



Statistiek van de extreme neerslag voor de Belgische gemeenten

Flémalle (NIS 62120)

1. Geschatte neerslaghoeveelheid voor een neerslagduur van 10 minuten tot 30 dagen (rijen) en een terugkeerperiode van 2 tot 200 jaar (kolommen). Eenheid: mm.

| Duur | Terugkeerperiode (jaren) | | | | | | | | | | | |
|--------|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 2 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 75 | 100 | 200 |
| 10 min | 7.7 | 11.0 | 13.5 | 15.1 | 16.2 | 17.1 | 17.8 | 19.0 | 20.0 | 21.9 | 23.2 | 26.7 |
| 20 min | 11.1 | 16.0 | 19.6 | 21.9 | 23.5 | 24.8 | 25.9 | 27.7 | 29.1 | 31.7 | 33.7 | 38.8 |
| 30 min | 13.1 | 19.1 | 23.5 | 26.2 | 28.2 | 29.8 | 31.1 | 33.3 | 35.0 | 38.2 | 40.6 | 46.8 |
| 1 u | 16.3 | 22.9 | 27.8 | 30.8 | 33.0 | 34.7 | 36.2 | 38.5 | 40.4 | 44.0 | 46.6 | 53.3 |
| 2 u | 19.6 | 27.0 | 32.6 | 35.9 | 38.4 | 40.3 | 42.0 | 44.6 | 46.7 | 50.7 | 53.6 | 61.1 |
| 3 u | 21.7 | 29.9 | 35.9 | 39.6 | 42.3 | 44.4 | 46.2 | 49.0 | 51.3 | 55.6 | 58.8 | 67.0 |
| 6 u | 26.2 | 34.6 | 40.7 | 44.4 | 47.2 | 49.3 | 51.1 | 54.0 | 56.3 | 60.7 | 63.9 | 72.1 |
| 12 u | 32.0 | 42.0 | 49.4 | 53.8 | 57.0 | 59.6 | 61.7 | 65.2 | 67.9 | 73.1 | 76.9 | 86.5 |
| 1 d | 39.0 | 50.4 | 58.7 | 63.6 | 67.1 | 69.9 | 72.2 | 75.9 | 78.9 | 84.4 | 88.4 | 98.4 |
| 2 d | 49.6 | 63.3 | 73.0 | 78.7 | 82.7 | 85.9 | 88.5 | 92.7 | 96.0 | 102.0 | 106.4 | 117.3 |
| 3 d | 52.8 | 67.5 | 77.7 | 83.6 | 87.8 | 91.1 | 93.8 | 98.0 | 101.4 | 107.6 | 112.0 | 122.9 |
| 4 d | 57.5 | 73.1 | 83.9 | 90.1 | 94.5 | 97.9 | 100.7 | 105.1 | 108.6 | 115.0 | 119.5 | 130.7 |
| 5 d | 65.2 | 82.2 | 93.8 | 100.4 | 105.1 | 108.7 | 111.7 | 116.4 | 120.1 | 126.8 | 131.6 | 143.3 |
| 7 d | 75.2 | 93.6 | 106.0 | 113.0 | 118.0 | 121.8 | 125.0 | 129.9 | 133.8 | 140.8 | 145.7 | 157.8 |
| 10 d | 89.6 | 110.4 | 124.3 | 132.1 | 137.6 | 141.8 | 145.3 | 150.7 | 154.9 | 162.5 | 167.8 | 180.8 |
| 15 d | 108.5 | 132.8 | 148.7 | 157.7 | 163.9 | 168.6 | 172.5 | 178.6 | 183.3 | 191.7 | 197.7 | 211.9 |
| 20 d | 126.4 | 154.8 | 173.2 | 183.4 | 190.5 | 196.0 | 200.4 | 207.3 | 212.5 | 222.1 | 228.8 | 244.7 |
| 25 d | 134.9 | 165.1 | 184.4 | 195.2 | 202.6 | 208.3 | 212.9 | 220.1 | 225.6 | 235.4 | 242.3 | 258.7 |
| 30 d | 157.5 | 189.9 | 210.5 | 221.9 | 229.8 | 235.8 | 240.6 | 248.1 | 253.9 | 264.3 | 271.5 | 288.5 |

2. Geschatte neerslaghoeveelheid en standaardafwijking van deze schatting voor een neerslagduur van 10 minuten tot 30 dagen (rijen) en een terugkeerperiode van 2 tot 200 jaar (kolommen). Eenheid: mm.

| Duur | Terugkeerperiode (jaren) | | | | | | | | | | | |
|--------|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 2 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 75 | 100 | 200 |
| 10 min | 7.7 | 11.0 | 13.5 | 15.1 | 16.2 | 17.1 | 17.8 | 19.0 | 20.0 | 21.9 | 23.2 | 26.7 |
| | 0.2 | 0.3 | 0.5 | 0.7 | 0.8 | 0.9 | 1.0 | 1.2 | 1.4 | 1.7 | 2.0 | 2.7 |
| 20 min | 11.1 | 16.0 | 19.6 | 21.9 | 23.5 | 24.8 | 25.9 | 27.7 | 29.1 | 31.7 | 33.7 | 38.8 |
| | 0.3 | 0.5 | 0.8 | 1.0 | 1.1 | 1.3 | 1.4 | 1.7 | 1.9 | 2.3 | 2.7 | 3.7 |
| 30 min | 13.1 | 19.1 | 23.5 | 26.2 | 28.2 | 29.8 | 31.1 | 33.3 | 35.0 | 38.2 | 40.6 | 46.8 |
| | 0.4 | 0.6 | 0.8 | 1.0 | 1.1 | 1.2 | 1.3 | 1.5 | 1.7 | 2.1 | 2.3 | 3.1 |
| 1 u | 16.3 | 22.9 | 27.8 | 30.8 | 33.0 | 34.7 | 36.2 | 38.5 | 40.4 | 44.0 | 46.6 | 53.3 |
| | 0.4 | 0.7 | 1.0 | 1.2 | 1.4 | 1.6 | 1.8 | 2.1 | 2.3 | 2.9 | 3.3 | 4.5 |
| 2 u | 19.6 | 27.0 | 32.6 | 35.9 | 38.4 | 40.3 | 42.0 | 44.6 | 46.7 | 50.7 | 53.6 | 61.1 |
| | 0.5 | 0.8 | 1.1 | 1.4 | 1.6 | 1.8 | 2.0 | 2.4 | 2.6 | 3.2 | 3.7 | 5.1 |
| 3 u | 21.7 | 29.9 | 35.9 | 39.6 | 42.3 | 44.4 | 46.2 | 49.0 | 51.3 | 55.6 | 58.8 | 67.0 |
| | 0.6 | 0.8 | 1.2 | 1.4 | 1.6 | 1.8 | 2.0 | 2.3 | 2.5 | 3.1 | 3.5 | 4.7 |
| 6 u | 26.2 | 34.6 | 40.7 | 44.4 | 47.2 | 49.3 | 51.1 | 54.0 | 56.3 | 60.7 | 63.9 | 72.1 |
| | 0.7 | 0.9 | 1.3 | 1.6 | 1.9 | 2.1 | 2.4 | 2.8 | 3.2 | 3.9 | 4.5 | 6.2 |
| 12 u | 32.0 | 42.0 | 49.4 | 53.8 | 57.0 | 59.6 | 61.7 | 65.2 | 67.9 | 73.1 | 76.9 | 86.5 |
| | 0.9 | 1.2 | 1.8 | 2.2 | 2.6 | 2.9 | 3.2 | 3.8 | 4.3 | 5.2 | 6.0 | 8.2 |
| 1 d | 39.0 | 50.4 | 58.7 | 63.6 | 67.1 | 69.9 | 72.2 | 75.9 | 78.9 | 84.4 | 88.4 | 98.4 |
| | 0.8 | 1.1 | 1.5 | 1.7 | 1.9 | 2.1 | 2.3 | 2.6 | 2.8 | 3.4 | 3.8 | 4.9 |
| 2 d | 49.6 | 63.3 | 73.0 | 78.7 | 82.7 | 85.9 | 88.5 | 92.7 | 96.0 | 102.0 | 106.4 | 117.3 |
| | 1.2 | 1.8 | 2.5 | 3.0 | 3.4 | 3.7 | 4.0 | 4.6 | 5.0 | 5.9 | 6.6 | 8.4 |
| 3 d | 52.8 | 67.5 | 77.7 | 83.6 | 87.8 | 91.1 | 93.8 | 98.0 | 101.4 | 107.6 | 112.0 | 122.9 |
| | 1.4 | 2.1 | 2.8 | 3.4 | 3.8 | 4.1 | 4.4 | 5.0 | 5.4 | 6.2 | 6.9 | 8.7 |
| 4 d | 57.5 | 73.1 | 83.9 | 90.1 | 94.5 | 97.9 | 100.7 | 105.1 | 108.6 | 115.0 | 119.5 | 130.7 |
| | 1.7 | 2.2 | 2.8 | 3.2 | 3.6 | 3.8 | 4.1 | 4.5 | 4.9 | 5.6 | 6.1 | 7.6 |
| 5 d | 65.2 | 82.2 | 93.8 | 100.4 | 105.1 | 108.7 | 111.7 | 116.4 | 120.1 | 126.8 | 131.6 | 143.3 |
| | 1.9 | 2.5 | 3.0 | 3.4 | 3.7 | 4.0 | 4.2 | 4.6 | 4.9 | 5.6 | 6.1 | 7.5 |
| 7 d | 75.2 | 93.6 | 106.0 | 113.0 | 118.0 | 121.8 | 125.0 | 129.9 | 133.8 | 140.8 | 145.7 | 157.8 |
| | 2.2 | 2.7 | 3.2 | 3.6 | 3.8 | 4.0 | 4.2 | 4.6 | 4.9 | 5.4 | 5.8 | 7.0 |
| 10 d | 89.6 | 110.4 | 124.3 | 132.1 | 137.6 | 141.8 | 145.3 | 150.7 | 154.9 | 162.5 | 167.8 | 180.8 |
| | 2.7 | 3.5 | 4.0 | 4.4 | 4.7 | 5.0 | 5.2 | 5.6 | 5.9 | 6.5 | 6.9 | 8.2 |
| 15 d | 108.5 | 132.8 | 148.7 | 157.7 | 163.9 | 168.6 | 172.5 | 178.6 | 183.3 | 191.7 | 197.7 | 211.9 |
| | 3.4 | 4.2 | 4.7 | 5.0 | 5.2 | 5.4 | 5.5 | 5.8 | 6.0 | 6.4 | 6.6 | 7.4 |
| 20 d | 126.4 | 154.8 | 173.2 | 183.4 | 190.5 | 196.0 | 200.4 | 207.3 | 212.5 | 222.1 | 228.8 | 244.7 |
| | 4.0 | 5.0 | 5.7 | 6.1 | 6.4 | 6.6 | 6.8 | 7.1 | 7.4 | 7.9 | 8.3 | 9.3 |
| 25 d | 134.9 | 165.1 | 184.4 | 195.2 | 202.6 | 208.3 | 212.9 | 220.1 | 225.6 | 235.4 | 242.3 | 258.7 |
| | 4.5 | 5.7 | 6.8 | 7.4 | 7.9 | 8.3 | 8.7 | 9.3 | 9.8 | 10.7 | 11.5 | 13.4 |
| 30 d | 157.5 | 189.9 | 210.5 | 221.9 | 229.8 | 235.8 | 240.6 | 248.1 | 253.9 | 264.3 | 271.5 | 288.5 |
| | 4.9 | 6.4 | 7.7 | 8.6 | 9.3 | 9.9 | 10.3 | 11.2 | 11.8 | 13.1 | 14.1 | 16.7 |

3. 95%-betrouwbaarheidsinterval van de geschatte neerslaghoeveelheid voor een neerslagduur van 10 minuten tot 30 dagen (rijen) en een terugkeerperiode van 2 tot 200 jaar (kolommen). Eenheid: mm.

| Duur | Terugkeerperiode (jaren) | | | | | | | | | | | |
|--------|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 2 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 75 | 100 | 200 |
| 10 min | 7.3 | 10.4 | 12.5 | 13.7 | 14.6 | 15.3 | 15.8 | 16.7 | 17.3 | 18.5 | 19.4 | 21.4 |
| | 8.1 | 11.7 | 14.6 | 16.4 | 17.8 | 18.9 | 19.9 | 21.4 | 22.7 | 25.2 | 27.1 | 32.0 |
| 20 min | 10.5 | 15.0 | 18.2 | 20.0 | 21.3 | 22.3 | 23.1 | 24.4 | 25.3 | 27.2 | 28.4 | 31.5 |
| | 11.7 | 17.0 | 21.1 | 23.8 | 25.7 | 27.4 | 28.7 | 31.0 | 32.8 | 36.3 | 39.0 | 46.0 |
| 30 min | 12.4 | 18.0 | 22.0 | 24.4 | 26.1 | 27.4 | 28.5 | 30.2 | 31.6 | 34.2 | 36.0 | 40.6 |
| | 13.9 | 20.2 | 25.1 | 28.1 | 30.4 | 32.2 | 33.8 | 36.3 | 38.4 | 42.3 | 45.2 | 52.9 |
| 1 u | 15.5 | 21.6 | 25.9 | 28.4 | 30.2 | 31.6 | 32.7 | 34.5 | 35.8 | 38.4 | 40.1 | 44.5 |
| | 17.1 | 24.2 | 29.7 | 33.2 | 35.8 | 37.9 | 39.7 | 42.6 | 45.0 | 49.6 | 53.0 | 62.1 |
| 2 u | 18.6 | 25.5 | 30.4 | 33.2 | 35.2 | 36.7 | 38.0 | 40.0 | 41.5 | 44.3 | 46.3 | 51.2 |
| | 20.5 | 28.5 | 34.7 | 38.6 | 41.5 | 43.9 | 45.9 | 49.2 | 51.9 | 57.0 | 60.8 | 71.0 |
| 3 u | 20.6 | 28.2 | 33.6 | 36.8 | 39.1 | 40.8 | 42.3 | 44.5 | 46.3 | 49.6 | 52.0 | 57.8 |
| | 22.9 | 31.5 | 38.2 | 42.4 | 45.5 | 48.0 | 50.1 | 53.5 | 56.3 | 61.7 | 65.7 | 76.1 |
| 6 u | 24.9 | 32.8 | 38.2 | 41.3 | 43.5 | 45.1 | 46.5 | 48.6 | 50.2 | 53.1 | 55.1 | 59.9 |
| | 27.5 | 36.3 | 43.2 | 47.6 | 50.9 | 53.5 | 55.8 | 59.5 | 62.5 | 68.3 | 72.7 | 84.3 |
| 12 u | 30.3 | 39.6 | 45.9 | 49.5 | 52.0 | 53.8 | 55.4 | 57.8 | 59.6 | 62.8 | 65.1 | 70.4 |
| | 33.8 | 44.4 | 52.8 | 58.1 | 62.1 | 65.3 | 68.1 | 72.6 | 76.2 | 83.3 | 88.6 | 102.7 |
| 1 d | 37.3 | 48.2 | 55.8 | 60.2 | 63.3 | 65.7 | 67.7 | 70.9 | 73.3 | 77.8 | 81.0 | 88.9 |
| | 40.6 | 52.7 | 61.6 | 67.0 | 70.9 | 74.1 | 76.8 | 81.0 | 84.5 | 90.9 | 95.7 | 107.9 |
| 2 d | 47.2 | 59.8 | 68.2 | 72.8 | 76.1 | 78.6 | 80.6 | 83.8 | 86.2 | 90.5 | 93.6 | 100.8 |
| | 51.9 | 66.8 | 77.8 | 84.5 | 89.4 | 93.2 | 96.4 | 101.6 | 105.8 | 113.6 | 119.3 | 133.8 |
| 3 d | 50.0 | 63.4 | 72.1 | 77.0 | 80.4 | 83.0 | 85.0 | 88.3 | 90.8 | 95.3 | 98.5 | 105.9 |
| | 55.7 | 71.7 | 83.2 | 90.2 | 95.2 | 99.2 | 102.5 | 107.8 | 112.0 | 119.8 | 125.5 | 139.9 |
| 4 d | 54.2 | 68.8 | 78.4 | 83.7 | 87.5 | 90.3 | 92.7 | 96.3 | 99.0 | 104.0 | 107.5 | 115.8 |
| | 60.7 | 77.5 | 89.4 | 96.4 | 101.4 | 105.4 | 108.7 | 114.0 | 118.2 | 125.9 | 131.5 | 145.6 |
| 5 d | 61.5 | 77.3 | 87.8 | 93.7 | 97.8 | 100.9 | 103.4 | 107.4 | 110.4 | 115.8 | 119.6 | 128.6 |
| | 69.0 | 87.1 | 99.7 | 107.1 | 112.4 | 116.5 | 119.9 | 125.4 | 129.7 | 137.7 | 143.5 | 157.9 |
| 7 d | 70.8 | 88.2 | 99.7 | 106.1 | 110.5 | 113.9 | 116.7 | 121.0 | 124.2 | 130.2 | 134.3 | 144.0 |
| | 79.5 | 99.0 | 112.3 | 120.0 | 125.5 | 129.8 | 133.3 | 138.9 | 143.3 | 151.4 | 157.2 | 171.6 |
| 10 d | 84.2 | 103.6 | 116.4 | 123.4 | 128.3 | 132.1 | 135.1 | 139.8 | 143.4 | 149.8 | 154.2 | 164.7 |
| | 94.9 | 117.2 | 132.2 | 140.8 | 146.8 | 151.5 | 155.4 | 161.5 | 166.3 | 175.1 | 181.4 | 196.9 |
| 15 d | 102.0 | 124.7 | 139.5 | 147.8 | 153.6 | 158.1 | 161.6 | 167.3 | 171.6 | 179.3 | 184.7 | 197.4 |
| | 115.1 | 141.0 | 158.0 | 167.5 | 174.1 | 179.2 | 183.4 | 189.9 | 195.0 | 204.2 | 210.7 | 226.4 |
| 20 d | 118.5 | 144.9 | 162.0 | 171.5 | 178.0 | 183.0 | 187.0 | 193.3 | 198.1 | 206.6 | 212.6 | 226.4 |
| | 134.3 | 164.6 | 184.3 | 195.3 | 203.0 | 208.9 | 213.7 | 221.2 | 227.0 | 237.5 | 245.0 | 262.9 |
| 25 d | 126.2 | 153.8 | 171.2 | 180.7 | 187.1 | 192.0 | 195.9 | 201.9 | 206.4 | 214.4 | 219.9 | 232.5 |
| | 143.6 | 176.3 | 197.7 | 209.7 | 218.2 | 224.7 | 230.0 | 238.3 | 244.8 | 256.5 | 264.8 | 284.9 |
| 30 d | 148.0 | 177.3 | 195.4 | 205.0 | 211.6 | 216.4 | 220.3 | 226.3 | 230.7 | 238.5 | 243.9 | 255.9 |
| | 167.1 | 202.4 | 225.6 | 238.7 | 248.0 | 255.1 | 260.9 | 270.0 | 277.1 | 290.0 | 299.1 | 321.2 |

4. Schatting van de coëfficiënten van Montana.

Formule van Montana : intensiteit[mm/h] = $a \cdot \text{duur}[\text{min}]^{-b}$ voor verschillende tijdsduren

a_1, b_1 : duur < 25 min

a_2, b_2 : duur tussen 25 min en 6000 min (= 100 h)

a_3, b_3 : duur > 6000 min (= 100 h)

| Terugkeerperiode (jaren) | a_1 | b_1 | a_2 | b_2 | a_3 | b_3 |
|--------------------------|-------|--------|--------|--------|-------|--------|
| 2 | 135.0 | 0.4664 | 303.5 | 0.7182 | 52.3 | 0.5159 |
| 5 | 192.7 | 0.4644 | 471.6 | 0.7425 | 77.5 | 0.5349 |
| 10 | 234.6 | 0.4610 | 606.4 | 0.7561 | 100.2 | 0.5491 |
| 15 | 259.6 | 0.4586 | 692.1 | 0.7632 | 115.6 | 0.5575 |
| 20 | 277.7 | 0.4567 | 756.5 | 0.7680 | 127.7 | 0.5635 |
| 25 | 292.0 | 0.4551 | 808.8 | 0.7717 | 137.7 | 0.5682 |
| 30 | 303.8 | 0.4538 | 853.1 | 0.7746 | 146.5 | 0.5721 |
| 40 | 322.9 | 0.4517 | 926.3 | 0.7791 | 161.3 | 0.5782 |
| 50 | 338.0 | 0.4500 | 985.8 | 0.7825 | 173.7 | 0.5830 |
| 75 | 366.2 | 0.4468 | 1100.6 | 0.7886 | 198.4 | 0.5917 |
| 100 | 386.9 | 0.4444 | 1187.7 | 0.7929 | 217.9 | 0.5980 |
| 200 | 438.9 | 0.4385 | 1418.7 | 0.8029 | 272.3 | 0.6132 |

Referenties

Van de Vyver, H. (2012). Spatial regression models for extreme precipitation in Belgium, *Water Resour. Res.*, 48, W09549, doi :10.1029/2011WR011707.

Van de Vyver, H. (2013). Practical return level mapping for extreme precipitation in Belgium, RMI scientific and technical publication 062, 30 pages.

Disclaimer

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Zo niet, dan zijn de rechtbanken van het arrondissement Brussel bevoegd.