	97.22	100.00	
07	0.00	0.00	0.00	0.00	0.00	0.25	0.51	0.51	1.01	2.03	12.91	27.85	46.58	58.99	73.42	87.59	97.47	100.00		
08	0.00	0.00	0.00	0.00	0.00	0.00	0.51	0.76	1.01	1.77	11.65	30.13	46.84	62.28	74.94	88.86	97.97	100.00		
09	0.00	0.00	0.00	0.00	0.00	0.00	0.51	0.51	1.01	2.53	22.53	40.00	57.97	72.15	83.54	93.42	99.24	100.00		
10	0.00	0.00	0.00	0.00	0.00	0.00	1.01	1.52	5.32	8.35	31.65	51.65	69.62	82.28	90.89	96.46	99.49	100.00		
11	0.00	0.00	0.00	0.00	0.00	0.25	1.01	2.53	6.08	12.91	17.97	45.82	65.82	81.77	89.62	94.94	97.97	99.24	100.00	
12	0.00	0.00	0.00	0.00	0.00	0.51	1.52	6.33	14.18	20.51	29.11	57.97	76.20	87.85	92.41	95.95	99.24	99.49	100.00	
13	0.00	0.00	0.00	0.00	0.00	2.03	7.09	11.65	22.53	29.87	38.23	63.80	82.78	91.14	94.94	97.47	99.49	99.75	100.00	
14	0.00	0.00	0.00	0.00	0.51	2.53	7.59	15.44	27.59	35.70	43.29	70.13	86.33	91.90	96.20	96.71	99.49	99.75	100.00	
15	0.00	0.00	0.00	0.00	1.52	3.54	9.11	19.49	31.39	40.51	48.61	73.67	87.85	92.41	95.95	97.72	98.99	99.49	100.00	
16	0.00	0.00	0.25	0.76	4.30	10.38	24.30	35.19	42.28	50.63	75.95	88.35	92.91	95.44	96.96	98.99	99.49	99.49	100.00	
17	0.00	0.00	0.25	0.51	4.30	11.65	23.54	33.16	41.77	49.62	74.43	88.10	92.66	94.18	96.20	98.73	99.75	99.75	100.00	
18	0.00	0.00	0.25	0.51	1.27	7.85	17.22	28.35	36.46	43.04	68.10	84.81	90.89	93.92	95.95	98.48	98.99	99.49	100.00	
19	0.00	0.00	0.00	0.00	0.51	3.04	7.85	12.15	20.76	28.10	56.46	76.46	87.85	92.41	95.70	98.23	99.49	99.49	100.00	
20	0.00	0.00	0.00	0.00	0.25	1.52	3.29	7.09	11.90	17.22	44.56	67.85	83.04	91.14	94.68	97.72	98.99	99.49	100.00	
21	0.00	0.00	0.00	0.00	0.00	1.52	2.28	4.30	5.82	9.11	35.44	58.73	77.72	87.09	93.92	97.47	98.73	98.73	100.00	
22	0.00	0.00	0.00	0.00	0.00	0.76	1.52	3.04	4.05	6.84	26.58	53.92	71.14	84.30	91.90	97.47	98.73	98.73	100.00	
23	0.00	0.00	0.00	0.00	0.25	0.76	1.77	2.53	3.04	3.80	21.77	46.08	64.05	82.03	90.13	95.19	98.48	98.48	100.00	

Table 6. Cumulative Frequency Distribution of Relative Humidity by Hour (MST)  
at Yuma, Arizona, in March during the Years 1973-1986

Hr	Threshold (Percent)																			
	2	4	6	8	10	12	14	16	18	20	30	40	50	60	70	80	90	100		
00	0.00	0.00	0.00	0.00	0.00	0.23	1.15	1.84	2.76	3.69	15.21	41.01	69.12	86.18	92.86	97.00	99.31	100.00		
01	0.00	0.00	0.00	0.00	0.00	0.00	0.46	2.07	3.00	3.00	14.75	36.18	61.06	84.33	92.86	96.31	99.08	100.00		
02	0.00	0.00	0.00	0.00	0.23	0.23	0.92	1.84	2.07	3.23	11.52	32.49	57.37	77.88	91.24	96.08	99.08	100.00		
03	0.00	0.00	0.00	0.00	0.00	0.00	0.69	1.38	2.30	3.00	11.98	29.95	55.30	76.27	89.40	96.08	99.08	100.00		
04	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.69	1.61	2.53	11.98	25.58	51.61	72.35	87.33	95.16	98.85	100.00		
05	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.92	1.84	2.07	9.22	22.35	48.62	70.28	86.64	95.16	98.62	100.00		
06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.92	2.07	10.14	21.89	47.93	68.43	83.64	94.47	99.08	100.00		
07	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.46	0.92	1.84	8.99	21.89	44.93	66.36	81.80	91.94	99.31	100.00		
08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.92	1.38	2.76	14.06	26.73	51.61	73.04	86.41	94.70	99.54	100.00		
09	0.00	0.00	0.00	0.00	0.00	0.00	0.23	1.38	3.69	6.22	18.89	44.24	68.66	84.10	92.40	97.93	99.77	100.00		
10	0.00	0.00	0.00	0.00	0.23	0.23	1.38	3.92	6.91	12.44	33.18	61.06	82.72	92.17	97.93	99.54	100.00	100.00		
11	0.00	0.00	0.00	0.00	0.23	1.61	5.07	9.91	14.75	19.59	46.77	76.73	91.94	96.77	98.62	99.77	100.00	100.00		
12	0.00	0.00	0.00	0.23	1.15	3.23	11.29	17.74	23.50	29.49	59.68	85.48	95.62	97.70	99.77	100.00	100.00	100.00		
13	0.00	0.00	0.00	0.46	2.30	6.91	16.36	23.50	30.41	36.18	68.43	91.47	96.77	98.39	99.77	100.00	100.00	100.00		
14	0.00	0.00	0.00	1.84	3.46	8.06	19.35	27.42	37.10	43.55	72.81	94.01	97.00	98.85	100.00	100.00	100.00	100.00		
15	0.00	0.00	0.00	2.07	4.15	9.68	21.89	30.18	38.02	47.47	74.42	93.78	97.24	99.31	99.77	100.00	100.00	100.00		
16	0.00	0.00	0.69	1.61	5.30	11.75	24.42	32.26	41.71	50.00	77.65	93.78	96.54	99.08	99.77	100.00	100.00	100.00		
17	0.00	0.00	0.92	1.84	5.07	14.52	23.73	31.57	40.78	50.92	74.88	93.55	96.77	98.16	99.08	99.77	100.00	100.00		
18	0.00	0.00	0.46	1.61	3.46	11.06	19.59	27.19	36.41	44.70	72.35	90.55	96.54	97.93	98.85	99.77	100.00	100.00		
19	0.00	0.00	0.00	0.46	1.38	5.76	9.68	15.44	19.82	25.81	60.14	85.94	93.78	96.54	97.93	99.77	100.00	100.00		
20	0.00	0.00	0.00	0.00	0.46	2.07	4.15	7.83	11.52	15.67	46.77	75.35	90.78	94.70	96.77	98.85	100.00	100.00		
21	0.00	0.00	0.00	0.00	0.00	1.61	3.92	5.30	7.60	10.14	35.71	66.59	86.41	93.32	96.31	97.93	99.31	100.00		
22	0.00	0.00	0.00	0.00	0.23	0.46	2.76	4.38	5.30	7.14	26.96	56.45	80.18	91.24	95.16	97.93	99.77	100.00		
23	0.00	0.00	0.00	0.23	0.23	0.23	0.92	3.00	3.23	4.61	20.51	49.77	74.42	88.94	94.70	97.93	99.54	100.00		

Table 7. Cumulative Frequency Distribution of Relative Humidity by Hour (MST)  
at Yuma, Arizona, in April during the Years 1973-1986

Hr	Threshold (Percent)																			
	2	4	6	8	10	12	14	16	18	20	30	40	50	60	70	80	90	100		
00	0.00	0.00	0.00	0.24	0.24	1.90	2.14	4.05	5.48	8.33	35.95	67.86	89.05	98.10	99.05	99.29	99.76	100.00		
01	0.00	0.00	0.00	0.00	0.00	0.71	1.90	4.29	5.71	7.14	30.95	60.48	84.52	95.48	98.33	99.29	99.52	100.00		
02	0.00	0.00	0.00	0.00	0.00	0.95	1.90	2.38	3.81	6.43	25.48	55.95	82.14	94.52	98.57	99.29	99.76	100.00		
03	0.00	0.00	0.00	0.00	0.00	0.48	0.95	2.14	3.10	5.48	25.00	50.00	78.33	93.10	97.86	99.05	99.76	100.00		
04	0.00	0.00	0.00	0.00	0.00	0.24	1.67	2.38	3.33	5.00	18.57	44.52	72.86	90.24	96.90	98.33	99.76	100.00		
05	0.00	0.00	0.00	0.00	0.00	0.00	1.19	2.14	3.33	5.00	15.71	40.48	68.33	87.33	95.71	98.33	99.05	100.00		
06	0.00	0.00	0.00	0.00	0.00	0.24	0.95	1.67	3.10	4.52	15.48	36.67	64.52	86.19	93.81	97.86	99.29	100.00		
07	0.00	0.00	0.00	0.00	0.00	0.24	0.24	1.43	2.86	4.29	15.48	36.19	65.48	85.71	94.29	98.33	99.05	100.00		
08	0.00	0.00	0.00	0.00	0.00	0.24	0.95	3.33	5.24	8.10	24.29	52.86	79.05	92.62	97.62	99.05	99.29	100.00		
09	0.00	0.00	0.00	0.00	0.00	0.71	2.62	5.71	8.57	13.33	39.52	70.71	90.71	96.90	98.57	99.29	100.00	100.00		
10	0.00	0.00	0.00	0.00	0.24	3.81	6.90	12.62	17.62	23.57	55.95	88.33	96.67	98.57	99.05	99.52	100.00	100.00		
11	0.00	0.00	0.00	0.71	1.67	7.86	16.43	23.57	34.76	40.95	74.29	92.86	98.33	98.57	99.29	99.52	100.00	100.00		
12	0.00	0.00	0.00	0.95	3.81	12.14	25.71	37.38	43.81	50.71	82.86	96.90	98.57	99.29	99.29	100.00	100.00	100.00		
13	0.00	0.00	0.24	1.90	5.71	17.86	34.29	45.00	52.14	59.76	88.33	98.10	98.81	99.29	99.29	100.00	100.00	100.00		
14	0.00	0.00	0.00	2.62	7.38	20.24	38.81	50.00	58.81	66.90	92.14	98.57	98.81	99.29	99.52	99.76	100.00	100.00		
15	0.00	0.00	0.48	3.10	9.29	22.86	44.05	54.29	63.33	70.95	94.76	98.33	99.05	99.29	99.52	99.52	100.00	100.00		
16	0.00	0.00	1.19	4.76	11.90	28.57	45.71	55.48	62.62	71.90	95.24	98.33	98.81	99.52	99.52	99.76	99.76	100.00		
17	0.00	0.00	0.48	3.57	9.76	30.24	45.24	57.86	65.48	70.48	94.05	98.81	99.29	99.52	99.76	99.76	100.00	100.00		
18	0.00	0.00	0.48	3.57	6.67	26.67	42.38	53.33	62.14	67.86	91.90	97.62	99.05	99.29	99.76	99.76	100.00	100.00		
19	0.00	0.00	0.24	0.24	2.62	11.90	22.62	34.52	44.52	53.81	85.71	96.67	98.33	99.29	99.76	100.00	100.00	100.00		
20	0.00	0.00	0.00	0.00	1.43	5.48	9.05	13.81	22.86	32.62	74.52	94.29	98.33	99.05	99.29	99.52	100.00	100.00		
21	0.00	0.00	0.00	0.24	1.43	3.81	6.67	10.48	14.29	21.43	60.95	88.81	97.86	98.81	99.29	99.52	99.76	100.00		
22	0.00	0.00	0.00	0.00	0.48	2.62	5.00	6.43	9.05	13.33	50.48	83.81	95.95	98.33	99.05	99.52	99.52	100.00		
23	0.00	0.00	0.00	0.00	0.71	1.19	2.62	3.81	5.95	9.52	40.95	74.05	92.62	97.14	98.81	99.52	100.00	100.00		



Table 8. Cumulative Frequency Distribution of Relative Humidity by Hour (MST)  
at Yuma, Arizona, in May during the Years 1973-1986

Hr	Threshold (Percent)																			
	2	4	6	8	10	12	14	16	18	20	30	40	50	60	70	80	90	100		
00	0.00	0.00	0.00	0.00	0.00	1.38	3.23	4.84	7.83	12.21	44.70	76.73	93.55	97.93	99.08	99.77	100.00	100.00		
01	0.00	0.00	0.00	0.00	0.23	1.15	2.07	2.76	6.45	9.91	36.41	71.20	90.55	97.93	99.31	99.77	100.00	100.00		
02	0.00	0.00	0.00	0.00	0.23	0.46	1.84	2.76	5.30	9.68	33.64	65.90	86.18	96.54	99.08	99.31	99.77	100.00		
03	0.00	0.00	0.00	0.00	0.00	0.46	1.61	2.53	3.92	5.99	30.41	61.29	84.79	95.16	99.31	99.54	100.00	100.00		
04	0.00	0.00	0.00	0.00	0.00	0.23	0.46	1.61	3.23	5.07	23.04	53.23	82.49	92.40	97.93	99.77	100.00	100.00		
05	0.00	0.00	0.00	0.00	0.00	0.23	0.46	1.61	2.53	4.15	17.28	44.47	73.04	89.86	97.47	99.31	100.00	100.00		
06	0.00	0.00	0.00	0.00	0.00	0.23	0.46	0.69	1.38	3.46	16.59	41.94	70.51	88.71	97.00	99.08	100.00	100.00		
07	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.69	2.07	3.23	20.51	46.77	75.35	91.47	97.47	99.31	100.00	100.00		
08	0.00	0.00	0.00	0.00	0.00	0.23	0.92	2.53	5.76	8.06	31.80	62.44	84.10	95.39	99.08	100.00	100.00	100.00		
09	0.00	0.00	0.00	0.00	0.23	0.92	3.00	5.76	9.22	14.29	46.54	77.19	93.09	99.08	99.77	100.00	100.00	100.00		
10	0.00	0.00	0.23	0.69	0.92	3.69	8.76	14.29	20.97	26.96	65.67	90.78	98.62	100.00	100.00	100.00	100.00	100.00		
11	0.00	0.23	0.23	0.92	2.30	8.29	16.36	23.27	31.57	42.17	79.49	97.00	99.77	100.00	100.00	100.00	100.00	100.00		
12	0.00	0.23	0.23	1.38	3.46	12.90	22.81	36.18	44.47	52.76	88.25	98.85	100.00	100.00	100.00	100.00	100.00	100.00		
13	0.00	0.00	0.23	2.07	6.22	16.13	31.57	44.70	53.46	63.36	94.70	99.54	99.77	99.77	99.77	99.77	100.00	100.00		
14	0.00	0.23	0.69	3.46	7.60	20.97	39.40	53.00	61.52	70.28	96.77	99.54	99.77	99.77	99.77	100.00	100.00	100.00		
15	0.00	0.23	0.92	4.38	10.14	23.73	45.62	60.60	69.82	76.50	98.16	99.08	99.77	100.00	100.00	100.00	100.00	100.00		
16	0.00	0.23	1.61	4.61	10.83	28.80	48.62	61.75	74.42	79.95	97.47	99.31	99.54	100.00	100.00	100.00	100.00	100.00		
17	0.00	0.23	1.38	5.07	11.75	32.26	50.23	63.82	72.58	79.72	97.00	99.08	99.54	99.54	99.77	99.77	100.00	100.00		
18	0.00	0.23	1.15	4.15	10.14	31.80	48.62	60.83	69.82	77.19	97.00	99.08	99.77	100.00	100.00	100.00	100.00	100.00		
19	0.00	0.00	0.00	1.84	5.99	19.35	32.49	45.62	55.53	65.44	94.01	98.62	99.77	100.00	100.00	100.00	100.00	100.00		
20	0.00	0.00	0.00	0.46	2.30	6.45	13.82	23.04	32.26	44.47	82.72	97.24	99.77	99.77	99.77	100.00	100.00	100.00		
21	0.00	0.00	0.00	0.69	0.69	3.23	7.83	13.82	21.66	29.72	73.96	94.70	98.39	99.31	99.77	99.77	100.00	100.00		
22	0.00	0.00	0.00	0.00	0.69	1.61	3.46	7.60	11.52	17.74	59.91	86.64	97.24	99.08	99.77	100.00	100.00	100.00		
23	0.00	0.00	0.00	0.00	0.46	1.15	2.07	5.07	8.29	12.21	48.85	81.11	96.08	98.85	99.31	100.00	100.00	100.00		

Table 9. Cumulative Frequency Distribution of Relative Humidity by Hour (MST)  
at Yuma, Arizona, in June during the Years 1973-1986

Hr	Threshold (Percent)																			
	2	4	6	8	10	12	14	16	18	20	30	40	50	60	70	80	90	100		
00	0.00	0.00	0.00	0.48	1.43	3.10	6.19	8.81	14.05	21.43	62.38	87.38	97.62	99.29	99.52	100.00	100.00	100.00	100.00	
01	0.00	0.00	0.24	0.24	1.19	2.14	5.00	8.10	12.62	19.29	55.24	83.33	95.95	99.52	99.76	100.00	100.00	100.00	100.00	
02	0.00	0.24	0.24	0.24	1.90	2.62	3.81	7.86	11.19	16.19	48.81	80.71	92.62	98.57	99.52	100.00	100.00	100.00	100.00	
03	0.00	0.24	0.24	0.48	1.90	2.38	3.81	5.71	9.52	13.81	45.48	77.86	91.90	97.14	99.05	100.00	100.00	100.00	100.00	
04	0.00	0.00	0.24	0.48	0.95	1.43	2.62	3.10	5.24	8.33	39.52	74.52	88.57	96.67	99.29	100.00	100.00	100.00	100.00	
05	0.00	0.00	0.00	0.00	0.24	1.19	1.43	2.14	3.33	6.43	29.76	65.24	84.52	94.52	98.33	99.76	100.00	100.00	100.00	
06	0.00	0.00	0.00	0.24	0.48	0.71	1.19	1.43	2.86	4.05	25.95	59.05	84.05	93.33	98.57	99.52	100.00	100.00	100.00	
07	0.00	0.00	0.00	0.00	0.24	0.71	1.19	3.10	4.52	5.95	29.05	63.57	86.19	94.76	98.57	100.00	100.00	100.00	100.00	
08	0.00	0.00	0.00	0.00	0.24	0.71	2.86	4.05	6.90	9.29	41.43	74.76	89.29	97.86	99.52	100.00	100.00	100.00	100.00	
09	0.00	0.00	0.00	0.48	0.95	3.10	6.90	10.00	14.05	20.71	58.33	83.33	94.76	99.29	99.76	100.00	100.00	100.00	100.00	
10	0.00	0.00	0.24	0.71	4.05	7.14	13.10	21.90	29.76	37.62	76.43	92.14	98.57	99.29	99.76	100.00	100.00	100.00	100.00	
11	0.00	0.00	0.24	3.10	5.71	12.62	21.19	32.38	41.19	52.62	85.24	96.90	99.52	99.76	100.00	100.00	100.00	100.00	100.00	
12	0.00	0.24	1.43	5.00	10.71	18.57	32.38	44.05	57.14	66.90	92.14	99.05	99.52	99.76	100.00	100.00	100.00	100.00	100.00	
13	0.00	0.24	2.14	6.90	12.86	25.95	42.86	55.00	67.62	76.43	95.71	99.52	99.76	100.00	100.00	100.00	100.00	100.00	100.00	
14	0.00	0.24	3.81	9.52	15.95	33.33	52.38	65.24	76.67	84.76	97.14	99.52	99.76	99.76	100.00	100.00	100.00	100.00	100.00	
15	0.00	0.24	4.29	10.00	18.10	38.57	60.00	72.14	83.10	87.86	97.86	99.52	99.76	99.76	100.00	100.00	100.00	100.00	100.00	
16	0.00	0.48	4.05	10.24	18.81	42.62	62.86	76.67	85.48	89.76	97.86	99.76	99.76	99.76	99.76	100.00	100.00	100.00	100.00	
17	0.00	0.24	3.81	10.48	19.52	46.67	65.00	77.86	86.19	90.00	98.57	99.76	99.76	99.76	100.00	100.00	100.00	100.00	100.00	
18	0.00	0.00	2.62	9.52	17.14	44.52	63.57	75.00	84.29	88.57	97.62	99.52	99.76	99.76	100.00	100.00	100.00	100.00	100.00	
19	0.00	0.00	0.95	3.57	10.00	31.90	46.19	61.19	73.10	81.19	95.48	99.05	99.76	99.76	100.00	100.00	100.00	100.00	100.00	
20	0.00	0.00	0.00	0.95	4.52	13.81	22.62	35.71	45.95	60.71	92.38	97.86	99.76	99.76	100.00	100.00	100.00	100.00	100.00	
21	0.00	0.00	0.00	0.71	2.62	7.86	15.71	22.38	31.67	43.81	83.81	96.43	99.05	99.76	100.00	100.00	100.00	100.00	100.00	
22	0.00	0.00	0.00	0.71	1.67	5.00	9.29	15.24	24.05	31.90	75.00	95.95	99.05	99.76	99.76	100.00	100.00	100.00	100.00	
23	0.00	0.00	0.00	0.71	1.67	3.57	6.19	11.67	16.67	25.00	65.71	91.90	98.57	99.05	99.76	100.00	100.00	100.00	100.00	

Table 10. Cumulative Frequency Distribution of Relative Humidity by Hour (MST)  
at Yuma, Arizona, in July during the Years 1973-1986

Hr	Threshold (Percent)																	90	100
	2	4	6	8	10	12	14	16	18	20	30	40	50	60	70	80			
00	0.00	0.00	0.00	0.00	0.46	0.46	1.15	3.23	4.84	6.91	20.97	54.84	79.03	91.71	98.39	99.54	100.00	100.00	
01	0.00	0.00	0.00	0.00	0.46	0.69	1.61	3.00	4.38	5.99	21.66	46.08	72.58	88.94	97.00	99.08	100.00	100.00	
02	0.00	0.00	0.00	0.23	0.69	0.69	0.92	2.30	3.46	5.76	19.82	43.78	66.59	85.25	96.31	99.54	100.00	100.00	
03	0.00	0.00	0.00	0.00	0.69	0.69	0.69	1.38	1.84	3.00	16.59	38.48	65.21	84.56	96.31	98.85	100.00	100.00	
04	0.00	0.00	0.00	0.00	0.46	0.46	0.46	0.69	1.38	2.76	13.59	32.49	61.75	81.80	95.62	98.85	99.77	100.00	
05	0.00	0.00	0.00	0.00	0.23	0.23	0.46	0.46	1.38	2.76	11.29	30.65	54.15	78.34	91.94	98.16	100.00	100.00	
06	0.00	0.00	0.00	0.00	0.23	0.23	0.46	0.46	1.15	1.61	9.68	25.12	51.15	77.19	90.78	98.16	100.00	100.00	
07	0.00	0.00	0.00	0.00	0.00	0.23	0.23	0.69	2.07	2.53	9.68	26.27	53.23	74.42	92.17	99.08	100.00	100.00	
08	0.00	0.00	0.00	0.00	0.00	0.23	0.69	1.84	2.53	3.46	14.98	34.33	61.06	81.57	97.47	99.77	100.00	100.00	
09	0.00	0.00	0.00	0.00	0.00	0.92	1.15	3.69	4.84	6.45	22.81	47.47	72.58	92.63	99.08	100.00	100.00	100.00	
10	0.00	0.00	0.23	0.46	1.15	2.76	4.61	7.14	9.68	13.82	32.03	60.14	84.79	97.93	100.00	100.00	100.00	100.00	
11	0.00	0.00	0.46	0.92	2.07	4.15	7.14	9.68	13.82	17.74	44.24	74.88	92.63	98.39	99.54	99.77	99.77	100.00	
12	0.00	0.23	0.69	1.61	2.30	5.99	10.37	13.36	18.66	21.89	54.84	84.56	96.77	98.62	99.54	99.54	99.77	100.00	
13	0.00	0.00	0.00	1.38	3.23	7.83	11.98	17.05	23.04	27.88	66.59	91.47	97.24	99.31	99.54	99.77	100.00	100.00	
14	0.00	0.00	0.69	1.84	3.00	8.76	14.75	19.59	25.35	33.18	74.65	93.09	97.70	99.08	99.77	100.00	100.00	100.00	
15	0.00	0.00	0.92	2.53	3.69	9.68	17.28	23.27	31.34	38.71	79.95	94.93	98.16	98.85	99.77	100.00	100.00	100.00	
16	0.00	0.00	0.69	2.30	4.38	11.06	18.89	24.65	33.64	42.63	80.88	94.47	97.47	98.85	99.54	99.54	99.77	100.00	
17	0.00	0.00	0.92	2.76	5.07	13.36	20.05	26.96	37.33	45.16	80.88	94.01	97.00	98.62	99.31	99.54	100.00	100.00	
18	0.00	0.00	0.46	3.23	4.15	11.75	19.12	25.58	33.64	41.47	78.34	92.17	96.77	98.39	99.54	99.77	100.00	100.00	
19	0.00	0.00	0.23	0.92	3.92	10.37	13.36	19.59	25.81	34.79	68.20	88.71	94.93	97.00	98.85	99.54	100.00	100.00	
20	0.00	0.00	0.00	0.23	1.15	5.30	7.14	11.29	14.52	20.51	54.15	82.26	93.32	97.24	99.08	99.31	100.00	100.00	
21	0.00	0.00	0.00	0.00	0.23	1.38	3.46	7.14	10.60	13.59	44.93	74.42	91.47	95.62	98.85	99.31	100.00	100.00	
22	0.00	0.00	0.00	0.00	0.23	0.69	2.07	3.69	5.53	7.83	34.33	67.74	88.48	95.16	98.62	99.31	100.00	100.00	
23	0.00	0.00	0.00	0.23	0.23	0.69	2.30	3.23	4.84	6.91	24.42	58.29	83.87	93.78	99.08	99.77	100.00	100.00	

Table 11. Cumulative Frequency Distribution of Relative Humidity by Hour (MST)  
at Yuma, Arizona, in August during the Years 1973-1986

Hr	Threshold (Percent)																			
	2	4	6	8	10	12	14	16	18	20	30	40	50	60	70	80	90	100		
00	0.00	0.00	0.00	0.00	0.23	0.46	0.69	1.38	2.76	3.69	18.66	44.93	71.66	87.33	96.31	99.31	99.77	100.00		
01	0.00	0.00	0.00	0.00	0.00	0.23	0.23	0.46	2.30	3.23	15.90	40.32	67.74	83.87	94.70	99.08	99.54	100.00		
02	0.00	0.00	0.00	0.00	0.00	0.00	0.23	1.15	1.84	3.00	12.67	35.71	63.13	79.49	93.09	99.08	99.77	100.00		
03	0.00	0.00	0.00	0.00	0.00	0.23	0.46	0.92	1.61	2.30	9.45	31.34	58.06	76.50	91.71	98.39	99.77	100.00		
04	0.00	0.00	0.00	0.00	0.00	0.23	0.46	0.46	0.69	1.15	9.45	26.73	53.69	76.04	92.40	97.24	99.54	100.00		
05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.69	1.61	7.37	23.27	49.77	69.12	88.48	96.08	99.54	100.00		
06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.92	1.15	6.45	20.97	41.94	66.82	85.94	95.39	99.08	100.00		
07	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.23	0.69	0.92	7.37	20.97	41.47	60.83	84.10	96.31	99.54	100.00		
08	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.69	1.38	3.23	11.06	29.72	48.62	70.51	91.47	98.62	99.77	100.00		
09	0.00	0.00	0.00	0.00	0.00	0.23	1.61	2.30	3.92	5.30	18.89	37.33	59.45	84.56	97.00	99.31	100.00	100.00		
10	0.00	0.00	0.00	0.00	0.23	1.38	3.46	5.30	7.14	10.37	24.42	50.23	76.96	94.70	98.62	99.54	100.00	100.00		
11	0.00	0.00	0.00	0.23	1.84	3.23	6.45	9.22	12.21	15.44	36.41	65.44	89.86	97.24	99.31	100.00	100.00	100.00		
12	0.00	0.00	0.00	0.92	2.76	5.30	8.29	13.13	16.36	19.82	49.54	78.80	93.78	97.47	99.08	100.00	100.00	100.00		
13	0.00	0.00	0.23	0.92	3.69	6.68	12.90	16.36	19.35	23.73	62.44	86.87	95.16	97.70	98.85	99.77	100.00	100.00		
14	0.00	0.00	0.23	1.61	3.23	8.76	14.06	19.35	24.42	30.88	68.20	91.47	95.85	97.93	99.31	99.77	100.00	100.00		
15	0.00	0.00	0.23	2.07	4.84	10.14	16.82	21.20	29.03	35.71	76.50	92.86	96.77	98.39	98.85	99.54	99.77	100.00		
16	0.00	0.00	0.23	2.53	5.07	8.99	17.28	23.50	31.80	39.80	77.65	93.55	96.54	97.93	98.62	99.54	99.54	100.00		
17	0.00	0.00	0.46	2.53	5.07	11.29	18.66	25.58	32.26	40.78	79.49	91.01	96.08	97.93	98.85	99.31	100.00	100.00		
18	0.00	0.00	0.00	1.15	3.23	8.99	16.36	25.12	31.34	37.33	71.20	89.63	95.62	97.70	99.08	99.54	99.77	100.00		
19	0.00	0.00	0.00	0.23	0.92	4.38	8.06	14.52	21.66	27.42	62.67	84.56	93.55	97.24	98.85	99.54	99.77	100.00		
20	0.00	0.00	0.00	0.00	0.46	1.61	3.69	6.22	10.83	16.82	49.54	77.42	91.47	96.77	98.62	99.54	99.54	100.00		
21	0.00	0.00	0.00	0.00	0.23	0.92	2.07	3.46	6.45	11.06	37.10	70.05	87.56	95.39	98.62	99.54	99.54	100.00		
22	0.00	0.00	0.00	0.00	0.23	0.46	1.38	3.23	4.38	5.99	27.88	61.52	83.18	94.01	98.39	99.54	99.77	100.00		
23	0.00	0.00	0.00	0.00	0.23	0.46	1.38	1.61	3.23	4.84	22.12	52.07	75.58	90.78	97.00	99.08	99.77	100.00		

Table 12. Cumulative Frequency Distribution of Relative Humidity by Hour (MST)  
at Yuma, Arizona, in September during the Years 1973-1986

Hr	Threshold (Percent)																			
	2	4	6	8	10	12	14	16	18	20	30	40	50	60	70	80	90	100		
00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	1.19	1.67	2.38	19.05	42.14	64.76	84.29	94.76	98.81	100.00	100.00		
01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.19	1.90	2.14	17.14	38.81	58.57	78.33	93.33	98.57	99.76	100.00		
02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.71	1.67	2.38	13.33	35.00	53.10	71.43	89.29	97.86	99.52	100.00		
03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.19	2.38	13.57	31.67	49.76	69.29	88.10	96.43	99.76	100.00		
04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.71	1.19	10.71	27.38	46.43	65.48	84.29	94.76	99.76	100.00		
05	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.48	0.71	1.43	7.38	23.81	43.33	62.14	84.76	95.24	99.52	100.00		
06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.19	1.67	6.43	21.19	40.48	60.71	82.86	94.29	99.52	100.00		
07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.95	0.95	6.19	21.90	39.29	60.71	80.24	93.57	99.29	100.00		
08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48	1.19	2.14	10.95	28.10	49.29	70.71	88.10	97.86	99.76	100.00		
09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.43	2.86	3.81	17.86	38.10	61.90	82.86	94.52	99.29	99.76	100.00		
10	0.00	0.00	0.00	0.00	0.00	0.24	0.95	3.33	5.48	7.38	27.14	48.10	75.95	93.57	98.57	99.29	99.76	100.00		
11	0.00	0.00	0.00	0.00	0.24	0.95	4.05	7.14	9.29	14.05	38.57	65.48	88.57	97.38	98.81	99.76	100.00	100.00		
12	0.00	0.00	0.00	0.24	0.71	2.14	6.43	10.71	16.19	19.76	48.57	80.00	94.29	96.90	98.81	99.52	100.00	100.00		
13	0.00	0.00	0.00	0.24	1.19	4.29	8.57	14.05	20.95	26.43	61.19	88.81	96.67	98.33	99.52	99.76	100.00	100.00		
14	0.00	0.00	0.00	0.71	1.90	5.00	10.95	18.10	25.48	33.81	70.95	90.95	96.19	99.29	99.76	100.00	100.00	100.00		
15	0.00	0.00	0.00	0.71	2.14	5.24	14.76	23.81	32.38	39.52	78.10	93.33	97.38	99.76	100.00	100.00	100.00	100.00		
16	0.00	0.00	0.00	1.19	2.38	6.43	18.33	26.43	35.48	42.57	73.76	93.33	97.38	99.29	99.29	100.00	100.00	100.00		
17	0.00	0.00	0.24	0.95	1.90	8.33	17.86	26.19	35.48	43.10	77.14	92.86	96.90	98.33	99.52	100.00	100.00	100.00		
18	0.00	0.00	0.00	0.48	0.71	7.62	13.81	20.48	29.76	36.43	71.67	91.19	95.95	98.57	99.52	100.00	100.00	100.00		
19	0.00	0.00	0.00	0.24	0.24	3.10	5.71	10.95	16.19	25.48	61.67	83.33	95.48	97.38	99.05	100.00	100.00	100.00		
20	0.00	0.00	0.00	0.00	0.24	0.71	1.43	3.57	8.33	14.52	49.05	75.48	90.71	96.43	98.81	100.00	100.00	100.00		
21	0.00	0.00	0.00	0.00	0.00	0.48	1.43	2.62	5.00	7.14	38.10	65.48	85.95	95.24	98.10	99.52	100.00	100.00		
22	0.00	0.00	0.00	0.00	0.00	0.24	0.95	1.67	3.57	5.95	28.10	54.05	78.57	92.62	98.10	99.05	100.00	100.00		
23	0.00	0.00	0.00	0.00	0.00	0.24	0.71	0.95	2.38	4.05	22.62	47.14	71.19	88.81	96.19	99.29	99.76	100.00		

Table 13. Cumulative Frequency Distribution of Relative Humidity by Hour (MST)  
at Yuma, Arizona, in October during the Years 1973-1986

Hr	Threshold (Percent)																			
	2	4	6	8	10	12	14	16	18	20	30	40	50	60	70	80	90	100		
00	0.00	0.00	0.00	0.00	0.00	0.23	0.92	1.84	2.53	3.46	18.89	46.31	70.28	84.79	92.40	97.47	99.31	100.00		
01	0.00	0.00	0.00	0.00	0.00	0.00	0.46	1.38	2.76	3.23	18.20	42.63	66.59	82.72	90.78	96.54	99.77	100.00		
02	0.00	0.00	0.00	0.00	0.00	0.00	0.23	1.15	1.84	4.15	17.28	39.63	62.90	79.26	89.40	95.85	99.31	100.00		
03	0.00	0.00	0.00	0.00	0.00	0.00	0.23	1.15	2.76	3.46	16.82	35.94	60.37	77.88	86.64	94.70	98.39	100.00		
04	0.00	0.00	0.00	0.00	0.00	0.00	0.23	1.15	2.76	3.92	13.59	32.49	57.14	75.12	86.18	92.63	97.47	100.00		
05	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.69	1.61	3.23	12.21	31.11	53.69	74.65	85.02	91.94	97.93	100.00		
06	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.46	0.92	2.53	11.98	29.49	51.84	73.04	83.87	91.24	97.47	100.00		
07	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.69	0.92	2.30	11.98	28.11	50.69	71.43	82.49	91.47	97.70	100.00		
08	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.46	1.15	2.76	15.44	35.94	61.06	79.95	86.87	94.93	99.31	100.00		
09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.84	3.00	5.53	26.27	50.92	72.12	85.02	91.47	97.47	99.77	100.00		
10	0.00	0.00	0.00	0.00	0.00	0.00	1.38	3.46	8.53	11.75	41.71	64.52	81.34	91.47	97.47	99.54	100.00	100.00		
11	0.00	0.00	0.00	0.00	0.23	0.92	4.84	9.91	15.67	22.12	51.38	74.88	88.71	97.00	99.31	99.54	100.00	100.00		
12	0.00	0.00	0.00	0.00	0.23	3.23	8.53	15.67	25.35	31.11	61.75	82.26	94.47	98.62	99.31	99.77	100.00	100.00		
13	0.00	0.00	0.00	0.23	0.92	5.76	13.59	23.73	32.03	38.71	69.35	89.63	97.47	99.31	99.31	99.77	100.00	100.00		
14	0.00	0.00	0.00	0.23	1.84	6.22	19.12	28.57	37.10	44.70	75.58	92.86	97.00	99.08	99.31	99.54	100.00	100.00		
15	0.00	0.00	0.00	0.69	2.30	10.37	22.35	32.45	40.78	51.84	79.03	94.24	96.54	99.08	99.31	99.77	100.00	100.00		
16	0.00	0.00	0.00	0.92	3.00	11.29	26.01	34.79	44.01	54.84	81.11	93.55	97.00	98.62	99.31	99.77	100.00	100.00		
17	0.00	0.00	0.00	0.69	1.38	13.36	22.35	32.43	41.24	50.00	80.88	94.24	96.31	98.16	98.85	99.54	100.00	100.00		
18	0.00	0.00	0.00	0.00	0.69	6.45	13.13	22.35	31.11	38.02	75.81	90.55	96.08	97.47	98.39	99.54	100.00	100.00		
19	0.00	0.00	0.00	0.00	0.46	2.30	7.60	10.83	15.67	21.89	62.21	83.64	93.78	97.24	98.39	99.08	99.77	100.00		
20	0.00	0.00	0.00	0.00	0.00	1.84	3.69	7.37	10.37	14.52	49.77	77.19	90.32	95.85	98.16	99.54	99.77	100.00		
21	0.00	0.00	0.00	0.00	0.00	1.61	1.84	3.92	7.37	10.83	39.40	69.12	85.94	94.01	96.77	99.31	99.54	100.00		
22	0.00	0.00	0.00	0.00	0.00	0.46	1.61	3.46	5.07	7.14	30.18	61.52	81.11	89.86	95.85	98.85	99.77	100.00		
23	0.00	0.00	0.00	0.00	0.00	0.23	1.38	2.30	3.23	5.30	23.04	53.00	76.27	88.02	94.47	97.93	99.54	100.00		

Table 14. Cumulative Frequency Distribution of Relative Humidity by Hour (MST)  
at Yuma, Arizona, in November during the Years 1973-1986

Hr	Threshold (Percent)																	90	100
	2	4	6	8	10	12	14	16	18	20	30	40	50	60	70	80			
00	0.00	0.00	0.00	0.24	0.48	0.48	1.43	2.86	4.05	5.24	20.00	49.05	70.48	83.57	90.24	96.19	98.81	100.00	
01	0.00	0.00	0.00	0.00	0.24	0.48	1.43	2.62	3.57	4.05	19.29	43.57	67.62	82.62	90.00	95.24	99.05	100.00	
02	0.00	0.00	0.00	0.00	0.00	0.48	1.43	2.62	3.81	5.00	19.76	40.24	65.24	81.67	89.05	95.48	98.81	100.00	
03	0.00	0.00	0.00	0.00	0.00	0.24	1.19	3.10	3.57	5.00	17.62	37.38	61.43	79.05	88.81	95.24	98.81	100.00	
04	0.00	0.00	0.00	0.00	0.00	0.24	1.43	2.38	3.10	4.05	17.86	35.00	61.43	76.67	87.86	94.76	98.10	100.00	
05	0.00	0.00	0.00	0.00	0.00	0.24	1.19	1.90	1.90	3.10	15.95	35.24	59.52	76.43	87.62	94.52	97.86	100.00	
06	0.00	0.00	0.00	0.00	0.00	0.24	0.48	1.67	2.62	3.81	15.48	36.67	59.52	76.19	86.43	94.29	98.81	100.00	
07	0.00	0.00	0.00	0.00	0.00	0.00	0.24	1.43	2.14	3.57	16.19	35.24	59.29	75.71	86.90	94.29	98.33	100.00	
08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.43	2.14	2.62	19.52	39.52	63.33	76.67	87.62	94.29	97.86	100.00	
09	0.00	0.00	0.00	0.00	0.00	0.00	0.24	1.43	2.62	4.29	28.33	53.33	73.57	85.00	92.86	96.19	98.33	100.00	
10	0.00	0.00	0.00	0.00	0.00	0.24	0.71	2.62	5.95	10.71	42.38	65.71	81.67	91.19	95.71	97.38	99.05	100.00	
11	0.00	0.00	0.00	0.00	0.24	0.71	4.05	8.81	15.00	21.43	54.05	77.14	88.33	93.57	97.14	98.81	99.52	100.00	
12	0.00	0.00	0.00	0.00	0.48	2.86	6.67	15.00	23.81	32.86	65.48	84.05	92.14	96.19	98.10	99.29	99.52	100.00	
13	0.00	0.00	0.00	0.24	1.19	4.29	12.14	23.33	31.43	39.05	72.86	89.05	94.76	97.14	98.10	98.81	99.76	100.00	
14	0.00	0.00	0.00	0.71	1.19	5.24	19.05	28.81	37.38	46.90	78.10	90.48	96.19	97.62	98.57	99.05	99.76	100.00	
15	0.00	0.00	0.24	0.95	1.67	6.90	21.90	31.67	41.43	51.43	79.52	91.90	95.71	98.10	98.81	99.29	100.00	100.00	
16	0.00	0.00	0.00	0.71	1.43	3.10	23.57	32.86	43.57	51.19	79.52	91.67	95.48	97.62	98.81	99.29	99.76	100.00	
17	0.00	0.00	0.00	0.48	0.95	5.95	20.00	29.52	39.29	46.90	77.86	90.95	95.71	97.38	98.81	99.05	99.76	100.00	
18	0.00	0.00	0.00	0.24	0.24	4.76	11.43	18.33	26.19	30.48	66.43	85.00	93.10	95.71	98.10	99.29	99.52	100.00	
19	0.00	0.00	0.00	0.24	0.24	1.67	5.00	9.76	14.76	23.57	53.33	80.00	90.71	95.24	97.62	98.81	99.52	100.00	
20	0.00	0.00	0.00	0.00	0.24	1.19	3.10	5.71	9.29	13.33	46.43	72.86	88.57	94.29	96.19	98.57	99.29	100.00	
21	0.00	0.00	0.00	0.00	0.00	1.19	1.67	3.81	5.48	8.81	35.24	67.14	83.10	90.71	95.48	97.62	99.52	100.00	
22	0.00	0.00	0.00	0.00	0.24	1.19	2.14	3.33	4.52	6.90	28.33	58.10	79.29	89.76	93.57	97.14	99.05	100.00	
23	0.00	0.00	0.00	0.00	0.48	0.48	1.19	3.10	3.57	5.71	23.10	50.95	73.81	87.38	92.62	96.67	99.29	100.00	

Table 15. Cumulative Frequency Distribution of Relative Humidity by Hour (MST)  
at Yuma, Arizona, in December during the Years 1973-1986

Hr	Threshold (Percent)																				2	4	6	8	10	12	14	16	18	20	30	40	50	60	70	80	90	100
00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.92	1.61	3.00	15.21	34.33	56.68	72.81	83.18	91.01	96.77	100.00															
01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.92	1.15	2.30	16.13	32.03	52.30	71.20	82.03	90.78	97.00	100.00															
02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.92	1.61	2.53	14.29	29.95	51.61	68.89	81.57	89.86	95.16	100.00															
03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.46	0.46	0.69	1.15	1.38	12.21	28.57	47.93	67.74	79.49	88.48	95.85	100.00															
04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.46	0.46	0.46	1.38	1.84	10.37	26.73	47.47	66.13	77.88	87.79	96.08	100.00															
05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.46	0.46	1.61	1.84	11.52	26.73	46.08	65.67	76.96	88.94	96.08	100.00															
06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.46	0.46	0.46	0.92	1.15	8.99	26.04	47.24	64.29	77.42	88.71	96.31	100.00															
07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.46	0.46	0.46	0.46	1.38	8.76	25.12	47.70	62.90	76.73	89.17	95.85	100.00															
08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.46	0.46	0.69	1.38	10.14	23.96	47.93	64.75	75.81	89.17	95.39	100.00															
09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.23	0.46	0.46	0.92	1.84	14.52	35.48	57.60	73.04	83.41	91.24	95.85	100.00															
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.46	2.07	3.46	23.27	49.54	69.82	82.03	88.94	93.09	96.77	100.00															
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.92	2.53	6.45	11.06	36.87	62.67	79.26	88.02	91.47	95.39	97.47	100.00															
12	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.92	1.15	1.15	3.69	5.99	9.45	11.29	17.97	52.53	72.35	83.41	89.86	93.55	95.39	98.62	100.00															
13	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.92	0.92	2.30	5.76	8.06	14.29	20.97	31.34	65.67	82.26	89.40	91.71	94.24	95.85	99.08	100.00															
14	0.00	0.00	0.00	0.00	0.00	0.00	0.23	1.84	3.23	3.23	8.06	8.76	17.74	24.42	34.79	69.35	82.03	89.63	92.86	94.93	97.47	99.54	100.00															
15	0.00	0.00	0.00	0.00	0.00	0.46	1.84	4.61	4.61	4.61	8.76	9.91	16.59	26.27	36.18	59.82	81.80	89.17	93.09	95.16	96.77	99.08	100.00															
16	0.00	0.00	0.00	0.00	0.23	0.69	1.38	4.38	4.38	4.38	9.91	9.91	16.59	26.27	36.18	59.82	81.80	89.17	93.09	95.16	96.77	99.08	100.00															
17	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.69	3.00	3.00	7.37	7.37	14.29	19.82	31.11	67.05	80.88	88.02	92.40	95.39	96.77	99.08	100.00															
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.23	2.53	4.15	4.15	5.99	11.29	17.05	52.76	73.73	83.87	90.09	93.78	96.31	98.85	100.00															
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.61	1.61	3.46	3.46	5.07	9.22	13.13	40.32	67.05	80.88	88.94	91.71	95.62	98.62	100.00															
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.23	2.07	2.07	3.92	6.22	8.20	35.25	58.06	76.27	85.71	90.55	94.47	97.93	100.00															
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.15	1.15	1.84	3.00	4.84	26.96	50.69	69.59	81.80	90.55	93.78	97.24	100.00															
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.46	1.15	2.30	4.38	19.82	45.16	64.98	77.42	87.33	94.01	97.00	100.00															
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.46	1.15	1.84	3.23	17.74	38.25	60.83	76.73	85.71	91.94	96.54	100.00															



Table 16. Mean Relative Humidity by Month and Hour (GMT)  
for In Salah, Algeria, during the Years 1973-1986

Hr	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
00	47.8	39.6	32.4	27.7	23.4	20.8	18.7	18.9	25.2	33.1	43.1	46.8
03	53.3	43.5	37.0	31.8	27.4	23.3	20.6	21.1	28.0	37.9	46.9	53.0
06	55.6	48.9	40.6	35.0	29.2	25.1	22.8	22.8	30.8	40.7	51.9	55.3
09	47.8	38.3	30.9	25.3	21.6	18.6	16.7	17.1	23.1	31.0	40.3	47.2
12	33.5	27.2	23.0	19.7	16.3	14.3	12.9	13.7	18.0	23.8	29.3	34.0
15	28.7	24.6	20.2	18.2	15.3	13.3	12.2	12.8	16.3	21.2	26.0	29.8
18	35.5	28.8	22.7	18.8	16.7	14.3	13.3	14.1	18.5	26.3	33.5	38.1
21	42.7	34.9	29.3	24.3	21.1	18.8	16.6	17.3	21.9	30.5	38.3	43.5

Table 17. Minimum Relative Humidity by Month and Hour (GMT)  
for In Salah, Algeria, during the Years 1973-1986

Hr	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
00	15.3	10.8	9.4	9.8	6.5	9.7	8.5	8.4	8.1	6.0	8.2	18.1
03	21.0	13.0	13.3	2.5	10.8	8.6	10.1	10.7	11.2	12.9	2.2	19.4
06	11.7	14.6	4.9	5.8	8.5	9.7	9.2	2.9	5.4	13.3	20.4	12.5
09	7.6	10.5	11.4	9.2	8.1	5.5	2.3	8.2	7.9	1.5	16.5	5.4
12	12.1	6.6	8.4	8.5	7.4	2.1	6.4	6.7	8.0	9.2	4.5	11.3
15	4.0	8.7	7.4	6.8	6.8	3.2	7.1	6.4	8.5	8.4	1.5	1.2
18	6.5	11.1	9.4	7.0	8.6	6.7	7.1	7.8	9.0	9.4	14.0	9.4
21	18.4	10.8	10.8	9.9	10.4	9.7	8.0	10.0	10.9	1.1	14.1	14.3

Table 18. Cumulative Frequency Distribution of Relative Humidity by Hour (GMT)  
at In Salah, Algeria, in July during the Years 1973-1986

Hr	Threshold (Percent)																	
	2	4	6	8	10	12	14	16	18	20	30	40	50	60	70	80	90	100
00	0.00	0.00	0.00	0.00	1.69	7.89	21.69	38.87	52.96	67.89	96.90	99.44	99.72	99.72	99.72	99.72	100.00	100.00
03	0.00	0.00	0.00	0.00	0.00	5.06	13.92	25.63	39.87	52.22	92.72	98.10	99.37	100.00	100.00	100.00	100.00	100.00
06	0.00	0.00	0.00	0.00	0.28	2.23	6.13	16.99	28.13	41.78	86.35	97.21	98.61	99.16	99.44	99.44	99.44	100.00
09	0.00	0.34	0.34	0.34	5.70	20.13	39.60	55.37	66.78	75.50	96.31	99.66	99.66	100.00	100.00	100.00	100.00	100.00
12	0.00	0.00	0.00	3.03	23.03	53.33	69.39	83.33	88.79	93.64	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
15	0.00	0.00	0.00	4.00	26.33	57.67	77.67	89.00	94.33	96.33	99.67	100.00	100.00	100.00	100.00	100.00	100.00	100.00
18	0.00	0.00	0.00	3.47	22.40	44.79	67.82	82.33	88.96	94.64	98.42	99.37	99.68	100.00	100.00	100.00	100.00	100.00
21	0.00	0.00	0.00	0.33	3.29	16.78	37.17	51.32	67.43	77.30	98.68	99.67	99.67	99.67	100.00	100.00	100.00	100.00

Table 19. Mean Relative Humidity by Month and Hour (GMT)  
for Adrar, Algeria, during the Years 1973-1986

Hr	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
06	66.8	55.3	43.1	33.5	29.4	22.5	19.9	23.0	33.6	47.6	59.5	66.7
09	56.9	42.8	32.0	24.8	20.9	16.6	14.0	17.1	23.6	34.7	46.5	54.5
12	35.4	27.9	23.1	19.3	16.6	13.9	11.5	12.5	17.7	25.1	32.0	35.2
15	29.8	23.9	19.9	17.3	14.8	11.8	11.8	12.3	16.1	22.8	27.6	29.4
18	35.5	25.1	19.8	17.9	14.2	11.7	10.4	12.4	15.5	24.8	32.4	36.1

Table 20. Minimum Relative Humidity by Month and Hour (GMT)  
for Adrar, Algeria, during the Years 1973-1986

Hr	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
06	14.6	12.5	9.0	6.9	7.2	7.3	3.9	8.2	10.6	11.8	9.9	23.1
09	3.7	10.3	9.0	8.3	1.5	7.1	5.6	7.1	6.9	8.3	20.0	17.6
12	10.0	8.9	8.2	5.2	8.3	6.5	6.4	6.4	7.9	8.6	11.3	2.5
15	8.7	6.7	8.7	7.9	6.7	6.6	6.0	6.4	7.0	7.4	10.0	9.3
18	8.5	8.3	8.4	9.0	7.6	6.6	6.4	6.4	0.7	4.2	5.0	7.8

Table 21. Cumulative Frequency Distribution of Relative Humidity by Hour (GMT)  
at Adrar, Algeria, in July during the Years 1973-1986

Hr	Threshold (Percent)																	
	2	4	6	8	10	12	14	16	18	20	30	40	50	60	70	80	90	100
06	0.00	0.37	0.37	0.37	1.48	7.41	22.59	34.81	44.81	55.93	91.48	99.26	99.63	99.63	100.00	100.00	100.00	100.00
09	0.00	0.00	0.58	1.16	19.19	46.51	62.21	73.84	81.40	88.37	98.26	100.00	100.00	100.00	100.00	100.00	100.00	100.00
12	0.00	0.00	0.00	0.00	42.03	68.84	78.99	88.41	94.93	97.10	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
15	0.00	0.00	0.00	12.94	44.71	71.76	83.53	91.76	95.29	96.47	97.65	97.65	100.00	100.00	100.00	100.00	100.00	100.00
18	0.00	0.00	0.00	17.58	51.65	76.92	89.01	96.70	98.90	98.90	98.90	100.00	100.00	100.00	100.00	100.00	100.00	100.00

**Table 22. Mean Relative Humidity by Month and Hour (GMT)  
for Timimoun, Algeria, during the Years 1973-1986**

Hr	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
06	69.5	55.4	45.6	36.7	30.5	27.0	21.4	25.3	33.7	45.1	60.6	66.2
09	57.7	42.5	32.7	26.7	21.9	19.1	15.8	17.7	24.0	35.2	46.5	54.5
12	40.3	30.3	23.8	21.5	17.6	15.1	12.9	14.1	18.3	25.6	33.8	38.7
15	33.9	25.3	21.8	18.0	15.7	14.1	11.6	12.0	17.4	23.7	29.8	32.7
18	41.5	29.4	22.0	19.4	16.7	14.1	12.1	13.5	18.2	26.9	38.0	42.0

**Table 23. Minimum Relative Humidity by Month and Hour (GMT)  
for Timimoun, Algeria, during the Years 1973-1986**

Hr	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
06	10.9	10.9	17.3	7.4	2.8	9.7	2.9	8.6	5.4	15.1	2.9	26.2
09	15.7	11.2	8.2	5.5	2.3	8.6	3.3	8.7	9.7	10.5	15.3	15.0
12	11.4	10.0	9.0	8.9	8.6	5.5	6.1	7.8	8.0	8.9	10.4	13.7
15	14.2	9.4	7.7	1.3	7.4	7.4	7.4	6.4	8.3	8.9	10.5	13.4
18	10.0	11.2	9.2	6.0	5.9	7.9	7.4	7.4	6.0	10.5	10.1	18.2

Table 24. Cumulative Frequency Distribution of Relative Humidity by Hour (GMT)  
at Timimoun, Algeria, in July during the Years 1973-1986

Hr	Threshold (Percent)																	
	2	4	6	8	10	12	14	16	18	20	30	40	50	60	70	80	90	100
06	0.00	0.33	0.33	0.33	1.98	8.58	15.51	27.39	37.62	51.16	86.80	98.35	99.34	99.34	99.67	99.67	100.00	100.00
09	0.00	0.42	0.84	0.84	8.40	27.73	45.80	63.45	75.21	80.25	98.32	99.58	99.58	99.58	100.00	100.00	100.00	100.00
12	0.00	0.00	0.00	3.40	27.18	51.46	71.36	84.47	93.20	93.69	99.03	99.03	99.51	99.51	100.00	100.00	100.00	100.00
15	0.00	0.00	0.00	3.03	37.12	62.12	83.33	92.42	96.97	96.97	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
18	0.00	0.00	0.00	6.15	37.99	60.89	81.01	90.50	93.30	96.65	99.44	99.44	99.44	99.44	99.44	100.00	100.00	100.00

Table 25. Mean Relative Humidity by Month and Hour (GMT)  
for Timbuktu, Mali, during the Years 1973-1986

Hr	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
00	30.1	27.0	23.9	22.5	27.6	40.7	56.6	66.1	61.5	35.8	30.5	31.5
03	32.7	28.8	26.8	25.8	29.7	46.8	60.8	70.4	67.3	39.9	33.6	34.1
06	36.3	31.1	29.4	27.1	33.9	51.5	67.1	74.5	71.5	43.6	36.6	37.6
09	26.9	23.3	20.9	18.5	23.6	40.7	54.2	60.4	55.5	29.1	25.3	27.8
12	19.8	16.4	14.9	14.3	17.7	28.7	40.6	46.0	38.2	21.6	18.5	20.6
15	17.4	14.6	14.2	13.1	16.1	24.7	32.9	38.0	32.1	19.4	17.8	18.7
18	22.1	17.9	15.5	15.8	17.8	26.1	37.1	42.1	38.8	24.1	23.8	25.0
21	26.8	22.9	21.9	21.0	24.4	37.0	49.5	57.0	52.2	31.7	28.9	27.9

Table 26. Minimum Relative Humidity by Month and Hour (GMT)  
for Timbuktu, Mali, during the Years 1973-1986

Hr	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
00	14.3	12.1	9.0	9.7	9.4	12.1	6.4	25.3	12.1	11.9	15.5	4.4
03	17.5	13.6	12.1	10.5	6.9	12.7	15.3	1.2	4.9	16.0	13.9	18.1
06	1.0	6.1	9.7	9.0	7.9	2.9	12.2	3.7	1.9	11.2	3.6	8.6
09	12.9	10.6	7.9	6.8	2.4	13.0	9.9	17.6	11.5	10.5	1.7	12.7
12	7.2	6.5	5.6	4.5	3.9	6.9	9.1	16.7	8.2	5.8	7.3	6.7
15	5.6	5.7	2.7	5.6	5.3	6.3	4.7	9.1	5.4	6.0	6.8	7.4
18	10.3	2.6	1.2	5.5	5.7	7.8	8.9	11.2	2.1	2.2	2.8	9.4
21	9.4	9.4	8.9	8.2	8.4	6.1	3.9	17.6	18.5	10.6	12.7	8.1

Table 27. Cumulative Frequency Distribution of Relative Humidity by Hour (GMT)  
at Timbuktu, Mali, in April during the Years 1973-1986

/																			
Hr	Threshold (Percent)																		
	2	4	6	8	10	12	14	16	18	20	30	40	50	60	70	80	90	100	
00	0.00	0.00	0.00	0.00	1.31	3.92	8.50	16.34	27.12	41.50	88.56	96.73	98.37	99.02	100.00	100.00	100.00	100.00	
03	0.00	0.00	0.00	0.00	0.00	1.94	7.10	9.68	20.65	31.61	78.71	90.32	94.19	98.06	99.35	100.00	100.00	100.00	
06	0.00	0.00	0.00	0.00	0.58	1.16	2.31	6.65	13.29	23.12	73.41	91.04	96.24	97.98	98.84	99.71	100.00	100.00	
09	0.00	0.00	0.00	2.06	10.29	21.81	35.80	48.56	63.79	74.07	90.95	95.47	97.53	98.35	99.18	100.00	100.00	100.00	
12	0.00	0.00	2.35	13.49	28.45	46.92	60.41	70.09	78.89	83.87	96.19	98.53	99.12	99.71	99.71	100.00	100.00	100.00	
15	0.00	0.00	1.73	13.85	32.47	50.65	64.94	76.62	84.85	89.61	98.27	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
18	0.00	0.00	2.41	7.93	19.31	34.48	50.69	63.79	73.45	78.97	94.48	98.62	99.31	99.66	99.66	99.66	100.00	100.00	
21	0.00	0.00	0.00	0.00	1.89	5.03	15.09	28.93	47.17	57.23	86.79	97.48	98.74	100.00	100.00	100.00	100.00	100.00	



Table 28. Mean Relative Humidity by Month and Hour (GMT)  
for Atar, Mauritania, during the Years 1973-1986

Hr	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
00	32.5	28.3	28.1	25.9	24.3	23.5	29.2	34.0	31.7	25.8	28.0	30.8
03	37.4	32.6	33.7	31.5	27.7	27.8	35.0	39.1	37.2	29.1	32.4	35.0
06	41.6	36.4	35.5	34.8	32.2	30.1	41.2	45.8	42.0	34.0	34.9	38.7
09	37.6	35.4	34.3	31.9	30.3	29.0	37.5	41.3	37.2	29.3	31.3	35.3
12	26.0	23.8	23.6	21.9	20.8	19.9	26.2	28.1	25.4	19.9	20.7	23.6
15	21.6	18.1	18.7	16.8	15.8	15.1	19.3	20.6	19.8	16.7	17.6	19.1
18	22.2	18.1	17.7	16.5	15.4	15.1	19.3	21.1	20.6	16.8	18.5	20.4
21	26.0	24.4	22.8	19.0	18.2	18.8	25.2	25.1	26.0	20.6	24.4	24.7

Table 29. Minimum Relative Humidity by Month and Hour (GMT)  
for Atar, Mauritania, during the Years 1973-1986

Hr	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
00	11.5	8.5	8.9	8.9	5.1	6.9	8.4	8.3	6.7	7.9	8.2	0.8
03	12.1	10.1	8.2	12.7	9.0	9.0	13.6	10.1	10.5	7.3	9.0	7.2
06	6.5	7.4	6.1	9.3	9.7	5.7	8.7	10.7	9.0	8.4	3.1	0.7
09	1.2	5.5	7.4	8.6	8.5	7.0	10.1	12.1	7.4	4.4	3.6	0.9
12	8.4	6.6	5.3	5.3	5.3	3.9	6.8	7.3	6.1	5.0	6.5	8.4
15	2.0	6.3	5.9	5.7	6.3	3.9	6.6	5.4	4.6	5.3	5.8	0.4
18	5.0	5.9	6.1	5.6	4.3	3.7	4.6	4.1	5.1	1.9	7.4	4.5
21	11.2	7.4	9.7	7.3	7.8	6.2	7.6	7.3	9.0	7.9	10.9	12.5

Table 30. Cumulative Frequency Distribution of Relative Humidity by Hour (GMT)  
at Atar, Mauritania, in June during the Years 1973-1986

Hr	Threshold (Percent)																	
	2	4	6	8	10	12	14	16	18	20	30	40	50	60	70	80	90	100
00	0.00	0.00	0.00	0.42	2.53	6.75	12.24	21.52	31.65	39.24	82.28	94.51	96.20	99.16	100.00	100.00	100.00	100.00
03	0.00	0.00	0.00	0.00	0.64	3.85	7.69	15.38	19.23	27.56	71.79	85.90	92.95	96.15	98.08	100.00	100.00	100.00
06	0.00	0.00	0.27	0.55	1.10	1.92	4.40	6.32	9.83	16.21	57.42	81.59	95.60	98.63	99.45	99.73	100.00	100.00
09	0.00	0.00	0.00	0.74	1.47	2.21	5.15	8.09	14.34	21.69	61.40	84.19	94.85	98.16	99.26	100.00	100.00	100.00
12	0.00	0.27	1.10	3.02	7.97	15.66	24.45	36.81	47.25	57.14	91.76	96.98	98.63	99.18	99.45	99.73	99.73	100.00
15	0.00	0.38	2.30	7.28	18.77	34.87	46.36	65.13	77.39	83.52	98.08	99.23	100.00	100.00	100.00	100.00	100.00	100.00
18	0.00	0.58	3.48	8.12	19.42	35.94	53.04	65.51	76.81	83.77	97.10	98.55	99.42	99.42	100.00	100.00	100.00	100.00
21	0.00	0.00	0.00	2.61	8.70	18.26	31.30	46.09	59.13	72.17	94.78	95.65	97.39	98.26	98.26	100.00	100.00	100.00

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