

11. St. Anthony

This station was updated in CRA (2015) by creating a partial IDF curve for St. Anthony (8403399). There were insufficient data to create a full IDF curve at St. Anthony (8403399). For short durations (5, 10-, 15-, and 30-min) users must consult the original St. Anthony curve. For long durations, the St. Anthony (8403399) curve may be used. Both IDF curves are reproduced below

In general, the IDF curve increased during the update (Table 11.1), but some combinations of duration and return period decreased. Where there are decreases greater than 5 percent, users should exercise caution when using the updated IDF curve, or use the EC IDF curve. The curves are reproduced below, with the addition of the 20-year return period.

Table 11.1 Differences Between IDF Curves for St. Anthony (8403399) and St. Anthony (8403401)

Percent Difference in Precipitation Amount (%) (Difference in Precipitation Amount (mm))						
Duration	Return Period (years)					
	2	5	10	25	50	100
5-min	N/A	N/A	N/A	N/A	N/A	N/A
10-min	N/A	N/A	N/A	N/A	N/A	N/A
15-min	N/A	N/A	N/A	N/A	N/A	N/A
30-min	N/A	N/A	N/A	N/A	N/A	N/A
1-hr	49.4 (6.2)	67.0 (10.4)	75.4 (13.2)	83.6 (16.8)	88.5 (19.4)	92.5 (22.0)
2-hr	22.0 (4.0)	29.2 (6.3)	32.8 (7.9)	36.4 (9.9)	38.5 (11.4)	40.4 (12.8)
6-hr	7.2 (2.2)	12.1 (4.4)	14.6 (5.9)	17.1 (7.8)	18.7 (9.2)	20.0 (10.6)
12-hr	7.0 (2.8)	3.4 (1.6)	1.5 (0.8)	-0.3 (-0.2)	-1.4 (-0.9)	-2.4 (-1.7)
24-hr	-3.1 (-1.6)	-7.3 (-4.6)	-9.3 (-6.6)	-11.2 (-9.2)	-12.4 (-11.1)	-13.4 (-12.9)

Notes:

Red numbers indicate that the updated IDF curve is lower than the EC-IDF V2.3 IDF curve for that duration and return period.

Bold numbers indicate changes greater than 5 percent.

Section 11.1 presents the IDF curves for 11.1 St. Anthony (8403401) – EC-IDF V2.3. Section 11.2 presents the partial IDF curves for St. Anthony (8403399) – Updated.

11.1 St. Anthony (8403401)

Office of Climate Change and Energy Efficiency

Short Duration Rainfall Intensity-Duration-Frequency Data
Données sur l'intensité, la durée et la fréquence des chutes
de pluie de courte durée

Gumbel - Method of moments/Méthode des moments

2015/10/30

ST ANTHONY

NL

8403401

Latitude: 51 22'N Longitude: 55 36'W Elevation/Altitude: 11 m

Years/Années : 1971 - 1995 # Years/Années : 23

Table 1 : Annual Maximum (mm)/Maximum annuel (mm)

	Year Année	5 min	10 min	15 min	30 min	1 h	2 h	6 h	12 h	24 h
EC-IDF	1971	8.4	13.7	16.3	18.3	18.8	22.4	35.3	47.8	52.6
EC-IDF	1972	2.3	4.1	6.1	7.1	9.9	18.5	34.8	47.2	54.6
EC-IDF	1973	3.6	5.3	6.6	8.6	11.7	12.4	28.2	41.1	59.2
EC-IDF	1974	2.5	3.3	4.3	6.9	10.2	17.3	39.6	49.3	49.8
EC-IDF	1975	3.8	4.8	6.1	10.9	16.3	23.1	33.5	40.1	43.4
EC-IDF	1976	2.8	5.6	7.4	10.4	12.2	19.6	27.4	29.7	35.1
EC-IDF	1978	2.0	3.9	5.7	8.8	14.3	18.4	25.4	33.3	51.6
EC-IDF	1979	2.7	4.1	5.4	8.4	13.5	21.0	30.1	47.0	71.3
EC-IDF	1980	4.7	6.6	8.8	14.1	19.1	24.3	34.9	37.2	37.9
EC-IDF	1981	8.1	13.1	15.1	16.5	16.7	20.1	45.9	59.1	74.6
EC-IDF	1982	4.3	4.9	7.4	9.5	13.0	18.5	27.4	34.2	37.1
EC-IDF	1983	6.8	10.8	13.2	14.2	16.8	30.2	43.6	58.6	67.8
EC-IDF	1984	4.4	5.9	8.9	10.0	15.9	17.5	26.5	33.2	39.8
EC-IDF	1985	2.4	3.8	5.8	8.4	11.2	14.8	31.0	51.1	80.7
EC-IDF	1986	2.1	3.1	4.5	8.9	11.5	14.9	21.2	25.2	32.4
EC-IDF	1987	2.4	3.8	4.7	6.0	8.8	12.9	26.1	31.3	43.2
EC-IDF	1988	1.7	2.9	4.2	7.3	10.4	18.4	35.0	49.4	50.2
EC-IDF	1989	2.3	3.9	4.6	7.9	10.7	15.7	28.7	34.2	48.6
EC-IDF	1990	7.8	11.2	12.3	14.6	18.2	23.2	44.8	46.0	55.6
EC-IDF	1991	2.9	4.3	5.3	8.2	9.6	15.0	23.2	40.5	44.1
EC-IDF	1993	2.7	3.3	4.0	7.1	10.2	16.2	30.4	40.5	53.9
EC-IDF	1994	3.2	5.4	5.6	6.5	7.8	13.6	26.6	39.4	68.4
EC-IDF	1995	2.2	3.4	5.0	8.2	15.0	20.2	32.1	45.2	74.2
# Yrs.	23	23	23	23	23	23	23	23	23	23
Années										
Mean	3.7	5.7	7.3	9.9	13.1	18.6	31.8	41.8	53.3	
Moyenne										
Std. Dev.	2.1	3.2	3.6	3.4	3.4	4.2	6.7	8.9	13.9	
Écart-type										
Skew.	1.37	1.62	1.49	1.24	0.36	0.84	0.72	0.19	0.44	
Dissymétrie										
Kurtosis	3.94	4.69	4.46	3.91	2.25	4.41	3.22	2.91	2.56	

*-99.9 Indicates Missing Data/Données manquantes

Table 2a : Return Period Rainfall Amounts (mm)
Quantité de pluie (mm) par période de retour

Duration/Durée	2	5	10	20	25	50	100	#Years Années
	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans	
EC-IDF	5 min	3.4	5.2	6.4	7.6	8.0	10.2	23
EC-IDF	10 min	5.2	8.0	9.9	11.7	12.3	14.1	23
EC-IDF	15 min	6.7	9.8	11.9	14.0	14.6	16.6	23
EC-IDF	30 min	9.3	12.3	14.3	16.2	16.8	18.6	23
EC-IDF	1 h	12.6	15.6	17.5	19.4	20.0	21.9	23
EC-IDF	2 h	17.9	21.6	24.1	26.5	27.2	29.5	23
EC-IDF	6 h	30.7	36.6	40.6	44.4	45.5	49.2	23
EC-IDF	12 h	40.3	48.1	53.3	58.3	59.9	64.8	23
EC-IDF	24 h	51.0	63.3	71.4	79.2	81.6	89.2	23

Table 2b :

Return Period Rainfall Rates (mm/h) - 95% Confidence limits
Intensité de la pluie (mm/h) par période de retour - Limites de confiance de 95%

Duration/Durée		2	5	10	20	25	50	100	#Years
		yr/ans	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans	Années
EC-IDF	5 min	40.9	62.8	77.3	91.2	95.6	109.2	122.7	23
		+/- 9.3	+/- 15.7	+/- 21.1	+/- 26.7	+/- 28.5	+/- 34.1	+/- 39.7	23
EC-IDF	10 min	31.0	48.2	59.5	70.4	73.9	84.5	95.0	23
		+/- 7.3	+/- 12.3	+/- 16.5	+/- 20.9	+/- 22.3	+/- 26.7	+/- 31.1	23
EC-IDF	15 min	26.7	39.4	47.8	55.8	58.4	66.2	74.0	23
		+/- 5.4	+/- 9.0	+/- 12.2	+/- 15.4	+/- 16.5	+/- 19.7	+/- 23.0	23
EC-IDF	30 min	18.6	24.6	28.5	32.3	33.5	37.2	40.9	23
		+/- 2.5	+/- 4.3	+/- 5.8	+/- 7.3	+/- 7.8	+/- 9.3	+/- 10.8	23
EC-IDF	1 h	12.6	15.6	17.5	19.4	20.0	21.9	23.7	23
		+/- 1.3	+/- 2.1	+/- 2.9	+/- 3.7	+/- 3.9	+/- 4.7	+/- 5.4	23
EC-IDF	2 h	9.0	10.8	12.1	13.2	13.6	14.8	15.9	23
		+/- 0.8	+/- 1.3	+/- 1.8	+/- 2.3	+/- 2.4	+/- 2.9	+/- 3.4	23
EC-IDF	6 h	5.1	6.1	6.8	7.4	7.6	8.2	8.8	23
		+/- 0.4	+/- 0.7	+/- 1.0	+/- 1.2	+/- 1.3	+/- 1.5	+/- 1.8	23
EC-IDF	12 h	3.4	4.0	4.4	4.9	5.0	5.4	5.8	23
		+/- 0.3	+/- 0.5	+/- 0.6	+/- 0.8	+/- 0.9	+/- 1.0	+/- 1.2	23
EC-IDF	24 h	2.1	2.6	3.0	3.3	3.4	3.7	4.0	23
		+/- 0.2	+/- 0.4	+/- 0.5	+/- 0.6	+/- 0.7	+/- 0.8	+/- 0.9	23

Table 3 : Interpolation Equation / Équation d'interpolation: $R = A \cdot T^B$

R = Interpolated Rainfall rate (mm/h)/Intensité interpolée de la pluie (mm/h)

RR = Rainfall rate (mm/h) / Intensité de la pluie (mm/h)

T = Rainfall duration (h) / Durée de la pluie (h)

Statistics/Statistiques	2	5	10	20	25	50	100
	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans
Mean of RR/Moyenne de RR	16.6	23.8	28.5	33.1	34.5	39.0	43.4
Std. Dev. /Écart-type (RR)	13.7	21.6	26.9	32.0	33.6	38.6	43.6
Std. Error/Erreur-type	1.8	2.5	3.3	4.1	4.4	5.3	6.2
Coefficient (A)	12.3	16.5	19.1	21.6	22.4	24.9	27.3
Exponent/Exposant (B)	-0.523	-0.571	-0.591	-0.606	-0.610	-0.620	-0.629
Mean % Error/% erreur moyenne	4.8	3.9	4.9	5.9	6.2	6.9	7.6

Short Duration Rainfall Intensity-Duration-Frequency Data Données sur l'intensité, la durée et la fréquence des chutes de pluie de courte durée

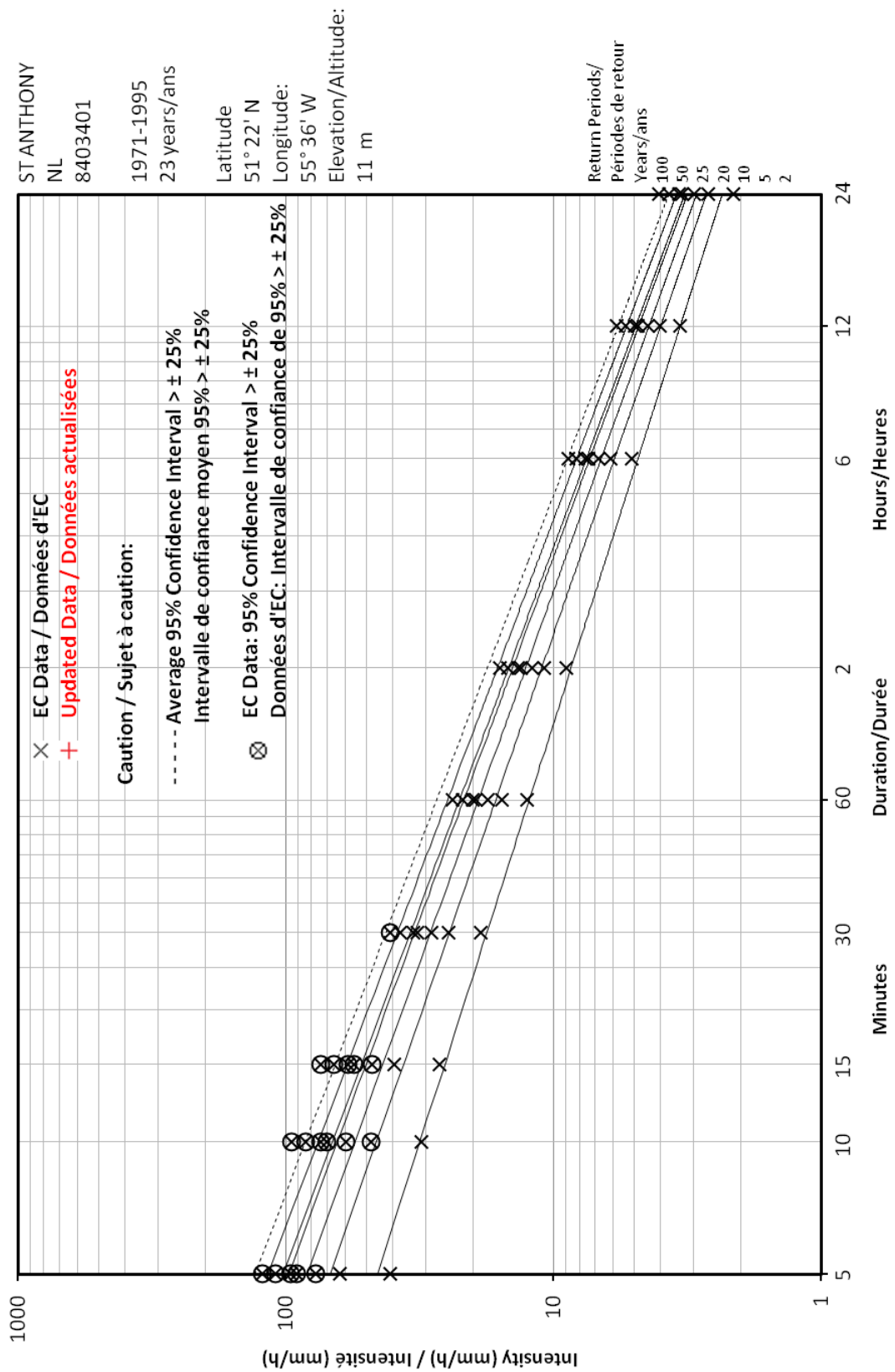


Figure 11.1 St. Anthony (8403401) IDF Curve – EC IDF V2.3

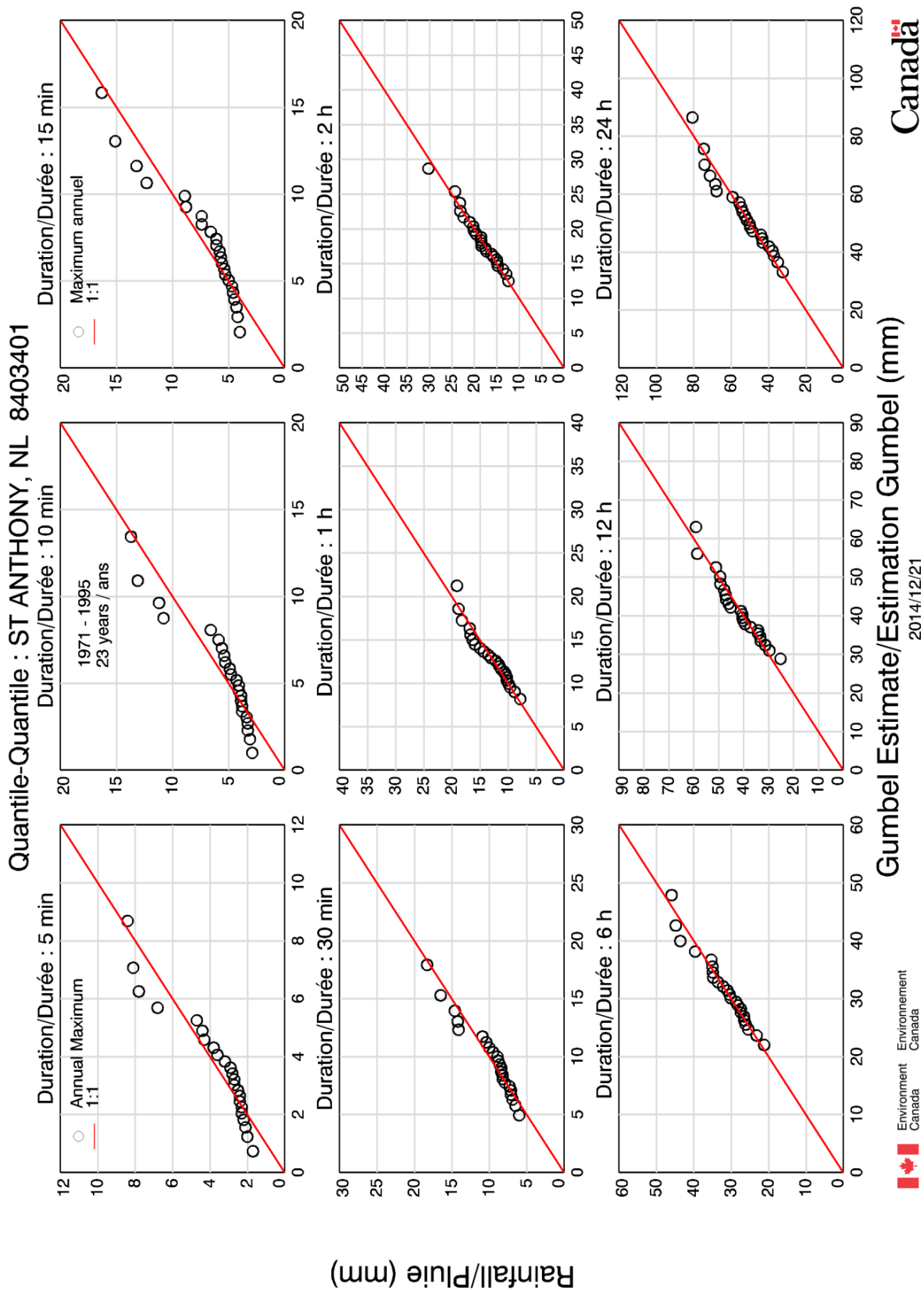


Figure 11.2 St. Anthony (8403401) Quantile-Quantile Plot - EC IDF V2.3

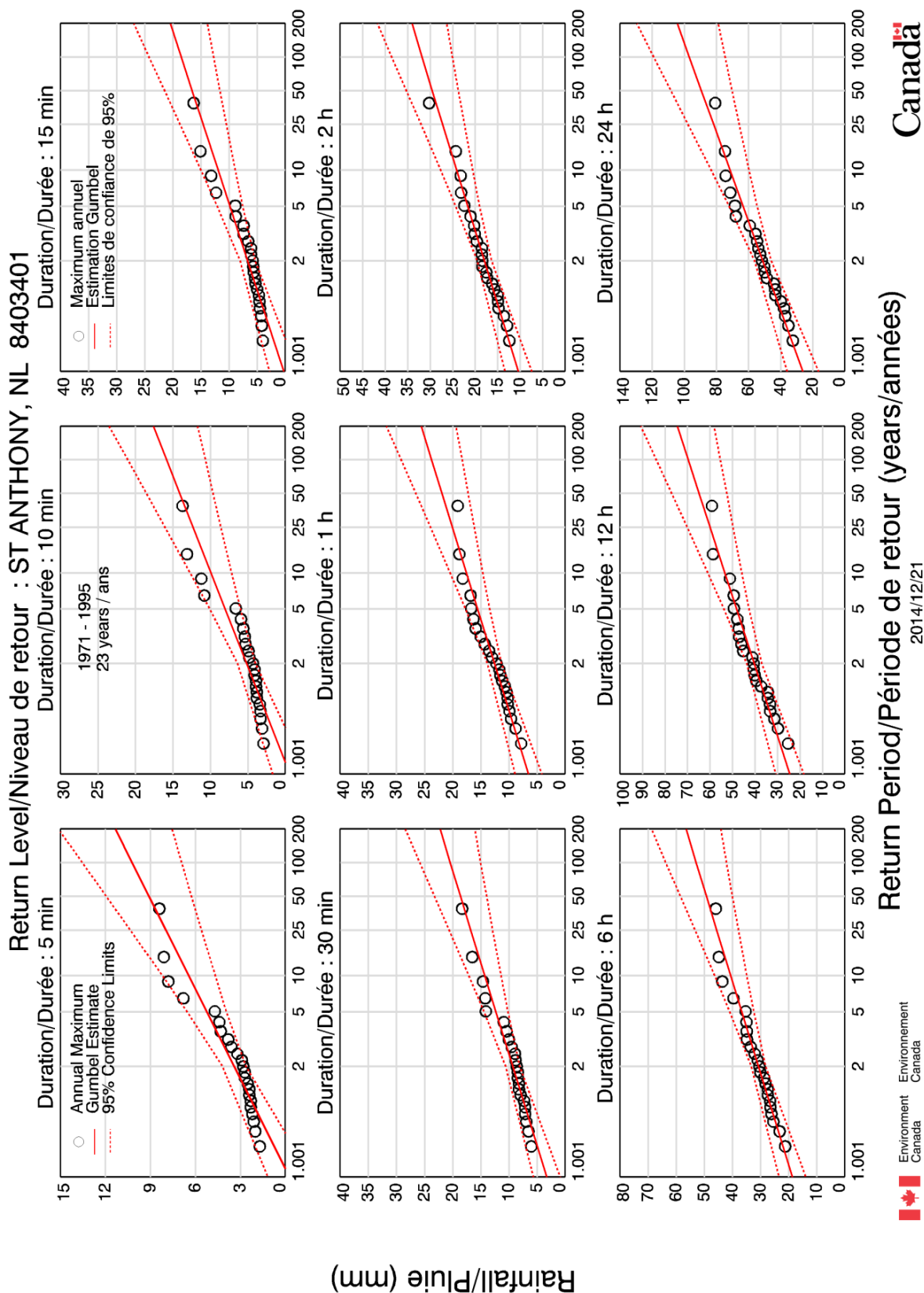


Figure 11.3 St. Anthony (8403401) Return Level Plot – EC IDF V2.3

Trend/Tendance : ST ANTHONY, NL 8403401

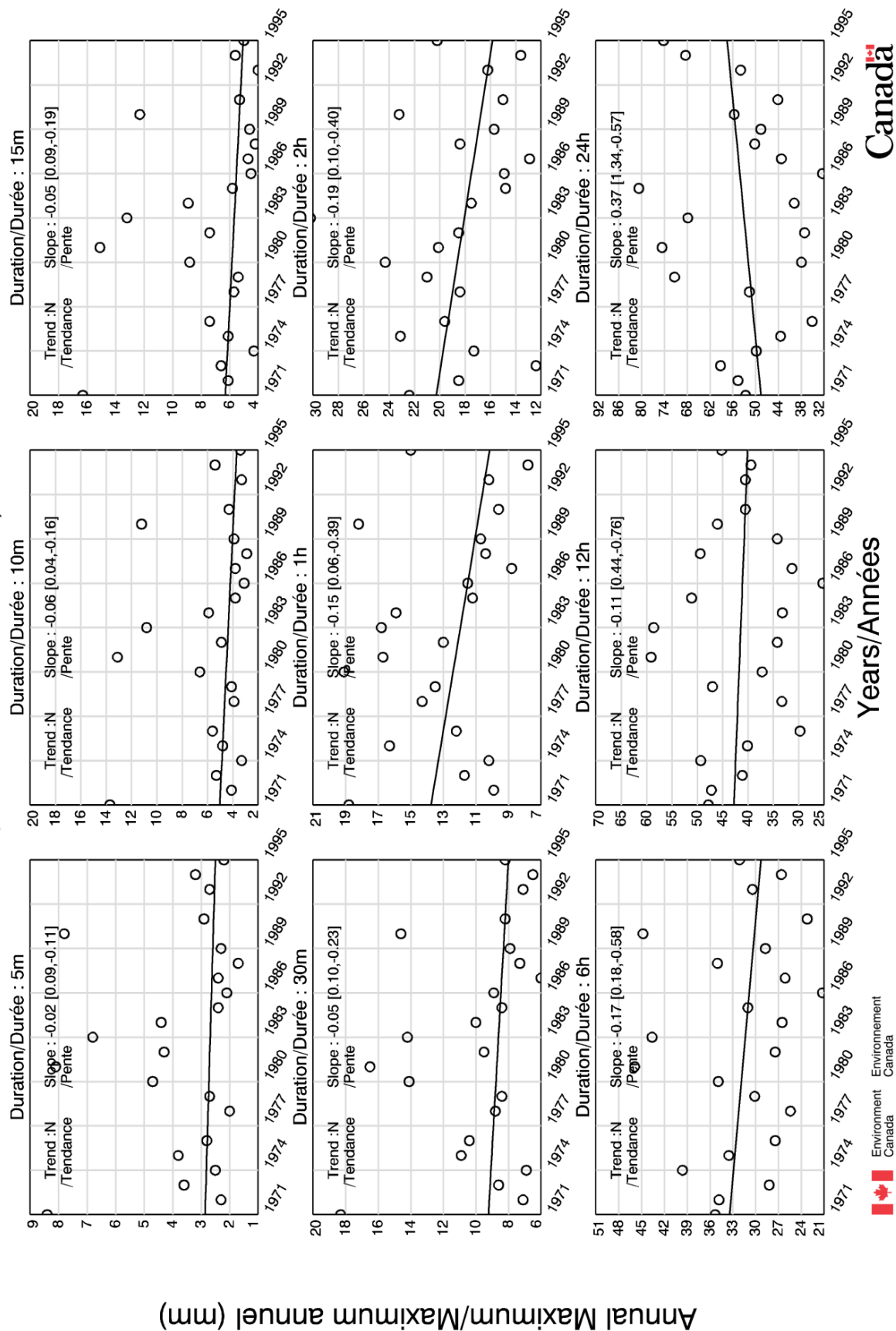


Figure 11.4 St. Anthony (8403401) Trend Plot - EC IDF V2.3

11.2 St. Anthony (8403399)

Office of Climate Change and Energy Efficiency

Short Duration Rainfall Intensity-Duration-Frequency Data
Données sur l'intensité, la durée et la fréquence des chutes
de pluie de courte durée

Gumbel - Method of moments/Méthode des moments

2015/10/30

ST ANTHONY NL 8403399
Generated with 6-hr and 1-hr data measured at St. Anthony (8403399): 2000-2014

Latitude: 51 23'N Longitude: 56 6'W Elevation/Altitude: 29.3 m
Years/Années : 2000 - 2014 # Years/Années : 10

Table 1 : Annual Maximum (mm)/Maximum annuel (mm)

Year Année	5 min	10 min	15 min	30 min	1 h	2 h	6 h	12 h	24 h
UPDATE 2000	NM	NM	NM	NM	NM	NM	39.0	43.0	45.0
UPDATE 2002	NM	NM	NM	NM	NM	NM	43.0	59.0	74.0
UPDATE 2003	NM	NM	NM	NM	NM	NM	35.0	51.0	62.0
UPDATE 2004	NM	NM	NM	NM	24.0	25.8	58.7	58.7	58.7
UPDATE 2005	NM	NM	NM	NM	16.4	20.5	29.7	43.6	47.1
UPDATE 2006	NM	NM	NM	NM	16.6	19.8	26.8	34.0	41.6
UPDATE 2007	NM	NM	NM	NM	19.3	19.3	28.4	41.1	41.9
UPDATE 2008	NM	NM	NM	NM	39.9	39.9	39.9	39.9	43.4
UPDATE 2009	NM	NM	NM	NM	17.7	20.9	24.0	44.0	46.9
UPDATE 2010	NM	NM	NM	NM	23.2	24.3	30.9	38.6	41.3
UPDATE 2011	NM	NM	NM	NM	21.1	25.9	31.7	41.6	64.7
UPDATE 2013	NM	NM	NM	NM	11.5	14.2	26.2	38.9	51.4
UPDATE 2014	NM	NM	NM	NM	11.4	19.5	34.4	43.4	46.8
# Yrs. Années	0	0	0	0	10	10	13	13	13
Mean Moyenne	-99.9	-99.9	-99.9	-99.9	20.1	23.0	34.4	44.4	51.1
Std. Dev. Écart-type	-99.9	-99.9	-99.9	-99.9	8.2	6.9	9.3	7.5	10.4
Skew. Dissymétrie	-99.99	-99.99	-99.99	-99.99	1.64	1.71	1.57	1.11	1.10
Kurtosis	-99.99	-99.99	-99.99	-99.99	7.38	7.73	6.56	4.20	3.84

*-99.9 Indicates Missing Data/Données manquantes

* NM Indicates No Measurements/Aucunes mesures

Table 2a : Return Period Rainfall Amounts (mm)
Quantité de pluie (mm) par période de retour

Duration/Durée	2	5	10	20	25	50	100	#Years Années
	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans	
EC-IDF 5 min	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	0
EC-IDF 10 min	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	0
EC-IDF 15 min	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	0
EC-IDF 30 min	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	0
UPDATE 1 h	18.8	26.0	30.8	35.3	36.8	41.3	45.7	10
UPDATE 2 h	21.9	28.0	32.0	35.9	37.1	40.9	44.6	10
UPDATE 6 h	32.9	41.1	46.5	51.7	53.3	58.4	63.5	13

UPDATE 12 h 43.1 49.8 54.2 58.4 59.7 63.8 67.9 13
 UPDATE 24 h 49.4 58.6 64.7 70.6 72.5 78.2 83.9 13
 * There were insufficient data to generate the IDF curve for 5-, 10-, 15-, 30-min

Table 2b :

Return Period Rainfall Rates (mm/h) - 95% Confidence limits
 Intensité de la pluie (mm/h) par période de retour - Limites de confiance de 95%

Duration/Durée	2	5	10	20	25	50	100	#Years Années
	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans	
EC-IDF 5 min	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	0
	+/- -99.9	+/- -99.9	+/- -99.9	+/- -99.9	+/- -99.9	+/- -99.9	+/- -99.9	0
EC-IDF 10 min	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	0
	+/- -99.9	+/- -99.9	+/- -99.9	+/- -99.9	+/- -99.9	+/- -99.9	+/- -99.9	0
EC-IDF 15 min	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	0
	+/- -99.9	+/- -99.9	+/- -99.9	+/- -99.9	+/- -99.9	+/- -99.9	+/- -99.9	0
EC-IDF 30 min	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	0
	+/- -99.9	+/- -99.9	+/- -99.9	+/- -99.9	+/- -99.9	+/- -99.9	+/- -99.9	0
UPDATE 1 h	18.8	26.0	30.8	35.3	36.8	41.3	45.7	10
	+/- 4.6	+/- 7.8	+/- 10.6	+/- 13.3	+/- 14.2	+/- 17.0	+/- 19.9	10
UPDATE 2 h	10.9	14.0	16.0	17.9	18.6	20.4	22.3	10
	+/- 2.0	+/- 3.3	+/- 4.5	+/- 5.6	+/- 6.0	+/- 7.2	+/- 8.4	10
UPDATE 6 h	5.5	6.8	7.8	8.6	8.9	9.7	10.6	13
	+/- 0.8	+/- 1.3	+/- 1.7	+/- 2.2	+/- 2.4	+/- 2.8	+/- 3.3	13
UPDATE 12 h	3.6	4.1	4.5	4.9	5.0	5.3	5.7	13
	+/- 0.3	+/- 0.5	+/- 0.7	+/- 0.9	+/- 1.0	+/- 1.1	+/- 1.3	13
UPDATE 24 h	2.1	2.4	2.7	2.9	3.0	3.3	3.5	13
	+/- 0.2	+/- 0.4	+/- 0.5	+/- 0.6	+/- 0.7	+/- 0.8	+/- 0.9	13
* There were insufficient data to generate the IDF curve for 5-, 10-, 15-, 30-min								

Table 3 : Interpolation Equation / Équation d'interpolation: $R = A \cdot T^B$

R = Interpolated Rainfall rate (mm/h)/Intensité interpolée de la pluie (mm/h)
 RR = Rainfall rate (mm/h) / Intensité de la pluie (mm/h)
 T = Rainfall duration (h) / Durée de la pluie (h)

Statistics/Statistiques	2	5	10	20	25	50	100
	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans
Mean of RR/Moyenne de RR	8.2	10.7	12.3	13.9	14.4	16.0	17.6
Std. Dev. /Écart-type (RR)	6.8	9.6	11.5	13.3	13.9	15.6	17.3
Std. Error/Erreur-type	0.4	0.9	1.2	1.5	1.6	1.9	2.2
Coefficient (A)	18.3	24.8	29.2	33.3	34.6	38.7	42.7
Exponent/Exposant (B)	-0.677	-0.728	-0.751	-0.768	-0.773	-0.787	-0.798
Mean % Error/% erreur moyenne	3.3	3.1	3.2	4.0	4.3	4.9	5.4

Short Duration Rainfall Intensity-Duration-Frequency Data Données sur l'intensité, la durée et la fréquence des chutes de pluie de courte durée

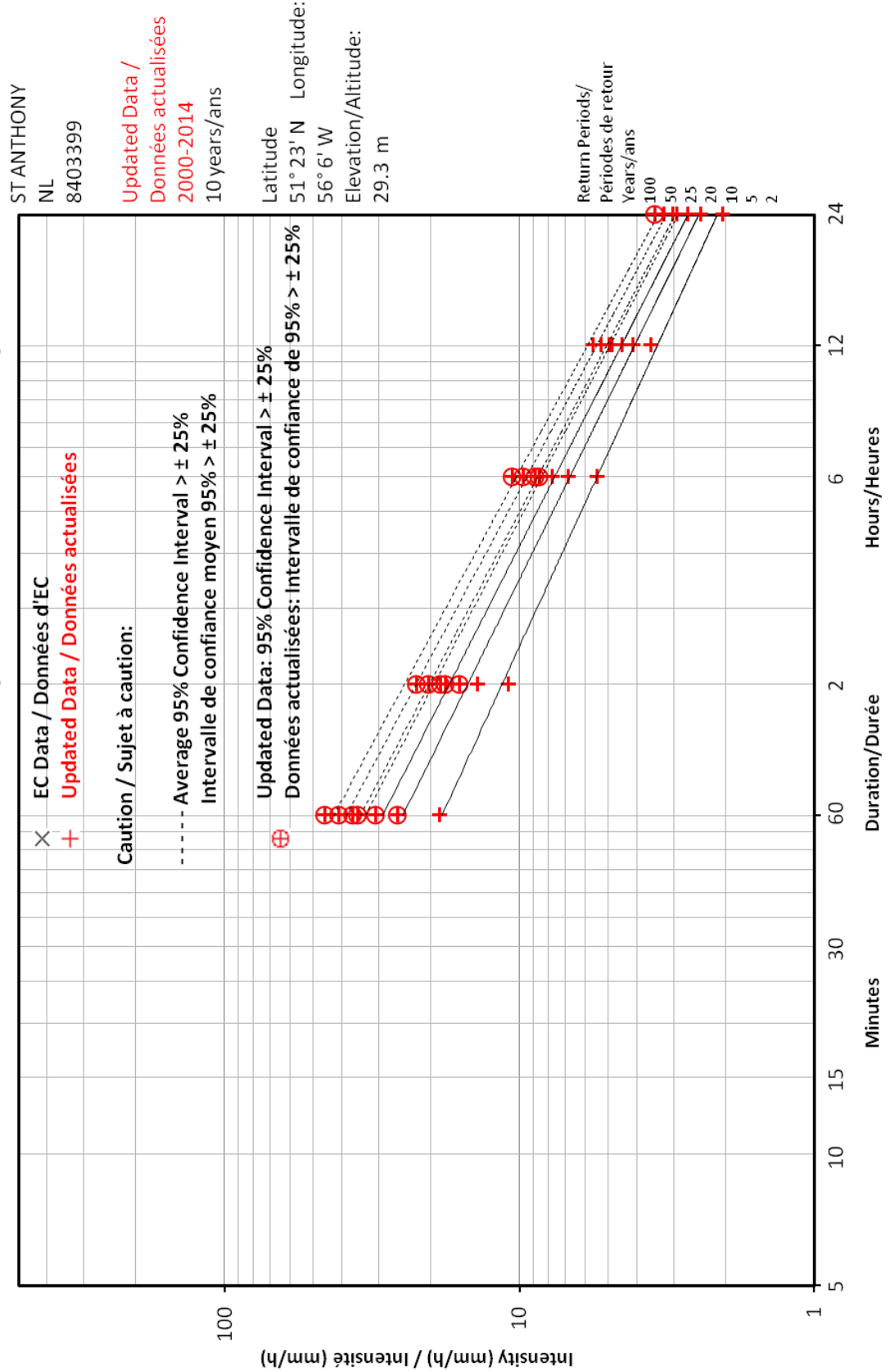


Figure 11.5 St. Anthony (8403399) IDF Curve – Updated

Quantile-Quantile : ST ANTHONY, NL 8403399

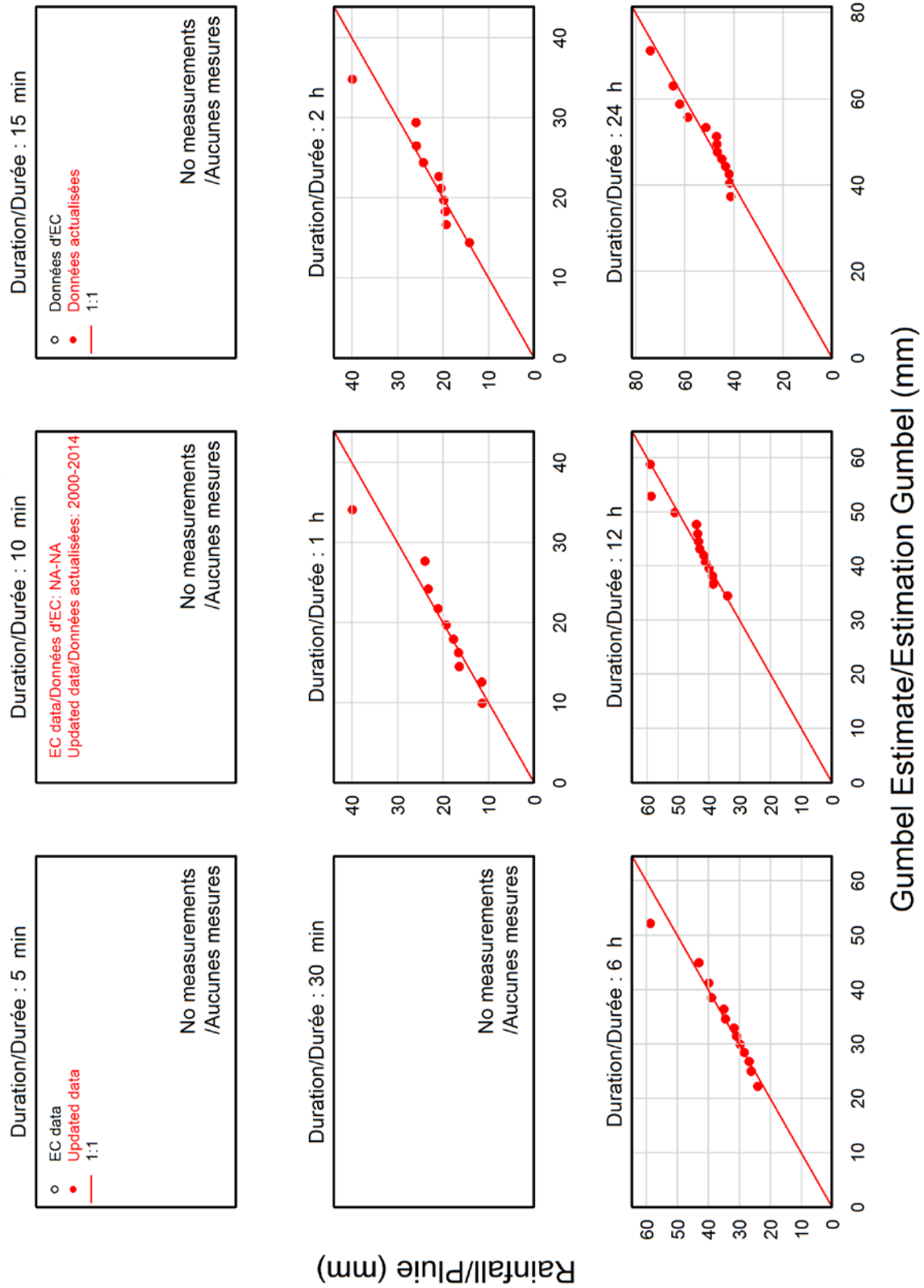


Figure 11.6 St. Anthony (8403399) Quantile-Quantile Plot - Updated

Return Level/Niveau de retour : ST ANTHONY, NL 8403399

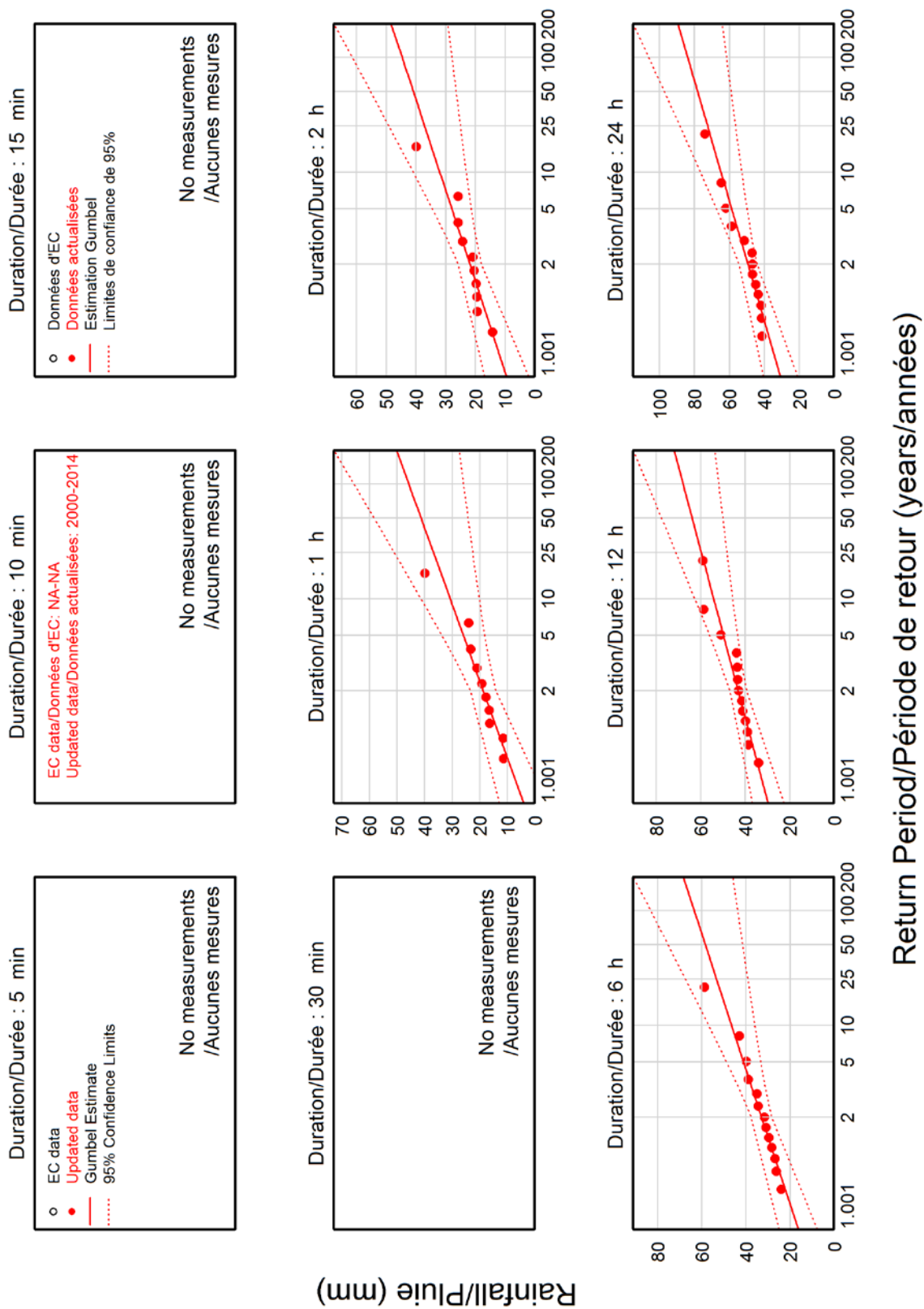


Figure 11.7 St. Anthony (8403399) Return Level Plot – Updated

Trend/Tendance : ST ANTHONY, NL 8403399

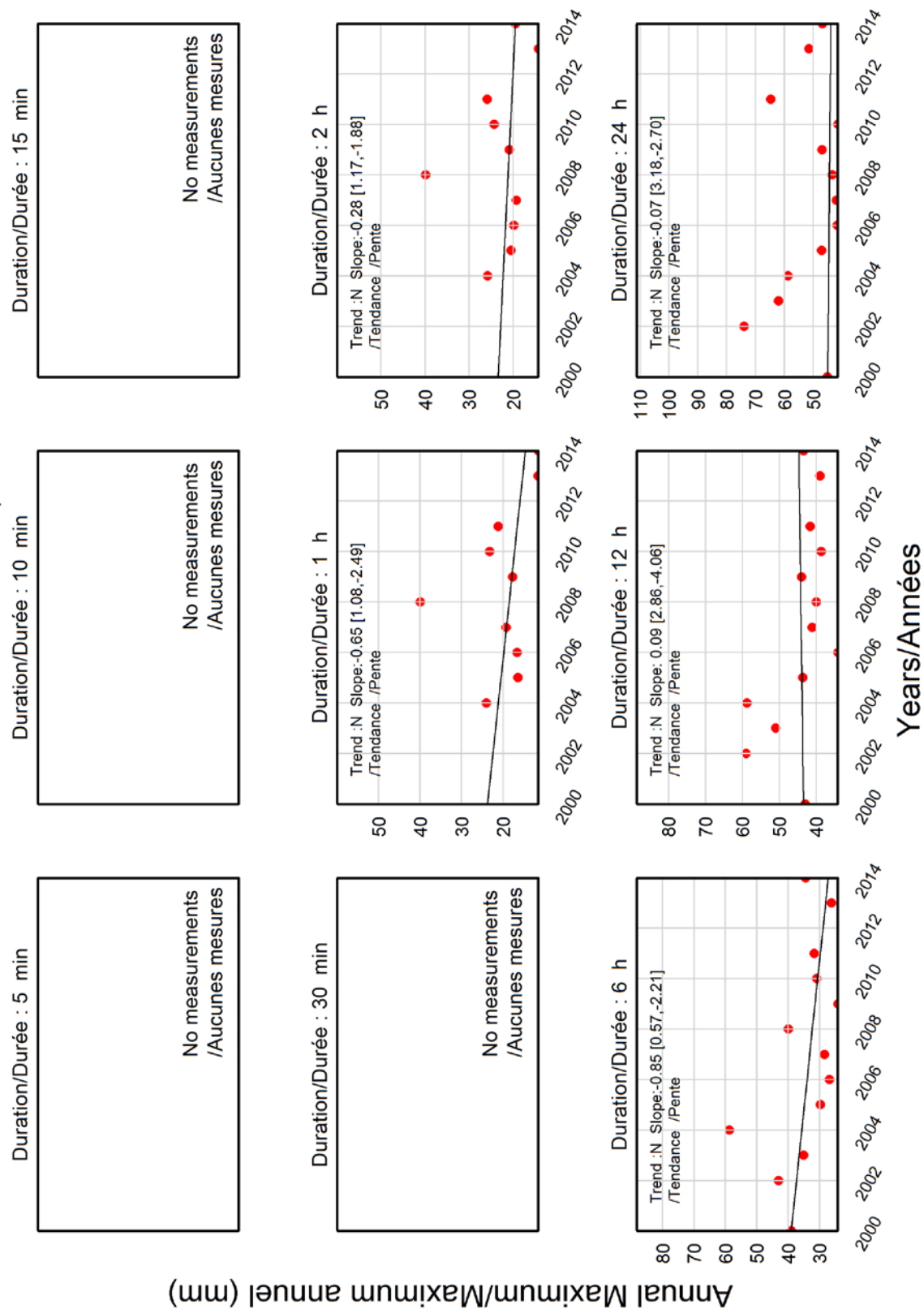


Figure 11.8 St. Anthony (8403399) Trend Plot – Updated