



Statistiques des précipitations extrêmes des communes belges

Zelee (INS 42028)

1. Niveau de retour estimé pour une durée de précipitations de 10 minutes à 30 jours (lignes) et une période de retour de 2 à 200 années (colonnes). Unités : mm.

| Durée | Période de retour (années) | | | | | | | | | | | |
|--------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 2 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 75 | 100 | 200 |
| 10 min | 7.5 | 10.8 | 13.2 | 14.7 | 15.8 | 16.7 | 17.4 | 18.6 | 19.6 | 21.4 | 22.7 | 26.2 |
| 20 min | 10.7 | 15.3 | 18.8 | 20.9 | 22.5 | 23.7 | 24.8 | 26.4 | 27.8 | 30.3 | 32.2 | 37.0 |
| 30 min | 12.7 | 18.4 | 22.7 | 25.4 | 27.3 | 28.8 | 30.1 | 32.2 | 33.8 | 36.9 | 39.3 | 45.2 |
| 1 h | 15.7 | 21.9 | 26.6 | 29.4 | 31.4 | 33.1 | 34.4 | 36.6 | 38.4 | 41.7 | 44.2 | 50.5 |
| 2 h | 18.8 | 25.8 | 31.0 | 34.1 | 36.4 | 38.3 | 39.8 | 42.3 | 44.3 | 48.0 | 50.7 | 57.8 |
| 3 h | 20.8 | 28.6 | 34.4 | 37.9 | 40.5 | 42.6 | 44.3 | 47.0 | 49.2 | 53.3 | 56.4 | 64.2 |
| 6 h | 25.1 | 33.3 | 39.4 | 43.1 | 45.8 | 47.9 | 49.7 | 52.5 | 54.8 | 59.1 | 62.3 | 70.4 |
| 12 h | 30.5 | 40.4 | 47.6 | 52.0 | 55.2 | 57.8 | 59.9 | 63.3 | 66.1 | 71.2 | 75.0 | 84.6 |
| 1 j | 37.4 | 48.7 | 56.9 | 61.8 | 65.3 | 68.0 | 70.3 | 74.0 | 76.9 | 82.4 | 86.3 | 96.3 |
| 2 j | 46.9 | 60.3 | 69.8 | 75.3 | 79.3 | 82.3 | 84.9 | 89.0 | 92.2 | 98.1 | 102.4 | 113.0 |
| 3 j | 49.6 | 63.8 | 73.6 | 79.3 | 83.4 | 86.5 | 89.1 | 93.3 | 96.5 | 102.4 | 106.7 | 117.3 |
| 4 j | 53.8 | 68.8 | 79.2 | 85.1 | 89.3 | 92.6 | 95.3 | 99.6 | 102.9 | 109.0 | 113.4 | 124.1 |
| 5 j | 61.0 | 77.2 | 88.2 | 94.5 | 99.0 | 102.4 | 105.3 | 109.8 | 113.2 | 119.6 | 124.2 | 135.4 |
| 7 j | 70.0 | 87.5 | 99.3 | 106.0 | 110.8 | 114.4 | 117.4 | 122.1 | 125.8 | 132.4 | 137.2 | 148.7 |
| 10 j | 83.0 | 102.5 | 115.4 | 122.6 | 127.8 | 131.7 | 134.9 | 139.9 | 143.8 | 150.9 | 155.9 | 168.0 |
| 15 j | 100.5 | 123.2 | 138.1 | 146.4 | 152.2 | 156.6 | 160.3 | 165.9 | 170.3 | 178.2 | 183.7 | 197.0 |
| 20 j | 117.0 | 143.4 | 160.5 | 170.0 | 176.7 | 181.7 | 185.8 | 192.2 | 197.2 | 206.0 | 212.2 | 227.0 |
| 25 j | 124.3 | 152.4 | 170.5 | 180.5 | 187.4 | 192.7 | 197.0 | 203.7 | 208.8 | 218.0 | 224.4 | 239.7 |
| 30 j | 145.9 | 176.2 | 195.6 | 206.3 | 213.7 | 219.3 | 223.9 | 230.9 | 236.4 | 246.1 | 252.9 | 268.9 |

2. Niveau de retour estimé et écart-type de l'estimation pour une durée de précipitations de 10 minutes à 30 jours (lignes) et une période de retour de 2 à 200 années (colonnes). Unités : mm.

| Durée | Période de retour (années) | | | | | | | | | | | |
|--------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 2 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 75 | 100 | 200 |
| 10 min | 7.5 | 10.8 | 13.2 | 14.7 | 15.8 | 16.7 | 17.4 | 18.6 | 19.6 | 21.4 | 22.7 | 26.2 |
| | 0.2 | 0.3 | 0.5 | 0.7 | 0.8 | 0.9 | 1.0 | 1.2 | 1.3 | 1.7 | 1.9 | 2.6 |
| 20 min | 10.7 | 15.3 | 18.8 | 20.9 | 22.5 | 23.7 | 24.8 | 26.4 | 27.8 | 30.3 | 32.2 | 37.0 |
| | 0.3 | 0.5 | 0.7 | 0.9 | 1.1 | 1.2 | 1.4 | 1.6 | 1.8 | 2.2 | 2.5 | 3.4 |
| 30 min | 12.7 | 18.4 | 22.7 | 25.4 | 27.3 | 28.8 | 30.1 | 32.2 | 33.8 | 36.9 | 39.3 | 45.2 |
| | 0.4 | 0.6 | 0.9 | 1.1 | 1.2 | 1.4 | 1.5 | 1.7 | 1.9 | 2.3 | 2.6 | 3.4 |
| 1 h | 15.7 | 21.9 | 26.6 | 29.4 | 31.4 | 33.1 | 34.4 | 36.6 | 38.4 | 41.7 | 44.2 | 50.5 |
| | 0.4 | 0.7 | 1.1 | 1.3 | 1.6 | 1.8 | 1.9 | 2.2 | 2.5 | 3.0 | 3.4 | 4.6 |
| 2 h | 18.8 | 25.8 | 31.0 | 34.1 | 36.4 | 38.3 | 39.8 | 42.3 | 44.3 | 48.0 | 50.7 | 57.8 |
| | 0.5 | 0.9 | 1.3 | 1.5 | 1.8 | 2.0 | 2.2 | 2.5 | 2.8 | 3.4 | 3.8 | 5.1 |
| 3 h | 20.8 | 28.6 | 34.4 | 37.9 | 40.5 | 42.6 | 44.3 | 47.0 | 49.2 | 53.3 | 56.4 | 64.2 |
| | 0.7 | 1.0 | 1.3 | 1.6 | 1.8 | 2.0 | 2.2 | 2.5 | 2.8 | 3.3 | 3.7 | 4.9 |
| 6 h | 25.1 | 33.3 | 39.4 | 43.1 | 45.8 | 47.9 | 49.7 | 52.5 | 54.8 | 59.1 | 62.3 | 70.4 |
| | 0.8 | 1.1 | 1.5 | 1.8 | 2.1 | 2.3 | 2.6 | 3.0 | 3.4 | 4.1 | 4.7 | 6.4 |
| 12 h | 30.5 | 40.4 | 47.6 | 52.0 | 55.2 | 57.8 | 59.9 | 63.3 | 66.1 | 71.2 | 75.0 | 84.6 |
| | 1.1 | 1.4 | 1.9 | 2.4 | 2.7 | 3.1 | 3.4 | 3.9 | 4.4 | 5.3 | 6.1 | 8.3 |
| 1 j | 37.4 | 48.7 | 56.9 | 61.8 | 65.3 | 68.0 | 70.3 | 74.0 | 76.9 | 82.4 | 86.3 | 96.3 |
| | 1.1 | 1.4 | 1.8 | 2.0 | 2.3 | 2.5 | 2.6 | 2.9 | 3.2 | 3.7 | 4.1 | 5.2 |
| 2 j | 46.9 | 60.3 | 69.8 | 75.3 | 79.3 | 82.3 | 84.9 | 89.0 | 92.2 | 98.1 | 102.4 | 113.0 |
| | 1.7 | 2.3 | 3.0 | 3.5 | 3.9 | 4.3 | 4.6 | 5.1 | 5.6 | 6.5 | 7.1 | 9.0 |
| 3 j | 49.6 | 63.8 | 73.6 | 79.3 | 83.4 | 86.5 | 89.1 | 93.3 | 96.5 | 102.4 | 106.7 | 117.3 |
| | 2.1 | 2.8 | 3.5 | 4.1 | 4.5 | 4.8 | 5.1 | 5.7 | 6.1 | 6.9 | 7.6 | 9.3 |
| 4 j | 53.8 | 68.8 | 79.2 | 85.1 | 89.3 | 92.6 | 95.3 | 99.6 | 102.9 | 109.0 | 113.4 | 124.1 |
| | 2.4 | 3.0 | 3.6 | 4.1 | 4.4 | 4.7 | 4.9 | 5.3 | 5.7 | 6.4 | 6.9 | 8.4 |
| 5 j | 61.0 | 77.2 | 88.2 | 94.5 | 99.0 | 102.4 | 105.3 | 109.8 | 113.2 | 119.6 | 124.2 | 135.4 |
| | 2.8 | 3.4 | 4.0 | 4.4 | 4.7 | 5.0 | 5.2 | 5.6 | 5.9 | 6.5 | 7.0 | 8.4 |
| 7 j | 70.0 | 87.5 | 99.3 | 106.0 | 110.8 | 114.4 | 117.4 | 122.1 | 125.8 | 132.4 | 137.2 | 148.7 |
| | 3.3 | 4.0 | 4.5 | 4.9 | 5.2 | 5.4 | 5.6 | 6.0 | 6.2 | 6.8 | 7.2 | 8.4 |
| 10 j | 83.0 | 102.5 | 115.4 | 122.6 | 127.8 | 131.7 | 134.9 | 139.9 | 143.8 | 150.9 | 155.9 | 168.0 |
| | 4.1 | 5.1 | 5.8 | 6.2 | 6.6 | 6.9 | 7.1 | 7.5 | 7.8 | 8.4 | 8.9 | 10.1 |
| 15 j | 100.5 | 123.2 | 138.1 | 146.4 | 152.2 | 156.6 | 160.3 | 165.9 | 170.3 | 178.2 | 183.7 | 197.0 |
| | 5.0 | 6.1 | 6.8 | 7.2 | 7.5 | 7.8 | 7.9 | 8.2 | 8.5 | 8.9 | 9.2 | 10.1 |
| 20 j | 117.0 | 143.4 | 160.5 | 170.0 | 176.7 | 181.7 | 185.8 | 192.2 | 197.2 | 206.0 | 212.2 | 227.0 |
| | 5.9 | 7.3 | 8.2 | 8.7 | 9.1 | 9.4 | 9.6 | 10.0 | 10.3 | 10.9 | 11.3 | 12.5 |
| 25 j | 124.3 | 152.4 | 170.5 | 180.5 | 187.4 | 192.7 | 197.0 | 203.7 | 208.8 | 218.0 | 224.4 | 239.7 |
| | 6.6 | 8.2 | 9.3 | 10.0 | 10.5 | 11.0 | 11.3 | 11.9 | 12.4 | 13.3 | 14.0 | 15.8 |
| 30 j | 145.9 | 176.2 | 195.6 | 206.3 | 213.7 | 219.3 | 223.9 | 230.9 | 236.4 | 246.1 | 252.9 | 268.9 |
| | 7.3 | 9.0 | 10.4 | 11.3 | 11.9 | 12.5 | 13.0 | 13.7 | 14.4 | 15.6 | 16.5 | 19.0 |

3. Intervalle de confiance à 95% de la période de retour estimée pour une durée de précipitations de 10 minutes à 30 jours (lignes) et une période de retour de 2 à 200 années (colonnes). Unités : mm.

| Durée | Période de retour (années) | | | | | | | | | | | |
|--------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 2 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 75 | 100 | 200 |
| 10 min | 7.1 | 10.1 | 12.2 | 13.4 | 14.2 | 14.9 | 15.4 | 16.3 | 16.9 | 18.1 | 19.0 | 21.0 |
| | 7.9 | 11.4 | 14.2 | 16.0 | 17.4 | 18.5 | 19.4 | 20.9 | 22.2 | 24.6 | 26.5 | 31.3 |
| 20 min | 10.1 | 14.3 | 17.4 | 19.1 | 20.4 | 21.3 | 22.1 | 23.3 | 24.3 | 26.1 | 27.3 | 30.3 |
| | 11.3 | 16.4 | 20.3 | 22.8 | 24.6 | 26.1 | 27.4 | 29.5 | 31.3 | 34.6 | 37.1 | 43.7 |
| 30 min | 11.9 | 17.2 | 21.0 | 23.3 | 24.9 | 26.1 | 27.1 | 28.8 | 30.1 | 32.5 | 34.3 | 38.6 |
| | 13.5 | 19.7 | 24.5 | 27.5 | 29.7 | 31.5 | 33.0 | 35.5 | 37.5 | 41.4 | 44.3 | 51.8 |
| 1 h | 14.9 | 20.5 | 24.4 | 26.7 | 28.4 | 29.6 | 30.7 | 32.3 | 33.6 | 35.9 | 37.5 | 41.6 |
| | 16.6 | 23.4 | 28.7 | 32.0 | 34.5 | 36.5 | 38.2 | 41.0 | 43.2 | 47.6 | 50.9 | 59.5 |
| 2 h | 17.7 | 24.1 | 28.5 | 31.1 | 33.0 | 34.4 | 35.5 | 37.4 | 38.8 | 41.4 | 43.3 | 47.7 |
| | 19.8 | 27.5 | 33.4 | 37.2 | 39.9 | 42.2 | 44.1 | 47.2 | 49.7 | 54.6 | 58.2 | 67.8 |
| 3 h | 19.5 | 26.7 | 31.8 | 34.8 | 36.9 | 38.6 | 39.9 | 42.1 | 43.8 | 46.9 | 49.1 | 54.5 |
| | 22.1 | 30.5 | 37.0 | 41.1 | 44.1 | 46.5 | 48.6 | 51.9 | 54.6 | 59.8 | 63.7 | 73.8 |
| 6 h | 23.6 | 31.3 | 36.6 | 39.6 | 41.7 | 43.3 | 44.6 | 46.7 | 48.2 | 51.1 | 53.1 | 57.8 |
| | 26.6 | 35.4 | 42.3 | 46.6 | 49.9 | 52.5 | 54.7 | 58.4 | 61.4 | 67.2 | 71.5 | 82.9 |
| 12 h | 28.4 | 37.5 | 43.8 | 47.4 | 49.9 | 51.8 | 53.3 | 55.7 | 57.5 | 60.8 | 63.1 | 68.4 |
| | 32.5 | 43.2 | 51.5 | 56.7 | 60.6 | 63.8 | 66.5 | 71.0 | 74.6 | 81.6 | 86.9 | 100.7 |
| 1 j | 35.1 | 45.9 | 53.4 | 57.8 | 60.8 | 63.2 | 65.2 | 68.3 | 70.7 | 75.1 | 78.3 | 86.1 |
| | 39.6 | 51.5 | 60.4 | 65.7 | 69.7 | 72.8 | 75.5 | 79.7 | 83.1 | 89.6 | 94.3 | 106.5 |
| 2 j | 43.5 | 55.8 | 63.9 | 68.4 | 71.5 | 73.9 | 75.9 | 78.9 | 81.2 | 85.4 | 88.4 | 95.3 |
| | 50.3 | 64.9 | 75.7 | 82.2 | 87.0 | 90.8 | 93.9 | 99.0 | 103.1 | 110.7 | 116.4 | 130.6 |
| 3 j | 45.5 | 58.3 | 66.7 | 71.4 | 74.6 | 77.1 | 79.1 | 82.2 | 84.6 | 88.9 | 91.9 | 98.9 |
| | 53.7 | 69.3 | 80.5 | 87.3 | 92.1 | 96.0 | 99.2 | 104.3 | 108.4 | 116.0 | 121.6 | 135.6 |
| 4 j | 49.1 | 62.9 | 72.0 | 77.2 | 80.7 | 83.5 | 85.7 | 89.1 | 91.8 | 96.5 | 99.9 | 107.7 |
| | 58.5 | 74.8 | 86.3 | 93.1 | 97.9 | 101.8 | 105.0 | 110.1 | 114.1 | 121.5 | 127.0 | 140.6 |
| 5 j | 55.6 | 70.4 | 80.3 | 85.9 | 89.7 | 92.7 | 95.1 | 98.8 | 101.7 | 106.8 | 110.4 | 119.0 |
| | 66.4 | 83.9 | 96.0 | 103.1 | 108.2 | 112.2 | 115.5 | 120.7 | 124.8 | 132.5 | 138.0 | 151.7 |
| 7 j | 63.6 | 79.8 | 90.5 | 96.4 | 100.6 | 103.8 | 106.4 | 110.4 | 113.5 | 119.1 | 123.0 | 132.2 |
| | 76.4 | 95.3 | 108.2 | 115.6 | 120.9 | 125.0 | 128.4 | 133.8 | 138.0 | 145.8 | 151.4 | 165.1 |
| 10 j | 75.0 | 92.5 | 104.0 | 110.4 | 114.9 | 118.3 | 121.0 | 125.3 | 128.6 | 134.4 | 138.5 | 148.1 |
| | 91.0 | 112.4 | 126.7 | 134.9 | 140.6 | 145.1 | 148.8 | 154.6 | 159.1 | 167.4 | 173.4 | 187.9 |
| 15 j | 90.7 | 111.2 | 124.7 | 132.2 | 137.4 | 141.5 | 144.7 | 149.8 | 153.7 | 160.7 | 165.6 | 177.3 |
| | 110.3 | 135.2 | 151.4 | 160.6 | 166.9 | 171.8 | 175.8 | 182.1 | 186.9 | 195.7 | 201.9 | 216.8 |
| 20 j | 105.4 | 129.1 | 144.5 | 153.0 | 158.8 | 163.3 | 167.0 | 172.6 | 176.9 | 184.6 | 190.0 | 202.6 |
| | 128.6 | 157.7 | 176.6 | 187.1 | 194.5 | 200.1 | 204.7 | 211.8 | 217.4 | 227.4 | 234.5 | 251.5 |
| 25 j | 111.4 | 136.4 | 152.2 | 160.9 | 166.8 | 171.2 | 174.8 | 180.3 | 184.5 | 191.9 | 197.0 | 208.6 |
| | 137.3 | 168.4 | 188.8 | 200.1 | 208.1 | 214.2 | 219.2 | 227.1 | 233.1 | 244.1 | 251.9 | 270.7 |
| 30 j | 131.5 | 158.5 | 175.3 | 184.2 | 190.3 | 194.8 | 198.5 | 204.0 | 208.2 | 215.5 | 220.4 | 231.7 |
| | 160.2 | 193.9 | 215.9 | 228.3 | 237.1 | 243.8 | 249.3 | 257.9 | 264.5 | 276.7 | 285.3 | 306.0 |

4. Estimation des coefficients de Montana.

Formule de Montana : intensité[mm/h] = $a \cdot \text{durée}[\text{min}]^{-b}$ pour une plage de durées

a_1, b_1 : durées < 25 min

a_2, b_2 : durées entre 25 min et 6000 min (= 100 h)

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

| Période de retour (années) | a_1 | b_1 | a_2 | b_2 | a_3 | b_3 |
|----------------------------|-------|--------|--------|--------|-------|--------|
| 2 | 133.6 | 0.4731 | 299.3 | 0.7237 | 53.5 | 0.5258 |
| 5 | 192.7 | 0.4754 | 460.4 | 0.7460 | 82.5 | 0.5484 |
| 10 | 235.6 | 0.4739 | 589.4 | 0.7587 | 108.6 | 0.5643 |
| 15 | 261.2 | 0.4723 | 671.2 | 0.7655 | 126.3 | 0.5735 |
| 20 | 279.8 | 0.4709 | 732.8 | 0.7700 | 140.3 | 0.5800 |
| 25 | 294.5 | 0.4698 | 782.7 | 0.7735 | 151.9 | 0.5850 |
| 30 | 306.6 | 0.4687 | 825.1 | 0.7763 | 162.0 | 0.5892 |
| 40 | 326.2 | 0.4670 | 894.9 | 0.7805 | 179.2 | 0.5957 |
| 50 | 341.7 | 0.4656 | 951.7 | 0.7838 | 193.6 | 0.6007 |
| 75 | 370.7 | 0.4629 | 1061.2 | 0.7897 | 222.3 | 0.6100 |
| 100 | 391.9 | 0.4608 | 1144.3 | 0.7938 | 244.9 | 0.6166 |
| 200 | 445.3 | 0.4555 | 1364.5 | 0.8034 | 308.3 | 0.6325 |

Références

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.

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