



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 INGEOMINAS

CÓDIGO: EMM-03

SEPTIEMBRE DE 2011

RESUMEN DIARIO Y MENSUAL DE VARIABLES METEOROLÓGICAS

| Variables Día | Temperatura del Aire (°C) | | | V.V. (m/s) | | P.B. (HPa) | Humedad Relativa (%) | | | LI. (mm) | Radiación Solar (W/m ²) | | ET. (mm) |
|------------------|---------------------------|-------------|-------------|------------|------------|--------------|----------------------|-------------|-------------|--------------|-------------------------------------|--------------|-------------|
| | Máxima | Media | Mínima | Máxima | Media | Media | Máxima | Media | Mínima | Suma | Máxima | Media | Suma |
| 1 | 25.9 | 18.9 | 14.4 | 4.0 | 1.1 | 788.0 | 80.0 | 56.7 | 33.0 | 0.0 | 911.0 | 454.6 | 4.1 |
| 2 | 25.3 | 17.8 | 13.1 | 4.0 | 0.8 | 788.4 | 81.0 | 62.5 | 34.0 | 0.0 | 1163.0 | 476.2 | 4.1 |
| 3 | 20.4 | 15.7 | 13.2 | 2.7 | 0.6 | 788.5 | 83.0 | 74.0 | 58.0 | 0.5 | 921.0 | 208.9 | 1.5 |
| 4 | 23.7 | 16.5 | 12.3 | 3.6 | 0.9 | 788.1 | 83.0 | 68.6 | 48.0 | 0.8 | 1157.0 | 278.4 | 2.5 |
| 5 | 27.2 | 18.8 | 12.8 | 3.6 | 0.9 | 787.7 | 81.0 | 59.9 | 36.0 | 0.0 | 1180.0 | 523.1 | 4.3 |
| 6 | 25.8 | 17.9 | 13.3 | 3.1 | 0.8 | 787.7 | 84.0 | 67.3 | 46.0 | 0.0 | 1210.0 | 357.1 | 3.1 |
| 7 | 26.6 | 16.7 | 13.8 | 4.0 | 0.7 | 788.0 | 89.0 | 75.1 | 47.0 | 1.8 | 1069.0 | 260.3 | 2.0 |
| 8 | 20.0 | 14.8 | 12.0 | 7.6 | 1.1 | 788.9 | 91.0 | 83.5 | 64.0 | 75.4 | 972.0 | 253.6 | 1.5 |
| 9 | 24.9 | 16.6 | 12.3 | 6.7 | 1.5 | 788.2 | 90.0 | 71.2 | 51.0 | 9.9 | 924.0 | 361.0 | 3.1 |
| 10 | 26.7 | 16.8 | 12.3 | 8.0 | 1.4 | 787.8 | 91.0 | 74.7 | 46.0 | 54.1 | 1224.0 | 502.7 | 3.6 |
| 11 | 23.3 | 15.9 | 12.1 | 4.0 | 0.7 | 788.9 | 91.0 | 81.7 | 54.0 | 2.3 | 1379.0 | 276.7 | 2.0 |
| 12 | 24.8 | 17.0 | 13.5 | 3.1 | 1.0 | 789.5 | 90.0 | 71.7 | 44.0 | 8.6 | 1045.0 | 272.8 | 2.3 |
| 13 | 25.9 | 18.8 | 14.4 | 5.4 | 1.2 | 788.8 | 77.0 | 58.9 | 34.0 | 0.0 | 1289.0 | 429.3 | 3.8 |
| 14 | 26.3 | 18.1 | 13.3 | 4.5 | 1.0 | 787.7 | 86.0 | 67.2 | 45.0 | 0.0 | 1230.0 | 387.5 | 3.1 |
| 15 | 25.2 | 18.0 | 13.3 | 2.7 | 0.8 | 788.0 | 87.0 | 67.1 | 42.0 | 0.0 | 958.0 | 336.1 | 3.0 |
| 16 | 22.4 | 15.9 | 13.5 | 4.0 | 0.7 | 788.2 | 90.0 | 79.8 | 61.0 | 24.6 | 879.0 | 189.6 | 1.5 |
| 17 | 24.3 | 16.2 | 13.3 | 3.1 | 0.9 | 787.8 | 90.0 | 77.7 | 54.0 | 4.6 | 1291.0 | 266.7 | 2.0 |
| 18 | 22.9 | 15.3 | 12.9 | 3.1 | 0.8 | 788.7 | 92.0 | 83.4 | 58.0 | 48.3 | 1076.0 | 254.2 | 1.5 |
| 19 | 24.3 | 16.2 | 12.7 | 3.1 | 0.7 | 787.9 | 90.0 | 79.2 | 53.0 | 2.0 | 1102.0 | 283.9 | 2.0 |
| 20 | 23.1 | 16.4 | 13.3 | 3.1 | 0.6 | 787.9 | 92.0 | 78.5 | 50.0 | 12.7 | 1184.0 | 286.6 | 2.3 |
| 21 | 24.8 | 17.9 | 13.6 | 2.7 | 0.9 | 788.0 | 89.0 | 72.5 | 46.0 | 0.0 | 1170.0 | 342.1 | 2.8 |
| 22 | 23.3 | 17.0 | 13.6 | 4.9 | 0.9 | 787.9 | 91.0 | 78.0 | 53.0 | 1.0 | 1191.0 | 258.2 | 1.8 |
| 23 | 27.0 | 17.1 | 13.3 | 5.4 | 1.0 | 788.1 | 89.0 | 78.0 | 48.0 | 7.6 | 1321.0 | 401.8 | 2.8 |
| 24 | 24.0 | 16.0 | 13.6 | 5.8 | 1.2 | 787.3 | 91.0 | 79.9 | 58.0 | 2.0 | 1204.0 | 205.5 | 1.5 |
| 25 | 19.1 | 15.8 | 13.7 | 3.6 | 0.8 | 787.5 | 88.0 | 78.3 | 64.0 | 3.0 | 512.0 | 188.8 | 1.5 |
| 26 | 25.1 | 17.2 | 13.7 | 4.0 | 0.9 | 788.3 | 88.0 | 75.0 | 46.0 | 1.8 | 1347.0 | 320.0 | 2.5 |
| 27 | 27.2 | 19.3 | 13.8 | 3.1 | 1.2 | 788.6 | 82.0 | 59.6 | 34.0 | 0.0 | 971.0 | 552.6 | 4.6 |
| 28 | 26.4 | 18.3 | 13.7 | 3.1 | 0.8 | 788.1 | 86.0 | 68.6 | 46.0 | 0.0 | 1100.0 | 340.5 | 2.8 |
| 29 | 25.2 | 16.7 | 13.4 | 6.3 | 1.1 | 787.1 | 89.0 | 74.0 | 51.0 | 2.0 | 994.0 | 259.6 | 2.0 |
| 30 | 24.8 | 18.3 | 13.2 | 3.1 | 0.9 | 787.0 | 82.0 | 68.4 | 48.0 | 0.0 | 1060.0 | 414.4 | 3.3 |
| Mensual | 27.2 | 17.1 | 12.0 | 8.0 | 0.9 | 788.1 | 92.0 | 72.4 | 33.0 | 263.2 | 1379.0 | 331.4 | 79.0 |

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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CÓDIGO: EMM-03



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 | 13% | 1% | 2% | 2% | 4% | 4% | 1% | 1% | 0% | 1% | 2% | 0% | 4% | 22% | 28% | 15% |
| 2 | 10% | 7% | 8% | 7% | 12% | 4% | 0% | 0% | 0% | 1% | 1% | 3% | 11% | 16% | 13% | 7% |
| 3 | 4% | 8% | 3% | 3% | 7% | 1% | 0% | 9% | 0% | 1% | 5% | 6% | 27% | 14% | 8% | 3% |
| 4 | 6% | 2% | 0% | 5% | 8% | 5% | 4% | 3% | 3% | 7% | 3% | 8% | 19% | 15% | 9% | 3% |
| 5 | 5% | 1% | 1% | 0% | 0% | 0% | 1% | 1% | 6% | 9% | 10% | 13% | 15% | 16% | 15% | 10% |
| 6 | 1% | 0% | 0% | 0% | 0% | 1% | 0% | 1% | 6% | 8% | 16% | 18% | 17% | 23% | 8% | 2% |
| 7 | 3% | 1% | 1% | 0% | 1% | 2% | 6% | 3% | 10% | 10% | 18% | 15% | 14% | 9% | 3% | 3% |
| 8 | 1% | 0% | 1% | 0% | 0% | 1% | 4% | 4% | 8% | 6% | 11% | 19% | 19% | 15% | 9% | 2% |
| 9 | 11% | 6% | 1% | 3% | 6% | 6% | 4% | 4% | 6% | 3% | 16% | 5% | 10% | 7% | 6% | 5% |
| 10 | 3% | 0% | 0% | 0% | 1% | 0% | 5% | 11% | 3% | 5% | 6% | 9% | 10% | 25% | 15% | 7% |
| 11 | 17% | 3% | 3% | 6% | 2% | 4% | 0% | 0% | 0% | 1% | 3% | 4% | 12% | 20% | 17% | 7% |
| 12 | 26% | 13% | 7% | 15% | 9% | 2% | 3% | 1% | 1% | 1% | 1% | 5% | 1% | 3% | 5% | 6% |
| 13 | 7% | 4% | 3% | 4% | 4% | 1% | 8% | 4% | 1% | 6% | 4% | 10% | 12% | 14% | 13% | 5% |
| 14 | 2% | 1% | 1% | 0% | 0% | 2% | 3% | 15% | 9% | 7% | 8% | 5% | 11% | 10% | 19% | 8% |
| 15 | 15% | 10% | 6% | 6% | 10% | 2% | 2% | 1% | 1% | 1% | 5% | 5% | 11% | 10% | 11% | 4% |
| 16 | 6% | 10% | 5% | 11% | 11% | 1% | 1% | 2% | 0% | 3% | 7% | 6% | 10% | 13% | 10% | 5% |
| 17 | 1% | 0% | 3% | 1% | 8% | 3% | 4% | 8% | 2% | 9% | 15% | 10% | 17% | 11% | 6% | 1% |
| 18 | 2% | 7% | 3% | 7% | 0% | 0% | 2% | 1% | 8% | 10% | 13% | 8% | 10% | 16% | 6% | 7% |
| 19 | 3% | 3% | 0% | 0% | 5% | 8% | 13% | 3% | 1% | 3% | 12% | 10% | 11% | 16% | 11% | 1% |
| 20 | 17% | 19% | 6% | 6% | 6% | 3% | 0% | 0% | 0% | 1% | 4% | 8% | 6% | 13% | 8% | 5% |
| 21 | 1% | 0% | 0% | 0% | 0% | 0% | 3% | 3% | 4% | 3% | 6% | 10% | 18% | 28% | 17% | 6% |
| 22 | 0% | 1% | 1% | 0% | 2% | 7% | 3% | 16% | 2% | 5% | 3% | 4% | 13% | 22% | 18% | 3% |
| 23 | 2% | 0% | 1% | 0% | 0% | 1% | 10% | 5% | 4% | 11% | 4% | 9% | 9% | 15% | 22% | 8% |
| 24 | 10% | 0% | 1% | 0% | 1% | 3% | 19% | 13% | 3% | 6% | 5% | 5% | 8% | 9% | 11% | 6% |
| 25 | 4% | 9% | 2% | 2% | 15% | 8% | 6% | 3% | 5% | 7% | 6% | 6% | 5% | 7% | 15% | 1% |
| 26 | 9% | 3% | 3% | 1% | 5% | 0% | 6% | 1% | 3% | 3% | 5% | 14% | 10% | 13% | 17% | 6% |
| 27 | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 10% | 6% | 5% | 15% | 18% | 19% | 14% | 9% | 2% |
| 28 | 6% | 1% | 1% | 0% | 4% | 1% | 1% | 1% | 2% | 3% | 6% | 21% | 17% | 13% | 16% | 6% |
| 29 | 3% | 0% | 1% | 3% | 1% | 5% | 9% | 7% | 7% | 14% | 2% | 15% | 12% | 10% | 6% | 4% |
| 30 | 5% | 1% | 0% | 0% | 0% | 2% | 10% | 2% | 1% | 3% | 6% | 9% | 14% | 23% | 18% | 6% |
| Mensual | 6% | 4% | 2% | 3% | 4% | 3% | 4% | 5% | 3% | 5% | 7% | 9% | 13% | 15% | 12% | 5% |

| DIRECCIÓN DEL VIENTO EN EL MES ORDENADA DE MAYOR A MENOR PREDOMINANCIA | | | | | | | | | | | | | | | | |
|--|-----|-----|-----|-----|----|----|-----|-----|-----|----|----|-----|----|-----|-----|----|
| R. V. | ONO | O | NO | OSO | SO | N | SSO | NNO | SSE | SE | E | NNE | S | ENE | ESE | NE |
| F. R. | 15% | 13% | 12% | 9% | 7% | 6% | 5% | 5% | 5% | 4% | 4% | 4% | 3% | 3% | 3% | 2% |

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



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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 | 9% | 1% | 1% | 1% | 6% | 20% | 13% | 10% | 5% | 1% | 3% | 5% | 4% | 7% | 11% | 4% |
| 2 | 2% | 10% | 1% | 0% | 4% | 6% | 13% | 8% | 5% | 11% | 3% | 5% | 1% | 19% | 10% | 3% |
| 3 | 0% | 0% | 0% | 0% | 0% | 13% | 3% | 30% | 13% | 26% | 3% | 0% | 13% | 0% | 0% | 0% |
| 4 | 8% | 0% | 1% | 0% | 16% | 13% | 26% | 12% | 3% | 3% | 0% | 17% | 0% | 0% | 0% | 0% |
| 5 | 0% | 0% | 1% | 0% | 1% | 5% | 26% | 30% | 15% | 6% | 3% | 7% | 6% | 0% | 0% | 0% |
| 6 | 7% | 0% | 0% | 0% | 1% | 6% | 18% | 29% | 15% | 5% | 13% | 0% | 1% | 4% | 0% | 0% |
| 7 | 3% | 6% | 7% | 0% | 0% | 0% | 6% | 6% | 3% | 3% | 27% | 9% | 17% | 5% | 8% | 0% |
| 8 | 0% | 0% | 0% | 0% | 0% | 0% | 10% | 22% | 11% | 12% | 17% | 14% | 10% | 4% | 0% | 0% |
| 9 | 6% | 22% | 1% | 1% | 2% | 19% | 27% | 13% | 4% | 2% | 0% | 0% | 1% | 0% | 0% | 1% |
| 10 | 14% | 11% | 3% | 2% | 1% | 6% | 13% | 17% | 3% | 4% | 13% | 3% | 3% | 1% | 0% | 5% |
| 11 | 1% | 13% | 0% | 19% | 8% | 10% | 6% | 10% | 8% | 3% | 4% | 10% | 1% | 4% | 1% | 0% |
| 12 | 9% | 0% | 0% | 0% | 5% | 8% | 41% | 13% | 1% | 2% | 0% | 1% | 0% | 6% | 1% | 13% |
| 13 | 1% | 3% | 3% | 0% | 19% | 19% | 16% | 19% | 13% | 1% | 0% | 1% | 1% | 0% | 5% | 0% |
| 14 | 2% | 0% | 0% | 1% | 1% | 5% | 11% | 10% | 9% | 6% | 10% | 22% | 1% | 4% | 12% | 6% |
| 15 | 6% | 5% | 0% | 1% | 3% | 10% | 5% | 12% | 26% | 6% | 9% | 5% | 8% | 3% | 1% | 0% |
| 16 | 3% | 1% | 6% | 3% | 4% | 3% | 9% | 17% | 6% | 11% | 22% | 4% | 3% | 2% | 6% | 0% |
| 17 | 1% | 8% | 2% | 3% | 23% | 8% | 6% | 11% | 2% | 6% | 3% | 14% | 6% | 8% | 0% | 0% |
| 18 | 6% | 7% | 6% | 15% | 23% | 1% | 5% | 10% | 1% | 1% | 1% | 7% | 3% | 1% | 6% | 10% |
| 19 | 0% | 0% | 0% | 0% | 0% | 1% | 6% | 13% | 5% | 28% | 10% | 1% | 13% | 23% | 0% | 0% |
| 20 | 10% | 6% | 0% | 11% | 0% | 0% | 19% | 6% | 0% | 1% | 1% | 11% | 2% | 27% | 4% | 2% |
| 21 | 13% | 8% | 0% | 1% | 7% | 14% | 16% | 8% | 0% | 0% | 1% | 0% | 13% | 6% | 13% | 1% |
| 22 | 0% | 0% | 0% | 0% | 0% | 0% | 13% | 27% | 26% | 17% | 1% | 2% | 5% | 6% | 3% | 0% |
| 23 | 1% | 1% | 3% | 2% | 2% | 10% | 10% | 30% | 11% | 4% | 3% | 4% | 8% | 6% | 6% | 1% |
| 24 | 6% | 1% | 0% | 5% | 7% | 10% | 22% | 21% | 13% | 3% | 3% | 1% | 0% | 3% | 5% | 1% |
| 25 | 3% | 1% | 18% | 17% | 5% | 9% | 6% | 24% | 6% | 2% | 1% | 0% | 4% | 4% | 1% | 0% |
| 26 | 17% | 3% | 4% | 12% | 26% | 6% | 10% | 14% | 1% | 1% | 0% | 0% | 1% | 0% | 1% | 5% |
| 27 | 1% | 3% | 0% | 1% | 4% | 6% | 39% | 19% | 17% | 2% | 0% | 0% | 8% | 0% | 0% | 0% |
| 28 | 7% | 3% | 1% | 4% | 5% | 5% | 22% | 10% | 3% | 9% | 3% | 13% | 5% | 5% | 5% | 0% |
| 29 | 1% | 4% | 2% | 3% | 6% | 5% | 23% | 3% | 1% | 4% | 8% | 8% | 17% | 8% | 0% | 7% |
| 30 | 6% | 7% | 3% | 1% | 7% | 5% | 24% | 15% | 8% | 13% | 1% | 0% | 0% | 10% | 2% | 1% |
| Mensual | 5% | 4% | 2% | 3% | 6% | 7% | 15% | 16% | 8% | 7% | 5% | 5% | 5% | 5% | 3% | 2% |

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|--|-----|-----|----|-----|-----|----|-----|-----|----|----|----|-----|-----|----|----|-----|
| R. V. | SSE | SE | S | ESE | SSO | E | OSO | ONO | SO | O | N | NNE | ENE | NO | NE | NNO |
| F. R. | 16% | 15% | 8% | 7% | 7% | 6% | 5% | 5% | 5% | 5% | 5% | 4% | 3% | 3% | 2% | 2% |

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