



Statistiques des précipitations extrêmes des communes belges

Houthalen-Helchteren (INS 72039)

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 | 7.6 | 11.0 | 13.5 | 15.0 | 16.1 | 17.0 | 17.7 | 18.9 | 19.9 | 21.7 | 23.1 | 26.6 |
| 20 min | 11.0 | 15.8 | 19.4 | 21.6 | 23.3 | 24.5 | 25.6 | 27.4 | 28.8 | 31.4 | 33.3 | 38.4 |
| 30 min | 13.0 | 18.9 | 23.3 | 26.0 | 28.0 | 29.6 | 30.9 | 33.0 | 34.7 | 37.9 | 40.3 | 46.4 |
| 1 h | 16.2 | 22.7 | 27.5 | 30.5 | 32.6 | 34.3 | 35.8 | 38.1 | 39.9 | 43.4 | 46.0 | 52.6 |
| 2 h | 19.4 | 26.7 | 32.2 | 35.5 | 37.9 | 39.8 | 41.4 | 44.0 | 46.1 | 50.0 | 52.9 | 60.3 |
| 3 h | 21.5 | 29.6 | 35.6 | 39.2 | 41.8 | 43.9 | 45.7 | 48.5 | 50.8 | 55.1 | 58.2 | 66.3 |
| 6 h | 26.0 | 34.3 | 40.4 | 44.1 | 46.8 | 49.0 | 50.8 | 53.7 | 56.0 | 60.3 | 63.5 | 71.7 |
| 12 h | 31.7 | 41.6 | 48.9 | 53.4 | 56.6 | 59.1 | 61.3 | 64.7 | 67.5 | 72.6 | 76.4 | 86.0 |
| 1 j | 38.9 | 50.3 | 58.6 | 63.4 | 67.0 | 69.8 | 72.1 | 75.8 | 78.7 | 84.2 | 88.2 | 98.2 |
| 2 j | 49.4 | 63.1 | 72.8 | 78.4 | 82.5 | 85.6 | 88.3 | 92.4 | 95.7 | 101.8 | 106.1 | 117.0 |
| 3 j | 52.6 | 67.2 | 77.4 | 83.3 | 87.5 | 90.7 | 93.4 | 97.7 | 101.0 | 107.2 | 111.6 | 122.5 |
| 4 j | 57.2 | 72.8 | 83.5 | 89.7 | 94.1 | 97.5 | 100.3 | 104.7 | 108.2 | 114.5 | 119.1 | 130.2 |
| 5 j | 64.9 | 81.8 | 93.3 | 99.9 | 104.6 | 108.2 | 111.2 | 115.9 | 119.6 | 126.3 | 131.0 | 142.7 |
| 7 j | 74.8 | 93.1 | 105.5 | 112.5 | 117.5 | 121.3 | 124.4 | 129.3 | 133.2 | 140.1 | 145.1 | 157.1 |
| 10 j | 89.1 | 109.8 | 123.6 | 131.4 | 136.8 | 141.1 | 144.5 | 149.9 | 154.0 | 161.6 | 166.9 | 179.8 |
| 15 j | 107.9 | 132.1 | 147.9 | 156.8 | 163.0 | 167.8 | 171.6 | 177.6 | 182.3 | 190.7 | 196.6 | 210.8 |
| 20 j | 125.7 | 153.9 | 172.2 | 182.4 | 189.5 | 194.9 | 199.3 | 206.1 | 211.4 | 220.9 | 227.5 | 243.3 |
| 25 j | 134.1 | 164.1 | 183.4 | 194.1 | 201.5 | 207.2 | 211.7 | 218.9 | 224.3 | 234.1 | 241.0 | 257.3 |
| 30 j | 156.7 | 188.8 | 209.4 | 220.7 | 228.6 | 234.5 | 239.3 | 246.9 | 252.6 | 262.9 | 270.1 | 287.1 |

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 | 7.6 | 11.0 | 13.5 | 15.0 | 16.1 | 17.0 | 17.7 | 18.9 | 19.9 | 21.7 | 23.1 | 26.6 |
| | 0.2 | 0.3 | 0.5 | 0.7 | 0.8 | 0.9 | 1.0 | 1.2 | 1.4 | 1.7 | 1.9 | 2.7 |
| 20 min | 11.0 | 15.8 | 19.4 | 21.6 | 23.3 | 24.5 | 25.6 | 27.4 | 28.8 | 31.4 | 33.3 | 38.4 |
| | 0.3 | 0.5 | 0.8 | 1.0 | 1.2 | 1.3 | 1.5 | 1.7 | 1.9 | 2.3 | 2.7 | 3.7 |
| 30 min | 13.0 | 18.9 | 23.3 | 26.0 | 28.0 | 29.6 | 30.9 | 33.0 | 34.7 | 37.9 | 40.3 | 46.4 |
| | 0.4 | 0.6 | 0.8 | 1.0 | 1.2 | 1.3 | 1.4 | 1.6 | 1.8 | 2.1 | 2.4 | 3.2 |
| 1 h | 16.2 | 22.7 | 27.5 | 30.5 | 32.6 | 34.3 | 35.8 | 38.1 | 39.9 | 43.4 | 46.0 | 52.6 |
| | 0.5 | 0.7 | 1.1 | 1.3 | 1.5 | 1.7 | 1.9 | 2.2 | 2.4 | 3.0 | 3.4 | 4.6 |
| 2 h | 19.4 | 26.7 | 32.2 | 35.5 | 37.9 | 39.8 | 41.4 | 44.0 | 46.1 | 50.0 | 52.9 | 60.3 |
| | 0.6 | 0.9 | 1.2 | 1.5 | 1.8 | 2.0 | 2.2 | 2.5 | 2.8 | 3.4 | 3.8 | 5.2 |
| 3 h | 21.5 | 29.6 | 35.6 | 39.2 | 41.8 | 43.9 | 45.7 | 48.5 | 50.8 | 55.1 | 58.2 | 66.3 |
| | 0.7 | 1.0 | 1.3 | 1.5 | 1.8 | 2.0 | 2.1 | 2.4 | 2.7 | 3.2 | 3.6 | 4.8 |
| 6 h | 26.0 | 34.3 | 40.4 | 44.1 | 46.8 | 49.0 | 50.8 | 53.7 | 56.0 | 60.3 | 63.5 | 71.7 |
| | 0.8 | 1.0 | 1.4 | 1.7 | 2.0 | 2.2 | 2.5 | 2.9 | 3.2 | 4.0 | 4.6 | 6.3 |
| 12 h | 31.7 | 41.6 | 48.9 | 53.4 | 56.6 | 59.1 | 61.3 | 64.7 | 67.5 | 72.6 | 76.4 | 86.0 |
| | 1.1 | 1.4 | 1.9 | 2.3 | 2.7 | 3.0 | 3.3 | 3.8 | 4.3 | 5.3 | 6.0 | 8.3 |
| 1 j | 38.9 | 50.3 | 58.6 | 63.4 | 67.0 | 69.8 | 72.1 | 75.8 | 78.7 | 84.2 | 88.2 | 98.2 |
| | 1.2 | 1.4 | 1.7 | 2.0 | 2.2 | 2.3 | 2.5 | 2.8 | 3.0 | 3.5 | 3.9 | 5.0 |
| 2 j | 49.4 | 63.1 | 72.8 | 78.4 | 82.5 | 85.6 | 88.3 | 92.4 | 95.7 | 101.8 | 106.1 | 117.0 |
| | 1.8 | 2.3 | 2.9 | 3.4 | 3.8 | 4.1 | 4.4 | 4.9 | 5.3 | 6.2 | 6.9 | 8.7 |
| 3 j | 52.6 | 67.2 | 77.4 | 83.3 | 87.5 | 90.7 | 93.4 | 97.7 | 101.0 | 107.2 | 111.6 | 122.5 |
| | 2.2 | 2.8 | 3.5 | 4.0 | 4.4 | 4.7 | 5.0 | 5.5 | 6.0 | 6.8 | 7.4 | 9.2 |
| 4 j | 57.2 | 72.8 | 83.5 | 89.7 | 94.1 | 97.5 | 100.3 | 104.7 | 108.2 | 114.5 | 119.1 | 130.2 |
| | 2.5 | 3.1 | 3.7 | 4.1 | 4.4 | 4.7 | 4.9 | 5.3 | 5.7 | 6.3 | 6.9 | 8.3 |
| 5 j | 64.9 | 81.8 | 93.3 | 99.9 | 104.6 | 108.2 | 111.2 | 115.9 | 119.6 | 126.3 | 131.0 | 142.7 |
| | 2.9 | 3.6 | 4.2 | 4.6 | 4.9 | 5.1 | 5.3 | 5.7 | 6.0 | 6.7 | 7.2 | 8.5 |
| 7 j | 74.8 | 93.1 | 105.5 | 112.5 | 117.5 | 121.3 | 124.4 | 129.3 | 133.2 | 140.1 | 145.1 | 157.1 |
| | 3.5 | 4.2 | 4.7 | 5.1 | 5.3 | 5.6 | 5.7 | 6.1 | 6.3 | 6.9 | 7.3 | 8.4 |
| 10 j | 89.1 | 109.8 | 123.6 | 131.4 | 136.8 | 141.1 | 144.5 | 149.9 | 154.0 | 161.6 | 166.9 | 179.8 |
| | 4.4 | 5.4 | 6.1 | 6.6 | 6.9 | 7.2 | 7.4 | 7.8 | 8.1 | 8.8 | 9.2 | 10.5 |
| 15 j | 107.9 | 132.1 | 147.9 | 156.8 | 163.0 | 167.8 | 171.6 | 177.6 | 182.3 | 190.7 | 196.6 | 210.8 |
| | 5.4 | 6.5 | 7.3 | 7.7 | 8.0 | 8.2 | 8.4 | 8.7 | 9.0 | 9.4 | 9.8 | 10.6 |
| 20 j | 125.7 | 153.9 | 172.2 | 182.4 | 189.5 | 194.9 | 199.3 | 206.1 | 211.4 | 220.9 | 227.5 | 243.3 |
| | 6.3 | 7.8 | 8.7 | 9.2 | 9.6 | 9.9 | 10.1 | 10.5 | 10.8 | 11.4 | 11.9 | 13.0 |
| 25 j | 134.1 | 164.1 | 183.4 | 194.1 | 201.5 | 207.2 | 211.7 | 218.9 | 224.3 | 234.1 | 241.0 | 257.3 |
| | 7.1 | 8.7 | 9.9 | 10.6 | 11.1 | 11.6 | 11.9 | 12.6 | 13.0 | 14.0 | 14.7 | 16.6 |
| 30 j | 156.7 | 188.8 | 209.4 | 220.7 | 228.6 | 234.5 | 239.3 | 246.9 | 252.6 | 262.9 | 270.1 | 287.1 |
| | 7.8 | 9.5 | 10.9 | 11.8 | 12.5 | 13.0 | 13.5 | 14.2 | 14.9 | 16.1 | 17.0 | 19.5 |

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 | 7.2 | 10.3 | 12.4 | 13.6 | 14.5 | 15.2 | 15.7 | 16.6 | 17.2 | 18.4 | 19.3 | 21.3 |
| | 8.0 | 11.6 | 14.5 | 16.3 | 17.7 | 18.8 | 19.8 | 21.3 | 22.6 | 25.1 | 26.9 | 31.9 |
| 20 min | 10.4 | 14.8 | 17.9 | 19.7 | 21.0 | 22.0 | 22.8 | 24.0 | 25.0 | 26.8 | 28.1 | 31.2 |
| | 11.7 | 16.9 | 21.0 | 23.6 | 25.6 | 27.1 | 28.5 | 30.7 | 32.5 | 36.0 | 38.6 | 45.5 |
| 30 min | 12.2 | 17.7 | 21.7 | 24.0 | 25.7 | 27.0 | 28.1 | 29.8 | 31.2 | 33.7 | 35.5 | 40.1 |
| | 13.8 | 20.1 | 25.0 | 28.0 | 30.3 | 32.1 | 33.7 | 36.2 | 38.2 | 42.1 | 45.0 | 52.7 |
| 1 h | 15.3 | 21.2 | 25.4 | 27.9 | 29.6 | 30.9 | 32.0 | 33.8 | 35.1 | 37.6 | 39.4 | 43.6 |
| | 17.1 | 24.1 | 29.6 | 33.0 | 35.6 | 37.7 | 39.5 | 42.4 | 44.7 | 49.2 | 52.6 | 61.6 |
| 2 h | 18.3 | 25.0 | 29.7 | 32.5 | 34.4 | 35.9 | 37.2 | 39.1 | 40.7 | 43.4 | 45.4 | 50.1 |
| | 20.5 | 28.4 | 34.6 | 38.5 | 41.4 | 43.7 | 45.7 | 48.9 | 51.6 | 56.6 | 60.4 | 70.4 |
| 3 h | 20.2 | 27.7 | 33.0 | 36.2 | 38.4 | 40.1 | 41.5 | 43.8 | 45.6 | 48.8 | 51.1 | 56.9 |
| | 22.8 | 31.4 | 38.1 | 42.2 | 45.3 | 47.8 | 49.9 | 53.3 | 56.1 | 61.4 | 65.3 | 75.7 |
| 6 h | 24.4 | 32.3 | 37.7 | 40.8 | 43.0 | 44.6 | 45.9 | 48.0 | 49.7 | 52.6 | 54.6 | 59.4 |
| | 27.5 | 36.3 | 43.1 | 47.4 | 50.7 | 53.3 | 55.6 | 59.3 | 62.3 | 68.1 | 72.5 | 84.0 |
| 12 h | 29.6 | 38.9 | 45.3 | 48.8 | 51.3 | 53.2 | 54.8 | 57.2 | 59.0 | 62.3 | 64.6 | 69.9 |
| | 33.8 | 44.3 | 52.6 | 57.9 | 61.8 | 65.0 | 67.8 | 72.3 | 75.9 | 82.9 | 88.2 | 102.2 |
| 1 j | 36.6 | 47.5 | 55.2 | 59.6 | 62.8 | 65.2 | 67.2 | 70.4 | 72.8 | 77.3 | 80.6 | 88.5 |
| | 41.2 | 53.1 | 61.9 | 67.3 | 71.2 | 74.4 | 77.0 | 81.2 | 84.6 | 91.1 | 95.8 | 108.0 |
| 2 j | 45.9 | 58.6 | 67.0 | 71.7 | 75.0 | 77.5 | 79.6 | 82.8 | 85.2 | 89.6 | 92.7 | 100.0 |
| | 52.8 | 67.6 | 78.5 | 85.1 | 89.9 | 93.7 | 96.9 | 102.1 | 106.2 | 113.9 | 119.6 | 134.0 |
| 3 j | 48.3 | 61.7 | 70.5 | 75.4 | 78.8 | 81.4 | 83.5 | 86.8 | 89.4 | 93.9 | 97.1 | 104.6 |
| | 56.9 | 72.8 | 84.3 | 91.1 | 96.1 | 100.0 | 103.3 | 108.5 | 112.7 | 120.5 | 126.1 | 140.4 |
| 4 j | 52.2 | 66.7 | 76.3 | 81.7 | 85.4 | 88.3 | 90.6 | 94.3 | 97.1 | 102.1 | 105.6 | 113.9 |
| | 62.1 | 79.0 | 90.8 | 97.7 | 102.8 | 106.7 | 110.0 | 115.2 | 119.3 | 126.9 | 132.5 | 146.5 |
| 5 j | 59.2 | 74.8 | 85.2 | 91.0 | 95.1 | 98.2 | 100.7 | 104.7 | 107.7 | 113.2 | 117.0 | 126.1 |
| | 70.6 | 88.9 | 101.5 | 108.9 | 114.1 | 118.3 | 121.7 | 127.1 | 131.4 | 139.3 | 145.1 | 159.3 |
| 7 j | 68.0 | 85.0 | 96.3 | 102.6 | 107.0 | 110.4 | 113.1 | 117.4 | 120.7 | 126.7 | 130.8 | 140.6 |
| | 81.6 | 101.3 | 114.7 | 122.4 | 127.9 | 132.2 | 135.7 | 141.3 | 145.6 | 153.6 | 159.4 | 173.7 |
| 10 j | 80.5 | 99.3 | 111.6 | 118.5 | 123.3 | 126.9 | 129.9 | 134.5 | 138.1 | 144.4 | 148.8 | 159.3 |
| | 97.6 | 120.4 | 135.6 | 144.3 | 150.4 | 155.2 | 159.1 | 165.2 | 170.0 | 178.8 | 185.1 | 200.4 |
| 15 j | 97.4 | 119.3 | 133.7 | 141.7 | 147.3 | 151.6 | 155.1 | 160.5 | 164.7 | 172.2 | 177.5 | 189.9 |
| | 118.4 | 144.9 | 162.2 | 171.9 | 178.7 | 183.9 | 188.1 | 194.8 | 199.9 | 209.2 | 215.8 | 231.6 |
| 20 j | 113.3 | 138.7 | 155.2 | 164.3 | 170.7 | 175.5 | 179.4 | 185.5 | 190.1 | 198.5 | 204.3 | 217.8 |
| | 138.1 | 169.1 | 189.3 | 200.5 | 208.3 | 214.3 | 219.1 | 226.8 | 232.6 | 243.3 | 250.8 | 268.8 |
| 25 j | 120.2 | 147.0 | 164.0 | 173.3 | 179.6 | 184.5 | 188.3 | 194.3 | 198.8 | 206.7 | 212.2 | 224.8 |
| | 148.0 | 181.2 | 202.8 | 214.9 | 223.3 | 229.9 | 235.1 | 243.5 | 249.9 | 261.5 | 269.8 | 289.7 |
| 30 j | 141.4 | 170.1 | 188.0 | 197.6 | 204.1 | 209.0 | 212.9 | 218.9 | 223.4 | 231.3 | 236.7 | 248.9 |
| | 172.0 | 207.5 | 230.7 | 243.8 | 253.0 | 260.0 | 265.7 | 274.8 | 281.8 | 294.5 | 303.5 | 325.2 |

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 | 135.9 | 0.4719 | 299.3 | 0.7171 | 52.2 | 0.5164 |
| 5 | 194.4 | 0.4706 | 464.3 | 0.7411 | 77.8 | 0.5358 |
| 10 | 236.8 | 0.4675 | 596.7 | 0.7546 | 100.8 | 0.5502 |
| 15 | 262.1 | 0.4652 | 680.7 | 0.7617 | 116.4 | 0.5587 |
| 20 | 280.4 | 0.4634 | 743.9 | 0.7665 | 128.7 | 0.5648 |
| 25 | 294.9 | 0.4619 | 795.3 | 0.7701 | 138.9 | 0.5695 |
| 30 | 306.9 | 0.4607 | 838.8 | 0.7730 | 147.8 | 0.5734 |
| 40 | 326.2 | 0.4586 | 910.6 | 0.7775 | 162.8 | 0.5796 |
| 50 | 341.6 | 0.4570 | 969.0 | 0.7809 | 175.4 | 0.5844 |
| 75 | 370.1 | 0.4538 | 1081.7 | 0.7870 | 200.5 | 0.5932 |
| 100 | 391.1 | 0.4515 | 1167.2 | 0.7912 | 220.2 | 0.5995 |
| 200 | 443.8 | 0.4457 | 1393.8 | 0.8012 | 275.5 | 0.6148 |

Références

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