



# UNIVERSIDAD NACIONAL DE COLOMBIA SEDE MANIZALES

OBSERVATORIOS AMBIENTALES PARA EL DESARROLLO URBANO SOTENIBLE EN MANIZALES

RED DE ESTACIONES HIDROMETEOROLÓGICAS PARA PREVENCIÓN DE DESASTRES DE MANIZALES



## ESTACIÓN METEOROLÓGICA ALCÁZARES

CÓDIGO: EMM-13

SEPTIEMBRE DE 2011

### RESUMEN DIARIO Y MENSUAL DE VARIABLES METEOROLÓGICAS

| Variables<br>Dia | Temperatura del Aire (°C) |             |             | V.V. (m/s) |            | P.B. (HPa)   | Humedad Relativa (%) |             |             | LI. (mm)     | Radiación Solar (W/m <sup>2</sup> ) |              | ET. (mm)    |
|------------------|---------------------------|-------------|-------------|------------|------------|--------------|----------------------|-------------|-------------|--------------|-------------------------------------|--------------|-------------|
|                  | Máxima                    | Media       | Mínima      | Máxima     | Media      | Media        | Máxima               | Media       | Mínima      | Suma         | Máxima                              | Media        | Suma        |
| 1                | 24.2                      | 19.4        | 16.3        | 4.9        | 1.5        | 804.2        | 82.0                 | 66.5        | 45.0        | 0.0          | 867.0                               | 426.3        | 3.8         |
| 2                | 22.2                      | 18.1        | 14.8        | 4.5        | 1.4        | 805.3        | 84.0                 | 72.7        | 49.0        | 0.0          | 1232.0                              | 447.0        | 3.7         |
| 3                | 19.4                      | 16.8        | 14.7        | 4.5        | 1.1        | 806.6        | 90.0                 | 81.3        | 66.0        | 0.0          | 900.0                               | 215.1        | 1.8         |
| 4                | 21.6                      | 17.4        | 14.3        | 4.9        | 1.6        | 806.4        | 87.0                 | 76.7        | 63.0        | 0.0          | 1278.0                              | 267.4        | 2.3         |
| 5                | 23.9                      | 18.8        | 14.8        | 4.5        | 1.9        | 805.1        | 83.0                 | 70.3        | 52.0        | 0.0          | 1230.0                              | 553.5        | 4.6         |
| 6                | 22.4                      | 18.4        | 15.3        | 4.5        | 1.3        | 804.5        | 86.0                 | 77.0        | 65.0        | 0.0          | 1216.0                              | 337.0        | 2.9         |
| 7                | 22.5                      | 17.4        | 15.3        | 3.6        | 0.7        | 805.2        | 95.0                 | 84.3        | 66.0        | 2.4          | 1187.0                              | 233.3        | 1.9         |
| 8                | 19.2                      | 15.5        | 13.5        | 6.3        | 0.9        | 807.7        | 97.0                 | 91.9        | 78.0        | 77.6         | 1078.0                              | 244.1        | 1.6         |
| 9                | 22.7                      | 16.6        | 13.8        | 4.9        | 1.3        | 807.3        | 94.0                 | 85.1        | 69.0        | 10.4         | 960.0                               | 363.3        | 2.8         |
| 10               | 23.6                      | 17.0        | 14.0        | 9.8        | 1.3        | 805.8        | 96.0                 | 84.7        | 67.0        | 46.2         | 1225.0                              | 466.6        | 3.3         |
| 11               | 21.1                      | 16.6        | 13.7        | 4.0        | 1.1        | 807.6        | 94.0                 | 88.0        | 79.0        | 2.0          | 1176.0                              | 250.2        | 2.0         |
| 12               | 22.1                      | 17.8        | 14.9        | 4.9        | 1.6        | 807.7        | 96.0                 | 80.9        | 65.0        | 7.2          | 984.0                               | 266.2        | 2.3         |
| 13               | 23.6                      | 19.2        | 16.3        | 4.5        | 1.8        | 806.0        | 81.0                 | 69.6        | 46.0        | 0.0          | 1304.0                              | 421.8        | 3.9         |
| 14               | 23.3                      | 18.6        | 15.4        | 4.9        | 1.5        | 804.0        | 92.0                 | 77.0        | 63.0        | 0.0          | 1167.0                              | 429.4        | 3.5         |
| 15               | 22.9                      | 18.4        | 15.2        | 4.0        | 1.1        | 804.9        | 91.0                 | 77.4        | 58.0        | 0.0          | 1208.0                              | 300.2        | 2.6         |
| 16               | 19.6                      | 16.8        | 15.2        | 4.0        | 0.9        | 805.5        | 96.0                 | 87.0        | 73.0        | 15.2         | 942.0                               | 205.6        | 1.6         |
| 17               | 20.8                      | 17.1        | 14.7        | 3.6        | 0.8        | 805.8        | 95.0                 | 86.5        | 76.0        | 6.0          | 1188.0                              | 279.9        | 2.1         |
| 18               | 19.2                      | 15.9        | 14.4        | 4.0        | 0.8        | 807.3        | 98.0                 | 92.4        | 80.0        | 28.8         | 1334.0                              | 264.0        | 1.7         |
| 19               | 20.4                      | 16.8        | 14.3        | 3.1        | 0.6        | 806.3        | 96.0                 | 89.5        | 76.0        | 1.2          | 1113.0                              | 270.2        | 2.0         |
| 20               | 21.2                      | 17.0        | 14.4        | 4.5        | 1.0        | 806.0        | 99.0                 | 87.8        | 67.0        | 10.8         | 1171.0                              | 257.0        | 2.0         |
| 21               | 22.7                      | 18.3        | 15.0        | 4.5        | 1.3        | 805.2        | 96.0                 | 81.6        | 62.0        | 0.0          | 1160.0                              | 344.7        | 2.8         |
| 22               | 21.1                      | 17.6        | 15.2        | 3.6        | 1.1        | 804.8        | 97.0                 | 87.6        | 72.0        | 1.6          | 635.0                               | 253.9        | 1.9         |
| 23               | 23.3                      | 18.0        | 14.9        | 5.4        | 1.4        | 804.9        | 96.0                 | 86.5        | 67.0        | 5.0          | 1202.0                              | 382.1        | 2.8         |
| 24               | 20.8                      | 17.0        | 15.3        | 4.9        | 1.6        | 804.8        | 96.0                 | 87.2        | 78.0        | 3.0          | 1190.0                              | 197.1        | 1.7         |
| 25               | 19.2                      | 16.9        | 15.2        | 4.0        | 1.0        | 805.5        | 95.0                 | 86.2        | 73.0        | 1.6          | 533.0                               | 181.5        | 1.5         |
| 26               | 21.7                      | 17.6        | 15.5        | 4.9        | 1.2        | 806.3        | 95.0                 | 84.9        | 63.0        | 4.0          | 1290.0                              | 279.3        | 2.3         |
| 27               | 23.8                      | 19.2        | 15.3        | 4.9        | 1.9        | 805.8        | 84.0                 | 71.1        | 49.0        | 0.0          | 1113.0                              | 516.6        | 4.5         |
| 28               | 22.6                      | 18.9        | 15.8        | 5.4        | 1.4        | 804.2        | 88.0                 | 77.7        | 62.0        | 0.0          | 1120.0                              | 384.9        | 3.2         |
| 29               | 21.2                      | 17.6        | 15.4        | 3.6        | 1.1        | 803.7        | 94.0                 | 82.0        | 68.0        | 0.8          | 1042.0                              | 233.9        | 1.9         |
| 30               | 23.2                      | 18.5        | 15.2        | 4.5        | 1.4        | 803.9        | 86.0                 | 79.2        | 63.0        | 0.0          | 1165.0                              | 412.5        | 3.4         |
| <b>Mensual</b>   | <b>24.2</b>               | <b>17.6</b> | <b>13.5</b> | <b>9.8</b> | <b>1.3</b> | <b>805.6</b> | <b>99.0</b>          | <b>81.7</b> | <b>45.0</b> | <b>223.8</b> | <b>1334.0</b>                       | <b>322.8</b> | <b>78.3</b> |

Convenciones: V.V.: Velocidad del Viento P.B.: Presión Barométrica LI.: Lluvia diaria ET.: Evapotranspiración. Nota: Datos resaltados en rojo están incompletos.



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## ESTACIÓN METEOROLÓGICA ALCÁZARES

CÓDIGO: EMM-13



SEPTIEMBRE DE 2011

JORNADA DIURNA - DIRECCIÓN DEL VIENTO SEGÚN LA ROSA DE LOS VIENTOS (Frecuencia relativa)

| Día     | N   | NNE | NE  | ENE | E   | ESE | SE  | SSE | S   | SSO | SO  | OSO | O   | ONO | NO  | NNO |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1       | 10% | 6%  | 1%  | 0%  | 1%  | 8%  | 4%  | 0%  | 0%  | 1%  | 3%  | 4%  | 6%  | 13% | 25% | 17% |
| 2       | 10% | 6%  | 3%  | 1%  | 6%  | 7%  | 3%  | 1%  | 1%  | 1%  | 0%  | 3%  | 12% | 18% | 15% | 13% |
| 3       | 7%  | 1%  | 2%  | 1%  | 3%  | 0%  | 0%  | 10% | 2%  | 1%  | 4%  | 3%  | 8%  | 36% | 16% | 7%  |
| 4       | 3%  | 3%  | 1%  | 2%  | 3%  | 3%  | 7%  | 6%  | 2%  | 3%  | 1%  | 2%  | 8%  | 40% | 10% | 6%  |
| 5       | 3%  | 1%  | 0%  | 0%  | 0%  | 0%  | 3%  | 7%  | 6%  | 3%  | 4%  | 5%  | 17% | 28% | 14% | 8%  |
| 6       | 1%  | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 10% | 2%  | 1%  | 6%  | 5%  | 44% | 20% | 8%  | 3%  |
| 7       | 7%  | 8%  | 0%  | 0%  | 1%  | 0%  | 2%  | 6%  | 6%  | 5%  | 3%  | 3%  | 13% | 26% | 14% | 6%  |
| 8       | 3%  | 0%  | 0%  | 1%  | 0%  | 1%  | 0%  | 1%  | 3%  | 3%  | 9%  | 25% | 10% | 25% | 15% | 5%  |
| 9       | 3%  | 1%  | 1%  | 0%  | 0%  | 0%  | 17% | 0%  | 0%  | 0%  | 5%  | 3%  | 19% | 30% | 17% | 6%  |
| 10      | 2%  | 3%  | 1%  | 0%  | 1%  | 3%  | 4%  | 6%  | 9%  | 2%  | 3%  | 7%  | 10% | 19% | 18% | 12% |
| 11      | 6%  | 1%  | 0%  | 0%  | 1%  | 0%  | 8%  | 1%  | 0%  | 0%  | 6%  | 2%  | 26% | 26% | 17% | 8%  |
| 12      | 11% | 10% | 3%  | 6%  | 8%  | 11% | 1%  | 1%  | 10% | 0%  | 3%  | 5%  | 5%  | 9%  | 8%  | 10% |
| 13      | 7%  | 8%  | 3%  | 1%  | 2%  | 4%  | 5%  | 5%  | 1%  | 0%  | 2%  | 1%  | 19% | 17% | 14% | 10% |
| 14      | 5%  | 6%  | 1%  | 0%  | 0%  | 1%  | 5%  | 10% | 8%  | 4%  | 11% | 6%  | 14% | 10% | 10% | 10% |
| 15      | 22% | 7%  | 1%  | 0%  | 0%  | 3%  | 1%  | 0%  | 0%  | 1%  | 8%  | 8%  | 13% | 12% | 19% | 7%  |
| 16      | 2%  | 3%  | 12% | 7%  | 16% | 5%  | 1%  | 0%  | 1%  | 0%  | 0%  | 1%  | 10% | 18% | 17% | 8%  |
| 17      | 8%  | 1%  | 2%  | 0%  | 6%  | 4%  | 7%  | 11% | 1%  | 3%  | 3%  | 5%  | 16% | 18% | 12% | 3%  |
| 18      | 1%  | 2%  | 0%  | 1%  | 15% | 0%  | 0%  | 0%  | 2%  | 2%  | 6%  | 7%  | 14% | 22% | 22% | 6%  |
| 19      | 1%  | 0%  | 0%  | 1%  | 1%  | 0%  | 15% | 1%  | 3%  | 2%  | 2%  | 3%  | 17% | 26% | 19% | 6%  |
| 20      | 13% | 5%  | 1%  | 1%  | 2%  | 2%  | 1%  | 0%  | 1%  | 3%  | 1%  | 3%  | 12% | 13% | 23% | 22% |
| 21      | 7%  | 2%  | 1%  | 0%  | 0%  | 1%  | 6%  | 3%  | 1%  | 1%  | 2%  | 4%  | 21% | 21% | 22% | 9%  |
| 22      | 8%  | 1%  | 0%  | 0%  | 5%  | 2%  | 2%  | 2%  | 10% | 7%  | 3%  | 8%  | 15% | 17% | 12% | 10% |
| 23      | 4%  | 0%  | 0%  | 0%  | 1%  | 0%  | 6%  | 10% | 5%  | 1%  | 3%  | 9%  | 17% | 19% | 14% | 9%  |
| 24      | 6%  | 1%  | 2%  | 1%  | 2%  | 3%  | 11% | 13% | 8%  | 3%  | 1%  | 5%  | 13% | 14% | 4%  | 13% |
| 25      | 1%  | 3%  | 3%  | 3%  | 6%  | 5%  | 8%  | 7%  | 2%  | 2%  | 1%  | 0%  | 14% | 22% | 10% | 10% |
| 26      | 13% | 6%  | 3%  | 0%  | 1%  | 0%  | 6%  | 2%  | 1%  | 2%  | 1%  | 3%  | 10% | 16% | 26% | 10% |
| 27      | 3%  | 0%  | 0%  | 0%  | 0%  | 0%  | 7%  | 7%  | 0%  | 1%  | 2%  | 7%  | 20% | 33% | 15% | 5%  |
| 28      | 5%  | 3%  | 1%  | 0%  | 0%  | 0%  | 4%  | 3%  | 0%  | 1%  | 1%  | 7%  | 17% | 26% | 18% | 14% |
| 29      | 9%  | 3%  | 1%  | 2%  | 6%  | 1%  | 1%  | 8%  | 15% | 2%  | 6%  | 10% | 5%  | 10% | 16% | 5%  |
| 30      | 3%  | 6%  | 0%  | 0%  | 0%  | 0%  | 11% | 4%  | 0%  | 1%  | 3%  | 5%  | 13% | 15% | 28% | 10% |
| Mensual | 6%  | 3%  | 1%  | 1%  | 3%  | 2%  | 5%  | 5%  | 3%  | 2%  | 3%  | 5%  | 15% | 21% | 16% | 9%  |

| DIRECCIÓN DEL VIENTO EN EL MES ORDENADA DE MAYOR A MENOR PREDOMINANCIA |     |     |     |     |    |     |    |     |    |    |     |    |     |     |    |     |
|--|-----|-----|-----|-----|----|-----|----|-----|----|----|-----|----|-----|-----|----|-----|
| R. V.  | ONO | NO  | O   | NNO | N  | OSO | SE | SSE | SO | S  | NNE | E  | ESE | SSO | NE | ENE |
| F. R.  | 21% | 16% | 15% | 9%  | 6% | 5%  | 5% | 5%  | 3% | 3% | 3%  | 3% | 2%  | 2%  | 1% | 1%  |

Convenciones: R. V.: Rosa de los Vientos F. R.: Frecuencia Relativa. Nota: Datos resaltados en rojo están incompletos.



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## ESTACIÓN METEOROLÓGICA ALCÁZARES

CÓDIGO: EMM-13



SEPTIEMBRE DE 2011

### JORNADA NOCTURNA - DIRECCIÓN DEL VIENTO SEGÚN LA ROSA DE LOS VIENTOS (Frecuencia relativa)

| DIA     | N   | NNE | NE | ENE | E   | ESE | SE  | SSE | S   | SSO | SO  | OSO | O   | ONO | NO  | NNO |
|---------|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1       | 0%  | 9%  | 0% | 4%  | 0%  | 11% | 35% | 24% | 5%  | 1%  | 2%  | 0%  | 0%  | 7%  | 1%  | 1%  |
| 2       | 0%  | 0%  | 0% | 0%  | 0%  | 13% | 34% | 31% | 8%  | 2%  | 0%  | 0%  | 0%  | 13% | 0%  | 0%  |
| 3       | 0%  | 0%  | 0% | 0%  | 0%  | 1%  | 25% | 54% | 3%  | 1%  | 0%  | 0%  | 0%  | 16% | 0%  | 0%  |
| 4       | 0%  | 4%  | 0% | 1%  | 1%  | 8%  | 54% | 31% | 1%  | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  |
| 5       | 0%  | 0%  | 0% | 0%  | 0%  | 3%  | 49% | 35% | 2%  | 0%  | 1%  | 0%  | 0%  | 11% | 0%  | 0%  |
| 6       | 0%  | 0%  | 2% | 2%  | 1%  | 8%  | 42% | 33% | 2%  | 1%  | 0%  | 0%  | 9%  | 0%  | 0%  | 0%  |
| 7       | 0%  | 13% | 0% | 0%  | 8%  | 4%  | 11% | 13% | 8%  | 2%  | 15% | 6%  | 10% | 2%  | 8%  | 0%  |
| 8       | 0%  | 0%  | 0% | 0%  | 1%  | 1%  | 10% | 12% | 9%  | 19% | 4%  | 38% | 0%  | 6%  | 0%  | 0%  |
| 9       | 2%  | 1%  | 3% | 6%  | 10% | 15% | 17% | 18% | 8%  | 18% | 1%  | 0%  | 1%  | 0%  | 0%  | 2%  |
| 10      | 5%  | 1%  | 1% | 3%  | 10% | 10% | 20% | 14% | 6%  | 5%  | 7%  | 4%  | 9%  | 3%  | 1%  | 1%  |
| 11      | 0%  | 1%  | 1% | 2%  | 22% | 11% | 23% | 26% | 3%  | 0%  | 2%  | 0%  | 6%  | 3%  | 0%  | 0%  |
| 12      | 0%  | 0%  | 1% | 9%  | 2%  | 5%  | 27% | 47% | 7%  | 2%  | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  |
| 13      | 0%  | 0%  | 0% | 0%  | 1%  | 22% | 44% | 30% | 3%  | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  |
| 14      | 6%  | 9%  | 3% | 1%  | 1%  | 6%  | 25% | 21% | 10% | 0%  | 0%  | 0%  | 2%  | 3%  | 3%  | 10% |
| 15      | 1%  | 0%  | 0% | 2%  | 11% | 5%  | 27% | 40% | 2%  | 1%  | 1%  | 0%  | 2%  | 9%  | 0%  | 0%  |
| 16      | 0%  | 0%  | 0% | 0%  | 3%  | 7%  | 40% | 35% | 7%  | 0%  | 0%  | 0%  | 0%  | 8%  | 0%  | 0%  |
| 17      | 0%  | 0%  | 0% | 0%  | 15% | 22% | 13% | 9%  | 7%  | 6%  | 3%  | 0%  | 1%  | 1%  | 17% | 6%  |
| 18      | 6%  | 1%  | 6% | 0%  | 35% | 8%  | 10% | 16% | 3%  | 3%  | 6%  | 1%  | 0%  | 4%  | 0%  | 1%  |
| 19      | 0%  | 0%  | 0% | 0%  | 2%  | 1%  | 26% | 14% | 0%  | 12% | 2%  | 6%  | 5%  | 24% | 8%  | 0%  |
| 20      | 20% | 1%  | 1% | 1%  | 6%  | 8%  | 25% | 10% | 0%  | 0%  | 0%  | 3%  | 2%  | 3%  | 19% | 2%  |
| 21      | 9%  | 11% | 1% | 0%  | 0%  | 5%  | 24% | 19% | 1%  | 0%  | 0%  | 1%  | 0%  | 16% | 1%  | 12% |
| 22      | 1%  | 0%  | 0% | 0%  | 0%  | 1%  | 23% | 26% | 13% | 0%  | 0%  | 18% | 1%  | 3%  | 10% | 3%  |
| 23      | 3%  | 0%  | 3% | 3%  | 10% | 5%  | 40% | 19% | 7%  | 0%  | 0%  | 0%  | 0%  | 0%  | 3%  | 7%  |
| 24      | 11% | 0%  | 5% | 0%  | 5%  | 10% | 37% | 22% | 1%  | 1%  | 9%  | 0%  | 0%  | 0%  | 0%  | 0%  |
| 25      | 0%  | 0%  | 2% | 1%  | 1%  | 8%  | 35% | 21% | 0%  | 23% | 0%  | 1%  | 0%  | 3%  | 0%  | 5%  |
| 26      | 1%  | 1%  | 1% | 4%  | 13% | 7%  | 31% | 27% | 3%  | 8%  | 1%  | 3%  | 0%  | 0%  | 0%  | 0%  |
| 27      | 0%  | 0%  | 0% | 0%  | 2%  | 6%  | 42% | 38% | 5%  | 0%  | 0%  | 3%  | 1%  | 3%  | 0%  | 0%  |
| 28      | 3%  | 0%  | 1% | 1%  | 4%  | 8%  | 37% | 40% | 1%  | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 6%  |
| 29      | 0%  | 0%  | 0% | 0%  | 3%  | 10% | 40% | 12% | 1%  | 0%  | 0%  | 1%  | 0%  | 21% | 13% | 0%  |
| 30      | 1%  | 8%  | 0% | 0%  | 0%  | 13% | 31% | 28% | 17% | 0%  | 0%  | 0%  | 3%  | 0%  | 0%  | 0%  |
| Mensual | 2%  | 2%  | 1% | 1%  | 6%  | 8%  | 30% | 25% | 5%  | 3%  | 2%  | 3%  | 2%  | 5%  | 3%  | 2%  |

| DIRECCIÓN DEL VIENTO EN EL MES ORDENADA DE MAYOR A MENOR PREDOMINANCIA |     |     |     |    |     |    |     |    |     |    |     |     |    |    |     |    |
|--|-----|-----|-----|----|-----|----|-----|----|-----|----|-----|-----|----|----|-----|----|
| R. V.  | SE  | SSE | ESE | E  | ONO | S  | SSO | NO | OSO | N  | NNE | NNO | SO | O  | ENE | NE |
| F. R.  | 30% | 25% | 8%  | 6% | 5%  | 5% | 3%  | 3% | 3%  | 2% | 2%  | 2%  | 2% | 2% | 1%  | 1% |

Convenciones: R. V.: Rosa de los Vientos F. R.: Frecuencia Relativa. Nota: Datos resaltados en rojo están incompletos.