



# Statistiques des précipitations extrêmes des communes belges

## Hechtel-Eksel (INS 72038)

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 | 7.7                        | 11.0  | 13.5  | 15.0  | 16.1  | 17.0  | 17.8  | 19.0  | 19.9  | 21.8  | 23.2  | 26.7  |
| 20 min | 11.1                       | 15.9  | 19.5  | 21.7  | 23.3  | 24.6  | 25.7  | 27.5  | 28.9  | 31.5  | 33.5  | 38.5  |
| 30 min | 13.1                       | 19.0  | 23.4  | 26.1  | 28.1  | 29.7  | 31.0  | 33.1  | 34.8  | 38.0  | 40.4  | 46.5  |
| 1 h    | 16.2                       | 22.8  | 27.6  | 30.6  | 32.7  | 34.5  | 35.9  | 38.2  | 40.1  | 43.6  | 46.2  | 52.9  |
| 2 h    | 19.4                       | 26.8  | 32.3  | 35.6  | 38.1  | 40.0  | 41.6  | 44.2  | 46.3  | 50.2  | 53.1  | 60.6  |
| 3 h    | 21.6                       | 29.7  | 35.7  | 39.3  | 42.0  | 44.1  | 45.9  | 48.7  | 51.0  | 55.3  | 58.5  | 66.5  |
| 6 h    | 26.1                       | 34.4  | 40.5  | 44.2  | 46.9  | 49.1  | 50.9  | 53.8  | 56.1  | 60.5  | 63.7  | 71.8  |
| 12 h   | 31.8                       | 41.8  | 49.1  | 53.5  | 56.7  | 59.3  | 61.4  | 64.9  | 67.6  | 72.8  | 76.6  | 86.2  |
| 1 j    | 38.9                       | 50.4  | 58.6  | 63.5  | 67.1  | 69.8  | 72.2  | 75.9  | 78.8  | 84.3  | 88.3  | 98.3  |
| 2 j    | 49.4                       | 63.2  | 72.9  | 78.5  | 82.6  | 85.8  | 88.4  | 92.5  | 95.8  | 101.9 | 106.3 | 117.1 |
| 3 j    | 52.7                       | 67.4  | 77.5  | 83.4  | 87.6  | 90.9  | 93.6  | 97.8  | 101.2 | 107.4 | 111.8 | 122.7 |
| 4 j    | 57.3                       | 73.0  | 83.7  | 89.9  | 94.3  | 97.7  | 100.5 | 104.9 | 108.4 | 114.7 | 119.3 | 130.4 |
| 5 j    | 65.0                       | 82.0  | 93.5  | 100.1 | 104.8 | 108.5 | 111.4 | 116.1 | 119.8 | 126.5 | 131.3 | 143.0 |
| 7 j    | 75.0                       | 93.4  | 105.7 | 112.7 | 117.7 | 121.5 | 124.7 | 129.6 | 133.4 | 140.4 | 145.4 | 157.4 |
| 10 j   | 89.3                       | 110.1 | 123.9 | 131.7 | 137.2 | 141.4 | 144.8 | 150.2 | 154.4 | 162.0 | 167.4 | 180.3 |
| 15 j   | 108.2                      | 132.4 | 148.3 | 157.2 | 163.4 | 168.2 | 172.0 | 178.1 | 182.7 | 191.2 | 197.1 | 211.3 |
| 20 j   | 126.0                      | 154.3 | 172.7 | 182.9 | 189.9 | 195.4 | 199.8 | 206.6 | 211.9 | 221.4 | 228.1 | 243.9 |
| 25 j   | 134.5                      | 164.5 | 183.9 | 194.6 | 202.0 | 207.7 | 212.3 | 219.4 | 224.9 | 234.7 | 241.6 | 257.9 |
| 30 j   | 157.1                      | 189.3 | 209.9 | 221.2 | 229.1 | 235.1 | 239.9 | 247.4 | 253.2 | 263.5 | 270.7 | 287.7 |

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 | 7.7                        | 11.0  | 13.5  | 15.0  | 16.1  | 17.0  | 17.8  | 19.0  | 19.9  | 21.8  | 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                       | 15.9  | 19.5  | 21.7  | 23.3  | 24.6  | 25.7  | 27.5  | 28.9  | 31.5  | 33.5  | 38.5  |
|        | 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 | 13.1                       | 19.0  | 23.4  | 26.1  | 28.1  | 29.7  | 31.0  | 33.1  | 34.8  | 38.0  | 40.4  | 46.5  |
|        | 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                       | 22.8  | 27.6  | 30.6  | 32.7  | 34.5  | 35.9  | 38.2  | 40.1  | 43.6  | 46.2  | 52.9  |
|        | 0.5                        | 0.7   | 1.0   | 1.3   | 1.5   | 1.7   | 1.9   | 2.2   | 2.4   | 2.9   | 3.4   | 4.6   |
| 2 h    | 19.4                       | 26.8  | 32.3  | 35.6  | 38.1  | 40.0  | 41.6  | 44.2  | 46.3  | 50.2  | 53.1  | 60.6  |
|        | 0.5                        | 0.9   | 1.2   | 1.5   | 1.7   | 1.9   | 2.1   | 2.5   | 2.7   | 3.3   | 3.8   | 5.1   |
| 3 h    | 21.6                       | 29.7  | 35.7  | 39.3  | 42.0  | 44.1  | 45.9  | 48.7  | 51.0  | 55.3  | 58.5  | 66.5  |
|        | 0.7                        | 0.9   | 1.3   | 1.5   | 1.7   | 1.9   | 2.1   | 2.4   | 2.6   | 3.2   | 3.6   | 4.8   |
| 6 h    | 26.1                       | 34.4  | 40.5  | 44.2  | 46.9  | 49.1  | 50.9  | 53.8  | 56.1  | 60.5  | 63.7  | 71.8  |
|        | 0.8                        | 1.0   | 1.3   | 1.7   | 1.9   | 2.2   | 2.4   | 2.8   | 3.2   | 3.9   | 4.5   | 6.3   |
| 12 h   | 31.8                       | 41.8  | 49.1  | 53.5  | 56.7  | 59.3  | 61.4  | 64.9  | 67.6  | 72.8  | 76.6  | 86.2  |
|        | 1.0                        | 1.4   | 1.8   | 2.3   | 2.7   | 3.0   | 3.3   | 3.8   | 4.3   | 5.3   | 6.0   | 8.2   |
| 1 j    | 38.9                       | 50.4  | 58.6  | 63.5  | 67.1  | 69.8  | 72.2  | 75.9  | 78.8  | 84.3  | 88.3  | 98.3  |
|        | 1.1                        | 1.4   | 1.7   | 1.9   | 2.1   | 2.3   | 2.4   | 2.7   | 3.0   | 3.5   | 3.9   | 5.0   |
| 2 j    | 49.4                       | 63.2  | 72.9  | 78.5  | 82.6  | 85.8  | 88.4  | 92.5  | 95.8  | 101.9 | 106.3 | 117.1 |
|        | 1.7                        | 2.2   | 2.8   | 3.3   | 3.7   | 4.0   | 4.3   | 4.8   | 5.3   | 6.1   | 6.8   | 8.6   |
| 3 j    | 52.7                       | 67.4  | 77.5  | 83.4  | 87.6  | 90.9  | 93.6  | 97.8  | 101.2 | 107.4 | 111.8 | 122.7 |
|        | 2.1                        | 2.7   | 3.4   | 3.9   | 4.3   | 4.6   | 4.9   | 5.4   | 5.8   | 6.6   | 7.3   | 9.0   |
| 4 j    | 57.3                       | 73.0  | 83.7  | 89.9  | 94.3  | 97.7  | 100.5 | 104.9 | 108.4 | 114.7 | 119.3 | 130.4 |
|        | 2.4                        | 3.0   | 3.5   | 3.9   | 4.2   | 4.5   | 4.7   | 5.2   | 5.5   | 6.2   | 6.7   | 8.1   |
| 5 j    | 65.0                       | 82.0  | 93.5  | 100.1 | 104.8 | 108.5 | 111.4 | 116.1 | 119.8 | 126.5 | 131.3 | 143.0 |
|        | 2.7                        | 3.4   | 3.9   | 4.3   | 4.6   | 4.9   | 5.1   | 5.5   | 5.8   | 6.4   | 6.9   | 8.3   |
| 7 j    | 75.0                       | 93.4  | 105.7 | 112.7 | 117.7 | 121.5 | 124.7 | 129.6 | 133.4 | 140.4 | 145.4 | 157.4 |
|        | 3.3                        | 3.9   | 4.4   | 4.8   | 5.0   | 5.2   | 5.4   | 5.8   | 6.0   | 6.6   | 7.0   | 8.1   |
| 10 j   | 89.3                       | 110.1 | 123.9 | 131.7 | 137.2 | 141.4 | 144.8 | 150.2 | 154.4 | 162.0 | 167.4 | 180.3 |
|        | 4.1                        | 5.0   | 5.7   | 6.2   | 6.5   | 6.8   | 7.0   | 7.4   | 7.7   | 8.3   | 8.8   | 10.0  |
| 15 j   | 108.2                      | 132.4 | 148.3 | 157.2 | 163.4 | 168.2 | 172.0 | 178.1 | 182.7 | 191.2 | 197.1 | 211.3 |
|        | 5.0                        | 6.1   | 6.8   | 7.2   | 7.5   | 7.7   | 7.9   | 8.2   | 8.4   | 8.8   | 9.2   | 10.0  |
| 20 j   | 126.0                      | 154.3 | 172.7 | 182.9 | 189.9 | 195.4 | 199.8 | 206.6 | 211.9 | 221.4 | 228.1 | 243.9 |
|        | 5.9                        | 7.2   | 8.1   | 8.6   | 9.0   | 9.3   | 9.5   | 9.9   | 10.2  | 10.7  | 11.2  | 12.3  |
| 25 j   | 134.5                      | 164.5 | 183.9 | 194.6 | 202.0 | 207.7 | 212.3 | 219.4 | 224.9 | 234.7 | 241.6 | 257.9 |
|        | 6.6                        | 8.1   | 9.3   | 10.0  | 10.5  | 10.9  | 11.3  | 11.9  | 12.4  | 13.3  | 14.0  | 15.9  |
| 30 j   | 157.1                      | 189.3 | 209.9 | 221.2 | 229.1 | 235.1 | 239.9 | 247.4 | 253.2 | 263.5 | 270.7 | 287.7 |
|        | 7.2                        | 8.9   | 10.3  | 11.1  | 11.8  | 12.4  | 12.8  | 13.6  | 14.2  | 15.5  | 16.4  | 18.9  |

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 | 7.3                        | 10.3  | 12.4  | 13.7  | 14.5  | 15.2  | 15.7  | 16.6  | 17.3  | 18.5  | 19.3  | 21.4  |
|        | 8.1                        | 11.7  | 14.5  | 16.3  | 17.7  | 18.8  | 19.8  | 21.4  | 22.6  | 25.1  | 27.0  | 31.9  |
| 20 min | 10.4                       | 14.9  | 18.0  | 19.8  | 21.1  | 22.0  | 22.9  | 24.1  | 25.1  | 26.9  | 28.2  | 31.3  |
|        | 11.7                       | 16.9  | 21.1  | 23.7  | 25.6  | 27.2  | 28.6  | 30.8  | 32.6  | 36.1  | 38.8  | 45.7  |
| 30 min | 12.3                       | 17.8  | 21.8  | 24.1  | 25.8  | 27.1  | 28.2  | 30.0  | 31.3  | 33.9  | 35.7  | 40.3  |
|        | 13.9                       | 20.1  | 25.0  | 28.1  | 30.3  | 32.2  | 33.7  | 36.2  | 38.3  | 42.2  | 45.1  | 52.8  |
| 1 h    | 15.3                       | 21.3  | 25.6  | 28.0  | 29.8  | 31.1  | 32.2  | 34.0  | 35.4  | 37.8  | 39.6  | 43.9  |
|        | 17.1                       | 24.2  | 29.7  | 33.1  | 35.7  | 37.8  | 39.6  | 42.5  | 44.8  | 49.4  | 52.8  | 61.8  |
| 2 h    | 18.4                       | 25.2  | 29.9  | 32.7  | 34.7  | 36.2  | 37.4  | 39.4  | 40.9  | 43.7  | 45.7  | 50.5  |
|        | 20.5                       | 28.5  | 34.7  | 38.6  | 41.5  | 43.8  | 45.8  | 49.1  | 51.7  | 56.8  | 60.6  | 70.7  |
| 3 h    | 20.3                       | 27.8  | 33.2  | 36.4  | 38.6  | 40.3  | 41.8  | 44.0  | 45.8  | 49.1  | 51.4  | 57.2  |
|        | 22.8                       | 31.5  | 38.1  | 42.3  | 45.4  | 47.9  | 50.0  | 53.4  | 56.2  | 61.5  | 65.5  | 75.9  |
| 6 h    | 24.6                       | 32.4  | 37.9  | 41.0  | 43.1  | 44.8  | 46.1  | 48.2  | 49.8  | 52.7  | 54.8  | 59.6  |
|        | 27.5                       | 36.3  | 43.2  | 47.5  | 50.8  | 53.4  | 55.7  | 59.4  | 62.4  | 68.2  | 72.6  | 84.1  |
| 12 h   | 29.8                       | 39.1  | 45.5  | 49.1  | 51.5  | 53.4  | 55.0  | 57.4  | 59.2  | 62.5  | 64.7  | 70.1  |
|        | 33.8                       | 44.4  | 52.7  | 58.0  | 61.9  | 65.2  | 67.9  | 72.4  | 76.0  | 83.1  | 88.4  | 102.4 |
| 1 j    | 36.7                       | 47.7  | 55.4  | 59.8  | 62.9  | 65.4  | 67.4  | 70.5  | 73.0  | 77.5  | 80.7  | 88.6  |
|        | 41.1                       | 53.0  | 61.9  | 67.2  | 71.2  | 74.3  | 77.0  | 81.2  | 84.6  | 91.1  | 95.8  | 108.0 |
| 2 j    | 46.2                       | 58.9  | 67.3  | 72.1  | 75.3  | 77.9  | 79.9  | 83.1  | 85.5  | 89.9  | 93.0  | 100.2 |
|        | 52.7                       | 67.5  | 78.4  | 85.0  | 89.8  | 93.7  | 96.9  | 102.0 | 106.1 | 113.9 | 119.6 | 134.0 |
| 3 j    | 48.7                       | 62.1  | 70.9  | 75.8  | 79.2  | 81.9  | 84.0  | 87.3  | 89.8  | 94.3  | 97.5  | 105.0 |
|        | 56.7                       | 72.6  | 84.1  | 91.0  | 96.0  | 99.9  | 103.2 | 108.4 | 112.6 | 120.4 | 126.1 | 140.4 |
| 4 j    | 52.7                       | 67.2  | 76.8  | 82.2  | 86.0  | 88.8  | 91.2  | 94.8  | 97.6  | 102.6 | 106.2 | 114.5 |
|        | 61.9                       | 78.7  | 90.6  | 97.5  | 102.6 | 106.5 | 109.8 | 115.0 | 119.1 | 126.8 | 132.4 | 146.4 |
| 5 j    | 59.7                       | 75.4  | 85.8  | 91.7  | 95.8  | 98.9  | 101.4 | 105.4 | 108.4 | 113.9 | 117.7 | 126.8 |
|        | 70.4                       | 88.6  | 101.2 | 108.6 | 113.9 | 118.0 | 121.4 | 126.9 | 131.2 | 139.1 | 144.8 | 159.2 |
| 7 j    | 68.6                       | 85.7  | 97.1  | 103.4 | 107.9 | 111.3 | 114.0 | 118.3 | 121.6 | 127.6 | 131.7 | 141.5 |
|        | 81.3                       | 101.0 | 114.4 | 122.1 | 127.5 | 131.8 | 135.3 | 140.9 | 145.3 | 153.3 | 159.1 | 173.4 |
| 10 j   | 81.3                       | 100.2 | 112.7 | 119.6 | 124.5 | 128.1 | 131.1 | 135.8 | 139.3 | 145.7 | 150.2 | 160.6 |
|        | 97.3                       | 119.9 | 135.1 | 143.8 | 149.9 | 154.6 | 158.5 | 164.7 | 169.5 | 178.2 | 184.5 | 199.9 |
| 15 j   | 98.4                       | 120.5 | 135.0 | 143.1 | 148.8 | 153.1 | 156.6 | 162.1 | 166.3 | 173.8 | 179.1 | 191.7 |
|        | 118.0                      | 144.3 | 161.6 | 171.3 | 178.0 | 183.2 | 187.4 | 194.1 | 199.2 | 208.5 | 215.0 | 230.9 |
| 20 j   | 114.5                      | 140.1 | 156.8 | 166.0 | 172.4 | 177.2 | 181.2 | 187.3 | 192.0 | 200.4 | 206.2 | 219.9 |
|        | 137.6                      | 168.5 | 188.6 | 199.7 | 207.5 | 213.5 | 218.4 | 226.0 | 231.8 | 242.4 | 249.9 | 268.0 |
| 25 j   | 121.6                      | 148.6 | 165.7 | 175.0 | 181.4 | 186.3 | 190.1 | 196.1 | 200.6 | 208.6 | 214.1 | 226.8 |
|        | 147.4                      | 180.5 | 202.1 | 214.1 | 222.6 | 229.1 | 234.4 | 242.7 | 249.1 | 260.8 | 269.1 | 289.0 |
| 30 j   | 142.9                      | 171.8 | 189.8 | 199.4 | 206.0 | 210.9 | 214.8 | 220.8 | 225.3 | 233.2 | 238.6 | 250.8 |
|        | 171.3                      | 206.8 | 230.0 | 243.1 | 252.2 | 259.3 | 265.0 | 274.1 | 281.1 | 293.8 | 302.9 | 324.7 |

#### 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                          | 135.6 | 0.4700 | 300.7  | 0.7174 | 52.2  | 0.5161 |
| 5                          | 193.8 | 0.4685 | 466.7  | 0.7415 | 77.7  | 0.5354 |
| 10                         | 236.1 | 0.4653 | 599.9  | 0.7551 | 100.5 | 0.5497 |
| 15                         | 261.3 | 0.4629 | 684.5  | 0.7622 | 116.1 | 0.5582 |
| 20                         | 279.5 | 0.4611 | 748.2  | 0.7670 | 128.2 | 0.5642 |
| 25                         | 293.9 | 0.4596 | 799.8  | 0.7706 | 138.4 | 0.5690 |
| 30                         | 305.9 | 0.4583 | 843.7  | 0.7735 | 147.2 | 0.5728 |
| 40                         | 325.1 | 0.4563 | 915.9  | 0.7780 | 162.1 | 0.5790 |
| 50                         | 340.4 | 0.4546 | 974.7  | 0.7814 | 174.6 | 0.5838 |
| 75                         | 368.8 | 0.4514 | 1088.1 | 0.7875 | 199.6 | 0.5926 |
| 100                        | 389.7 | 0.4491 | 1174.1 | 0.7917 | 219.2 | 0.5989 |
| 200                        | 442.2 | 0.4432 | 1402.2 | 0.8018 | 274.2 | 0.6141 |

## Références

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

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