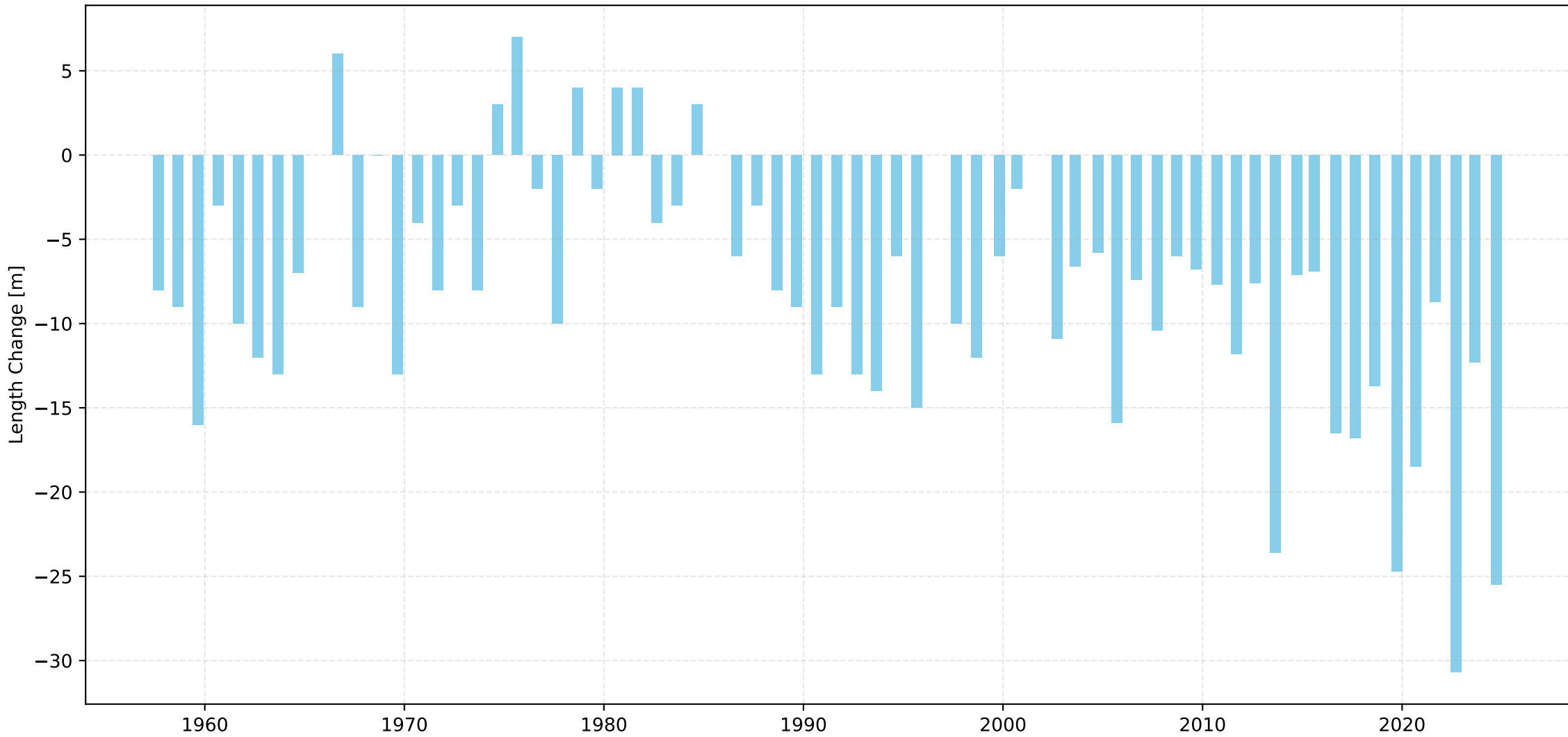
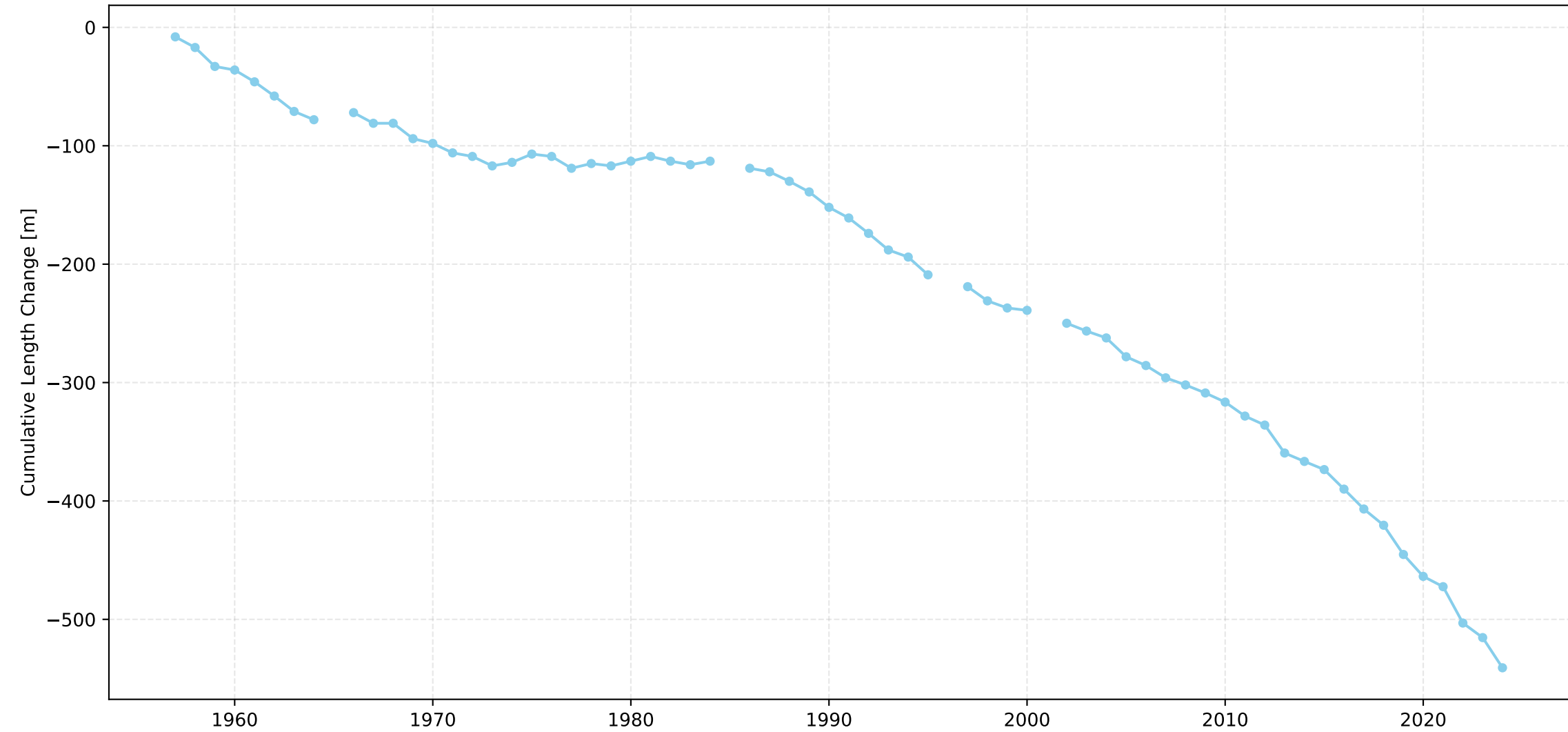


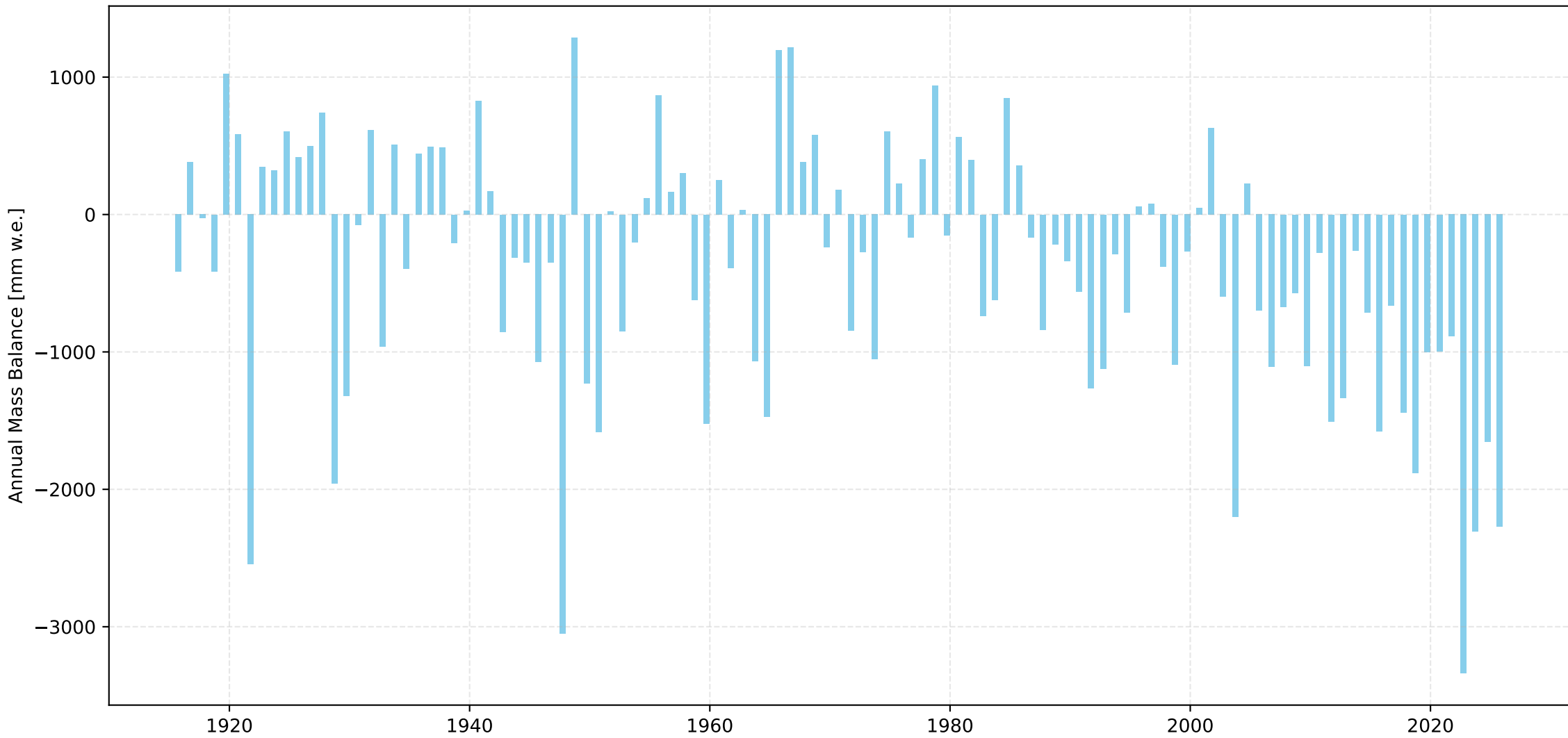
Silvrettagletscher Length Change Over Time



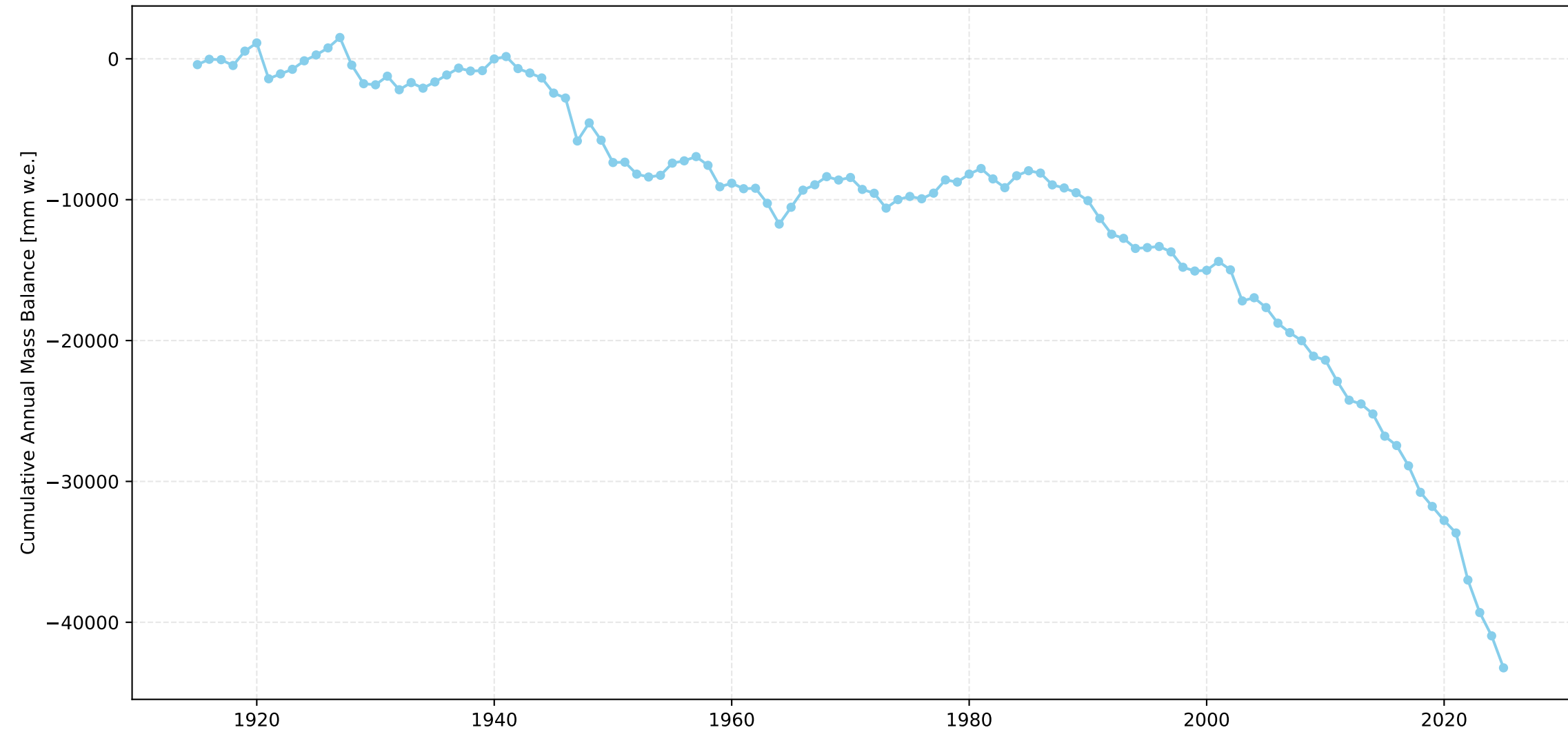
Silvrettagletscher Cumulative Length Change Over Time



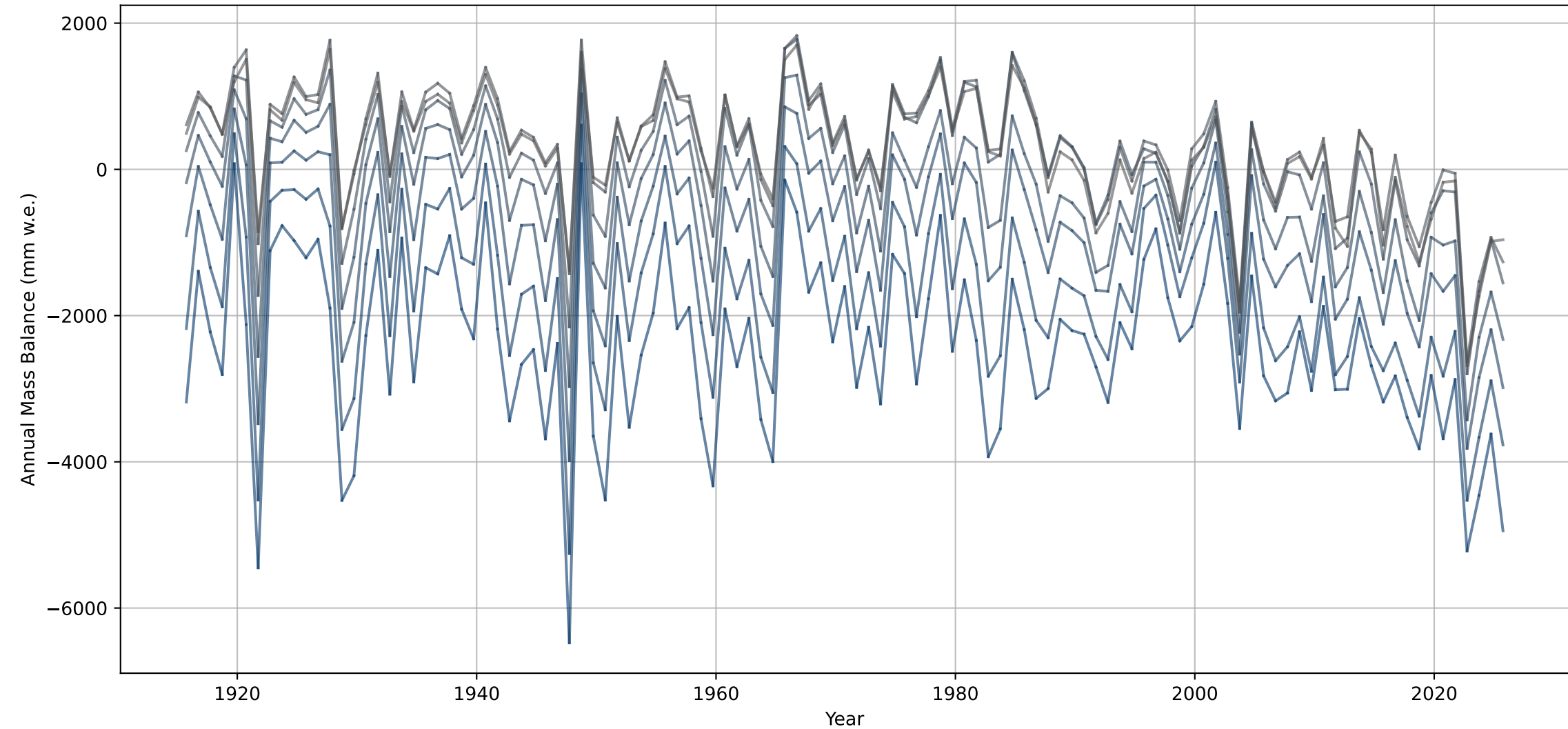
Silvrettagletscher Annual Mass Balance Over Time



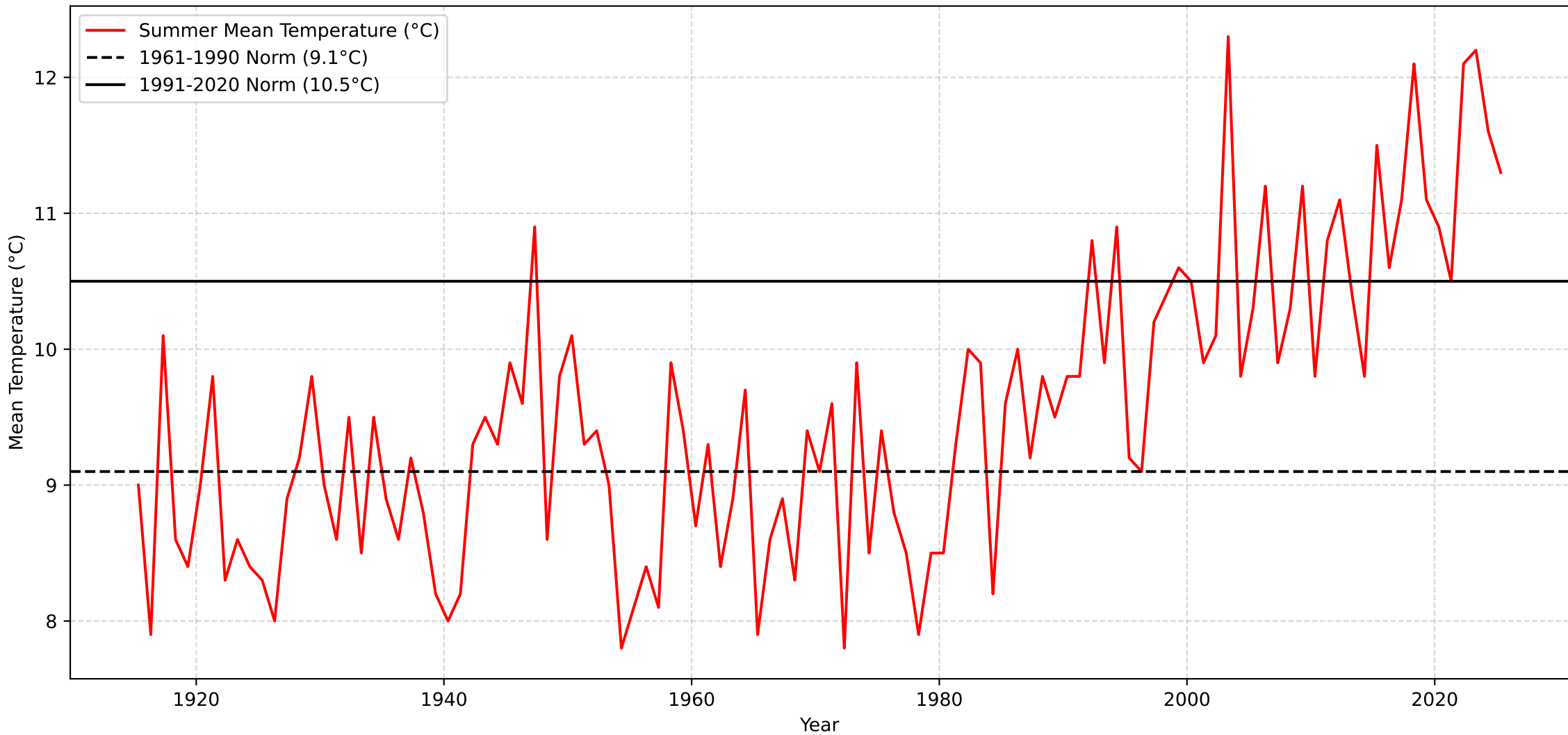
Silvrettagletscher Cumulative Annual Mass Balance Over Time



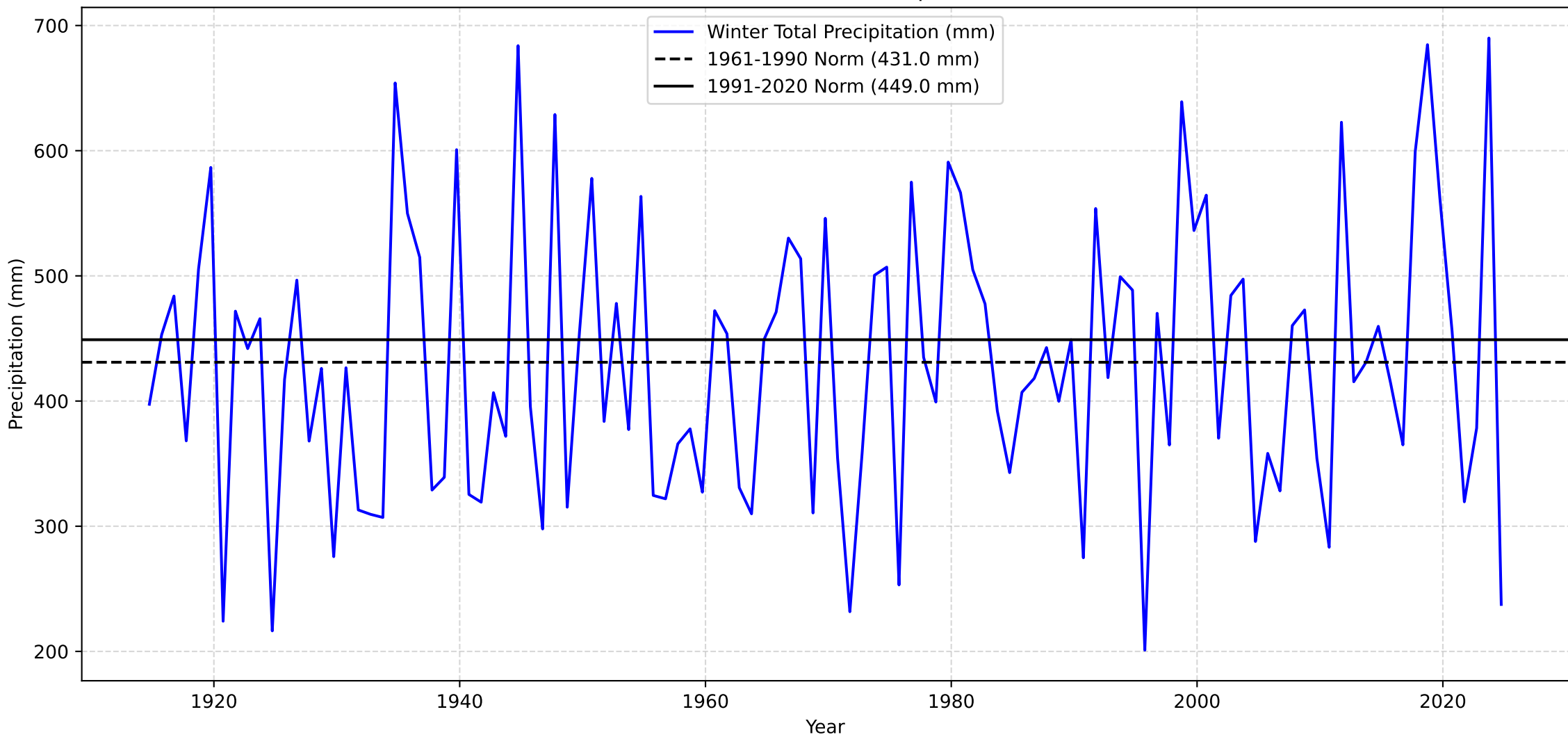
Annual Mass Balance for each Elevation Bin over Time - Silvrettagletscher



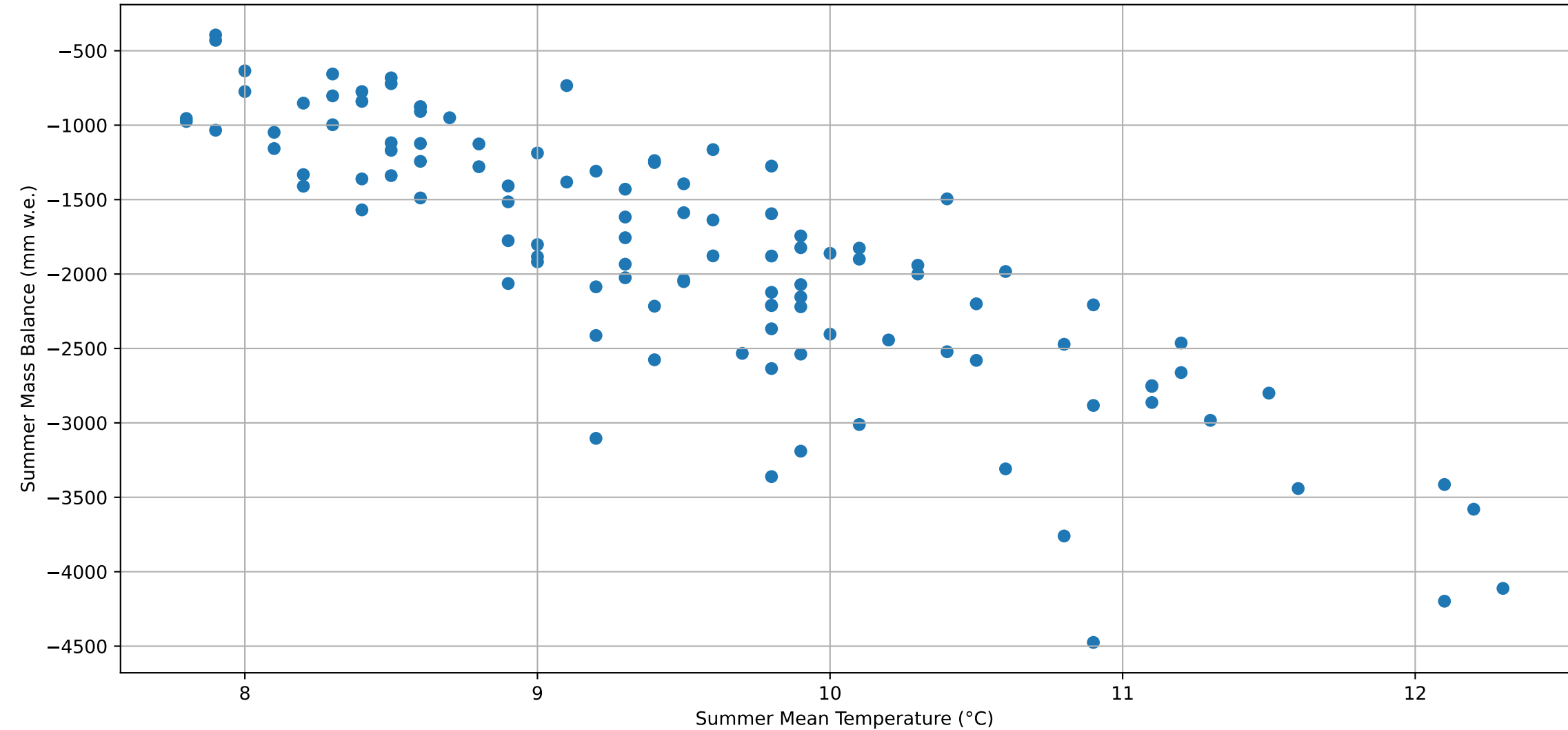
Davos Summer Mean Temperature



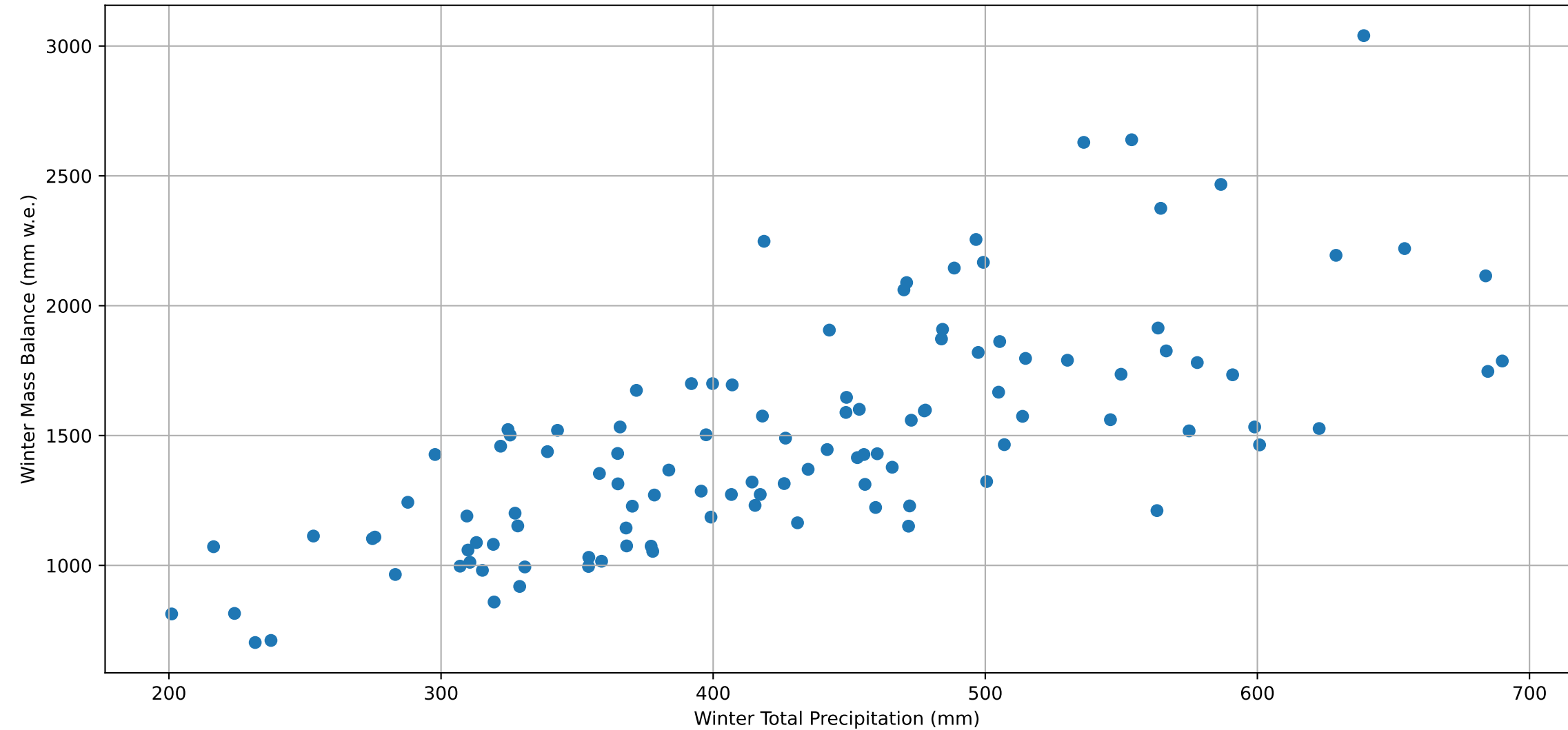
Davos Winter Total Precipitation



Silvrettagletscher Summer Mass Balance with relation to Temperature



Silvrettagletscher Winter Mass Balance with relation to Precipitation



Regression: Monthly 1961-1990

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MONTHLY DEVIATIONS for Silvrettagletscher using 1961-1990 climate norms

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Correlation Analysis with Significance Testing:

Skipping constant column: const

	Variable	Correlation Coefficient	P-value	Significant (p < 0.05)
2	july_td	-0.623656	2.646363e-13	True
3	august_td	-0.557269	2.119905e-10	True
1	june_td	-0.526089	3.034294e-09	True
4	september_td	-0.389909	2.335653e-05	True
0	may_td	-0.378461	4.210489e-05	True
9	february_pd	0.229137	1.556087e-02	True
7	december_pd	0.162994	8.740341e-02	False
11	april_pd	0.107554	2.611870e-01	False
10	march_pd	0.104035	2.772043e-01	False
8	january_pd	0.039006	6.844079e-01	False
6	november_pd	0.024012	8.024705e-01	False
5	october_pd	0.023914	8.032595e-01	False

Number of observations: 111

Regression Summary:

OLS Regression Results

Dep. Variable:	annual mass balance (mm w.e.)	R-squared:	0.730
Model:	OLS	Adj. R-squared:	0.697
Method:	Least Squares	F-statistic:	22.11
Date:	Wed, 17 Dec 2025	Prob (F-statistic):	8.96e-23
Time:	20:25:12	Log-Likelihood:	-841.07
No. Observations:	111	AIC:	1708.
Df Residuals:	98	BIC:	1743.
Df Model:	12		
Covariance Type:	nonrobust		

	coef	std err	t	P> t	[0.025	0.975]
const	-97.6019	55.476	-1.759	0.082	-207.692	12.488
may_td	-82.7007	32.167	-2.571	0.012	-146.535	-18.867
june_td	-129.4217	30.488	-4.245	0.000	-189.924	-68.919
july_td	-186.8879	34.816	-5.368	0.000	-255.979	-117.797
august_td	-138.3572	36.665	-3.774	0.000	-211.118	-65.596
september_td	-144.9407	32.587	-4.448	0.000	-209.608	-80.273
october_pd	3.2888	1.205	2.729	0.008	0.897	5.680
november_pd	1.9937	1.141	1.747	0.084	-0.271	4.258
december_pd	3.3502	1.027	3.262	0.002	1.312	5.388
january_pd	2.1727	0.953	2.279	0.025	0.281	4.065
february_pd	2.8034	0.989	2.834	0.006	0.840	4.766
march_pd	3.0489	1.374	2.219	0.029	0.322	5.776
april_pd	3.1920	2.086	1.530	0.129	-0.948	7.332

Omnibus:	9.671	Durbin-Watson:	1.744
Prob(Omnibus):	0.008	Jarque-Bera (JB):	9.749
Skew:	-0.621	Prob(JB):	0.00764
Kurtosis:	3.752	Cond. No.	65.3

Notes:

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

Regression: Optimal 1961-1990

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OPTIMAL SEASONAL DEVIATIONS for Silvrettagletscher 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	-0.736032	3.487469e-20	True
1	opt_season_pd	0.230968	1.473111e-02	True

Number of observations: 111

Regression Summary:

OLS Regression Results						
=====						
Dep. Variable:	annual mass balance (mm w.e.)			R-squared:	0.628	
Model:	OLS			Adj. R-squared:	0.621	
Method:	Least Squares			F-statistic:	91.17	
Date:	Wed, 17 Dec 2025			Prob (F-statistic):	6.41e-24	
Time:	20:25:12			Log-Likelihood:	-858.90	
No. Observations:	111			AIC:	1724.	
Df Residuals:	108			BIC:	1732.	
Df Model:	2					
Covariance Type:	nonrobust					
=====						
	coef	std err	t	P> t	[0.025	0.975]

const	-79.3339	59.079	-1.343	0.182	-196.439	37.771
opt_season_td	-586.6998	45.419	-12.917	0.000	-676.729	-496.671
opt_season_pd	2.6641	0.532	5.005	0.000	1.609	3.719
=====						
Omnibus:	6.003		Durbin-Watson:		1.809	
Prob(Omnibus):	0.050		Jarque-Bera (JB):		5.486	
Skew:	-0.459		Prob(JB):		0.0644	
Kurtosis:	3.585		Cond. No.		121.	
=====						

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 Silvrettagletscher 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 -0.774308 2.135179e-23 True
1 winter_pd 0.267049 4.606567e-03 True

Number of observations: 111

Regression Summary:

OLS Regression Results						
=====						
Dep. Variable:	annual mass balance (mm w.e.)			R-squared:	0.717	
Model:	OLS			Adj. R-squared:	0.712	
Method:	Least Squares			F-statistic:	137.0	
Date:	Wed, 17 Dec 2025			Prob (F-statistic):	2.38e-30	
Time:	20:25:12			Log-Likelihood:	-843.68	
No. Observations:	111			AIC:	1693.	
Df Residuals:	108			BIC:	1701.	
Df Model:	2					
Covariance Type:	nonrobust					
=====						
	coef	std err	t	P> t	[0.025	0.975]

const	-70.2623	50.771	-1.384	0.169	-170.899	30.374
summer_td	-693.9275	44.180	-15.707	0.000	-781.500	-606.355
winter_pd	2.8365	0.423	6.704	0.000	1.998	3.675
=====						
Omnibus:	11.362		Durbin-Watson:		1.809	
Prob(Omnibus):	0.003		Jarque-Bera (JB):		12.083	
Skew:	-0.670		Prob(JB):		0.00238	
Kurtosis:	3.904		Cond. No.		135.	
=====						

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

Regression: Monthly 1991-2020

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MONTHLY DEVIATIONS for Silvrettagletscher using 1991-2020 climate norms

=====

Correlation Analysis with Significance Testing:

Skipping constant column: const

	Variable	Correlation	Coefficient	P-value	Significant (p < 0.05)
2	july_td	-0.623656	2.646363e-13		True
3	august_td	-0.557269	2.119905e-10		True
1	june_td	-0.526089	3.034294e-09		True
4	september_td	-0.389909	2.335653e-05		True
0	may_td	-0.378461	4.210489e-05		True
9	february_pd	0.229137	1.556087e-02		True
7	december_pd	0.162994	8.740341e-02		False
11	april_pd	0.107554	2.611870e-01		False
10	march_pd	0.104035	2.772043e-01		False
8	january_pd	0.039006	6.844079e-01		False
6	november_pd	0.024012	8.024705e-01		False
5	october_pd	0.023914	8.032595e-01		False

Number of observations: 111

Regression Summary:

OLS Regression Results

Dep. Variable:	annual mass balance (mm w.e.)	R-squared:	0.730
Model:	OLS	Adj. R-squared:	0.697
Method:	Least Squares	F-statistic:	22.11
Date:	Wed, 17 Dec 2025	Prob (F-statistic):	8.96e-23
Time:	20:25:12	Log-Likelihood:	-841.07
No. Observations:	111	AIC:	1708.
Df Residuals:	98	BIC:	1743.
Df Model:	12		
Covariance Type:	nonrobust		

	coef	std err	t	P> t	[0.025	0.975]
const	-1012.9579	67.730	-14.956	0.000	-1147.366	-878.550
may_td	-82.7007	32.167	-2.571	0.012	-146.535	-18.867
june_td	-129.4217	30.488	-4.245	0.000	-189.924	-68.919
july_td	-186.8879	34.816	-5.368	0.000	-255.979	-117.797
august_td	-138.3572	36.665	-3.774	0.000	-211.118	-65.596
september_td	-144.9407	32.587	-4.448	0.000	-209.608	-80.273
october_pd	3.2888	1.205	2.729	0.008	0.897	5.680
november_pd	1.9937	1.141	1.747	0.084	-0.271	4.258
december_pd	3.3502	1.027	3.262	0.002	1.312	5.388
january_pd	2.1727	0.953	2.279	0.025	0.281	4.065
february_pd	2.8034	0.989	2.834	0.006	0.840	4.766
march_pd	3.0489	1.374	2.219	0.029	0.322	5.776
april_pd	3.1920	2.086	1.530	0.129	-0.948	7.332

Omnibus:	9.671	Durbin-Watson:	1.744
Prob(Omnibus):	0.008	Jarque-Bera (JB):	9.749
Skew:	-0.621	Prob(JB):	0.00764
Kurtosis:	3.752	Cond. No.	80.0

Notes:

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

Regression: Optimal 1991-2020

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OPTIMAL SEASONAL DEVIATIONS for Silvrettagletscher 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	-0.737299	2.787494e-20	True
1	opt_season_pd	0.230968	1.473111e-02	True

Number of observations: 111

Regression Summary:

OLS Regression Results						
=====						
Dep. Variable:	annual mass balance (mm w.e.)			R-squared:	0.629	
Model:	OLS			Adj. R-squared:	0.622	
Method:	Least Squares			F-statistic:	91.67	
Date:	Wed, 17 Dec 2025			Prob (F-statistic):	5.34e-24	
Time:	20:25:12			Log-Likelihood:	-858.71	
No. Observations:	111			AIC:	1723.	
Df Residuals:	108			BIC:	1732.	
Df Model:	2					
Covariance Type:	nonrobust					
=====						
	coef	std err	t	P> t	[0.025	0.975]

const	-1017.9957	74.263	-13.708	0.000	-1165.197	-870.794
opt_season_td	-587.3911	45.346	-12.954	0.000	-677.274	-497.508
opt_season_pd	2.6544	0.531	4.996	0.000	1.601	3.708
=====						
Omnibus:	5.737		Durbin-Watson:		1.807	
Prob(Omnibus):	0.057		Jarque-Bera (JB):		5.187	
Skew:	-0.449		Prob(JB):		0.0747	
Kurtosis:	3.560		Cond. No.		156.	
=====						

Notes:

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

Regression: Seasonal 1991-2020

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SUMMER/WINTER SEASONAL DEVIATIONS for Silvrettagletscher 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 -0.770585 4.666698e-23 True
1 winter_pd 0.267049 4.606567e-03 True

Number of observations: 111

Regression Summary:

OLS Regression Results						
=====						
Dep. Variable:	annual mass balance (mm w.e.)			R-squared:	0.711	
Model:	OLS			Adj. R-squared:	0.706	
Method:	Least Squares			F-statistic:	133.1	
Date:	Wed, 17 Dec 2025			Prob (F-statistic):	7.26e-30	
Time:	20:25:13			Log-Likelihood:	-844.83	
No. Observations:	111			AIC:	1696.	
Df Residuals:	108			BIC:	1704.	
Df Model:	2					
Covariance Type:	nonrobust					
=====						
	coef	std err	t	P> t	[0.025	0.975]

const	-1013.8381	64.214	-15.788	0.000	-1141.121	-886.555
summer_td	-688.8103	44.513	-15.474	0.000	-777.043	-600.578
winter_pd	2.8348	0.427	6.631	0.000	1.987	3.682
=====						
Omnibus:	11.257		Durbin-Watson:		1.803	
Prob(Omnibus):	0.004		Jarque-Bera (JB):		11.758	
Skew:	-0.684		Prob(JB):		0.00280	
Kurtosis:	3.820		Cond. No.		173.	
=====						

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