



# Statistiques des précipitations extrêmes des communes belges

## Chapelle-lez-Herlaimont (INS 52010)

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 | 7.8                        | 11.1  | 13.6  | 15.2  | 16.3  | 17.2  | 18.0  | 19.2  | 20.2  | 22.0  | 23.4  | 27.0  |
| 20 min | 11.3                       | 16.2  | 19.9  | 22.2  | 23.9  | 25.2  | 26.3  | 28.1  | 29.5  | 32.2  | 34.3  | 39.4  |
| 30 min | 13.3                       | 19.3  | 23.8  | 26.6  | 28.6  | 30.2  | 31.5  | 33.7  | 35.4  | 38.7  | 41.1  | 47.3  |
| 1 h    | 16.5                       | 23.2  | 28.3  | 31.3  | 33.5  | 35.3  | 36.8  | 39.2  | 41.1  | 44.7  | 47.4  | 54.3  |
| 2 h    | 19.8                       | 27.5  | 33.1  | 36.5  | 39.1  | 41.0  | 42.7  | 45.4  | 47.6  | 51.6  | 54.6  | 62.2  |
| 3 h    | 22.0                       | 30.3  | 36.4  | 40.2  | 42.9  | 45.0  | 46.8  | 49.8  | 52.1  | 56.5  | 59.7  | 67.9  |
| 6 h    | 26.6                       | 35.0  | 41.2  | 44.9  | 47.7  | 49.8  | 51.6  | 54.6  | 56.9  | 61.3  | 64.5  | 72.7  |
| 12 h   | 32.6                       | 42.6  | 50.0  | 54.4  | 57.6  | 60.2  | 62.4  | 65.8  | 68.6  | 73.7  | 77.5  | 87.2  |
| 1 j    | 39.6                       | 51.1  | 59.4  | 64.3  | 67.8  | 70.6  | 72.9  | 76.7  | 79.6  | 85.1  | 89.1  | 99.2  |
| 2 j    | 50.5                       | 64.4  | 74.2  | 79.9  | 84.0  | 87.2  | 89.9  | 94.1  | 97.4  | 103.5 | 107.9 | 118.9 |
| 3 j    | 54.0                       | 68.9  | 79.2  | 85.2  | 89.4  | 92.8  | 95.5  | 99.8  | 103.2 | 109.5 | 114.0 | 125.0 |
| 4 j    | 58.8                       | 74.7  | 85.6  | 91.9  | 96.4  | 99.8  | 102.7 | 107.2 | 110.7 | 117.2 | 121.8 | 133.1 |
| 5 j    | 66.8                       | 84.1  | 95.8  | 102.6 | 107.3 | 111.0 | 114.1 | 118.9 | 122.6 | 129.4 | 134.3 | 146.2 |
| 7 j    | 77.1                       | 95.9  | 108.5 | 115.6 | 120.7 | 124.6 | 127.8 | 132.8 | 136.7 | 143.9 | 148.9 | 161.2 |
| 10 j   | 92.0                       | 113.4 | 127.6 | 135.6 | 141.2 | 145.6 | 149.1 | 154.7 | 158.9 | 166.7 | 172.3 | 185.6 |
| 15 j   | 111.5                      | 136.4 | 152.7 | 161.8 | 168.2 | 173.1 | 177.1 | 183.3 | 188.1 | 196.7 | 202.8 | 217.4 |
| 20 j   | 129.9                      | 159.0 | 177.9 | 188.4 | 195.7 | 201.2 | 205.8 | 212.8 | 218.3 | 228.0 | 234.9 | 251.2 |
| 25 j   | 138.8                      | 169.7 | 189.6 | 200.6 | 208.3 | 214.1 | 218.8 | 226.2 | 231.8 | 241.9 | 249.0 | 265.8 |
| 30 j   | 161.9                      | 194.9 | 216.0 | 227.7 | 235.7 | 241.9 | 246.8 | 254.5 | 260.4 | 271.0 | 278.4 | 295.8 |

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 | 7.8                        | 11.1  | 13.6  | 15.2  | 16.3  | 17.2  | 18.0  | 19.2  | 20.2  | 22.0  | 23.4  | 27.0  |
|        | 0.2                        | 0.4   | 0.6   | 0.7   | 0.8   | 1.0   | 1.1   | 1.2   | 1.4   | 1.7   | 2.0   | 2.7   |
| 20 min | 11.3                       | 16.2  | 19.9  | 22.2  | 23.9  | 25.2  | 26.3  | 28.1  | 29.5  | 32.2  | 34.3  | 39.4  |
|        | 0.3                        | 0.6   | 0.8   | 1.0   | 1.2   | 1.4   | 1.5   | 1.8   | 2.0   | 2.5   | 2.8   | 3.9   |
| 30 min | 13.3                       | 19.3  | 23.8  | 26.6  | 28.6  | 30.2  | 31.5  | 33.7  | 35.4  | 38.7  | 41.1  | 47.3  |
|        | 0.4                        | 0.6   | 0.8   | 1.0   | 1.1   | 1.3   | 1.4   | 1.6   | 1.7   | 2.1   | 2.3   | 3.1   |
| 1 h    | 16.5                       | 23.2  | 28.3  | 31.3  | 33.5  | 35.3  | 36.8  | 39.2  | 41.1  | 44.7  | 47.4  | 54.3  |
|        | 0.5                        | 0.7   | 1.0   | 1.3   | 1.5   | 1.7   | 1.9   | 2.2   | 2.4   | 3.0   | 3.4   | 4.6   |
| 2 h    | 19.8                       | 27.5  | 33.1  | 36.5  | 39.1  | 41.0  | 42.7  | 45.4  | 47.6  | 51.6  | 54.6  | 62.2  |
|        | 0.5                        | 0.8   | 1.2   | 1.5   | 1.7   | 1.9   | 2.1   | 2.5   | 2.8   | 3.3   | 3.8   | 5.2   |
| 3 h    | 22.0                       | 30.3  | 36.4  | 40.2  | 42.9  | 45.0  | 46.8  | 49.8  | 52.1  | 56.5  | 59.7  | 67.9  |
|        | 0.7                        | 0.9   | 1.2   | 1.5   | 1.7   | 1.9   | 2.1   | 2.4   | 2.6   | 3.1   | 3.6   | 4.7   |
| 6 h    | 26.6                       | 35.0  | 41.2  | 44.9  | 47.7  | 49.8  | 51.6  | 54.6  | 56.9  | 61.3  | 64.5  | 72.7  |
|        | 0.7                        | 1.0   | 1.3   | 1.6   | 1.9   | 2.2   | 2.4   | 2.8   | 3.2   | 3.9   | 4.5   | 6.2   |
| 12 h   | 32.6                       | 42.6  | 50.0  | 54.4  | 57.6  | 60.2  | 62.4  | 65.8  | 68.6  | 73.7  | 77.5  | 87.2  |
|        | 1.0                        | 1.3   | 1.8   | 2.2   | 2.6   | 3.0   | 3.3   | 3.8   | 4.3   | 5.3   | 6.0   | 8.3   |
| 1 j    | 39.6                       | 51.1  | 59.4  | 64.3  | 67.8  | 70.6  | 72.9  | 76.7  | 79.6  | 85.1  | 89.1  | 99.2  |
|        | 1.5                        | 1.7   | 1.9   | 2.1   | 2.3   | 2.5   | 2.6   | 2.9   | 3.1   | 3.6   | 3.9   | 5.0   |
| 2 j    | 50.5                       | 64.4  | 74.2  | 79.9  | 84.0  | 87.2  | 89.9  | 94.1  | 97.4  | 103.5 | 107.9 | 118.9 |
|        | 2.2                        | 2.8   | 3.3   | 3.8   | 4.1   | 4.4   | 4.7   | 5.2   | 5.6   | 6.4   | 7.1   | 8.8   |
| 3 j    | 54.0                       | 68.9  | 79.2  | 85.2  | 89.4  | 92.8  | 95.5  | 99.8  | 103.2 | 109.5 | 114.0 | 125.0 |
|        | 2.8                        | 3.5   | 4.1   | 4.6   | 5.0   | 5.3   | 5.6   | 6.0   | 6.4   | 7.2   | 7.8   | 9.5   |
| 4 j    | 58.8                       | 74.7  | 85.6  | 91.9  | 96.4  | 99.8  | 102.7 | 107.2 | 110.7 | 117.2 | 121.8 | 133.1 |
|        | 3.2                        | 3.9   | 4.5   | 4.9   | 5.2   | 5.4   | 5.7   | 6.1   | 6.4   | 7.0   | 7.6   | 8.9   |
| 5 j    | 66.8                       | 84.1  | 95.8  | 102.6 | 107.3 | 111.0 | 114.1 | 118.9 | 122.6 | 129.4 | 134.3 | 146.2 |
|        | 3.7                        | 4.5   | 5.1   | 5.6   | 5.9   | 6.1   | 6.4   | 6.7   | 7.1   | 7.7   | 8.2   | 9.5   |
| 7 j    | 77.1                       | 95.9  | 108.5 | 115.6 | 120.7 | 124.6 | 127.8 | 132.8 | 136.7 | 143.9 | 148.9 | 161.2 |
|        | 4.5                        | 5.3   | 5.9   | 6.3   | 6.6   | 6.8   | 7.0   | 7.4   | 7.6   | 8.2   | 8.6   | 9.7   |
| 10 j   | 92.0                       | 113.4 | 127.6 | 135.6 | 141.2 | 145.6 | 149.1 | 154.7 | 158.9 | 166.7 | 172.3 | 185.6 |
|        | 5.6                        | 6.9   | 7.8   | 8.3   | 8.7   | 9.0   | 9.3   | 9.7   | 10.1  | 10.8  | 11.3  | 12.6  |
| 15 j   | 111.5                      | 136.4 | 152.7 | 161.8 | 168.2 | 173.1 | 177.1 | 183.3 | 188.1 | 196.7 | 202.8 | 217.4 |
|        | 6.9                        | 8.3   | 9.3   | 9.8   | 10.2  | 10.5  | 10.7  | 11.1  | 11.4  | 11.9  | 12.3  | 13.3  |
| 20 j   | 129.9                      | 159.0 | 177.9 | 188.4 | 195.7 | 201.2 | 205.8 | 212.8 | 218.3 | 228.0 | 234.9 | 251.2 |
|        | 8.1                        | 9.9   | 11.0  | 11.7  | 12.2  | 12.5  | 12.8  | 13.3  | 13.6  | 14.3  | 14.8  | 16.1  |
| 25 j   | 138.8                      | 169.7 | 189.6 | 200.6 | 208.3 | 214.1 | 218.8 | 226.2 | 231.8 | 241.9 | 249.0 | 265.8 |
|        | 9.1                        | 11.1  | 12.4  | 13.3  | 13.9  | 14.3  | 14.7  | 15.4  | 15.9  | 16.9  | 17.6  | 19.5  |
| 30 j   | 161.9                      | 194.9 | 216.0 | 227.7 | 235.7 | 241.9 | 246.8 | 254.5 | 260.4 | 271.0 | 278.4 | 295.8 |
|        | 10.0                       | 12.0  | 13.5  | 14.5  | 15.2  | 15.7  | 16.2  | 17.0  | 17.6  | 18.8  | 19.8  | 22.2  |

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                        | 10.4  | 12.6  | 13.8  | 14.7  | 15.3  | 15.9  | 16.8  | 17.4  | 18.6  | 19.5  | 21.6  |
|        | 8.2                        | 11.8  | 14.7  | 16.6  | 18.0  | 19.1  | 20.1  | 21.6  | 22.9  | 25.4  | 27.3  | 32.3  |
| 20 min | 10.6                       | 15.1  | 18.3  | 20.1  | 21.4  | 22.4  | 23.3  | 24.6  | 25.6  | 27.4  | 28.7  | 31.8  |
|        | 11.9                       | 17.3  | 21.6  | 24.3  | 26.3  | 27.9  | 29.3  | 31.6  | 33.5  | 37.1  | 39.8  | 47.0  |
| 30 min | 12.5                       | 18.1  | 22.2  | 24.6  | 26.4  | 27.7  | 28.8  | 30.6  | 32.0  | 34.6  | 36.5  | 41.2  |
|        | 14.1                       | 20.5  | 25.4  | 28.5  | 30.8  | 32.6  | 34.2  | 36.7  | 38.8  | 42.7  | 45.7  | 53.4  |
| 1 h    | 15.6                       | 21.8  | 26.2  | 28.8  | 30.6  | 32.0  | 33.1  | 34.9  | 36.4  | 39.0  | 40.8  | 45.3  |
|        | 17.4                       | 24.7  | 30.3  | 33.8  | 36.5  | 38.7  | 40.5  | 43.5  | 45.9  | 50.5  | 54.0  | 63.3  |
| 2 h    | 18.8                       | 25.8  | 30.8  | 33.6  | 35.7  | 37.2  | 38.5  | 40.6  | 42.2  | 45.1  | 47.1  | 52.1  |
|        | 20.9                       | 29.1  | 35.5  | 39.5  | 42.4  | 44.9  | 46.9  | 50.2  | 53.0  | 58.2  | 62.1  | 72.4  |
| 3 h    | 20.7                       | 28.5  | 34.0  | 37.2  | 39.5  | 41.3  | 42.8  | 45.1  | 47.0  | 50.3  | 52.7  | 58.7  |
|        | 23.3                       | 32.1  | 38.9  | 43.1  | 46.2  | 48.8  | 50.9  | 54.4  | 57.2  | 62.6  | 66.7  | 77.2  |
| 6 h    | 25.2                       | 33.1  | 38.6  | 41.7  | 43.9  | 45.6  | 47.0  | 49.1  | 50.7  | 53.6  | 55.7  | 60.5  |
|        | 28.1                       | 36.9  | 43.7  | 48.1  | 51.4  | 54.1  | 56.3  | 60.0  | 63.1  | 68.9  | 73.3  | 84.9  |
| 12 h   | 30.6                       | 40.0  | 46.4  | 50.0  | 52.5  | 54.4  | 55.9  | 58.3  | 60.1  | 63.4  | 65.7  | 71.0  |
|        | 34.6                       | 45.2  | 53.5  | 58.8  | 62.8  | 66.0  | 68.8  | 73.3  | 77.0  | 84.1  | 89.4  | 103.5 |
| 1 j    | 36.8                       | 47.8  | 55.6  | 60.1  | 63.3  | 65.8  | 67.8  | 71.0  | 73.5  | 78.1  | 81.4  | 89.4  |
|        | 42.4                       | 54.3  | 63.1  | 68.5  | 72.4  | 75.5  | 78.1  | 82.3  | 85.7  | 92.1  | 96.8  | 109.0 |
| 2 j    | 46.2                       | 59.0  | 67.7  | 72.6  | 75.9  | 78.5  | 80.6  | 83.9  | 86.4  | 91.0  | 94.1  | 101.6 |
|        | 54.9                       | 69.8  | 80.7  | 87.3  | 92.1  | 95.9  | 99.1  | 104.2 | 108.4 | 116.1 | 121.8 | 136.2 |
| 3 j    | 48.6                       | 62.1  | 71.1  | 76.2  | 79.7  | 82.4  | 84.6  | 88.0  | 90.6  | 95.3  | 98.6  | 106.3 |
|        | 59.5                       | 75.7  | 87.2  | 94.1  | 99.1  | 103.1 | 106.4 | 111.6 | 115.8 | 123.6 | 129.3 | 143.7 |
| 4 j    | 52.5                       | 67.1  | 76.9  | 82.4  | 86.2  | 89.2  | 91.6  | 95.3  | 98.2  | 103.4 | 107.0 | 115.6 |
|        | 65.1                       | 82.3  | 94.4  | 101.4 | 106.5 | 110.5 | 113.8 | 119.1 | 123.2 | 131.0 | 136.6 | 150.6 |
| 5 j    | 59.6                       | 75.2  | 85.8  | 91.7  | 95.8  | 99.0  | 101.6 | 105.7 | 108.8 | 114.4 | 118.3 | 127.6 |
|        | 74.0                       | 92.9  | 105.9 | 113.5 | 118.8 | 123.1 | 126.5 | 132.1 | 136.5 | 144.5 | 150.4 | 164.9 |
| 7 j    | 68.4                       | 85.5  | 96.9  | 103.3 | 107.8 | 111.2 | 114.0 | 118.4 | 121.8 | 127.8 | 132.1 | 142.2 |
|        | 85.9                       | 106.2 | 120.0 | 128.0 | 133.6 | 138.0 | 141.5 | 147.2 | 151.7 | 159.9 | 165.8 | 180.2 |
| 10 j   | 81.0                       | 99.9  | 112.3 | 119.3 | 124.1 | 127.9 | 130.9 | 135.6 | 139.2 | 145.7 | 150.2 | 160.9 |
|        | 103.0                      | 126.9 | 142.9 | 151.9 | 158.3 | 163.3 | 167.3 | 173.7 | 178.7 | 187.8 | 194.3 | 210.2 |
| 15 j   | 98.0                       | 120.1 | 134.5 | 142.6 | 148.2 | 152.6 | 156.1 | 161.5 | 165.8 | 173.3 | 178.6 | 191.2 |
|        | 125.0                      | 152.8 | 170.9 | 181.1 | 188.2 | 193.6 | 198.1 | 205.0 | 210.4 | 220.1 | 227.0 | 243.6 |
| 20 j   | 114.0                      | 139.6 | 156.2 | 165.4 | 171.8 | 176.7 | 180.7 | 186.8 | 191.5 | 200.0 | 205.8 | 219.6 |
|        | 145.8                      | 178.4 | 199.5 | 211.3 | 219.5 | 225.8 | 230.9 | 238.8 | 245.0 | 256.1 | 263.9 | 282.7 |
| 25 j   | 121.0                      | 148.1 | 165.2 | 174.7 | 181.1 | 186.0 | 189.9 | 196.0 | 200.6 | 208.8 | 214.4 | 227.4 |
|        | 156.6                      | 191.4 | 214.0 | 226.6 | 235.4 | 242.2 | 247.7 | 256.3 | 263.0 | 275.0 | 283.6 | 304.1 |
| 30 j   | 142.3                      | 171.3 | 189.5 | 199.3 | 206.0 | 211.0 | 215.1 | 221.2 | 225.9 | 234.1 | 239.7 | 252.4 |
|        | 181.5                      | 218.5 | 242.5 | 256.0 | 265.4 | 272.7 | 278.6 | 287.8 | 295.0 | 307.9 | 317.1 | 339.3 |

#### 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 | 0.4645 | 304.8  | 0.7161 | 51.9  | 0.5125 |
| 5                          | 192.9 | 0.4610 | 475.1  | 0.7411 | 75.9  | 0.5303 |
| 10                         | 234.5 | 0.4570 | 611.9  | 0.7550 | 97.6  | 0.5439 |
| 15                         | 259.3 | 0.4542 | 698.8  | 0.7623 | 112.2 | 0.5520 |
| 20                         | 277.2 | 0.4522 | 764.2  | 0.7672 | 123.7 | 0.5579 |
| 25                         | 291.4 | 0.4505 | 817.3  | 0.7709 | 133.3 | 0.5624 |
| 30                         | 303.2 | 0.4491 | 862.3  | 0.7738 | 141.6 | 0.5662 |
| 40                         | 322.1 | 0.4469 | 936.5  | 0.7784 | 155.7 | 0.5722 |
| 50                         | 337.1 | 0.4451 | 996.9  | 0.7819 | 167.5 | 0.5769 |
| 75                         | 365.1 | 0.4417 | 1113.5 | 0.7881 | 191.0 | 0.5854 |
| 100                        | 385.6 | 0.4392 | 1202.0 | 0.7924 | 209.5 | 0.5916 |
| 200                        | 437.3 | 0.4330 | 1436.5 | 0.8026 | 261.2 | 0.6066 |

## 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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