



# Statistiques des précipitations extrêmes des communes belges

Orp-Jauche (INS 25120)

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                        | 10.7  | 13.1  | 14.6  | 15.7  | 16.6  | 17.3  | 18.5  | 19.5  | 21.2  | 22.6  | 26.0  |
| 20 min | 10.6                       | 15.2  | 18.6  | 20.7  | 22.2  | 23.4  | 24.5  | 26.1  | 27.4  | 29.9  | 31.8  | 36.5  |
| 30 min | 12.6                       | 18.3  | 22.5  | 25.1  | 27.0  | 28.5  | 29.8  | 31.9  | 33.5  | 36.6  | 38.9  | 44.8  |
| 1 h    | 15.6                       | 21.7  | 26.2  | 29.0  | 31.0  | 32.6  | 34.0  | 36.1  | 37.9  | 41.2  | 43.6  | 49.8  |
| 2 h    | 18.6                       | 25.5  | 30.6  | 33.7  | 35.9  | 37.7  | 39.2  | 41.7  | 43.6  | 47.3  | 50.0  | 56.9  |
| 3 h    | 20.6                       | 28.3  | 34.0  | 37.5  | 40.1  | 42.1  | 43.8  | 46.5  | 48.6  | 52.7  | 55.8  | 63.5  |
| 6 h    | 24.8                       | 33.0  | 39.1  | 42.7  | 45.4  | 47.5  | 49.3  | 52.1  | 54.4  | 58.7  | 61.9  | 69.9  |
| 12 h   | 30.0                       | 39.9  | 47.2  | 51.6  | 54.8  | 57.3  | 59.4  | 62.9  | 65.6  | 70.7  | 74.5  | 84.0  |
| 1 j    | 36.6                       | 47.9  | 56.1  | 60.9  | 64.4  | 67.1  | 69.4  | 73.1  | 76.0  | 81.4  | 85.4  | 95.3  |
| 2 j    | 45.7                       | 59.0  | 68.3  | 73.7  | 77.6  | 80.7  | 83.2  | 87.2  | 90.4  | 96.2  | 100.5 | 110.9 |
| 3 j    | 48.1                       | 62.1  | 71.7  | 77.3  | 81.3  | 84.4  | 87.0  | 91.0  | 94.2  | 100.0 | 104.3 | 114.6 |
| 4 j    | 52.1                       | 66.8  | 77.0  | 82.8  | 86.9  | 90.2  | 92.8  | 97.0  | 100.3 | 106.3 | 110.6 | 121.1 |
| 5 j    | 59.0                       | 74.8  | 85.6  | 91.7  | 96.1  | 99.5  | 102.3 | 106.6 | 110.1 | 116.3 | 120.8 | 131.7 |
| 7 j    | 67.6                       | 84.7  | 96.2  | 102.8 | 107.4 | 111.0 | 113.9 | 118.5 | 122.0 | 128.6 | 133.2 | 144.4 |
| 10 j   | 80.0                       | 98.7  | 111.2 | 118.2 | 123.2 | 127.0 | 130.1 | 134.9 | 138.7 | 145.5 | 150.4 | 162.0 |
| 15 j   | 96.7                       | 118.7 | 133.1 | 141.1 | 146.7 | 151.0 | 154.5 | 160.0 | 164.2 | 171.9 | 177.2 | 190.1 |
| 20 j   | 112.6                      | 138.1 | 154.6 | 163.8 | 170.2 | 175.1 | 179.0 | 185.2 | 190.0 | 198.5 | 204.5 | 218.8 |
| 25 j   | 119.4                      | 146.5 | 164.0 | 173.6 | 180.3 | 185.5 | 189.6 | 196.0 | 201.0 | 209.9 | 216.1 | 230.8 |
| 30 j   | 140.4                      | 169.8 | 188.6 | 199.0 | 206.2 | 211.6 | 216.0 | 222.9 | 228.2 | 237.6 | 244.2 | 259.7 |

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 | 7.5                        | 10.7  | 13.1  | 14.6  | 15.7  | 16.6  | 17.3  | 18.5  | 19.5  | 21.2  | 22.6  | 26.0  |
|        | 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 | 10.6                       | 15.2  | 18.6  | 20.7  | 22.2  | 23.4  | 24.5  | 26.1  | 27.4  | 29.9  | 31.8  | 36.5  |
|        | 0.3                        | 0.5   | 0.8   | 0.9   | 1.1   | 1.2   | 1.4   | 1.6   | 1.8   | 2.2   | 2.5   | 3.4   |
| 30 min | 12.6                       | 18.3  | 22.5  | 25.1  | 27.0  | 28.5  | 29.8  | 31.9  | 33.5  | 36.6  | 38.9  | 44.8  |
|        | 0.4                        | 0.7   | 0.9   | 1.1   | 1.3   | 1.4   | 1.6   | 1.8   | 2.0   | 2.3   | 2.6   | 3.5   |
| 1 h    | 15.6                       | 21.7  | 26.2  | 29.0  | 31.0  | 32.6  | 34.0  | 36.1  | 37.9  | 41.2  | 43.6  | 49.8  |
|        | 0.5                        | 0.8   | 1.1   | 1.4   | 1.6   | 1.8   | 2.0   | 2.3   | 2.5   | 3.0   | 3.5   | 4.6   |
| 2 h    | 18.6                       | 25.5  | 30.6  | 33.7  | 35.9  | 37.7  | 39.2  | 41.7  | 43.6  | 47.3  | 50.0  | 56.9  |
|        | 0.6                        | 0.9   | 1.3   | 1.6   | 1.9   | 2.1   | 2.2   | 2.6   | 2.9   | 3.4   | 3.9   | 5.2   |
| 3 h    | 20.6                       | 28.3  | 34.0  | 37.5  | 40.1  | 42.1  | 43.8  | 46.5  | 48.6  | 52.7  | 55.8  | 63.5  |
|        | 0.7                        | 1.0   | 1.4   | 1.7   | 1.9   | 2.1   | 2.3   | 2.6   | 2.9   | 3.4   | 3.8   | 5.0   |
| 6 h    | 24.8                       | 33.0  | 39.1  | 42.7  | 45.4  | 47.5  | 49.3  | 52.1  | 54.4  | 58.7  | 61.9  | 69.9  |
|        | 0.8                        | 1.1   | 1.5   | 1.9   | 2.2   | 2.4   | 2.7   | 3.1   | 3.4   | 4.2   | 4.8   | 6.5   |
| 12 h   | 30.0                       | 39.9  | 47.2  | 51.6  | 54.8  | 57.3  | 59.4  | 62.9  | 65.6  | 70.7  | 74.5  | 84.0  |
|        | 1.1                        | 1.5   | 2.0   | 2.4   | 2.8   | 3.1   | 3.4   | 4.0   | 4.4   | 5.4   | 6.1   | 8.3   |
| 1 j    | 36.6                       | 47.9  | 56.1  | 60.9  | 64.4  | 67.1  | 69.4  | 73.1  | 76.0  | 81.4  | 85.4  | 95.3  |
|        | 1.2                        | 1.5   | 1.9   | 2.2   | 2.4   | 2.6   | 2.8   | 3.1   | 3.3   | 3.8   | 4.2   | 5.4   |
| 2 j    | 45.7                       | 59.0  | 68.3  | 73.7  | 77.6  | 80.7  | 83.2  | 87.2  | 90.4  | 96.2  | 100.5 | 110.9 |
|        | 1.9                        | 2.5   | 3.2   | 3.7   | 4.2   | 4.5   | 4.8   | 5.4   | 5.8   | 6.7   | 7.4   | 9.3   |
| 3 j    | 48.1                       | 62.1  | 71.7  | 77.3  | 81.3  | 84.4  | 87.0  | 91.0  | 94.2  | 100.0 | 104.3 | 114.6 |
|        | 2.3                        | 3.0   | 3.8   | 4.3   | 4.7   | 5.1   | 5.4   | 5.9   | 6.4   | 7.2   | 7.9   | 9.6   |
| 4 j    | 52.1                       | 66.8  | 77.0  | 82.8  | 86.9  | 90.2  | 92.8  | 97.0  | 100.3 | 106.3 | 110.6 | 121.1 |
|        | 2.6                        | 3.3   | 3.9   | 4.3   | 4.7   | 5.0   | 5.2   | 5.6   | 6.0   | 6.7   | 7.2   | 8.7   |
| 5 j    | 59.0                       | 74.8  | 85.6  | 91.7  | 96.1  | 99.5  | 102.3 | 106.6 | 110.1 | 116.3 | 120.8 | 131.7 |
|        | 3.0                        | 3.7   | 4.3   | 4.7   | 5.0   | 5.3   | 5.5   | 5.9   | 6.2   | 6.9   | 7.4   | 8.7   |
| 7 j    | 67.6                       | 84.7  | 96.2  | 102.8 | 107.4 | 111.0 | 113.9 | 118.5 | 122.0 | 128.6 | 133.2 | 144.4 |
|        | 3.6                        | 4.3   | 4.9   | 5.3   | 5.6   | 5.9   | 6.1   | 6.4   | 6.7   | 7.3   | 7.7   | 8.9   |
| 10 j   | 80.0                       | 98.7  | 111.2 | 118.2 | 123.2 | 127.0 | 130.1 | 134.9 | 138.7 | 145.5 | 150.4 | 162.0 |
|        | 4.4                        | 5.5   | 6.3   | 6.8   | 7.1   | 7.4   | 7.7   | 8.1   | 8.4   | 9.0   | 9.5   | 10.8  |
| 15 j   | 96.7                       | 118.7 | 133.1 | 141.1 | 146.7 | 151.0 | 154.5 | 160.0 | 164.2 | 171.9 | 177.2 | 190.1 |
|        | 5.4                        | 6.6   | 7.4   | 7.8   | 8.2   | 8.4   | 8.6   | 8.9   | 9.2   | 9.7   | 10.0  | 10.9  |
| 20 j   | 112.6                      | 138.1 | 154.6 | 163.8 | 170.2 | 175.1 | 179.0 | 185.2 | 190.0 | 198.5 | 204.5 | 218.8 |
|        | 6.4                        | 7.9   | 8.9   | 9.4   | 9.8   | 10.2  | 10.4  | 10.8  | 11.2  | 11.8  | 12.3  | 13.4  |
| 25 j   | 119.4                      | 146.5 | 164.0 | 173.6 | 180.3 | 185.5 | 189.6 | 196.0 | 201.0 | 209.9 | 216.1 | 230.8 |
|        | 7.2                        | 8.8   | 10.0  | 10.8  | 11.3  | 11.7  | 12.1  | 12.7  | 13.2  | 14.1  | 14.8  | 16.6  |
| 30 j   | 140.4                      | 169.8 | 188.6 | 199.0 | 206.2 | 211.6 | 216.0 | 222.9 | 228.2 | 237.6 | 244.2 | 259.7 |
|        | 8.0                        | 9.7   | 11.1  | 12.0  | 12.7  | 13.3  | 13.7  | 14.5  | 15.2  | 16.4  | 17.3  | 19.7  |

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                        | 10.0  | 12.1  | 13.3  | 14.1  | 14.8  | 15.3  | 16.2  | 16.8  | 18.0  | 18.8  | 20.8  |
|        | 7.9                        | 11.4  | 14.2  | 16.0  | 17.3  | 18.4  | 19.3  | 20.8  | 22.1  | 24.5  | 26.3  | 31.1  |
| 20 min | 9.9                        | 14.1  | 17.1  | 18.8  | 20.1  | 21.0  | 21.8  | 23.0  | 24.0  | 25.7  | 27.0  | 29.9  |
|        | 11.3                       | 16.2  | 20.1  | 22.5  | 24.4  | 25.9  | 27.1  | 29.2  | 30.9  | 34.2  | 36.6  | 43.2  |
| 30 min | 11.8                       | 17.0  | 20.7  | 22.9  | 24.5  | 25.7  | 26.7  | 28.4  | 29.7  | 32.0  | 33.7  | 38.0  |
|        | 13.4                       | 19.5  | 24.3  | 27.3  | 29.6  | 31.4  | 32.9  | 35.4  | 37.4  | 41.2  | 44.1  | 51.6  |
| 1 h    | 14.7                       | 20.1  | 24.0  | 26.2  | 27.8  | 29.1  | 30.1  | 31.7  | 32.9  | 35.2  | 36.8  | 40.7  |
|        | 16.5                       | 23.2  | 28.5  | 31.7  | 34.2  | 36.2  | 37.9  | 40.6  | 42.8  | 47.1  | 50.4  | 58.9  |
| 2 h    | 17.5                       | 23.6  | 28.0  | 30.5  | 32.3  | 33.7  | 34.8  | 36.6  | 38.0  | 40.6  | 42.4  | 46.7  |
|        | 19.7                       | 27.3  | 33.1  | 36.8  | 39.6  | 41.8  | 43.6  | 46.7  | 49.2  | 54.0  | 57.6  | 67.1  |
| 3 h    | 19.2                       | 26.3  | 31.3  | 34.2  | 36.3  | 37.9  | 39.3  | 41.4  | 43.0  | 46.1  | 48.3  | 53.6  |
|        | 21.9                       | 30.3  | 36.8  | 40.8  | 43.8  | 46.2  | 48.2  | 51.6  | 54.3  | 59.4  | 63.2  | 73.3  |
| 6 h    | 23.2                       | 30.8  | 36.1  | 39.1  | 41.1  | 42.8  | 44.1  | 46.1  | 47.7  | 50.5  | 52.5  | 57.2  |
|        | 26.4                       | 35.2  | 42.1  | 46.4  | 49.7  | 52.3  | 54.5  | 58.2  | 61.2  | 66.9  | 71.2  | 82.6  |
| 12 h   | 27.8                       | 36.9  | 43.2  | 46.8  | 49.3  | 51.2  | 52.7  | 55.1  | 56.9  | 60.2  | 62.5  | 67.8  |
|        | 32.2                       | 42.9  | 51.2  | 56.4  | 60.3  | 63.5  | 66.2  | 70.6  | 74.2  | 81.2  | 86.5  | 100.3 |
| 1 j    | 34.2                       | 44.9  | 52.3  | 56.6  | 59.7  | 62.1  | 64.0  | 67.1  | 69.5  | 73.9  | 77.1  | 84.8  |
|        | 39.0                       | 50.9  | 59.8  | 65.1  | 69.1  | 72.2  | 74.8  | 79.1  | 82.5  | 88.9  | 93.7  | 105.8 |
| 2 j    | 42.0                       | 54.0  | 62.0  | 66.4  | 69.5  | 71.8  | 73.7  | 76.7  | 79.0  | 83.1  | 85.9  | 92.7  |
|        | 49.4                       | 63.9  | 74.6  | 81.1  | 85.8  | 89.6  | 92.7  | 97.8  | 101.8 | 109.4 | 115.0 | 129.1 |
| 3 j    | 43.7                       | 56.2  | 64.3  | 68.9  | 72.0  | 74.4  | 76.4  | 79.4  | 81.7  | 85.9  | 88.8  | 95.7  |
|        | 52.6                       | 68.0  | 79.1  | 85.8  | 90.6  | 94.4  | 97.5  | 102.6 | 106.7 | 114.2 | 119.7 | 133.5 |
| 4 j    | 46.9                       | 60.4  | 69.3  | 74.3  | 77.8  | 80.4  | 82.6  | 85.9  | 88.5  | 93.1  | 96.4  | 104.1 |
|        | 57.2                       | 73.3  | 84.6  | 91.3  | 96.1  | 99.9  | 103.0 | 108.1 | 112.0 | 119.4 | 124.7 | 138.1 |
| 5 j    | 53.2                       | 67.6  | 77.1  | 82.5  | 86.2  | 89.1  | 91.4  | 95.0  | 97.8  | 102.8 | 106.3 | 114.6 |
|        | 64.9                       | 82.1  | 94.0  | 101.0 | 106.0 | 109.9 | 113.1 | 118.2 | 122.3 | 129.8 | 135.2 | 148.7 |
| 7 j    | 60.6                       | 76.2  | 86.6  | 92.4  | 96.4  | 99.5  | 102.0 | 105.9 | 108.9 | 114.3 | 118.0 | 126.9 |
|        | 74.6                       | 93.1  | 105.8 | 113.2 | 118.4 | 122.4 | 125.8 | 131.1 | 135.2 | 142.8 | 148.3 | 161.9 |
| 10 j   | 71.3                       | 88.0  | 98.9  | 105.0 | 109.2 | 112.4 | 115.0 | 119.1 | 122.2 | 127.8 | 131.7 | 140.9 |
|        | 88.7                       | 109.5 | 123.5 | 131.5 | 137.1 | 141.5 | 145.1 | 150.7 | 155.1 | 163.2 | 169.0 | 183.2 |
| 15 j   | 86.1                       | 105.7 | 118.6 | 125.7 | 130.7 | 134.6 | 137.7 | 142.5 | 146.2 | 152.9 | 157.6 | 168.7 |
|        | 107.4                      | 131.7 | 147.6 | 156.5 | 162.7 | 167.5 | 171.4 | 177.5 | 182.3 | 190.8 | 196.9 | 211.4 |
| 20 j   | 100.1                      | 122.6 | 137.2 | 145.3 | 150.9 | 155.1 | 158.6 | 164.0 | 168.1 | 175.4 | 180.5 | 192.5 |
|        | 125.2                      | 153.6 | 172.0 | 182.3 | 189.5 | 195.0 | 199.5 | 206.5 | 211.9 | 221.6 | 228.5 | 245.1 |
| 25 j   | 105.3                      | 129.2 | 144.3 | 152.5 | 158.2 | 162.4 | 165.9 | 171.1 | 175.1 | 182.2 | 187.0 | 198.2 |
|        | 133.4                      | 163.8 | 183.6 | 194.7 | 202.5 | 208.5 | 213.3 | 220.9 | 226.8 | 237.5 | 245.1 | 263.4 |
| 30 j   | 124.8                      | 150.8 | 166.8 | 175.4 | 181.3 | 185.6 | 189.1 | 194.4 | 198.5 | 205.5 | 210.2 | 221.1 |
|        | 156.0                      | 188.9 | 210.4 | 222.6 | 231.1 | 237.6 | 243.0 | 251.4 | 257.9 | 269.7 | 278.1 | 298.3 |

#### 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                          | 131.6 | 0.4699 | 302.4  | 0.7284 | 54.5  | 0.5313 |
| 5                          | 190.5 | 0.4738 | 463.3  | 0.7498 | 85.3  | 0.5554 |
| 10                         | 233.4 | 0.4729 | 592.0  | 0.7622 | 113.2 | 0.5720 |
| 15                         | 258.9 | 0.4717 | 673.7  | 0.7687 | 132.2 | 0.5815 |
| 20                         | 277.5 | 0.4705 | 735.1  | 0.7732 | 147.1 | 0.5882 |
| 25                         | 292.1 | 0.4695 | 784.9  | 0.7765 | 159.6 | 0.5934 |
| 30                         | 304.3 | 0.4686 | 827.1  | 0.7792 | 170.4 | 0.5977 |
| 40                         | 323.8 | 0.4670 | 896.7  | 0.7834 | 188.8 | 0.6044 |
| 50                         | 339.3 | 0.4657 | 953.3  | 0.7867 | 204.2 | 0.6095 |
| 75                         | 368.2 | 0.4632 | 1062.5 | 0.7924 | 235.0 | 0.6190 |
| 100                        | 389.4 | 0.4613 | 1145.3 | 0.7964 | 259.3 | 0.6257 |
| 200                        | 442.8 | 0.4562 | 1364.8 | 0.8059 | 327.5 | 0.6419 |

## 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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