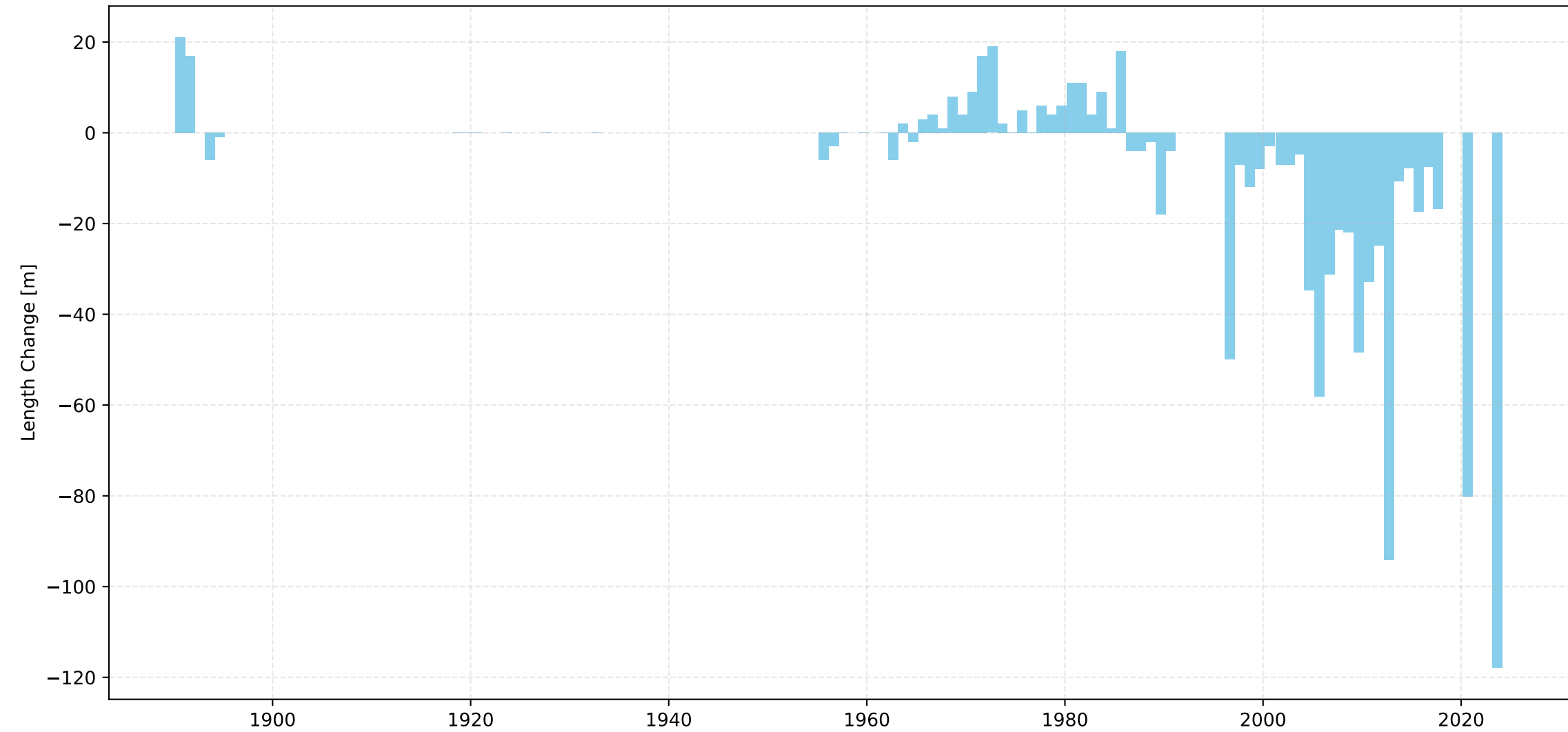
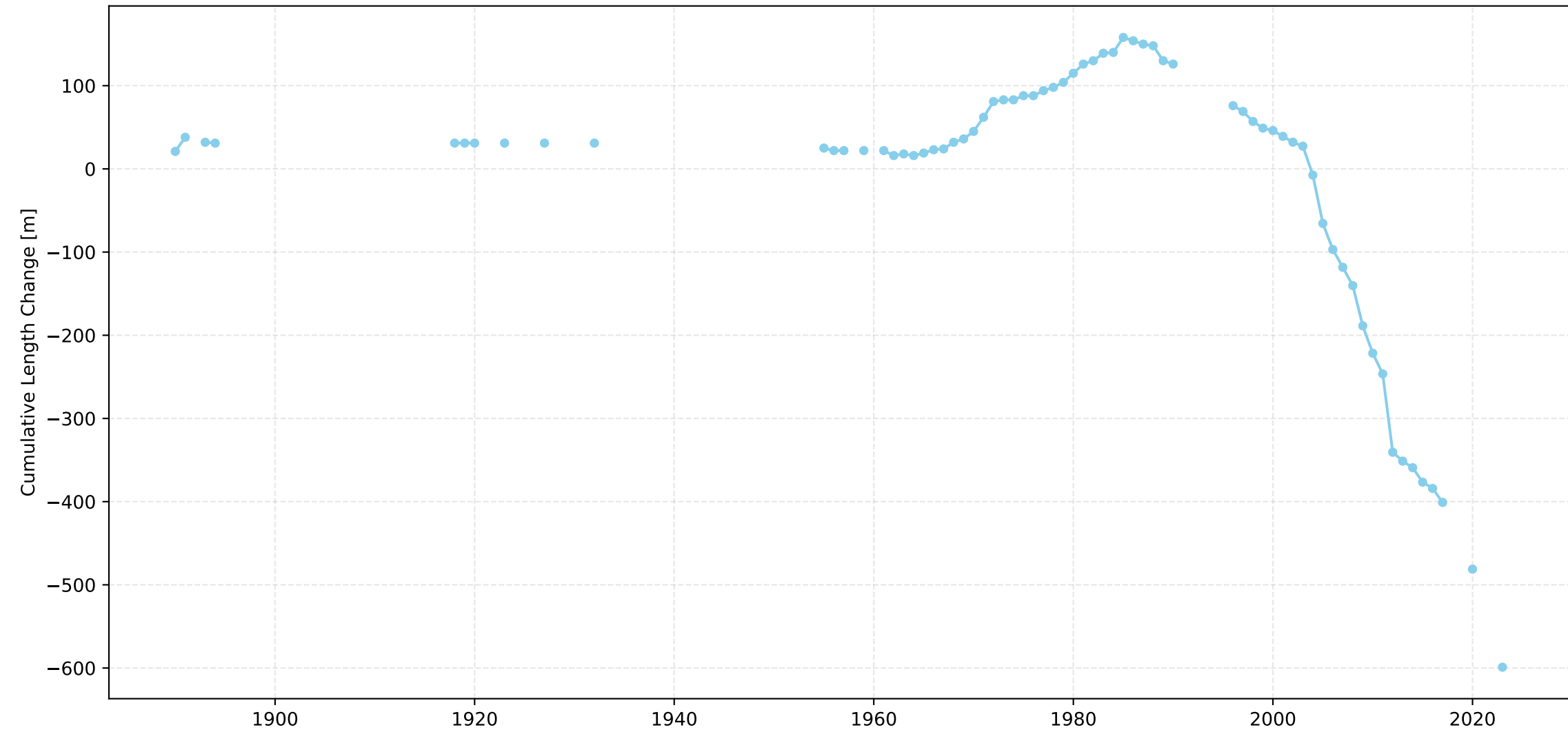


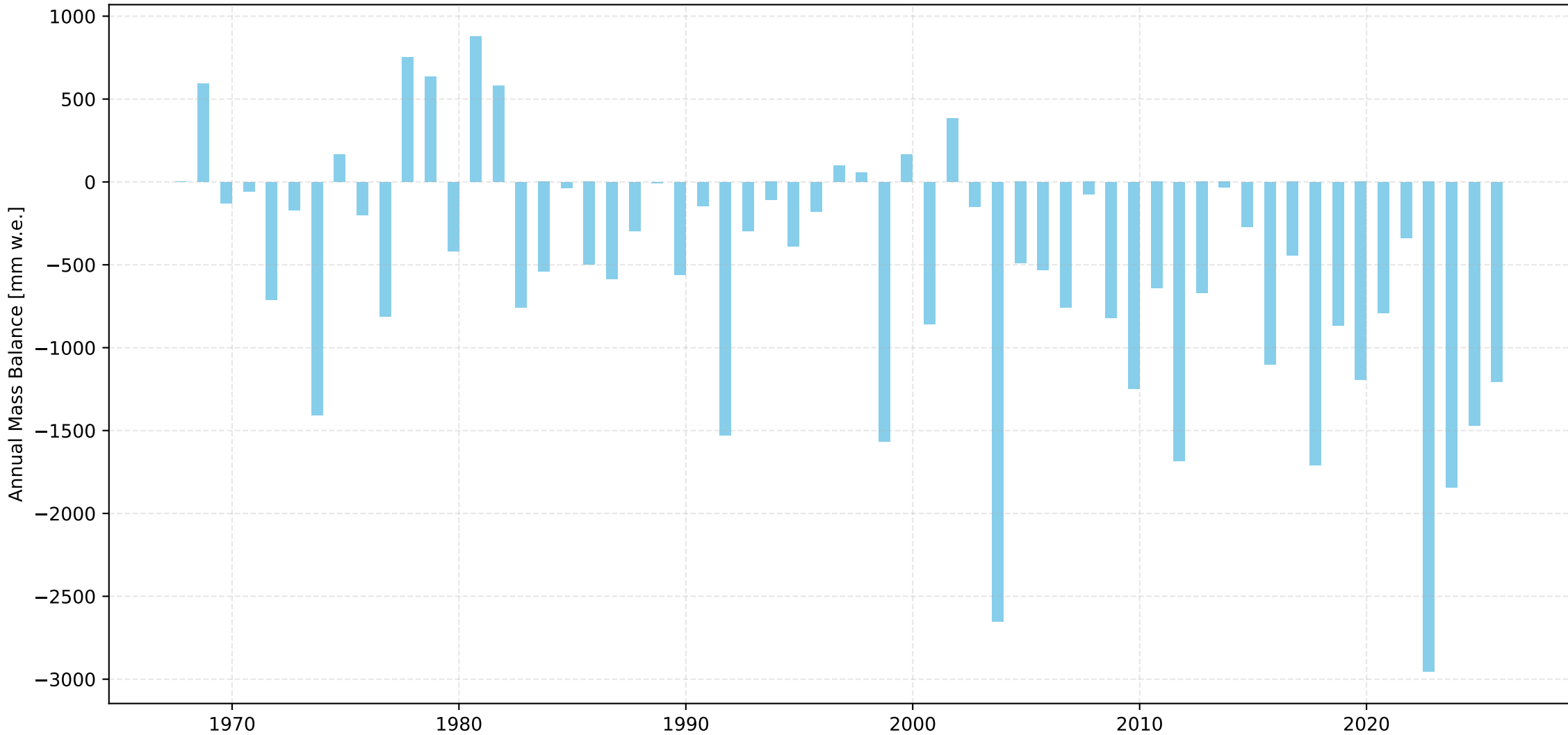
Glacier du Giétro Length Change Over Time



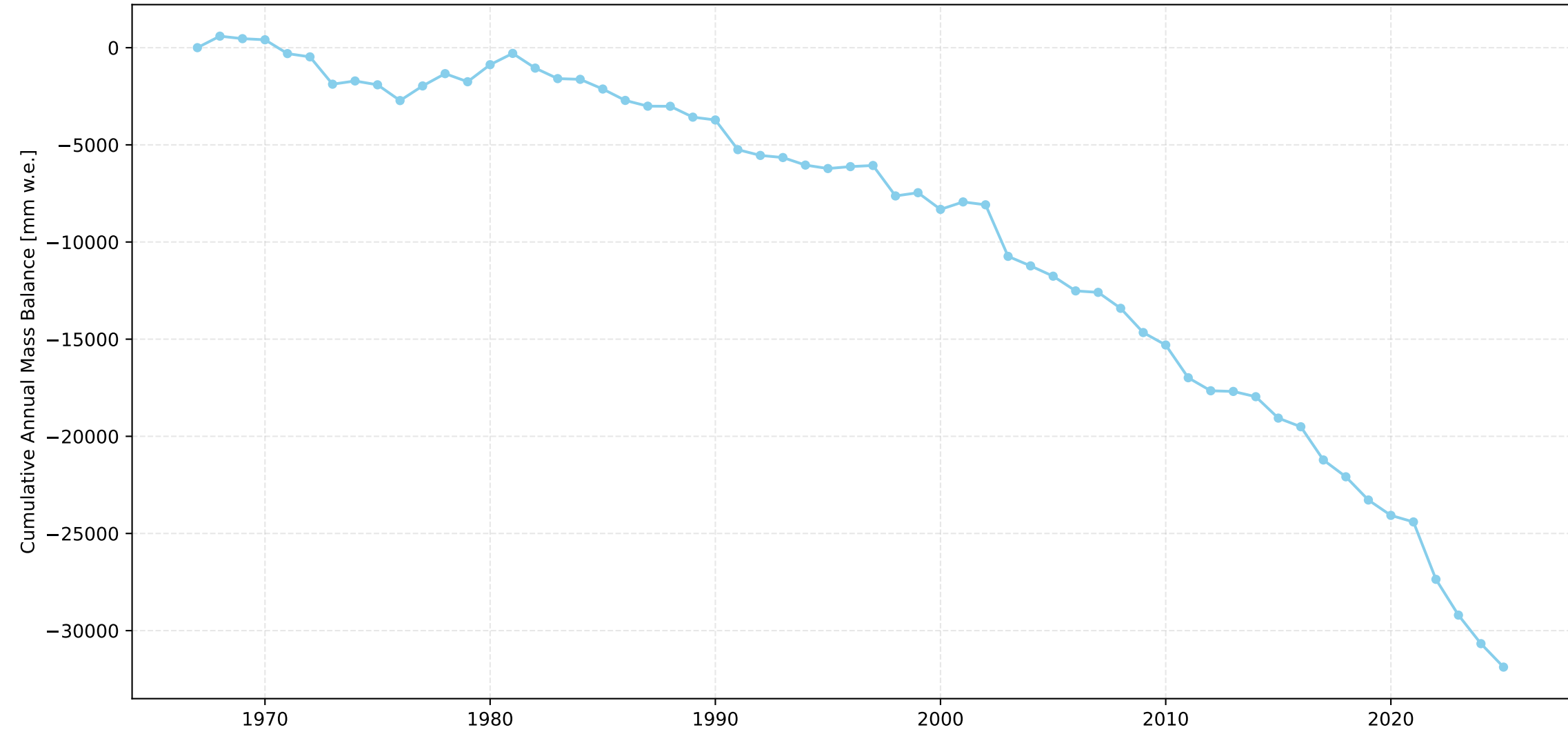
Glacier du Giétro Cumulative Length Change Over Time



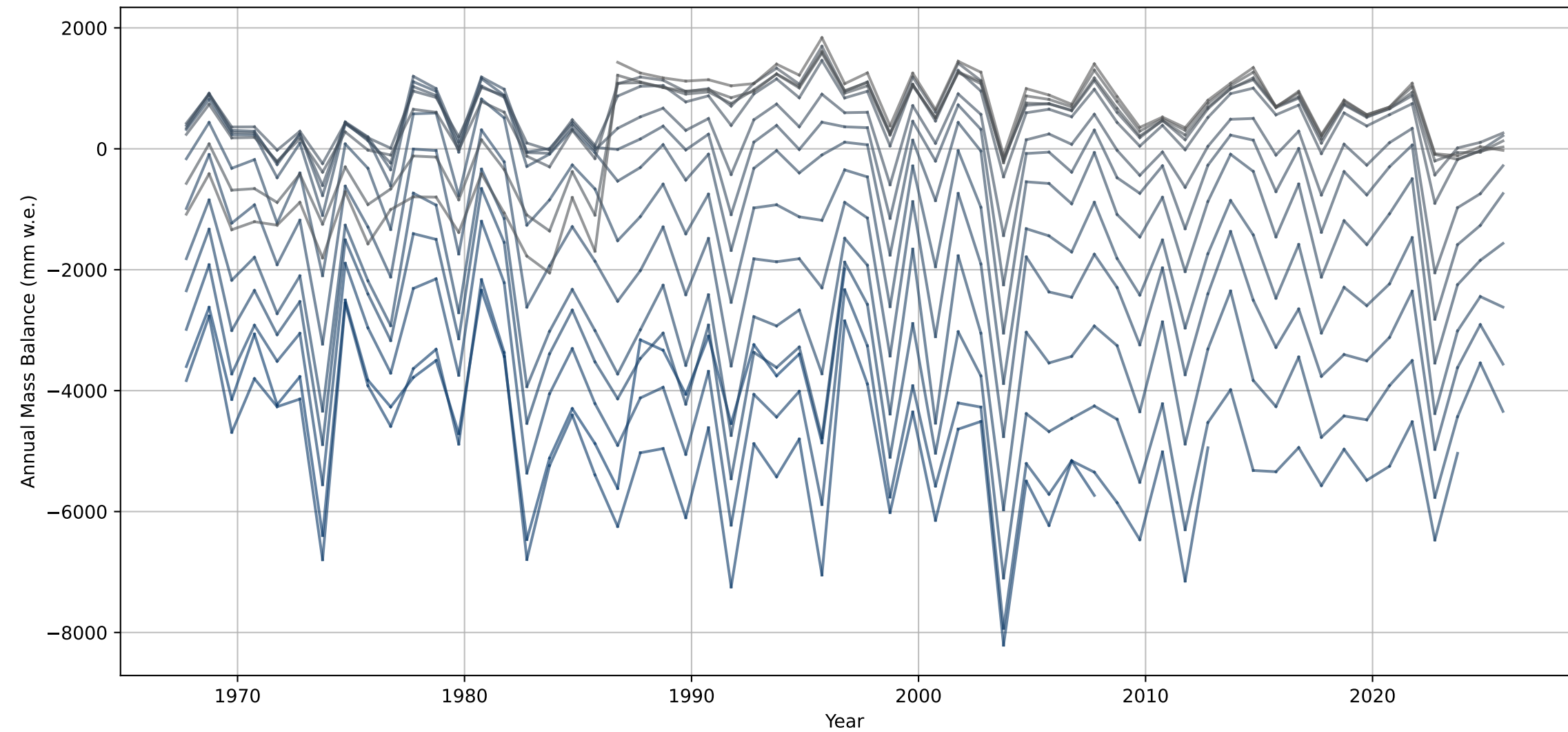
Glacier du Giétro Annual Mass Balance Over Time



Glacier du Giéto Cumulative Annual Mass Balance Over Time



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



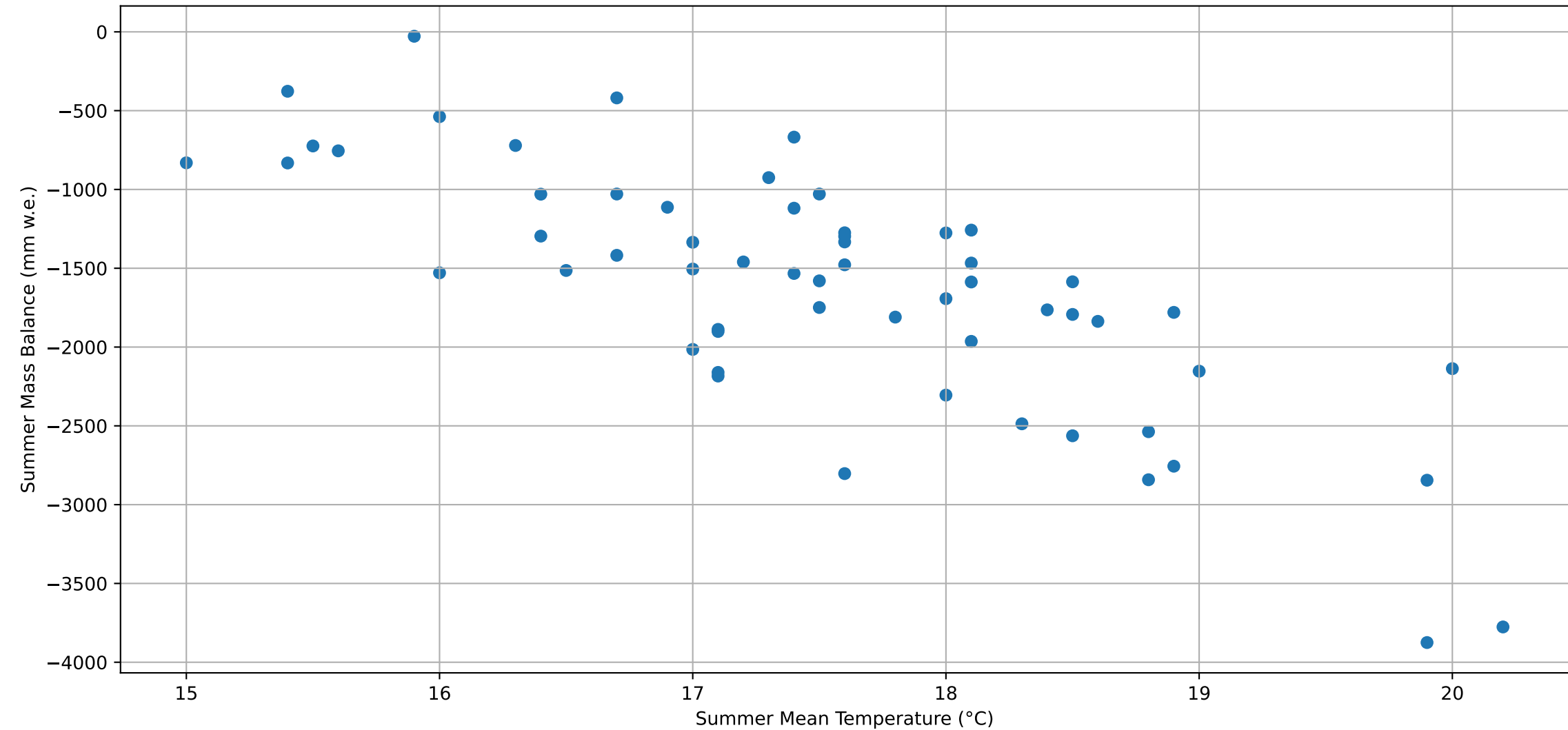
Sion Summer Mean Temperature



Sion Winter Total Precipitation



Glacier du Giétro Summer Mass Balance with relation to Temperature



Regression: Monthly 1961-1990

MONTHLY DEVIATIONS ANALYSIS USING 1961-1990 CLIMATE NORMS

MONTHLY DEVIATIONS for Glacier du Giétro (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)

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 Giétro (1961-1990 norms)

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Number of observations: 59

Regression Summary:

OLS Regression Results			
Dep. Variable:	annual mass balance (mm w.e.)	R-squared:	0.617
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 Giétro (1961-1990 norms)
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Number of observations: 59

Regression Summary:

OLS Regression Results
Dep. Variable: annual mass balance (mm w.e.) R-squared: 0.636
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

Table with 7 columns: , coef, std err, t, P>|t|, [0.025, 0.975]. Rows include const, summer_td, and winter_pd.

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

MONTHLY DEVIATIONS ANALYSIS USING 1991-2020 CLIMATE NORMS

MONTHLY DEVIATIONS for Glacier du Giétro (1991-2020 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	-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 Giétro (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: 0.613
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

Table with 7 columns: , coef, std err, t, P>|t|, [0.025, 0.975]. Rows include const, opt_season_td, and opt_season_pd.

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 Giétro (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: 0.639
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

Table with 7 columns: , coef, std err, t, P>|t|, [0.025, 0.975]. Rows include const, summer_td, and winter_pd.

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