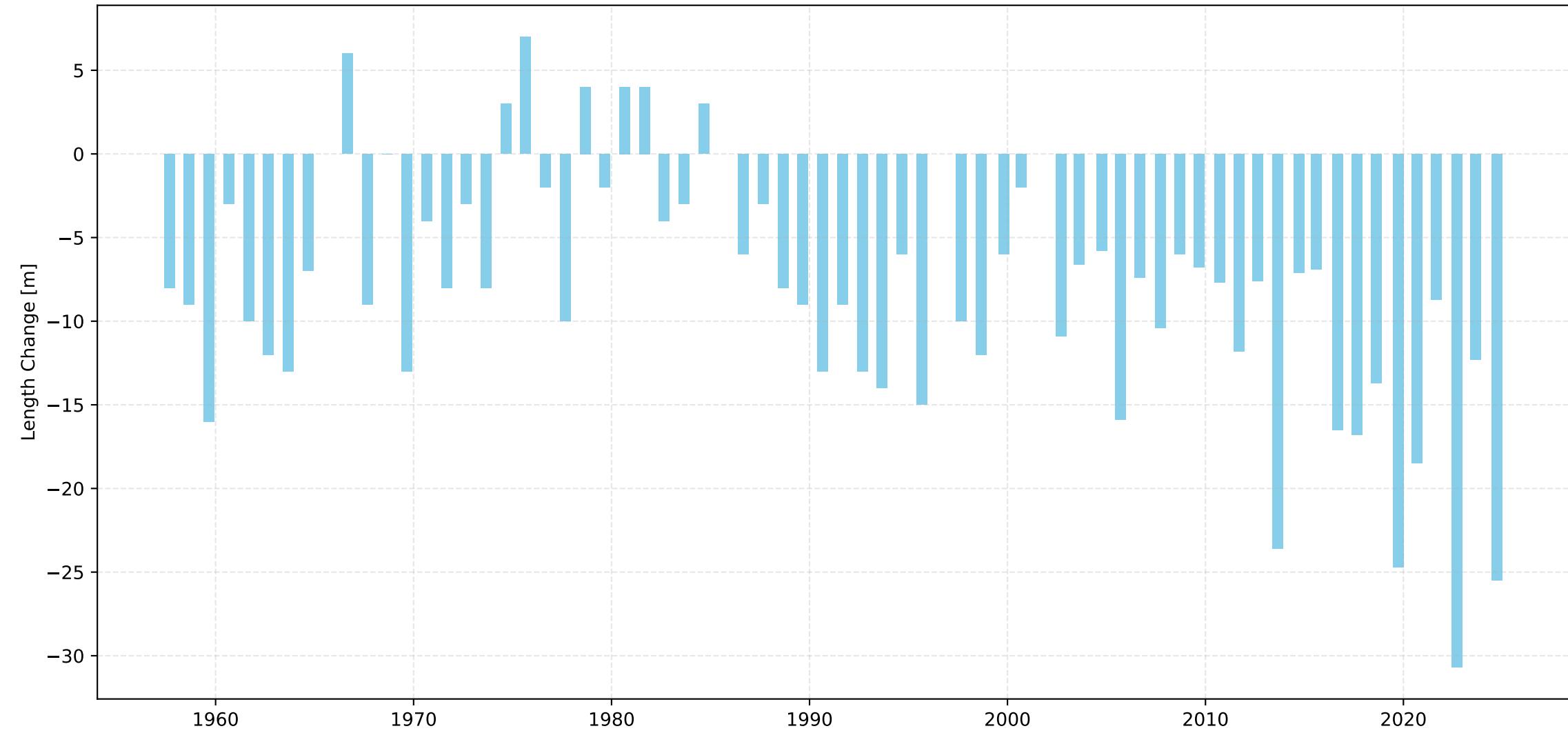
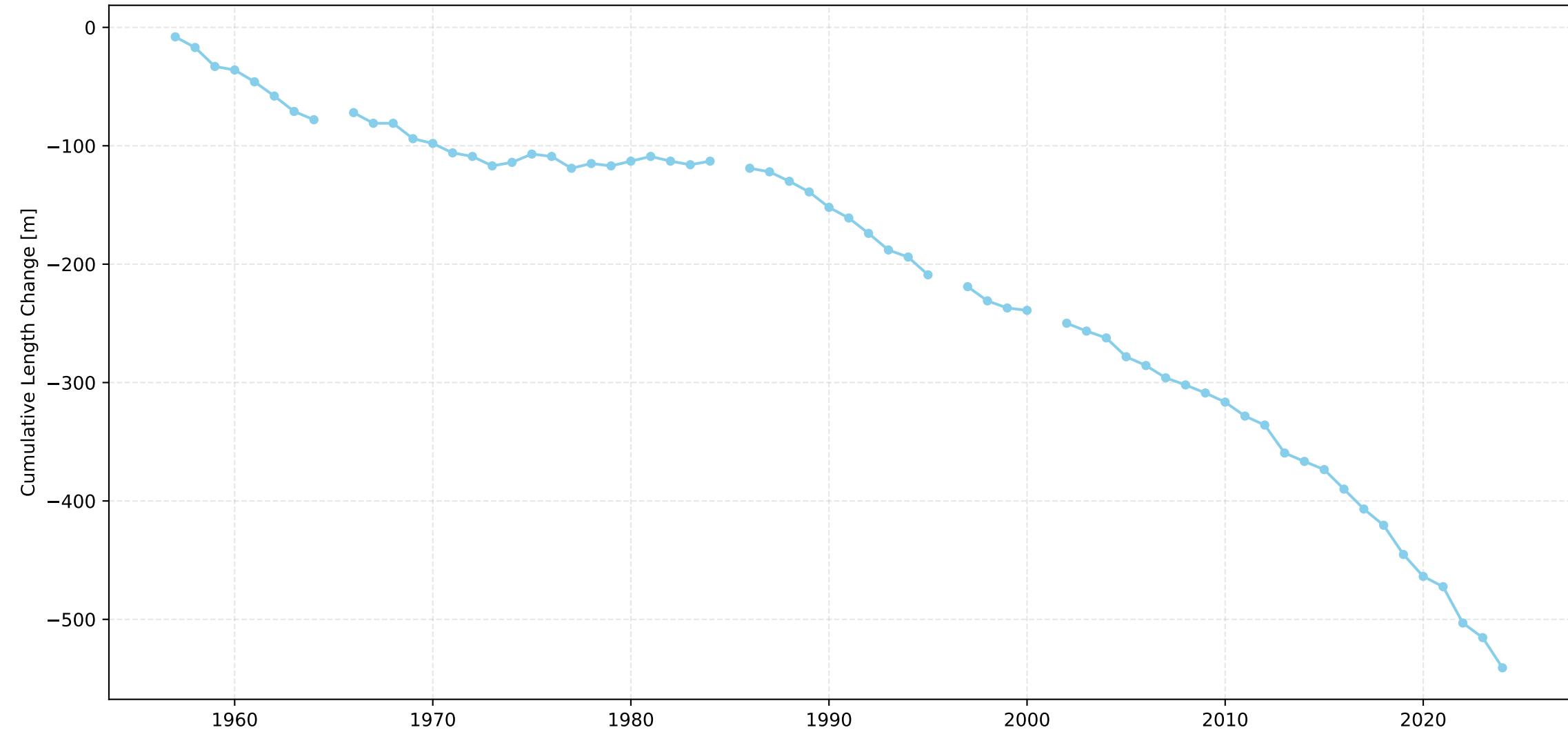


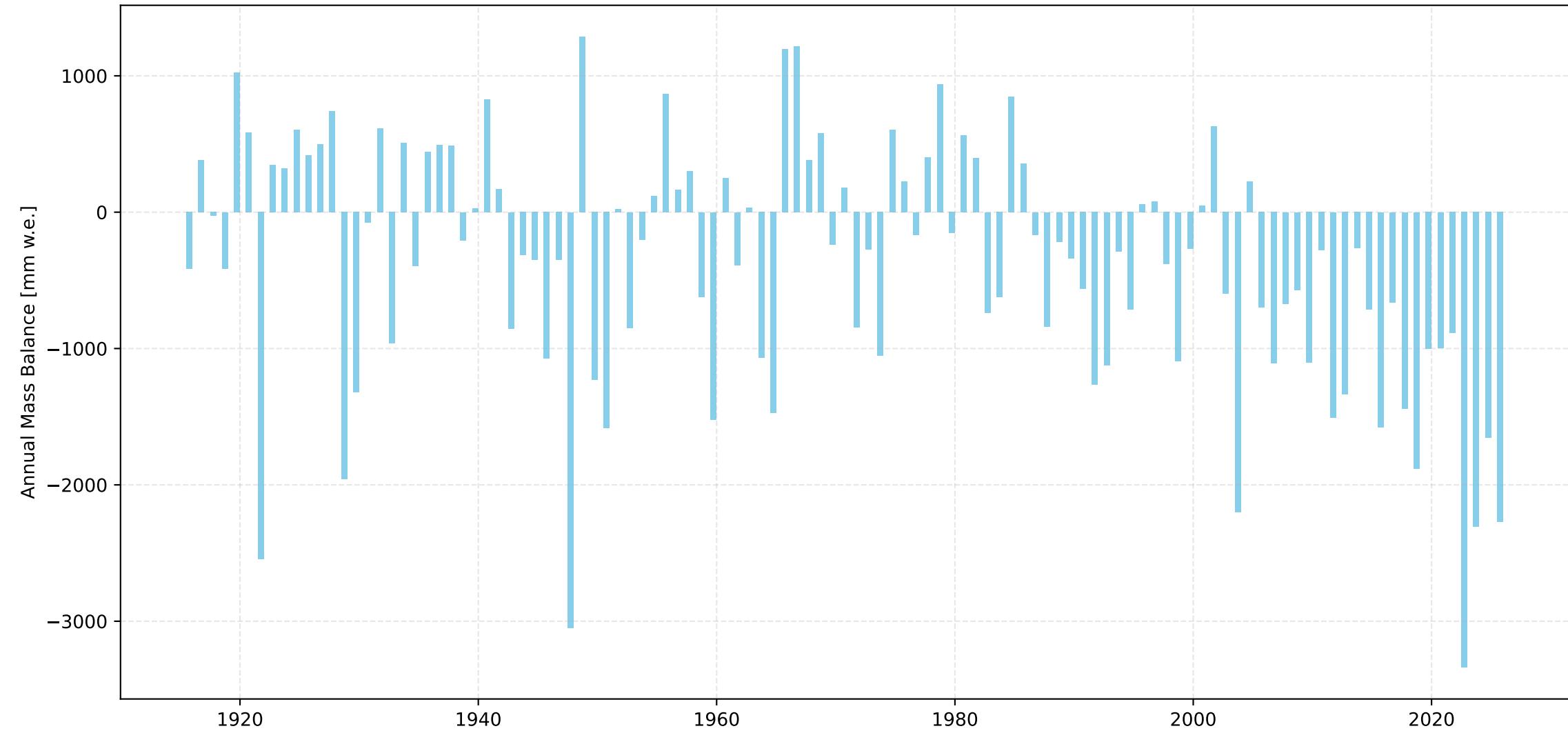
Silvrettagletscher Length Change Over Time



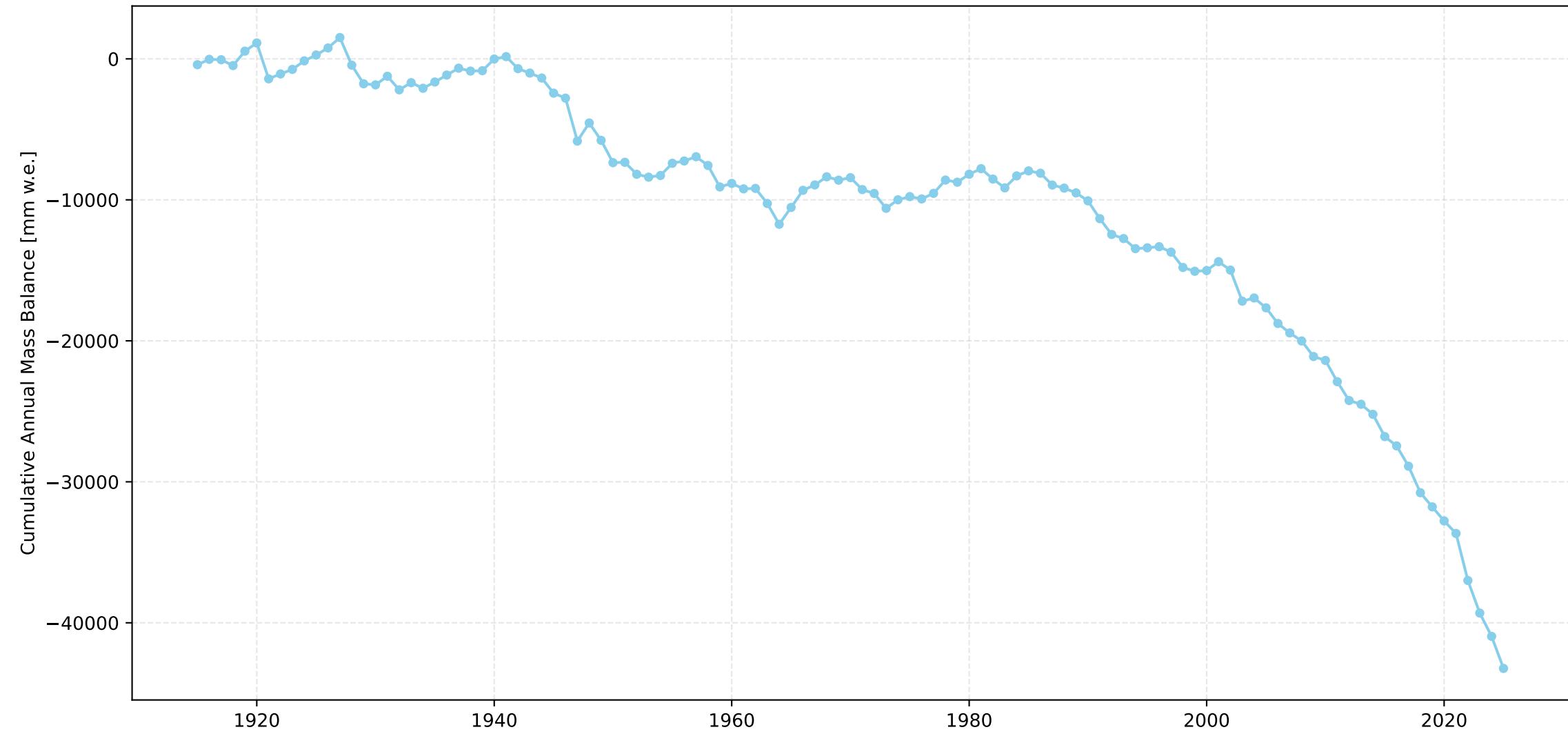
Silvrettagletscher Cumulative Length Change Over Time



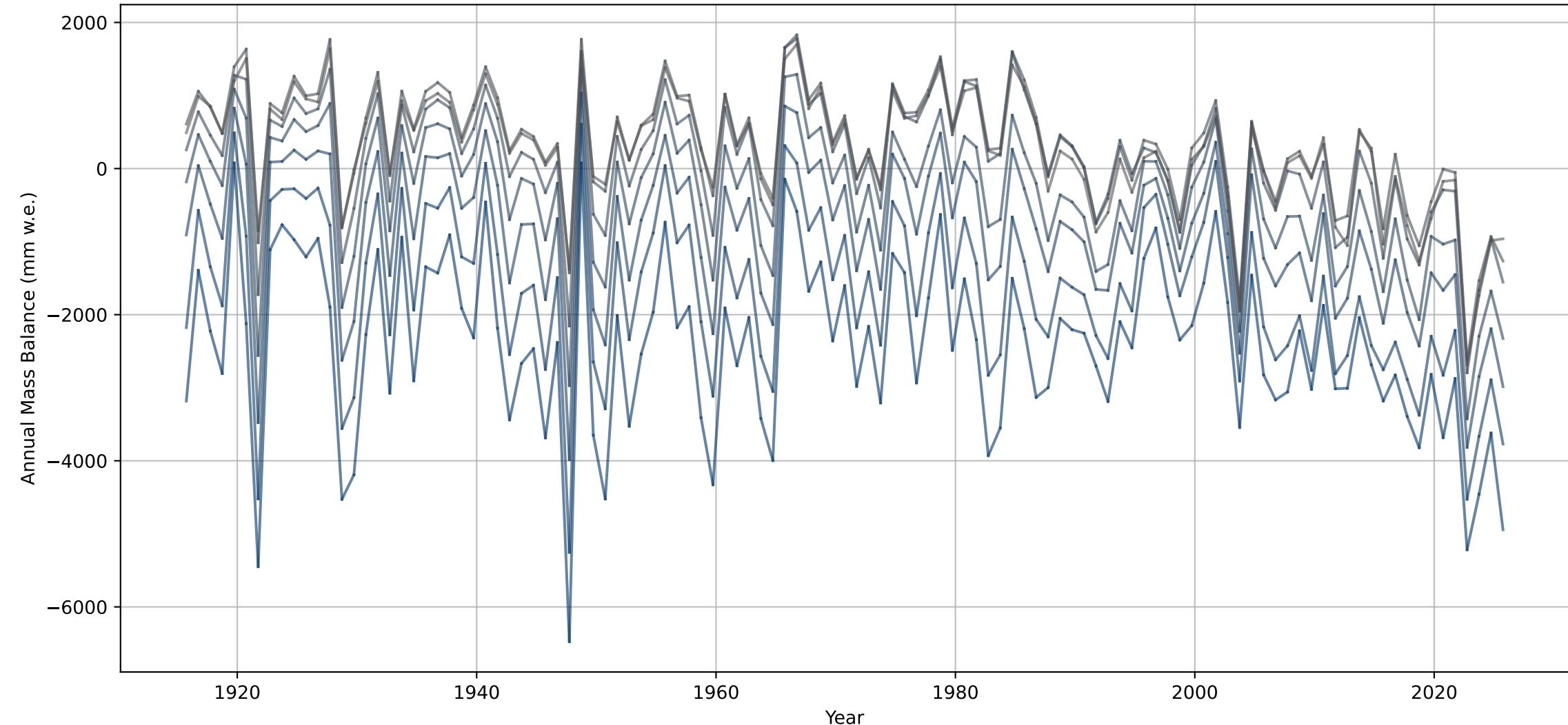
Silvrettagletscher Annual Mass Balance Over Time



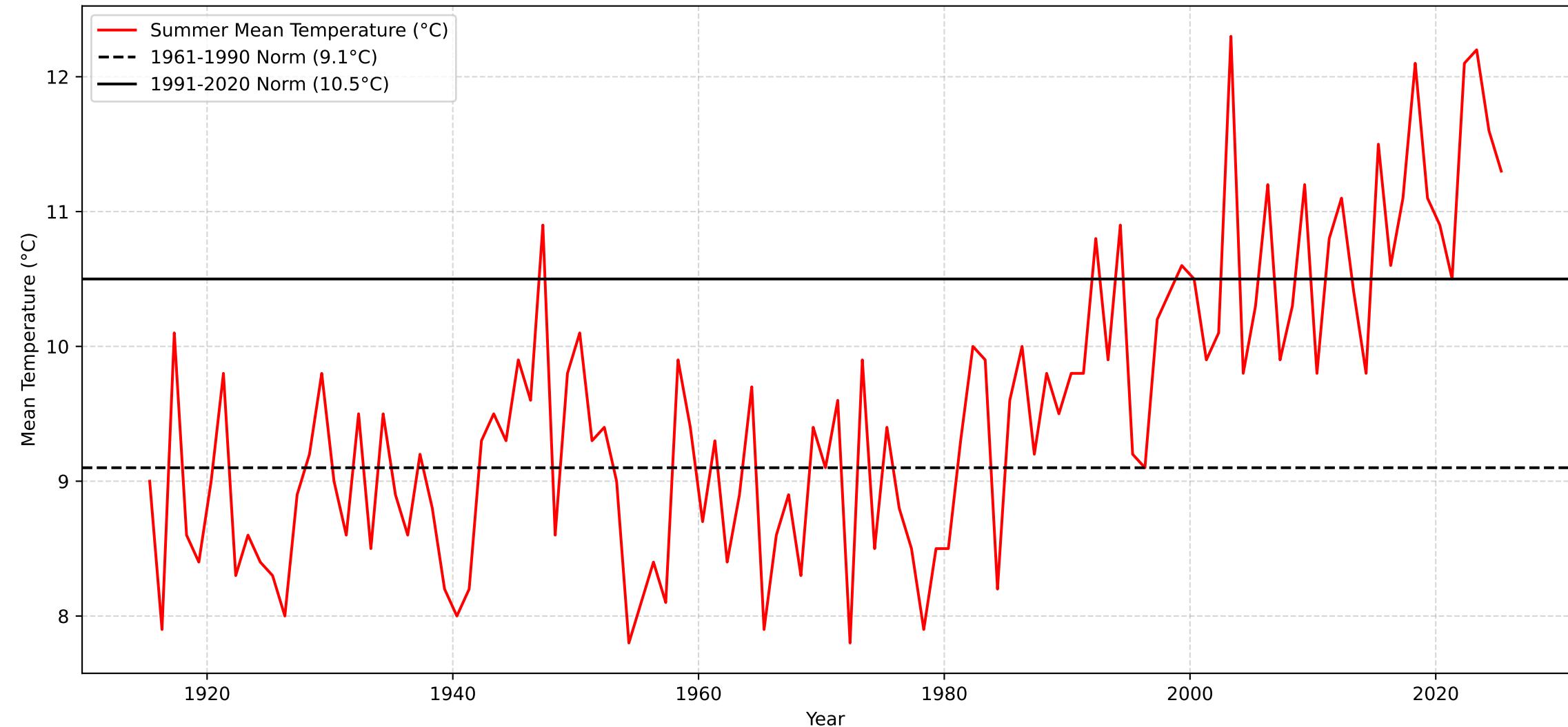
Silvrettagletscher Cumulative Annual Mass Balance Over Time



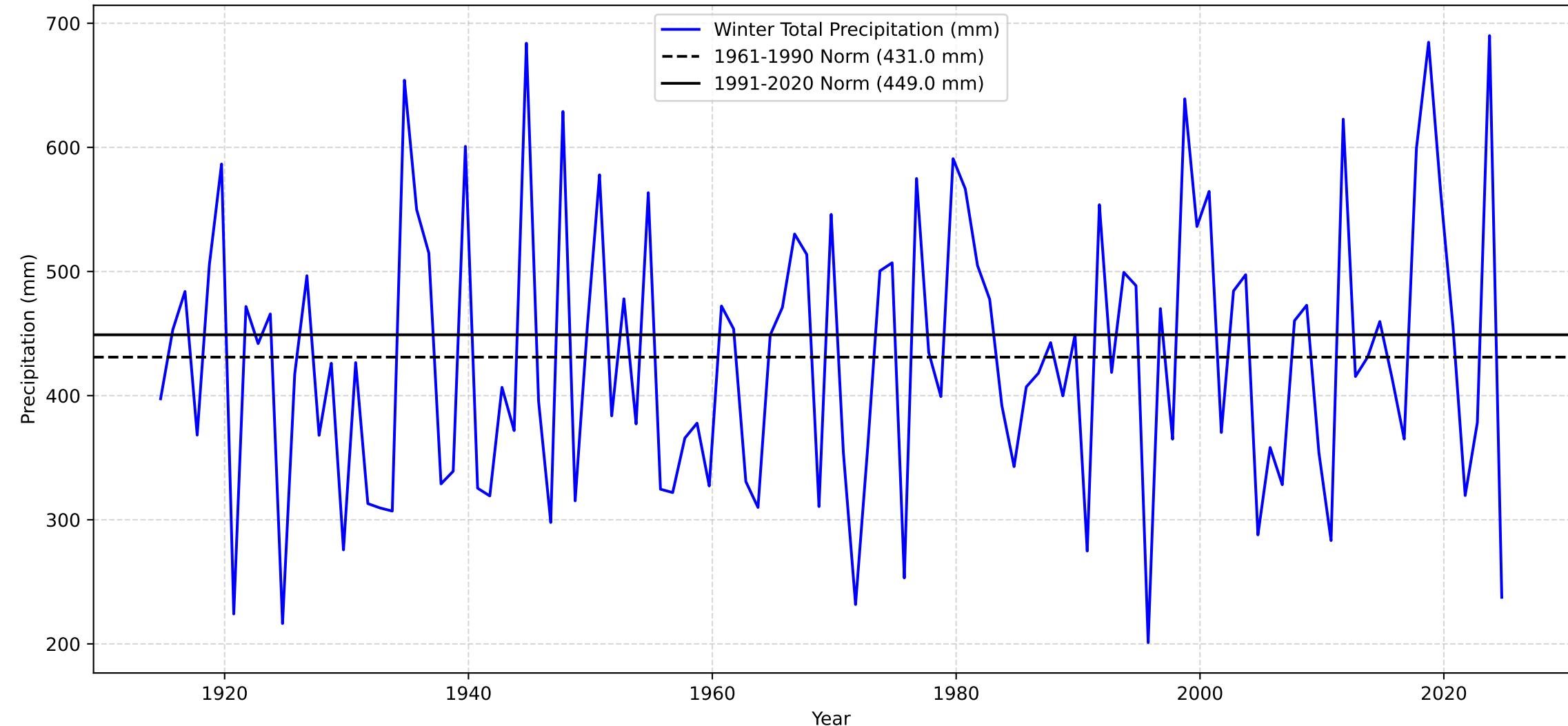
Annual Mass Balance for each Elevation Bin over Time - Silvrettagletscher



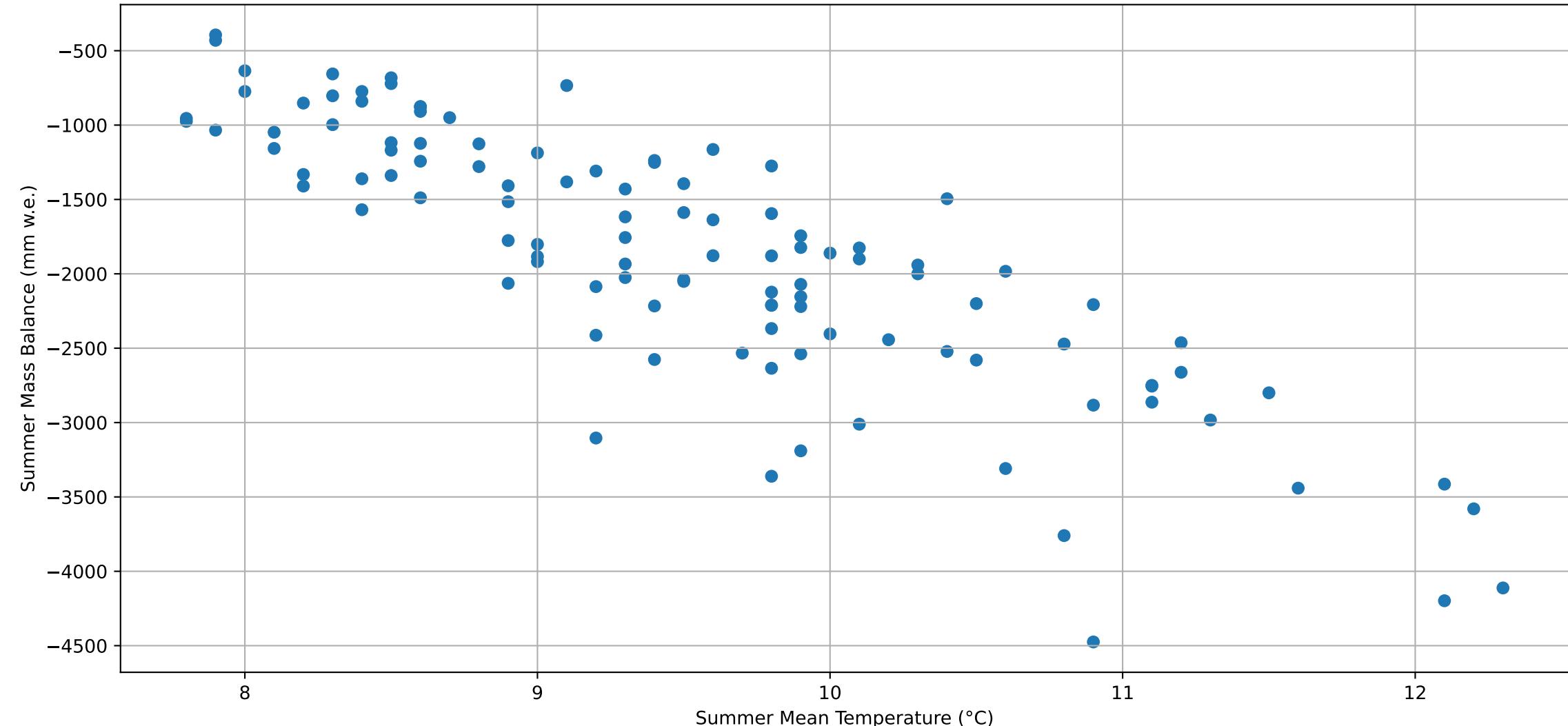
Davos Summer Mean Temperature



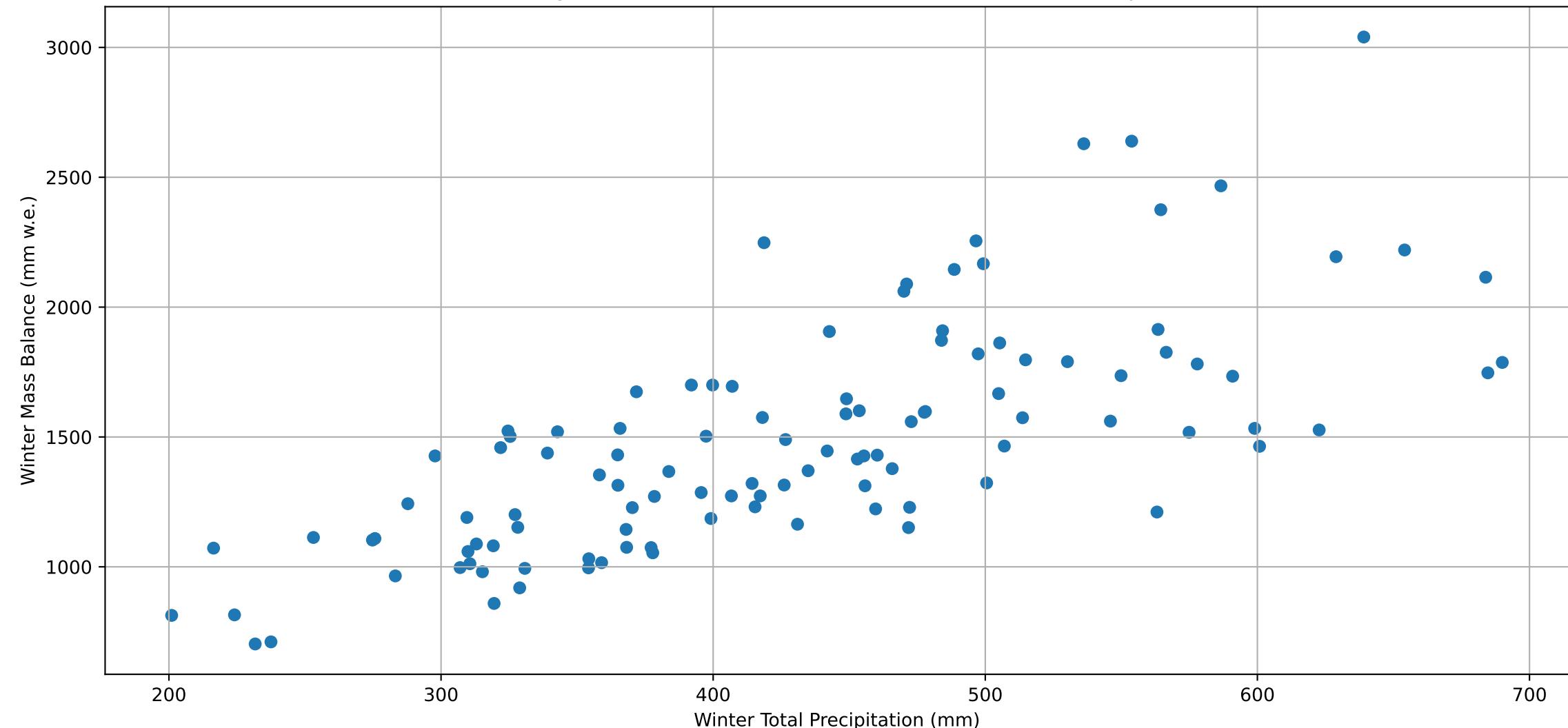
Davos Winter Total Precipitation



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
=====

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

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=====
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.