



# 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 LA PALMA

CÓDIGO: EMM-09

OCTUBRE DE 2011

### RESUMEN DIARIO Y MENSUAL DE VARIABLES METEOROLÓGICAS

| Variables<br>Día | 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                | 21.0                      | 18.1        | 16.3        | 2.2        | 0.2        | 813.2        | 98.0                 | 95.8        | 85.0        | 15.4         | 1139.0                              | 173.9        | 1.2         |
| 2                | 23.7                      | 18.5        | 15.6        | 3.1        | 0.3        | 814.0        | 98.0                 | 91.2        | 68.0        | 1.4          | 1341.0                              | 358.4        | 2.7         |
| 3                | 23.8                      | 18.7        | 16.1        | 3.1        | 0.3        | 813.7        | 98.0                 | 92.3        | 70.0        | 11.2         | 1306.0                              | 347.2        | 2.7         |
| 4                | 19.4                      | 17.0        | 15.7        | 4.0        | 0.2        | 815.2        | 98.0                 | 97.4        | 92.0        | 20.0         | 392.0                               | 184.6        | 1.3         |
| 5                | 25.4                      | 19.2        | 15.5        | 2.7        | 0.2        | 813.2        | 97.0                 | 88.0        | 62.0        | 0.0          | 1308.0                              | 475.2        | 3.5         |
| 6                | 24.9                      | 19.3        | 16.1        | 5.8        | 0.4        | 812.1        | 98.0                 | 90.5        | 64.0        | 11.4         | 1204.0                              | 420.0        | 3.1         |
| 7                | 25.6                      | 19.9        | 16.5        | 2.7        | 0.3        | 811.5        | 98.0                 | 89.8        | 63.0        | 1.4          | 1276.0                              | 446.7        | 3.3         |
| 8                | 19.3                      | 17.7        | 15.9        | 5.4        | 0.4        | 813.1        | 98.0                 | 96.3        | 90.0        | 8.2          | 640.0                               | 176.9        | 1.3         |
| 9                | 23.3                      | 18.7        | 16.2        | 2.2        | 0.2        | 813.2        | 98.0                 | 91.3        | 75.0        | 1.6          | 1100.0                              | 324.1        | 2.4         |
| 10               | 21.4                      | 18.0        | 15.5        | 1.8        | 0.1        | 814.4        | 98.0                 | 95.3        | 83.0        | 58.6         | 1100.0                              | 274.6        | 1.9         |
| 11               | 21.6                      | 18.0        | 16.2        | 2.2        | 0.3        | 814.4        | 98.0                 | 96.1        | 85.0        | 14.8         | 747.0                               | 203.6        | 1.4         |
| 12               | 21.3                      | 16.9        | 15.4        | 2.7        | 0.3        | 816.1        | 98.0                 | 96.7        | 82.0        | 24.6         | 833.0                               | 216.0        | 1.5         |
| 13               | 24.4                      | 18.5        | 14.7        | 3.1        | 0.3        | 813.9        | 98.0                 | 88.1        | 63.0        | 1.0          | 1178.0                              | 542.0        | 3.9         |
| 14               | 22.7                      | 17.3        | 14.7        | 5.8        | 0.6        | 813.9        | 98.0                 | 94.2        | 79.0        | 34.2         | 1290.0                              | 307.2        | 2.3         |
| 15               | 20.9                      | 17.2        | 14.6        | 2.2        | 0.3        | 815.2        | 98.0                 | 94.3        | 80.0        | 32.6         | 705.0                               | 287.0        | 2.0         |
| 16               | 20.5                      | 16.5        | 14.6        | 3.1        | 0.2        | 815.7        | 98.0                 | 96.8        | 86.0        | 38.4         | 1027.0                              | 207.7        | 1.4         |
| 17               | 18.6                      | 15.6        | 14.7        | 2.2        | 0.3        | 816.4        | 98.0                 | 97.9        | 96.0        | 35.2         | 749.0                               | 177.6        | 1.2         |
| 18               | 19.2                      | 15.7        | 13.9        | 2.2        | 0.3        | 817.6        | 98.0                 | 97.1        | 87.0        | 7.2          | 812.0                               | 251.3        | 1.7         |
| 19               | 21.9                      | 17.2        | 13.4        | 3.6        | 0.2        | 817.9        | 97.0                 | 81.5        | 55.0        | 0.8          | 1044.0                              | 429.2        | 3.2         |
| 20               | 21.1                      | 17.9        | 15.6        | 1.8        | 0.2        | 817.6        | 85.0                 | 70.1        | 52.0        | 0.0          | 684.0                               | 286.8        | 2.4         |
| 21               | 22.9                      | 17.8        | 14.9        | 2.7        | 0.3        | 816.2        | 90.0                 | 79.4        | 60.0        | 0.0          | 1181.0                              | 374.7        | 2.9         |
| 22               | 24.1                      | 18.6        | 15.2        | 3.1        | 0.3        | 814.2        | 93.0                 | 76.9        | 48.0        | 0.0          | 1201.0                              | 438.5        | 3.5         |
| 23               | 24.1                      | 19.1        | 14.7        | 2.2        | 0.3        | 813.2        | 97.0                 | 81.9        | 68.0        | 1.0          | 1176.0                              | 413.0        | 3.2         |
| 24               | 23.7                      | 18.8        | 16.2        | 2.7        | 0.3        | 813.7        | 98.0                 | 89.0        | 64.0        | 0.0          | 1130.0                              | 421.2        | 3.1         |
| 25               | 23.6                      | 18.4        | 15.6        | 2.7        | 0.2        | 813.1        | 98.0                 | 92.2        | 72.0        | 17.0         | 1368.0                              | 446.4        | 3.2         |
| 26               | 22.0                      | 18.3        | 15.9        | 1.3        | 0.1        | 811.2        | 98.0                 | 93.5        | 80.0        | 18.8         | 1005.0                              | 254.5        | 1.8         |
| 27               | 24.7                      | 19.7        | 16.0        | 1.8        | 0.2        | 809.8        | 98.0                 | 89.1        | 68.0        | 0.0          | 1264.0                              | 414.1        | 3.0         |
| 28               | 20.2                      | 17.7        | 16.2        | 2.7        | 0.3        | 811.9        | 98.0                 | 96.9        | 86.0        | 29.8         | 615.0                               | 200.9        | 1.3         |
| 29               | 19.3                      | 16.9        | 15.8        | 1.3        | 0.1        | 813.8        | 98.0                 | 97.3        | 93.0        | 13.4         | 1095.0                              | 162.2        | 1.1         |
| 30               | 18.0                      | 16.2        | 14.8        | 2.7        | 0.1        | 814.9        | 98.0                 | 97.6        | 96.0        | 17.2         | 353.0                               | 132.8        | 0.8         |
| 31               | 22.4                      | 17.6        | 14.2        | 2.7        | 0.3        | 814.0        | 98.0                 | 89.0        | 74.0        | 0.0          | 1229.0                              | 366.4        | 2.8         |
| <b>Mensual</b>   | <b>25.6</b>               | <b>17.9</b> | <b>13.4</b> | <b>5.8</b> | <b>0.3</b> | <b>814.1</b> | <b>98.0</b>          | <b>91.1</b> | <b>48.0</b> | <b>415.2</b> | <b>1368.0</b>                       | <b>313.4</b> | <b>71.0</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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OCTUBRE 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       | 1%  | 0%  | 0% | 0%  | 6%  | 8%  | 4%  | 22% | 7%  | 3%  | 14% | 5%  | 3%  | 5%  | 13% | 8%  |
| 2       | 3%  | 0%  | 0% | 0%  | 3%  | 2%  | 10% | 8%  | 5%  | 10% | 13% | 15% | 10% | 9%  | 5%  | 7%  |
| 3       | 3%  | 0%  | 0% | 1%  | 1%  | 0%  | 0%  | 6%  | 4%  | 7%  | 24% | 14% | 11% | 11% | 8%  | 10% |
| 4       | 9%  | 0%  | 0% | 0%  | 1%  | 0%  | 2%  | 1%  | 3%  | 9%  | 16% | 14% | 14% | 19% | 10% | 3%  |
| 5       | 17% | 2%  | 1% | 1%  | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 10% | 7%  | 6%  | 34% | 10% | 12% |
| 6       | 8%  | 1%  | 0% | 1%  | 1%  | 1%  | 8%  | 8%  | 4%  | 4%  | 6%  | 8%  | 11% | 14% | 10% | 15% |
| 7       | 8%  | 3%  | 3% | 0%  | 0%  | 0%  | 0%  | 1%  | 19% | 3%  | 8%  | 5%  | 10% | 21% | 13% | 7%  |
| 8       | 0%  | 1%  | 0% | 2%  | 1%  | 9%  | 6%  | 6%  | 1%  | 16% | 4%  | 10% | 17% | 8%  | 8%  | 9%  |
| 9       | 8%  | 6%  | 0% | 2%  | 7%  | 7%  | 6%  | 10% | 16% | 2%  | 6%  | 10% | 6%  | 8%  | 2%  | 5%  |
| 10      | 18% | 10% | 1% | 0%  | 13% | 3%  | 3%  | 1%  | 3%  | 1%  | 3%  | 20% | 10% | 6%  | 6%  | 1%  |
| 11      | 8%  | 5%  | 3% | 6%  | 0%  | 1%  | 3%  | 10% | 3%  | 8%  | 8%  | 12% | 7%  | 8%  | 12% | 6%  |
| 12      | 8%  | 6%  | 9% | 1%  | 1%  | 3%  | 3%  | 3%  | 4%  | 8%  | 10% | 10% | 4%  | 8%  | 11% | 10% |
| 13      | 6%  | 1%  | 1% | 0%  | 0%  | 0%  | 2%  | 5%  | 1%  | 3%  | 10% | 5%  | 8%  | 33% | 8%  | 15% |
| 14      | 6%  | 1%  | 0% | 0%  | 2%  | 3%  | 4%  | 6%  | 1%  | 9%  | 3%  | 22% | 13% | 6%  | 12% | 13% |
| 15      | 17% | 0%  | 0% | 0%  | 0%  | 0%  | 0%  | 0%  | 1%  | 1%  | 7%  | 15% | 31% | 8%  | 13% | 9%  |
| 16      | 1%  | 0%  | 0% | 0%  | 0%  | 0%  | 1%  | 0%  | 3%  | 28% | 8%  | 19% | 11% | 9%  | 6%  | 13% |
| 17      | 3%  | 0%  | 8% | 0%  | 1%  | 1%  | 1%  | 4%  | 9%  | 7%  | 15% | 22% | 6%  | 5%  | 7%  | 10% |
| 18      | 19% | 1%  | 1% | 0%  | 0%  | 2%  | 1%  | 1%  | 8%  | 7%  | 8%  | 7%  | 8%  | 13% | 11% | 13% |
| 19      | 4%  | 1%  | 1% | 1%  | 0%  | 3%  | 1%  | 20% | 5%  | 3%  | 1%  | 15% | 10% | 13% | 17% | 6%  |
| 20      | 10% | 0%  | 0% | 0%  | 0%  | 0%  | 3%  | 35% | 5%  | 9%  | 8%  | 6%  | 13% | 2%  | 4%  | 5%  |
| 21      | 3%  | 1%  | 1% | 1%  | 0%  | 2%  | 0%  | 31% | 15% | 8%  | 7%  | 6%  | 7%  | 5%  | 7%  | 7%  |
| 22      | 6%  | 3%  | 1% | 0%  | 0%  | 0%  | 21% | 8%  | 2%  | 3%  | 3%  | 6%  | 13% | 12% | 13% | 10% |
| 23      | 17% | 6%  | 0% | 4%  | 13% | 0%  | 1%  | 2%  | 7%  | 3%  | 11% | 6%  | 9%  | 2%  | 6%  | 13% |
| 24      | 10% | 1%  | 0% | 1%  | 1%  | 1%  | 1%  | 1%  | 3%  | 11% | 12% | 15% | 17% | 8%  | 10% | 9%  |
| 25      | 6%  | 1%  | 2% | 0%  | 1%  | 0%  | 0%  | 13% | 6%  | 4%  | 8%  | 13% | 17% | 9%  | 13% | 8%  |
| 26      | 22% | 5%  | 0% | 0%  | 0%  | 14% | 0%  | 0%  | 5%  | 3%  | 7%  | 5%  | 3%  | 10% | 14% | 13% |
| 27      | 17% | 0%  | 1% | 0%  | 0%  | 0%  | 1%  | 18% | 6%  | 4%  | 3%  | 8%  | 3%  | 6%  | 8%  | 24% |
| 28      | 6%  | 0%  | 1% | 0%  | 0%  | 0%  | 3%  | 18% | 5%  | 12% | 17% | 10% | 12% | 6%  | 3%  | 8%  |
| 29      | 3%  | 0%  | 0% | 0%  | 3%  | 21% | 1%  | 7%  | 16% | 15% | 2%  | 6%  | 6%  | 11% | 6%  | 6%  |
| 30      | 5%  | 1%  | 0% | 9%  | 0%  | 21% | 3%  | 6%  | 12% | 3%  | 8%  | 6%  | 3%  | 6%  | 15% | 4%  |
| 31      | 10% | 3%  | 0% | 0%  | 0%  | 0%  | 6%  | 26% | 8%  | 4%  | 11% | 9%  | 4%  | 8%  | 5%  | 6%  |
| Mensual | 8%  | 2%  | 1% | 1%  | 2%  | 3%  | 3%  | 9%  | 6%  | 7%  | 9%  | 11% | 10% | 10% | 9%  | 9%  |

| DIRECCIÓN DEL VIENTO EN EL MES ORDENADA DE MAYOR A MENOR PREDOMINANCIA |     |     |     |    |     |     |    |    |     |    |     |    |     |    |    |     |
|--|-----|-----|-----|----|-----|-----|----|----|-----|----|-----|----|-----|----|----|-----|
| R. V.  | OSO | ONO | O   | NO | NNO | SSE | SO | N  | SSO | S  | ESE | SE | NNE | E  | NE | ENE |
| F. R.  | 11% | 10% | 10% | 9% | 9%  | 9%  | 9% | 8% | 7%  | 6% | 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 LA PALMA

CÓDIGO: EMM-09

OCTUBRE DE 2011

JORNADA NOCTURNA - 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       | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 51% | 17% | 10% | 23% | 0%  | 0%  | 0%  | 0%  | 0%  |
| 2       | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 53% | 16% | 5%  | 6%  | 18% | 3%  | 0%  | 0%  | 0%  |
| 3       | 0%  | 0%  | 0%  | 1%  | 17% | 1%  | 0%  | 9%  | 1%  | 4%  | 5%  | 1%  | 50% | 8%  | 1%  | 0%  |
| 4       | 51% | 0%  | 1%  | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 44% | 0%  | 0%  | 4%  | 1%  |
| 5       | 50% | 0%  | 0%  | 0%  | 0%  | 0%  | 46% | 0%  | 0%  | 0%  | 3%  | 1%  | 0%  | 0%  | 0%  | 0%  |
| 6       | 0%  | 0%  | 0%  | 0%  | 0%  | 1%  | 16% | 19% | 8%  | 11% | 29% | 1%  | 14% | 0%  | 0%  | 0%  |
| 7       | 1%  | 0%  | 0%  | 0%  | 1%  | 1%  | 15% | 5%  | 3%  | 17% | 19% | 30% | 4%  | 5%  | 0%  | 0%  |
| 8       | 1%  | 1%  | 1%  | 1%  | 6%  | 6%  | 10% | 31% | 3%  | 4%  | 6%  | 6%  | 17% | 7%  | 0%  | 3%  |
| 9       | 0%  | 0%  | 0%  | 0%  | 0%  | 1%  | 3%  | 15% | 33% | 17% | 20% | 5%  | 6%  | 0%  | 0%  | 0%  |
| 10      | 6%  | 5%  | 1%  | 10% | 24% | 1%  | 0%  | 0%  | 0%  | 0%  | 24% | 1%  | 0%  | 5%  | 21% | 1%  |
| 11      | 0%  | 0%  | 0%  | 0%  | 0%  | 1%  | 7%  | 6%  | 1%  | 31% | 33% | 19% | 1%  | 0%  | 0%  | 0%  |
| 12      | 0%  | 0%  | 0%  | 6%  | 2%  | 31% | 12% | 13% | 19% | 1%  | 9%  | 6%  | 1%  | 0%  | 0%  | 0%  |
| 13      | 0%  | 0%  | 0%  | 0%  | 1%  | 10% | 18% | 24% | 4%  | 2%  | 6%  | 4%  | 5%  | 25% | 1%  | 0%  |
| 14      | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 28% | 20% | 10% | 28% | 10% | 4%  | 0%  | 0%  | 0%  | 0%  |
| 15      | 3%  | 0%  | 0%  | 0%  | 1%  | 5%  | 8%  | 11% | 6%  | 3%  | 4%  | 23% | 10% | 25% | 0%  | 0%  |
| 16      | 0%  | 0%  | 0%  | 0%  | 1%  | 2%  | 3%  | 4%  | 3%  | 4%  | 10% | 24% | 35% | 4%  | 1%  | 8%  |
| 17      | 1%  | 0%  | 31% | 9%  | 6%  | 7%  | 23% | 9%  | 3%  | 1%  | 0%  | 1%  | 0%  | 0%  | 0%  | 9%  |
| 18      | 0%  | 0%  | 0%  | 0%  | 1%  | 2%  | 4%  | 21% | 38% | 5%  | 7%  | 11% | 9%  | 2%  | 0%  | 0%  |
| 19      | 0%  | 0%  | 0%  | 0%  | 0%  | 17% | 7%  | 22% | 2%  | 50% | 2%  | 0%  | 0%  | 0%  | 0%  | 0%  |
| 20      | 0%  | 3%  | 0%  | 0%  | 0%  | 0%  | 10% | 21% | 7%  | 13% | 23% | 1%  | 18% | 6%  | 0%  | 0%  |
| 21      | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 38% | 32% | 0%  | 0%  | 0%  | 1%  | 28% | 0%  | 0%  |
| 22      | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 47% | 6%  | 1%  | 0%  | 22% | 2%  | 17% | 6%  | 0%  | 0%  |
| 23      | 0%  | 0%  | 0%  | 0%  | 4%  | 0%  | 0%  | 5%  | 32% | 0%  | 34% | 19% | 1%  | 1%  | 1%  | 3%  |
| 24      | 0%  | 0%  | 0%  | 0%  | 38% | 3%  | 31% | 6%  | 8%  | 4%  | 8%  | 1%  | 1%  | 1%  | 0%  | 0%  |
| 25      | 0%  | 2%  | 2%  | 1%  | 8%  | 0%  | 7%  | 1%  | 12% | 0%  | 63% | 1%  | 3%  | 0%  | 0%  | 0%  |
| 26      | 1%  | 0%  | 1%  | 10% | 2%  | 3%  | 1%  | 0%  | 0%  | 8%  | 19% | 29% | 19% | 7%  | 0%  | 0%  |
| 27      | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 31% | 24% | 3%  | 6%  | 30% | 4%  | 3%  | 0%  | 0%  |
| 28      | 1%  | 0%  | 0%  | 0%  | 0%  | 14% | 1%  | 3%  | 10% | 23% | 17% | 25% | 1%  | 5%  | 1%  | 0%  |
| 29      | 0%  | 0%  | 0%  | 0%  | 0%  | 10% | 0%  | 12% | 1%  | 63% | 9%  | 6%  | 0%  | 0%  | 0%  | 0%  |
| 30      | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 15% | 35% | 0%  | 0%  | 0%  | 0%  | 50% | 0%  |
| 31      | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 73% | 14% | 8%  | 0%  | 0%  | 0%  | 0%  | 6%  | 0%  |
| Mensual | 4%  | 0%  | 1%  | 1%  | 4%  | 4%  | 10% | 16% | 10% | 11% | 13% | 10% | 7%  | 4%  | 3%  | 1%  |

| DIRECCIÓN DEL VIENTO EN EL MES ORDENADA DE MAYOR A MENOR PREDOMINANCIA |     |     |     |     |     |     |    |     |     |    |    |    |     |    |     |     |
|--|-----|-----|-----|-----|-----|-----|----|-----|-----|----|----|----|-----|----|-----|-----|
| R. V.  | SSE | SO  | SSO | S   | OSO | SE  | O  | ONO | ESE | N  | E  | NO | ENE | NE | NNO | NNE |
| F. R.  | 16% | 13% | 11% | 10% | 10% | 10% | 7% | 4%  | 4%  | 4% | 4% | 3% | 1%  | 1% | 1%  | 0%  |

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