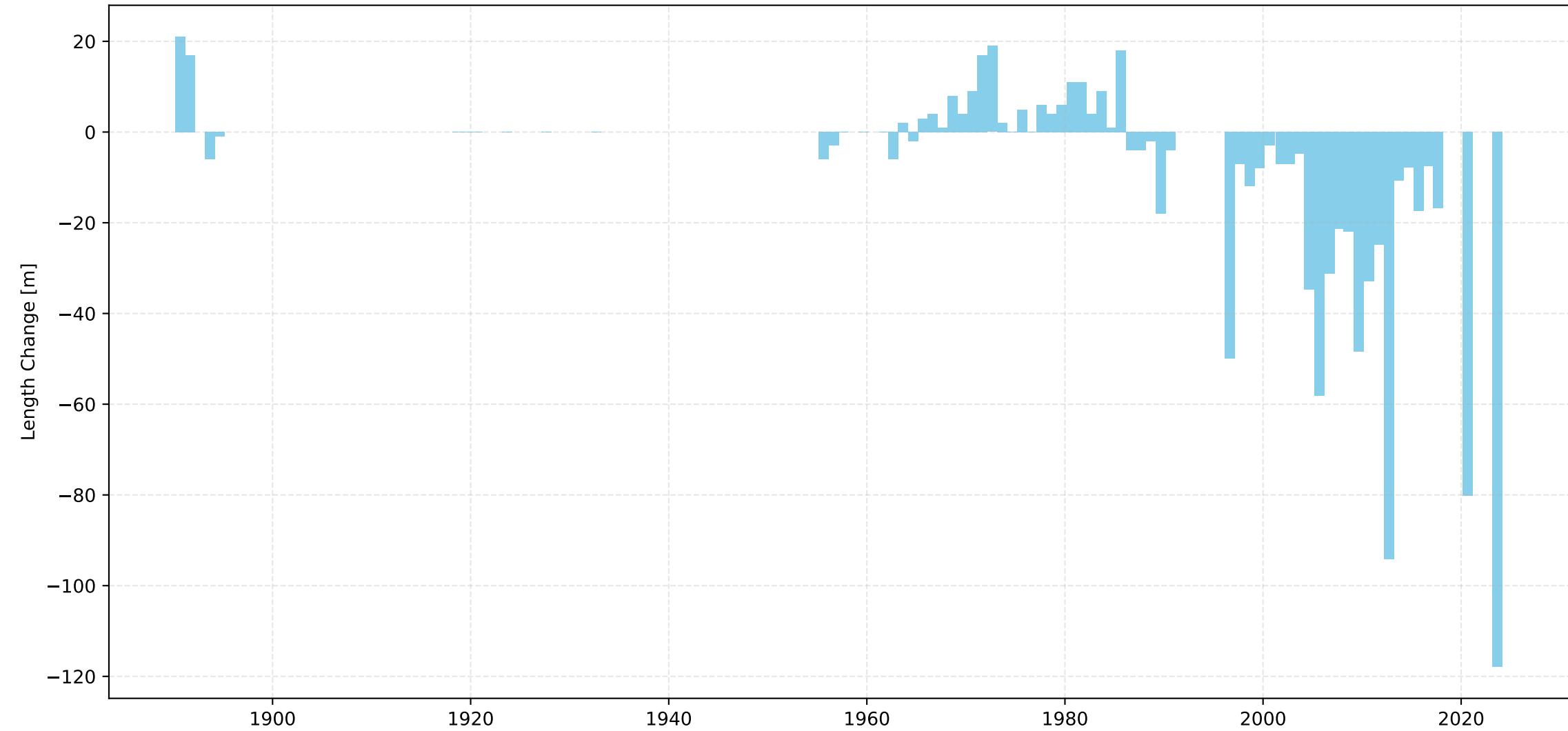
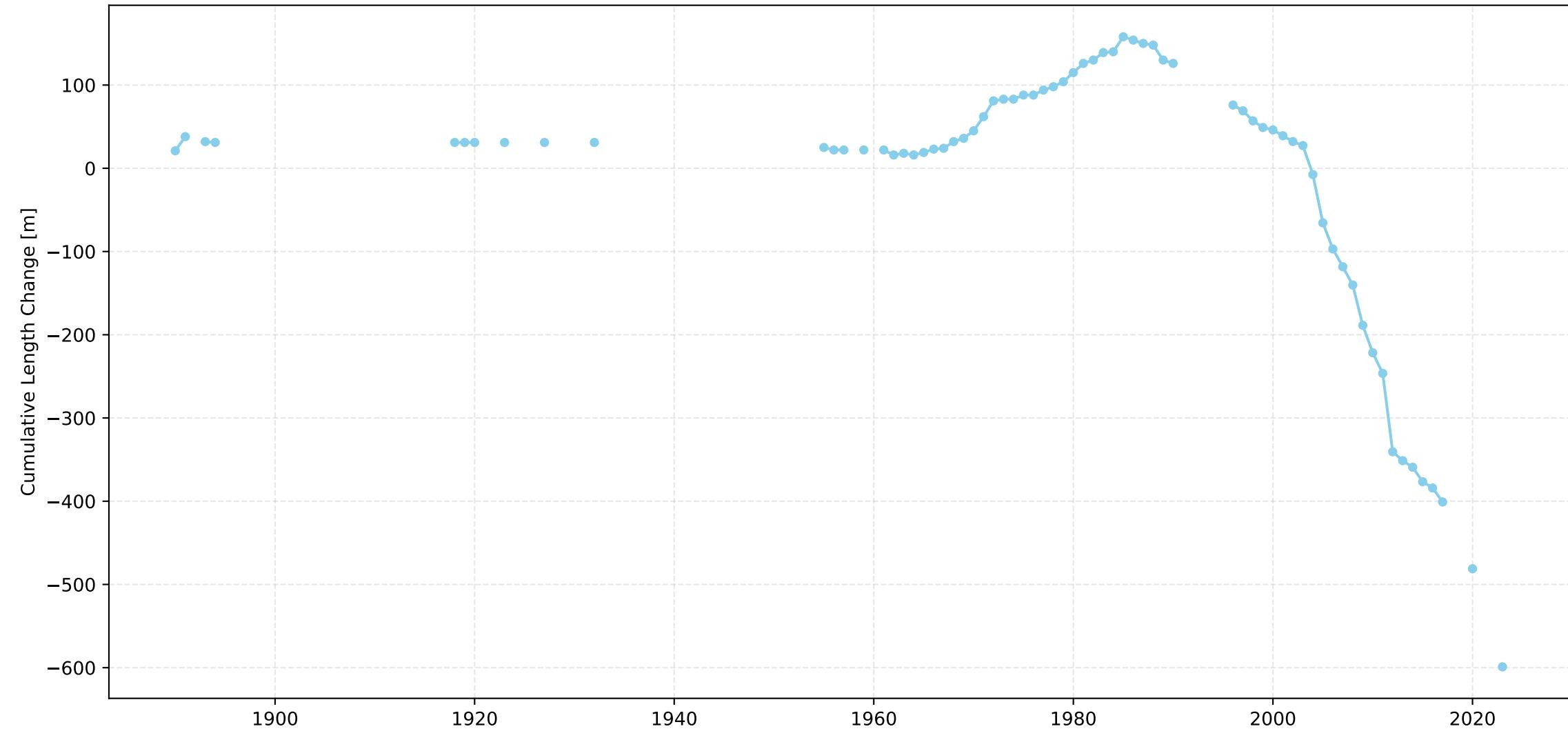


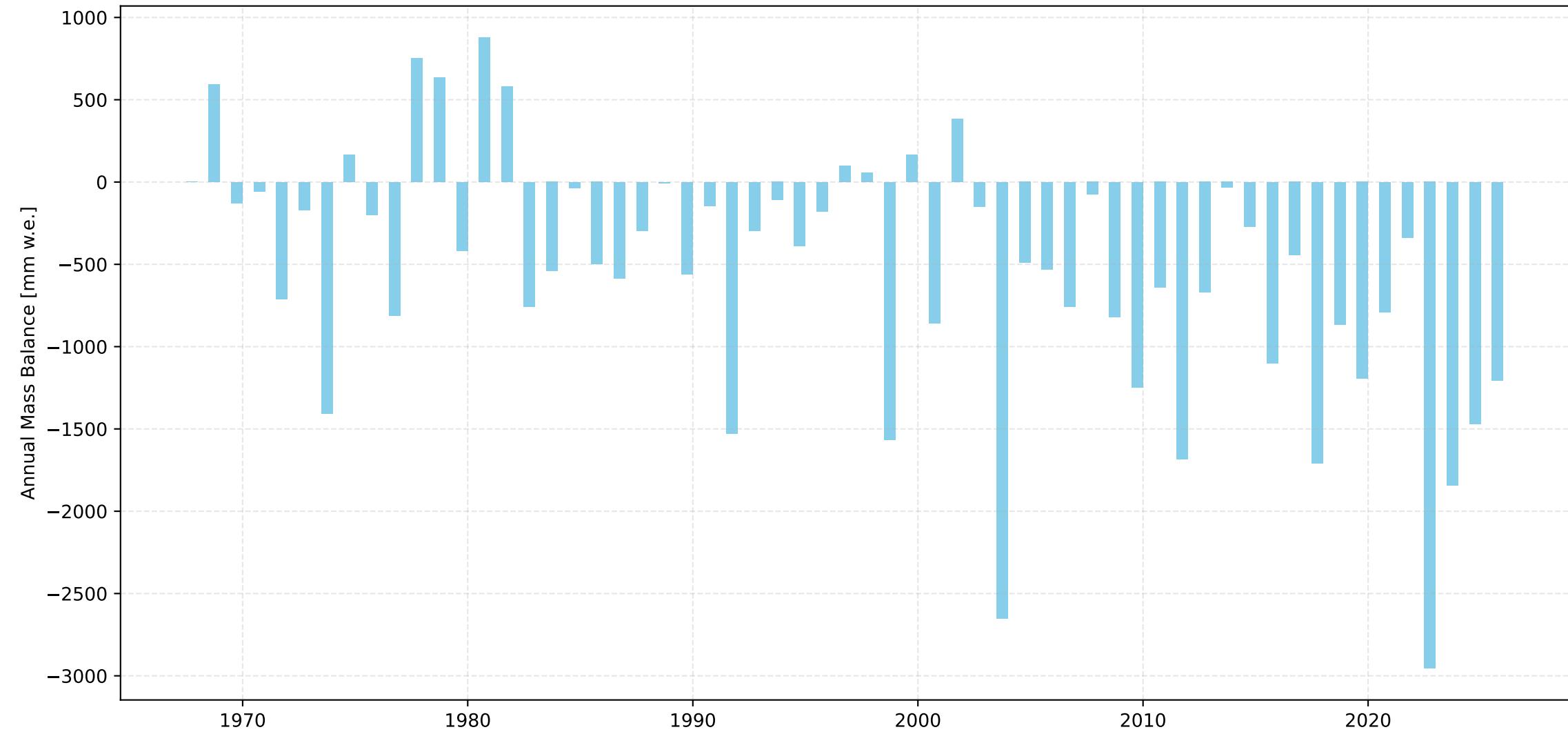
Glacier du Giétero Length Change Over Time



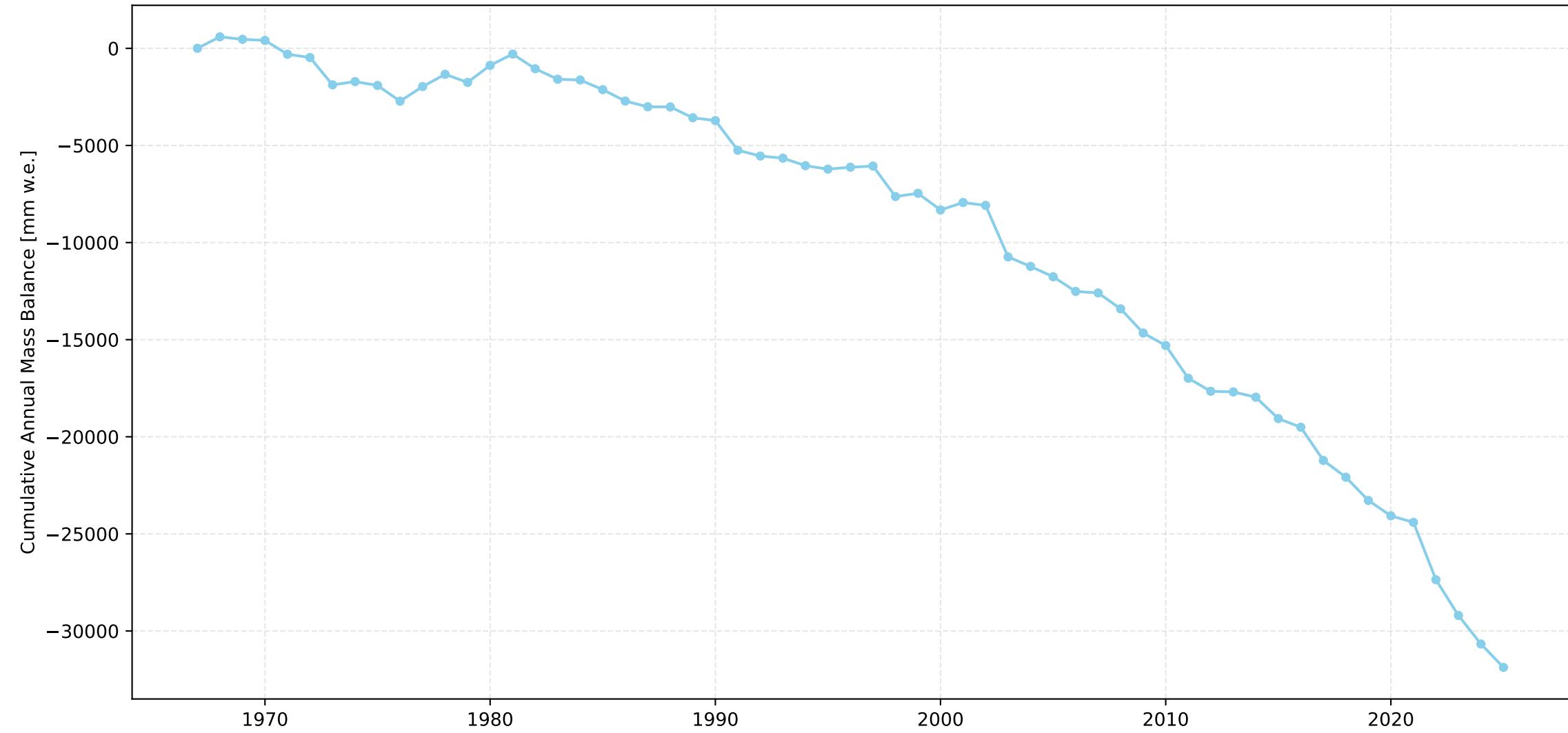
Glacier du Giéstro Cumulative Length Change Over Time



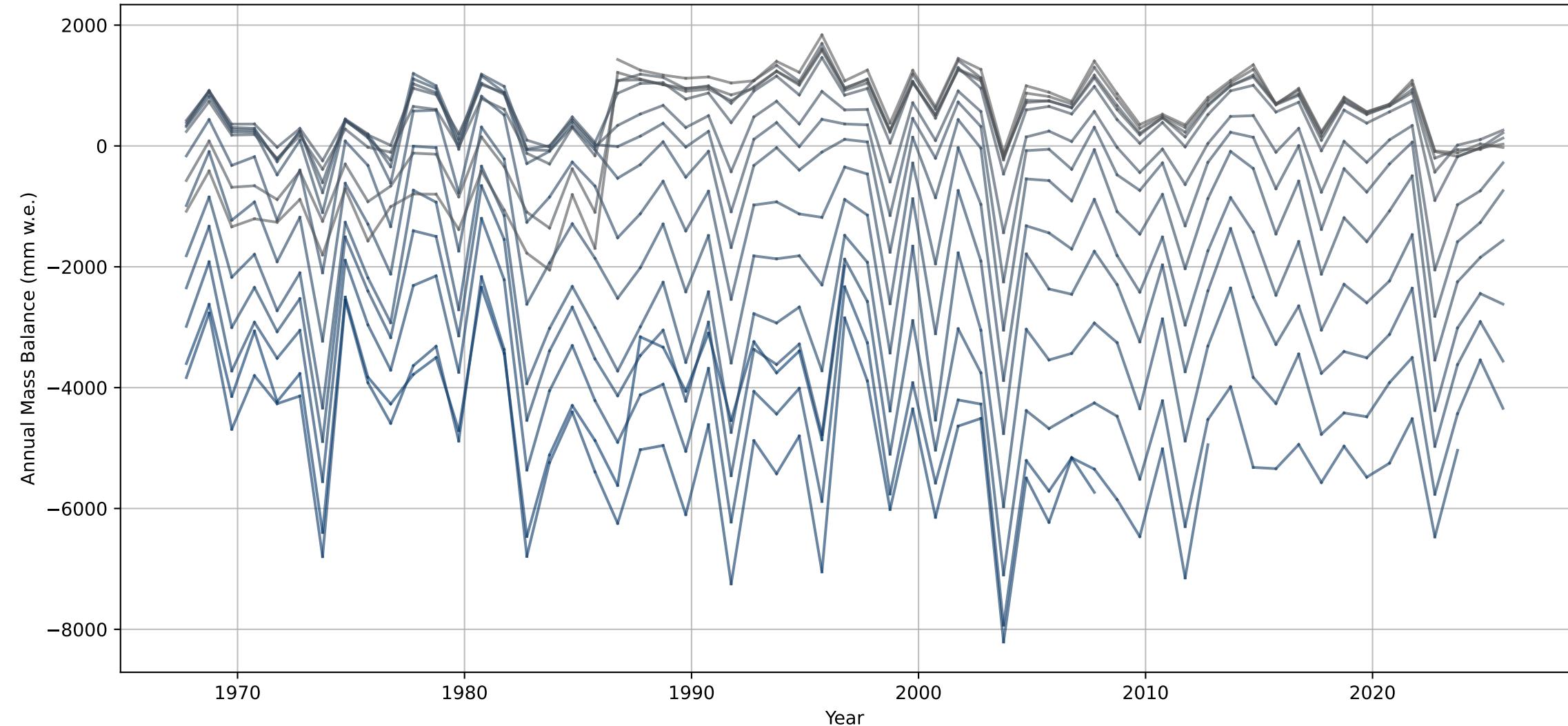
Glacier du Giétre Annual Mass Balance Over Time



Glacier du Giétre Cumulative Annual Mass Balance Over Time



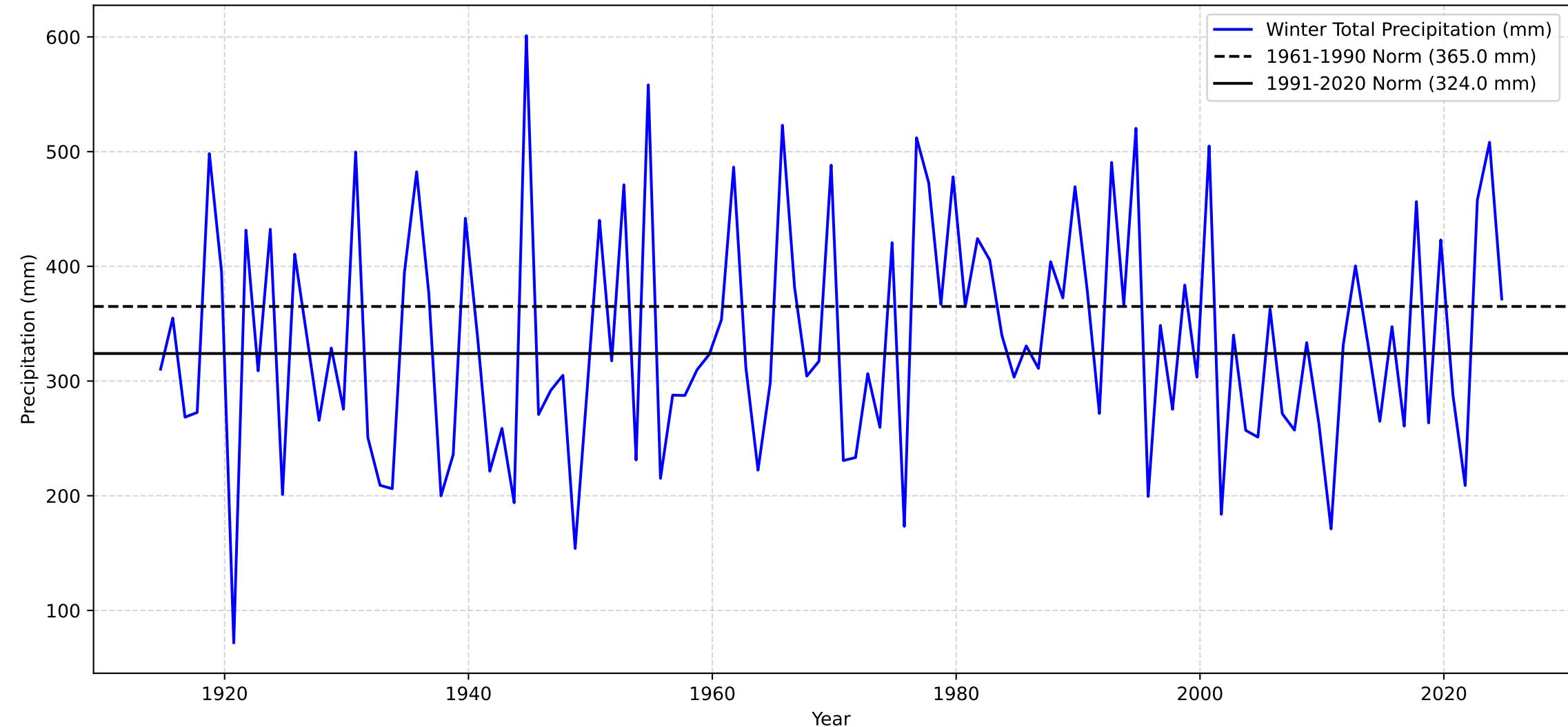
Annual Mass Balance for each Elevation Bin over Time - Glacier du Giéstro



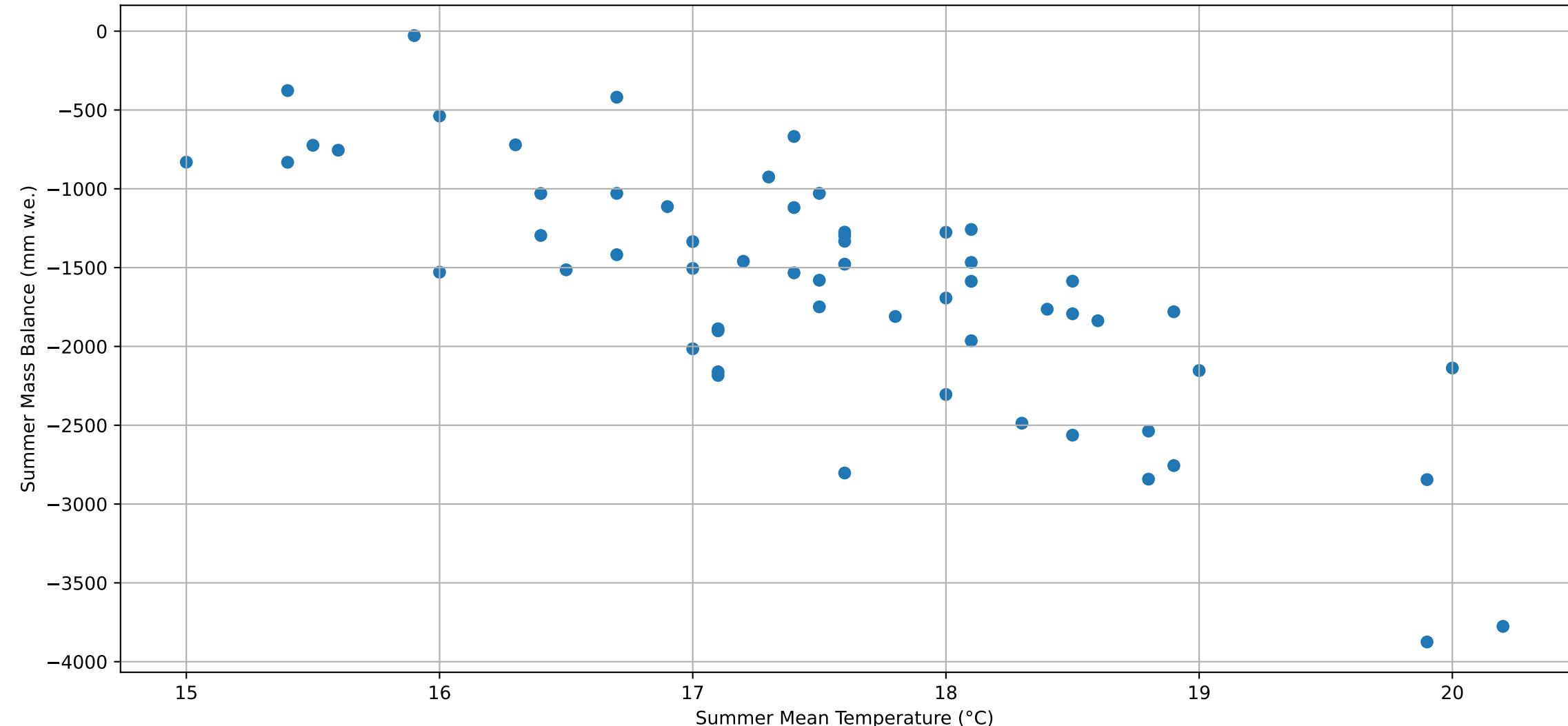
Sion Summer Mean Temperature



Sion Winter Total Precipitation



Glacier du Giétero Summer Mass Balance with relation to Temperature



Regression: Monthly 1961-1990

MONTHLY DEVIATIONS ANALYSIS USING 1961-1990 CLIMATE NORMS

MONTHLY DEVIATIONS for Glacier du Giétra (1961-1990 norms)

Number of observations: 59

Regression Summary:

OLS Regression Results

Dep. Variable:	annual mass balance (mm w.e.)	R-squared:	0.703
Model:	OLS	Adj. R-squared:	0.625
Method:	Least Squares	F-statistic:	9.065
Date:	Sun, 07 Dec 2025	Prob (F-statistic):	1.40e-08
Time:	23:22:42	Log-Likelihood:	-438.92
No. Observations:	59	AIC:	903.8
Df Residuals:	46	BIC:	930.9
Df Model:	12		
Covariance Type:	nonrobust		

	coef	std err	t	P> t	[0.025	0.975]
const	1.617e+04	1948.539	8.300	0.000	1.23e+04	2.01e+04
may_td	-38.2728	50.064	-0.764	0.448	-139.046	62.500
june_td	-89.3936	45.822	-1.951	0.057	-181.629	2.842
july_td	-145.8930	49.850	-2.927	0.005	-246.235	-45.551
august_td	-120.0130	61.355	-1.956	0.057	-243.515	3.489
september_td	-75.7921	47.156	-1.607	0.115	-170.713	19.129
october_pd	2.3180	2.186	1.060	0.295	-2.083	6.719
november_pd	-1.5704	1.698	-0.925	0.360	-4.988	1.847
december_pd	1.3308	1.522	0.874	0.386	-1.733	4.395
january_pd	3.3608	1.667	2.017	0.050	0.006	6.715
february_pd	2.8796	1.417	2.032	0.048	0.027	5.732
march_pd	1.7271	1.961	0.881	0.383	-2.219	5.674
april_pd	3.1540	2.942	1.072	0.289	-2.768	9.076

Omnibus:	1.577	Durbin-Watson:	2.085
Prob(Omnibus):	0.454	Jarque-Bera (JB):	1.584
Skew:	-0.345	Prob(JB):	0.453
Kurtosis:	2.589	Cond. No.	2.52e+03

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
[2] The condition number is large, 2.52e+03. This might indicate that there are strong multicollinearity or other numerical problems.

Coefficient Interpretation:

Intercept (normal mass balance): 16173.56 (p=0.0000)

may_td: -38.27 (p=0.4485)

june_td: -89.39 (p=0.0572)

july_td: -145.89 (p=0.0053)

august_td: -120.01 (p=0.0565)

september_td: -75.79 (p=0.1148)

october_pd: 2.32 (p=0.2946)

november_pd: -1.57 (p=0.3598)

december_pd: 1.33 (p=0.3225)

Regression: Optimal 1961-1990

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OPTIMAL SEASONAL DEVIATIONS ANALYSIS USING 1961-1990 CLIMATE NORMS
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OPTIMAL SEASONAL DEVIATIONS for Glacier du Giéstro (1961-1990 norms)
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Number of observations: 59

Regression Summary:

OLS Regression Results

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Dep. Variable: annual mass balance (mm w.e.) R-squared: 0.617
Model: OLS Adj. R-squared: 0.604
Method: Least Squares F-statistic: 45.20
Date: Sun, 07 Dec 2025 Prob (F-statistic): 2.06e-12
Time: 23:22:42 Log-Likelihood: -446.37
No. Observations: 59 AIC: 898.7
Df Residuals: 56 BIC: 905.0
Df Model: 2
Covariance Type: nonrobust
=====

	coef	std err	t	P> t	[0.025	0.975]
const	1.524e+04	1760.086	8.656	0.000	1.17e+04	1.88e+04
opt_season_td	-450.4983	50.330	-8.951	0.000	-551.322	-349.675
opt_season_pd	1.4877	0.787	1.889	0.064	-0.090	3.065

=====

Omnibus: 1.705 Durbin-Watson: 2.018
Prob(Omnibus): 0.426 Jarque-Bera (JB): 1.531
Skew: -0.387 Prob(JB): 0.465
Kurtosis: 2.844 Cond. No. 2.29e+03
=====

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
[2] The condition number is large, 2.29e+03. This might indicate that there are strong multicollinearity or other numerical problems.

Coefficient Interpretation:

Intercept (normal mass balance): 15235.01 (p=0.0000)
opt_season_td: -450.50 (p=0.0000)
opt_season_pd: 1.49 (p=0.0640)

Variance Inflation Factors (VIF):

	Variable	VIF
0	const	795.023059
1	opt_season_td	1.021034
2	opt_season_pd	1.021034

R-squared: 0.6175

Adjusted R-squared: 0.6038

Regression: Seasonal 1961-1990

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SUMMER/WINTER SEASONAL DEVIATIONS ANALYSIS USING 1961-1990 CLIMATE NORMS
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SUMMER/WINTER SEASONAL DEVIATIONS for Glacier du Giéstro (1961-1990 norms)
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Number of observations: 59

Regression Summary:

OLS Regression Results

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Dep. Variable:	annual mass balance (mm w.e.)	R-squared:	0.636
Model:	OLS	Adj. R-squared:	0.623
Method:	Least Squares	F-statistic:	48.96
Date:	Sun, 07 Dec 2025	Prob (F-statistic):	5.08e-13
Time:	23:22:42	Log-Likelihood:	-444.89
No. Observations:	59	AIC:	895.8
Df Residuals:	56	BIC:	902.0
Df Model:	2		
Covariance Type:	nonrobust		

=====

	coef	std err	t	P> t	[0.025	0.975]
const	1.586e+04	1788.122	8.871	0.000	1.23e+04	1.94e+04
summer_td	-481.6753	52.641	-9.150	0.000	-587.128	-376.223
winter_pd	1.7815	0.666	2.676	0.010	0.448	3.115

=====

Omnibus:	2.465	Durbin-Watson:	2.093
Prob(Omnibus):	0.292	Jarque-Bera (JB):	2.370
Skew:	-0.431	Prob(JB):	0.306
Kurtosis:	2.529	Cond. No.	2.78e+03

=====

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
[2] The condition number is large, 2.78e+03. This might indicate that there are strong multicollinearity or other numerical problems.

Coefficient Interpretation:

Intercept (normal mass balance): 15862.72 (p=0.0000)
summer_td: -481.68 (p=0.0000)
winter_pd: 1.78 (p=0.0098)

Variance Inflation Factors (VIF):

	Variable	VIF
0	const	862.630407
1	summer_td	1.013727
2	winter_pd	1.013727

R-squared: 0.6362

Adjusted R-squared: 0.6232

Regression: Monthly 1991-2020

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MONTHLY DEVIATIONS ANALYSIS USING 1991-2020 CLIMATE NORMS

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MONTHLY DEVIATIONS for Glacier du Giétra (1991-2020 norms)

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Number of observations: 59

Regression Summary:

OLS Regression Results

=====

Dep. Variable:	annual mass balance (mm w.e.)	R-squared:	0.703
Model:	OLS	Adj. R-squared:	0.625
Method:	Least Squares	F-statistic:	9.065
Date:	Sun, 07 Dec 2025	Prob (F-statistic):	1.40e-08
Time:	23:22:42	Log-Likelihood:	-438.92
No. Observations:	59	AIC:	903.8
Df Residuals:	46	BIC:	930.9
Df Model:	12		
Covariance Type:	nonrobust		

=====

	coef	std err	t	P> t	[0.025	0.975]
const	-848.2916	69.883	-12.139	0.000	-988.959	-707.625
may_td	-38.2728	50.064	-0.764	0.448	-139.046	62.500
june_td	-89.3936	45.822	-1.951	0.057	-181.629	2.842
july_td	-145.8930	49.850	-2.927	0.005	-246.235	-45.551
august_td	-120.0130	61.355	-1.956	0.057	-243.515	3.489
september_td	-75.7921	47.156	-1.607	0.115	-170.713	19.129
october_pd	2.3180	2.186	1.060	0.295	-2.083	6.719
november_pd	-1.5704	1.698	-0.925	0.360	-4.988	1.847
december_pd	1.3308	1.522	0.874	0.386	-1.733	4.395
january_pd	3.3608	1.667	2.017	0.050	0.006	6.715
february_pd	2.8796	1.417	2.032	0.048	0.027	5.732
march_pd	1.7271	1.961	0.881	0.383	-2.219	5.674
april_pd	3.1540	2.942	1.072	0.289	-2.768	9.076

=====

Omnibus:	1.577	Durbin-Watson:	2.085
Prob(Omnibus):	0.454	Jarque-Bera (JB):	1.584
Skew:	-0.345	Prob(JB):	0.453
Kurtosis:	2.589	Cond. No.	59.6

=====

Notes:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

Coefficient Interpretation:

Intercept (normal mass balance): -848.29 (p=0.0000)

may_td: -38.27 (p=0.4485)

june_td: -89.39 (p=0.0572)

july_td: -145.89 (p=0.0053)

august_td: -120.01 (p=0.0565)

september_td: -75.79 (p=0.1148)

october_pd: 2.32 (p=0.2946)

november_pd: -1.57 (p=0.3598)

december_pd: 1.33 (p=0.3865)

january_pd: 3.36 (p=0.0496)

Regression: Optimal 1991-2020

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OPTIMAL SEASONAL DEVIATIONS ANALYSIS USING 1991-2020 CLIMATE NORMS
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OPTIMAL SEASONAL DEVIATIONS for Glacier du Giéstro (1991-2020 norms)
=====

Number of observations: 59

Regression Summary:

OLS Regression Results

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Dep. Variable: annual mass balance (mm w.e.) R-squared: 0.613
Model: OLS Adj. R-squared: 0.599
Method: Least Squares F-statistic: 44.30
Date: Sun, 07 Dec 2025 Prob (F-statistic): 2.91e-12
Time: 23:22:42 Log-Likelihood: -446.73
No. Observations: 59 AIC: 899.5
Df Residuals: 56 BIC: 905.7
Df Model: 2
Covariance Type: nonrobust
=====

	coef	std err	t	P> t	[0.025	0.975]
const	-852.7609	71.051	-12.002	0.000	-995.092	-710.429
opt_season_td	-448.0476	50.588	-8.857	0.000	-549.388	-346.707
opt_season_pd	1.4408	0.793	1.816	0.075	-0.148	3.030

=====

Omnibus: 1.850 Durbin-Watson: 2.024
Prob(Omnibus): 0.396 Jarque-Bera (JB): 1.632
Skew: -0.402 Prob(JB): 0.442
Kurtosis: 2.871 Cond. No. 99.0
=====

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

Coefficient Interpretation:

Intercept (normal mass balance): -852.76 (p=0.0000)
opt_season_td: -448.05 (p=0.0000)
opt_season_pd: 1.44 (p=0.0746)

Variance Inflation Factors (VIF):

	Variable	VIF
0	const	1.279578
1	opt_season_td	1.023234
2	opt_season_pd	1.023234

R-squared: 0.6127

Adjusted R-squared: 0.5989

Regression: Seasonal 1991-2020

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SUMMER/WINTER SEASONAL DEVIATIONS ANALYSIS USING 1991-2020 CLIMATE NORMS
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SUMMER/WINTER SEASONAL DEVIATIONS for Glacier du Giétre (1991-2020 norms)
=====

Number of observations: 59

Regression Summary:

OLS Regression Results

=====
Dep. Variable: annual mass balance (mm w.e.) R-squared: 0.639
Model: OLS Adj. R-squared: 0.626
Method: Least Squares F-statistic: 49.62
Date: Sun, 07 Dec 2025 Prob (F-statistic): 3.99e-13
Time: 23:22:42 Log-Likelihood: -444.64
No. Observations: 59 AIC: 895.3
Df Residuals: 56 BIC: 901.5
Df Model: 2
Covariance Type: nonrobust
=====

	coef	std err	t	P> t	[0.025	0.975]
const	-863.4615	68.764	-12.557	0.000	-1001.212	-725.711
summer_td	-482.6673	52.371	-9.216	0.000	-587.580	-377.755
winter_pd	1.8040	0.663	2.723	0.009	0.477	3.131

=====

Omnibus: 2.461 Durbin-Watson: 2.051
Prob(Omnibus): 0.292 Jarque-Bera (JB): 2.309
Skew: -0.407 Prob(JB): 0.315
Kurtosis: 2.475 Cond. No. 116.
=====

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

Coefficient Interpretation:

Intercept (normal mass balance): -863.46 (p=0.0000)
summer_td: -482.67 (p=0.0000)
winter_pd: 1.80 (p=0.0086)

Variance Inflation Factors (VIF):

Variable	VIF
0 const	1.286778
1 summer_td	1.012792
2 winter_pd	1.012792

R-squared: 0.6393

Adjusted R-squared: 0.6264