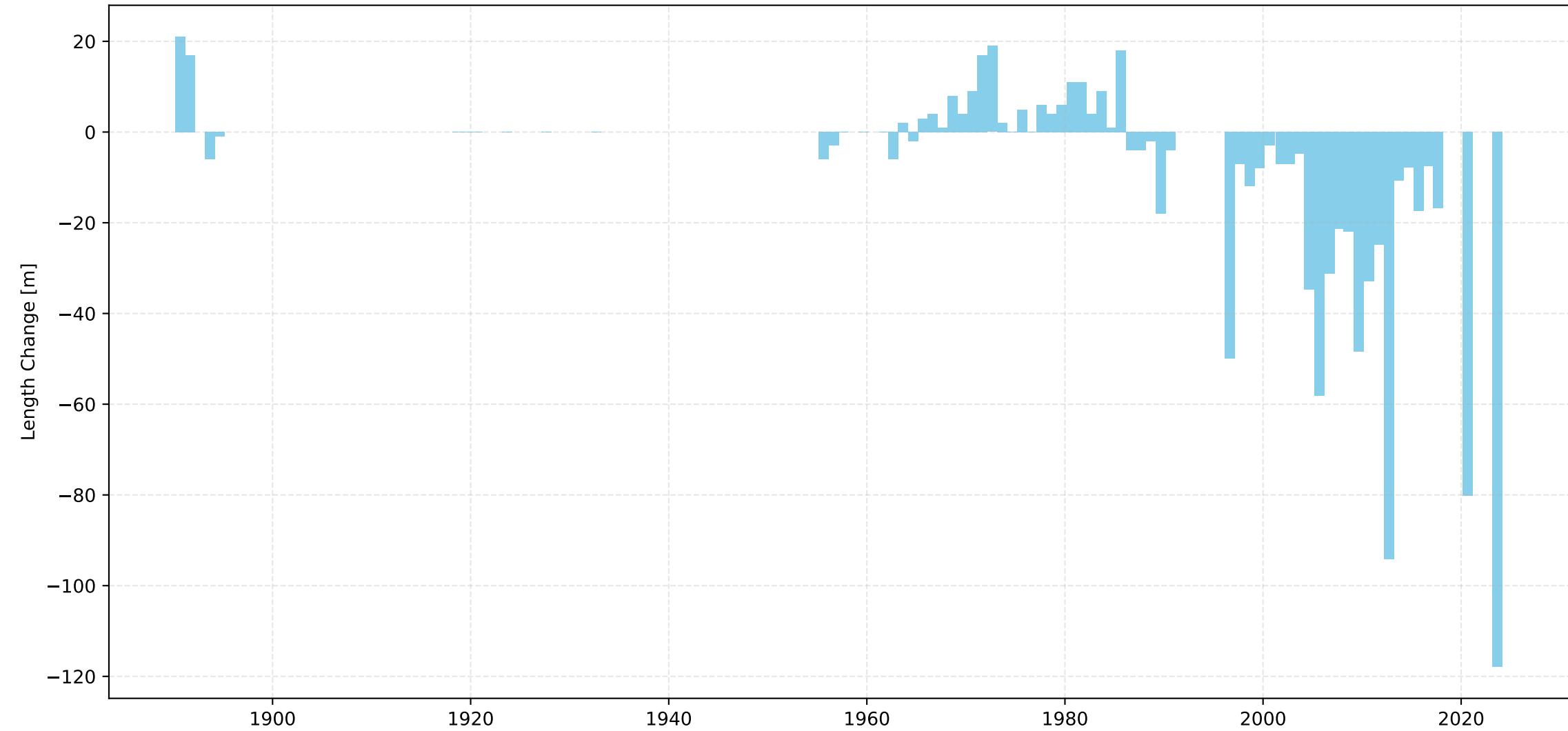
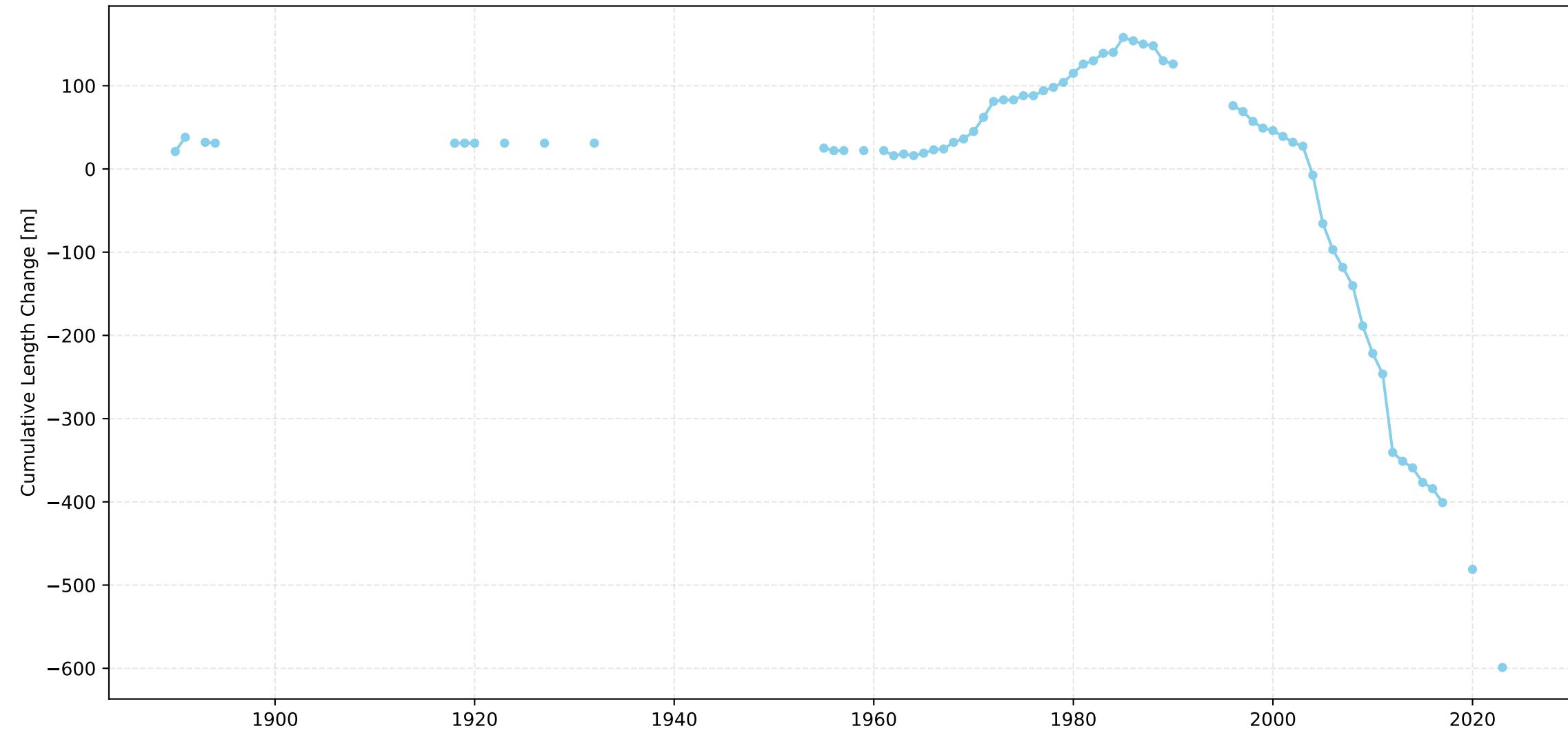


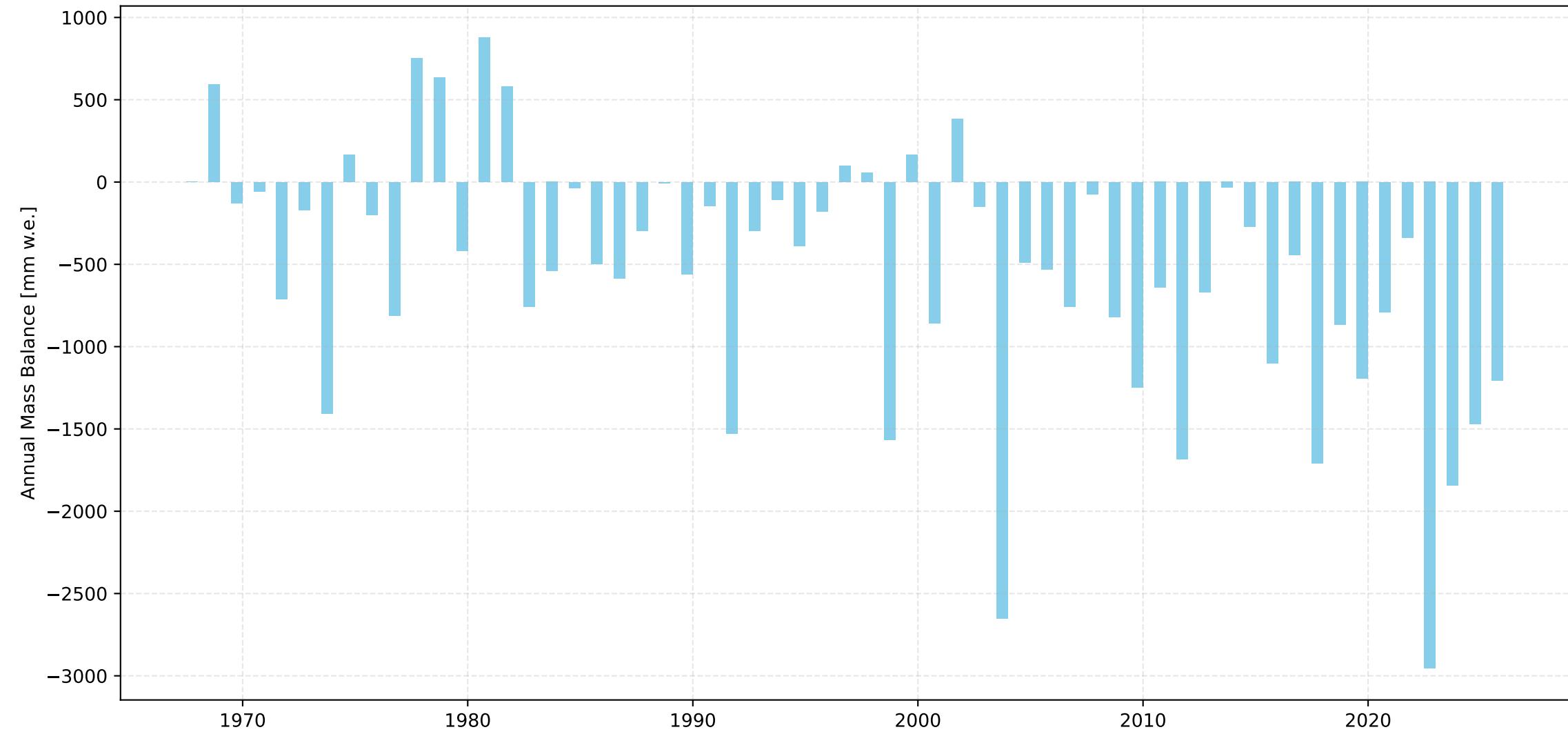
## Glacier du Giétero Length Change Over Time



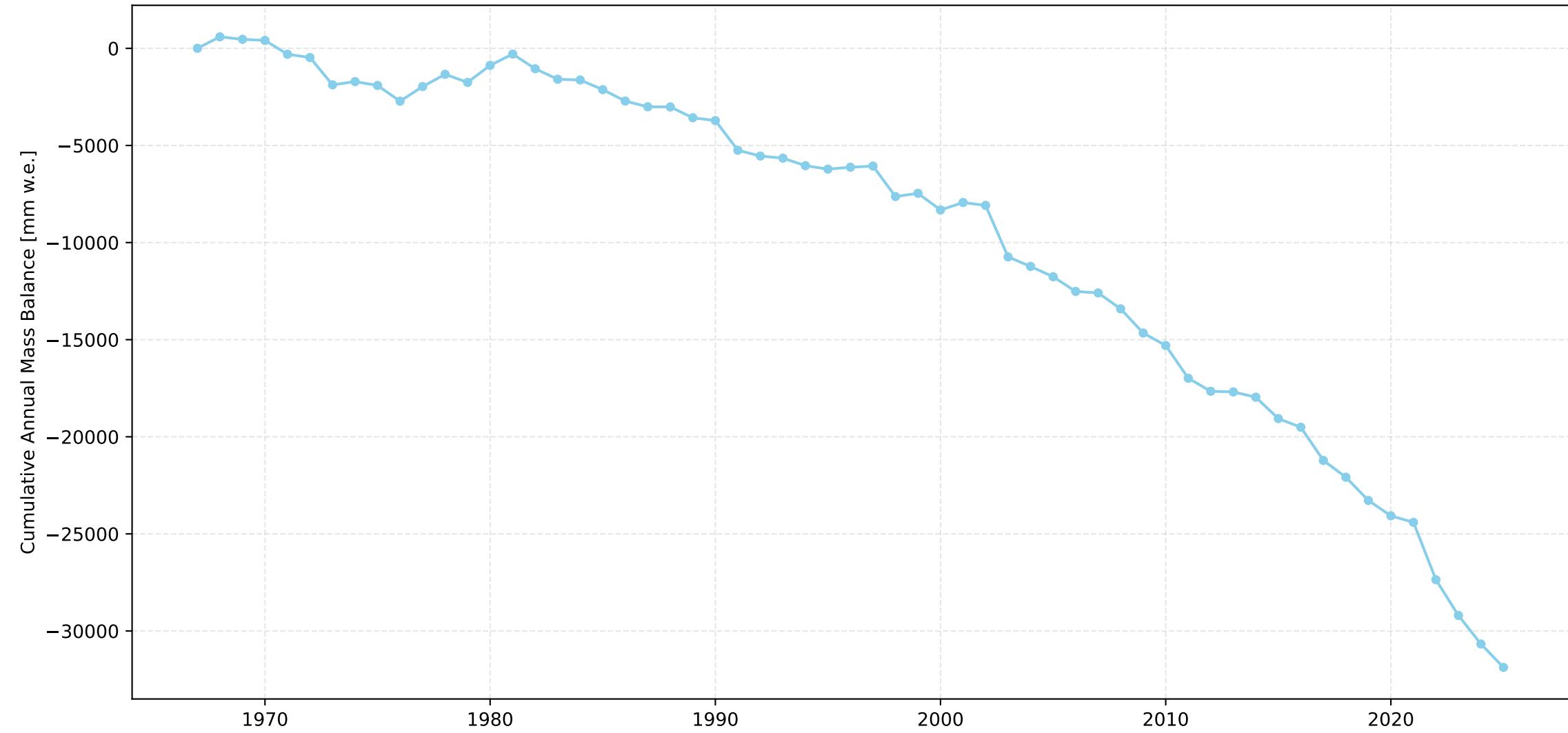
## Glacier du Giéstro Cumulative Length Change Over Time



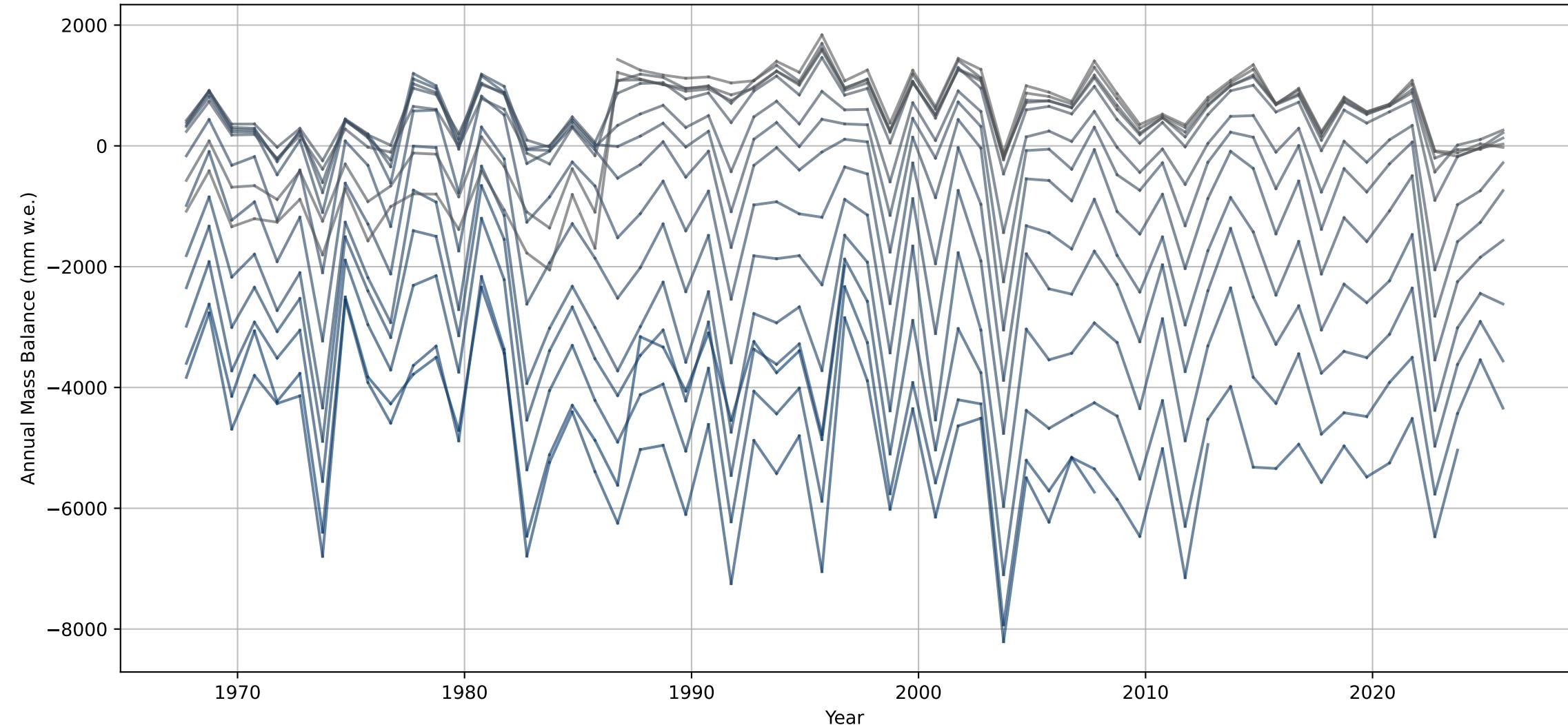
## Glacier du Giétre Annual Mass Balance Over Time



## Glacier du Giétre Cumulative Annual Mass Balance Over Time



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



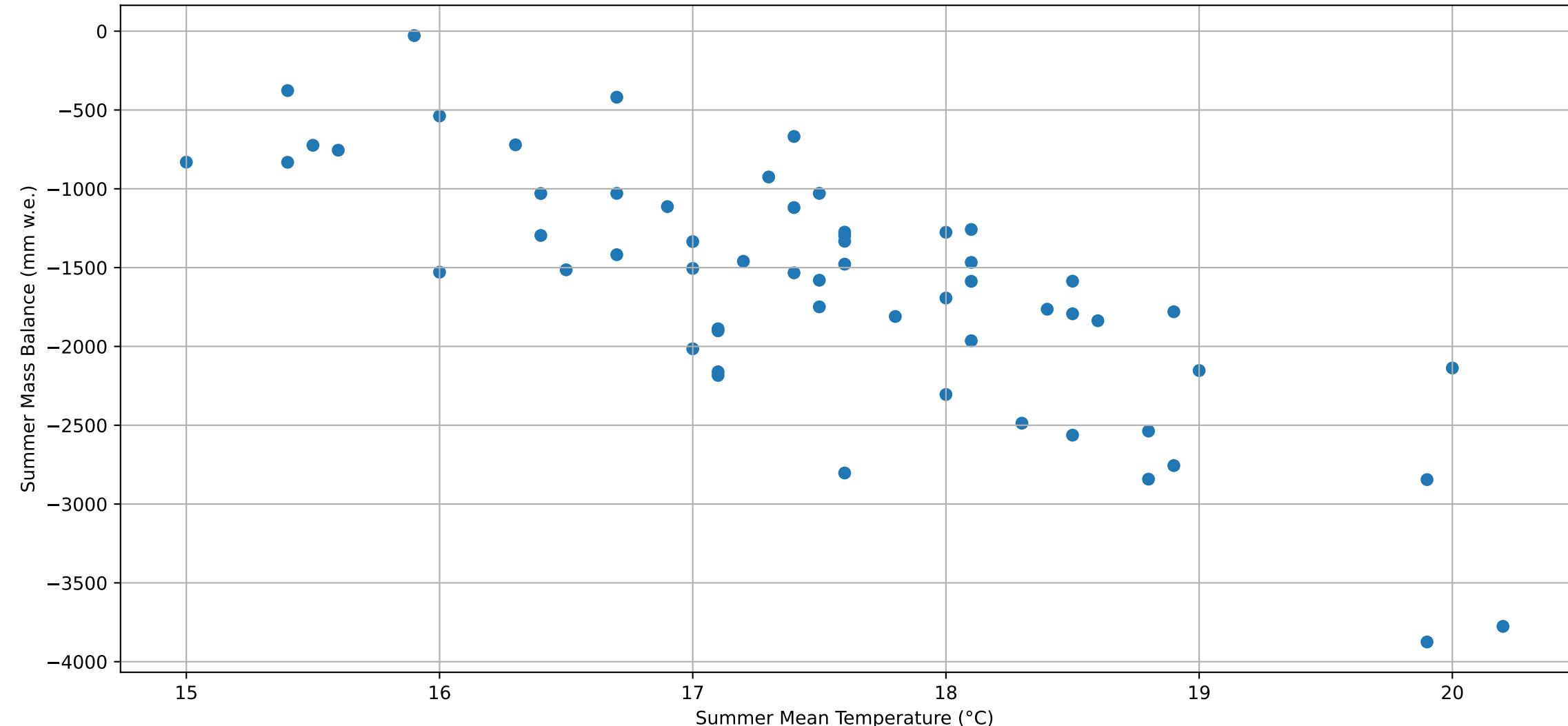
## Sion Summer Mean Temperature



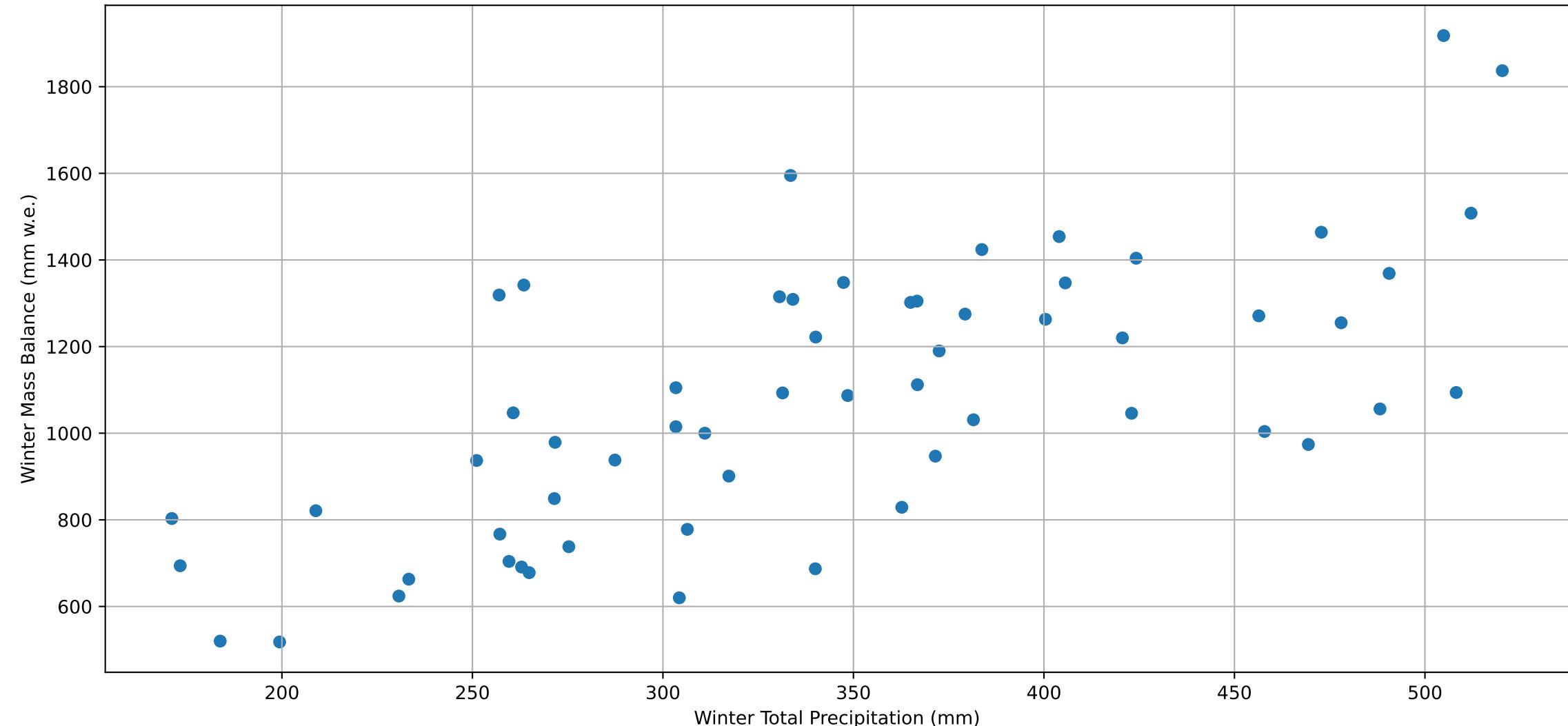
## Sion Winter Total Precipitation



### Glacier du Giétero Summer Mass Balance with relation to Temperature



### Glacier du Giétero Winter Mass Balance with relation to Precipitation



# Regression: Monthly 1961-1990

=====  
MONTHLY DEVIATIONS for Glacier du Giédro using 1961-1990 climate norms  
=====

Correlation Analysis with Significance Testing:

Skipping constant column: const

	Variable	Correlation Coefficient	P-value	Significant (p < 0.05)
3	august_td	-0.658178	1.470237e-08	True
1	june_td	-0.644929	3.523408e-08	True
2	july_td	-0.579919	1.483556e-06	True
0	may_td	-0.474425	1.469830e-04	True
4	september_td	-0.402591	1.571603e-03	True
9	february_pd	0.344876	7.473511e-03	True
10	march_pd	0.185747	1.589784e-01	False
8	january_pd	0.175636	1.833241e-01	False
5	october_pd	0.153290	2.464077e-01	False
6	november_pd	-0.079989	5.470221e-01	False
7	december_pd	-0.079247	5.507605e-01	False
11	april_pd	0.014406	9.137634e-01	False

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:	Wed, 17 Dec 2025	Prob (F-statistic):	1.40e-08
Time:	20:25:32	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	2.7952	83.806	0.033	0.974	-165.897	171.488
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.	70.8

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

# Regression: Optimal 1961-1990

=====  
OPTIMAL SEASONAL DEVIATIONS for Glacier du Giédro using 1961-1990 climate norms  
=====

Correlation Analysis with Significance Testing:

Skipping constant column: const

	Variable	Correlation Coefficient	P-value	Significant (p < 0.05)
0	opt_season_td	-0.763681	2.003258e-12	True
1	opt_season_pd	0.265071	4.246513e-02	True

Number of observations: 59

Regression Summary:

OLS Regression Results

Dep. Variable:	annual mass balance (mm w.e.)	R-squared:	0.608
Model:	OLS	Adj. R-squared:	0.594
Method:	Least Squares	F-statistic:	43.42
Date:	Wed, 17 Dec 2025	Prob (F-statistic):	4.11e-12
Time:	20:25:32	Log-Likelihood:	-447.09
No. Observations:	59	AIC:	900.2
Df Residuals:	56	BIC:	906.4
Df Model:	2		
Covariance Type:	nonrobust		

	coef	std err	t	P> t	[0.025	0.975]
const	-20.9892	84.812	-0.247	0.805	-190.889	148.910
opt_season_td	-442.8249	50.529	-8.764	0.000	-544.047	-341.603
opt_season_pd	1.4986	0.797	1.880	0.065	-0.098	3.095

Omnibus:	1.915	Durbin-Watson:	2.013
Prob(Omnibus):	0.384	Jarque-Bera (JB):	1.702
Skew:	-0.410	Prob(JB):	0.427
Kurtosis:	2.862	Cond. No.	118.

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

# Regression: Seasonal 1961-1990

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=====
SUMMER/WINTER SEASONAL DEVIATIONS for Glacier du Giétre using 1961-1990 climate norms
=====
```

Correlation Analysis with Significance Testing:

Skipping constant column: const

Variable	Correlation Coefficient	P-value	Significant (p < 0.05)
0 summer_td	-0.769112	1.119720e-12	True
1 winter_pd	0.303591	1.941328e-02	True

Number of observations: 59

Regression Summary:

OLS Regression Results

Dep. Variable:	annual mass balance (mm w.e.)	R-squared:	0.640
Model:	OLS	Adj. R-squared:	0.627
Method:	Least Squares	F-statistic:	49.78
Date:	Wed, 17 Dec 2025	Prob (F-statistic):	3.77e-13
Time:	20:25:32	Log-Likelihood:	-444.58
No. Observations:	59	AIC:	895.2
Df Residuals:	56	BIC:	901.4
Df Model:	2		
Covariance Type:	nonrobust		

	coef	std err	t	P> t	[0.025	0.975]
const	-2.1532	81.438	-0.026	0.979	-165.293	160.986
summer_td	-481.9572	52.207	-9.232	0.000	-586.541	-377.374
winter_pd	1.8171	0.662	2.746	0.008	0.492	3.143

Omnibus:	2.332	Durbin-Watson:	2.072
Prob(Omnibus):	0.312	Jarque-Bera (JB):	2.224
Skew:	-0.405	Prob(JB):	0.329
Kurtosis:	2.503	Cond. No.	140.

Notes:

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

# Regression: Monthly 1991-2020

=====  
MONTHLY DEVIATIONS for Glacier du Giéstro using 1991-2020 climate norms  
=====

Correlation Analysis with Significance Testing:

Skipping constant column: const

	Variable	Correlation Coefficient	P-value	Significant (p < 0.05)
3	august_td	-0.658178	1.470237e-08	True
1	june_td	-0.644929	3.523408e-08	True
2	july_td	-0.579919	1.483556e-06	True
0	may_td	-0.474425	1.469830e-04	True
4	september_td	-0.402591	1.571603e-03	True
9	february_pd	0.344876	7.473511e-03	True
10	march_pd	0.185747	1.589784e-01	False
8	january_pd	0.175636	1.833241e-01	False
5	october_pd	0.153290	2.464077e-01	False
6	november_pd	-0.079989	5.470221e-01	False
7	december_pd	-0.079247	5.507605e-01	False
11	april_pd	0.014406	9.137634e-01	False

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:	Wed, 17 Dec 2025	Prob (F-statistic):	1.40e-08
Time:	20:25:32	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.

# Regression: Optimal 1991-2020

=====  
OPTIMAL SEASONAL DEVIATIONS for Glacier du Giédro using 1991-2020 climate norms  
=====

Correlation Analysis with Significance Testing:

Skipping constant column: const

	Variable	Correlation Coefficient	P-value	Significant (p < 0.05)
0	opt_season_td	-0.768057	1.255240e-12	True
1	opt_season_pd	0.265071	4.246513e-02	True

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:	Wed, 17 Dec 2025	Prob (F-statistic):	2.91e-12
Time:	20:25:32	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.

# Regression: Seasonal 1991-2020

```
=====
SUMMER/WINTER SEASONAL DEVIATIONS for Glacier du Giétre using 1991-2020 climate norms
=====
```

Correlation Analysis with Significance Testing:

Skipping constant column: const

Variable	Correlation Coefficient	P-value	Significant (p < 0.05)
0 summer_td	-0.769107	1.120325e-12	True
1 winter_pd	0.303591	1.941328e-02	True

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:	Wed, 17 Dec 2025	Prob (F-statistic):	3.99e-13
Time:	20:25:32	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.