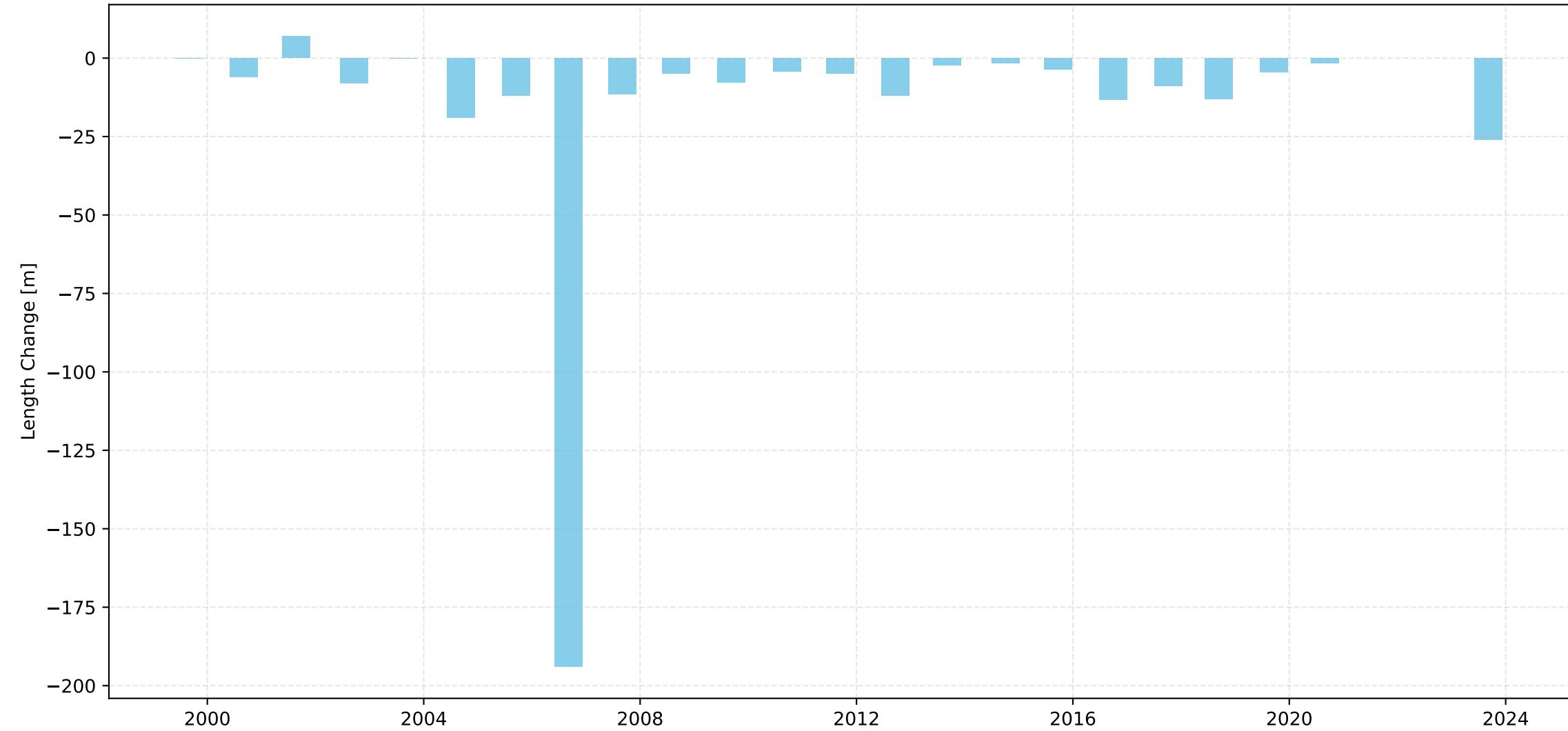
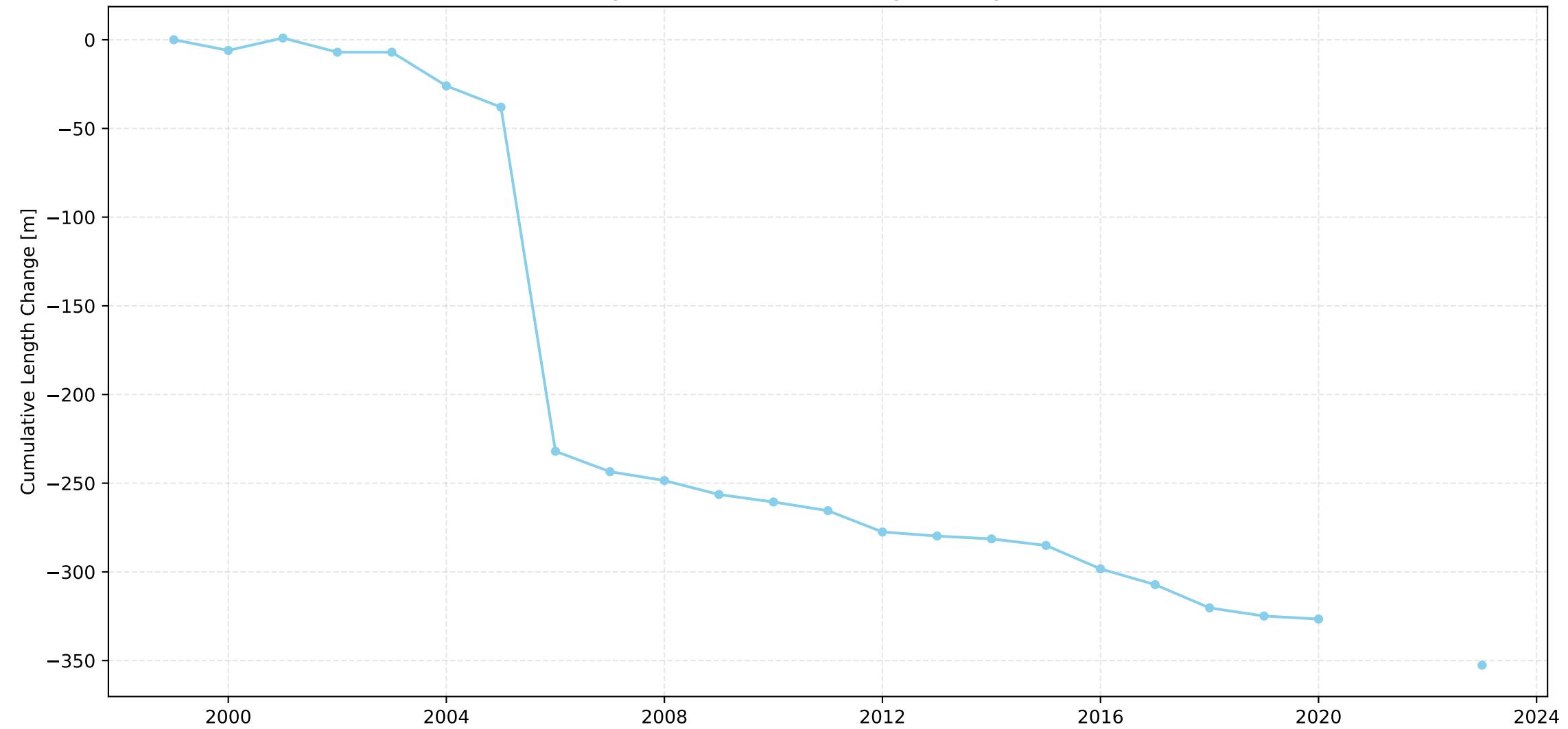


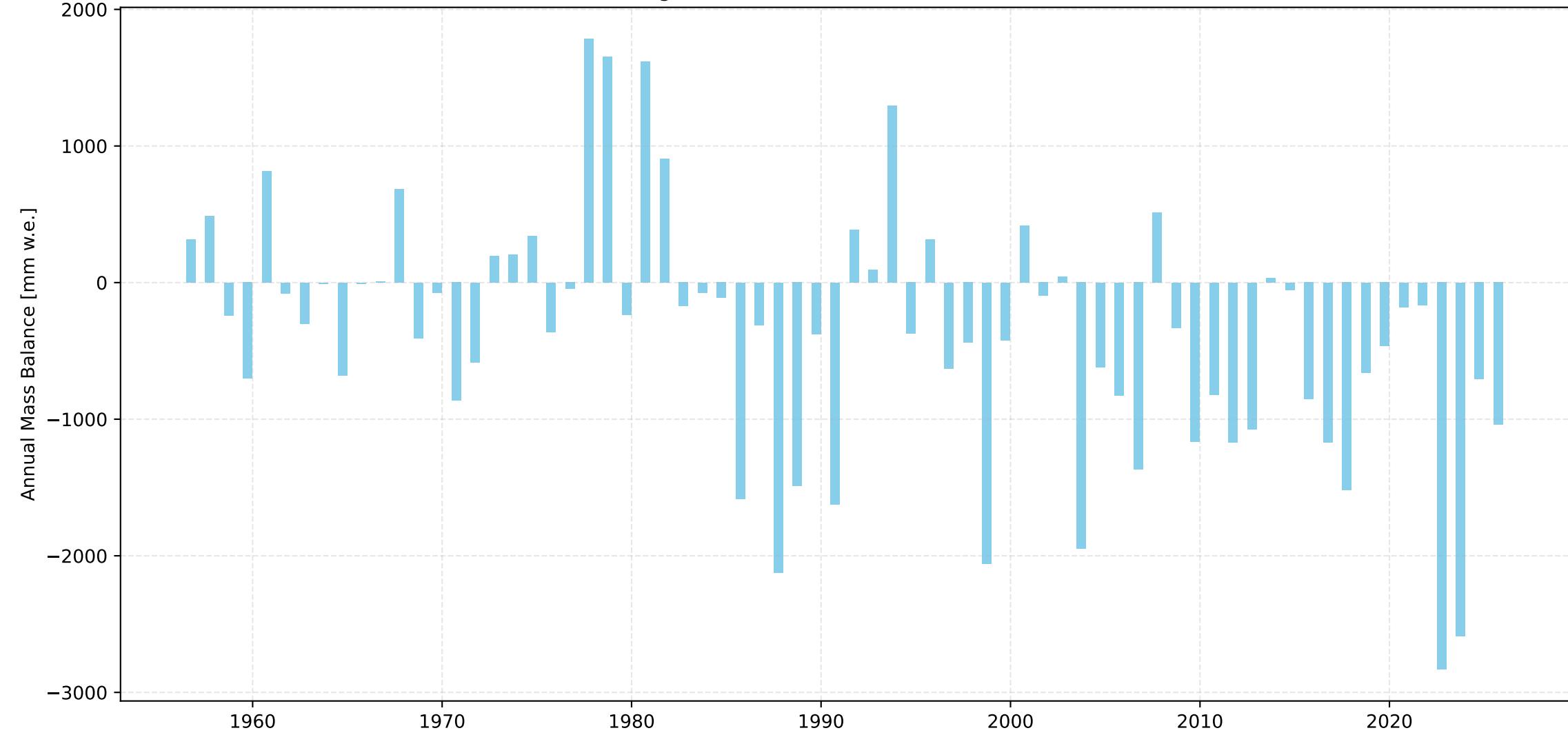
Hohlaubgletscher Length Change Over Time



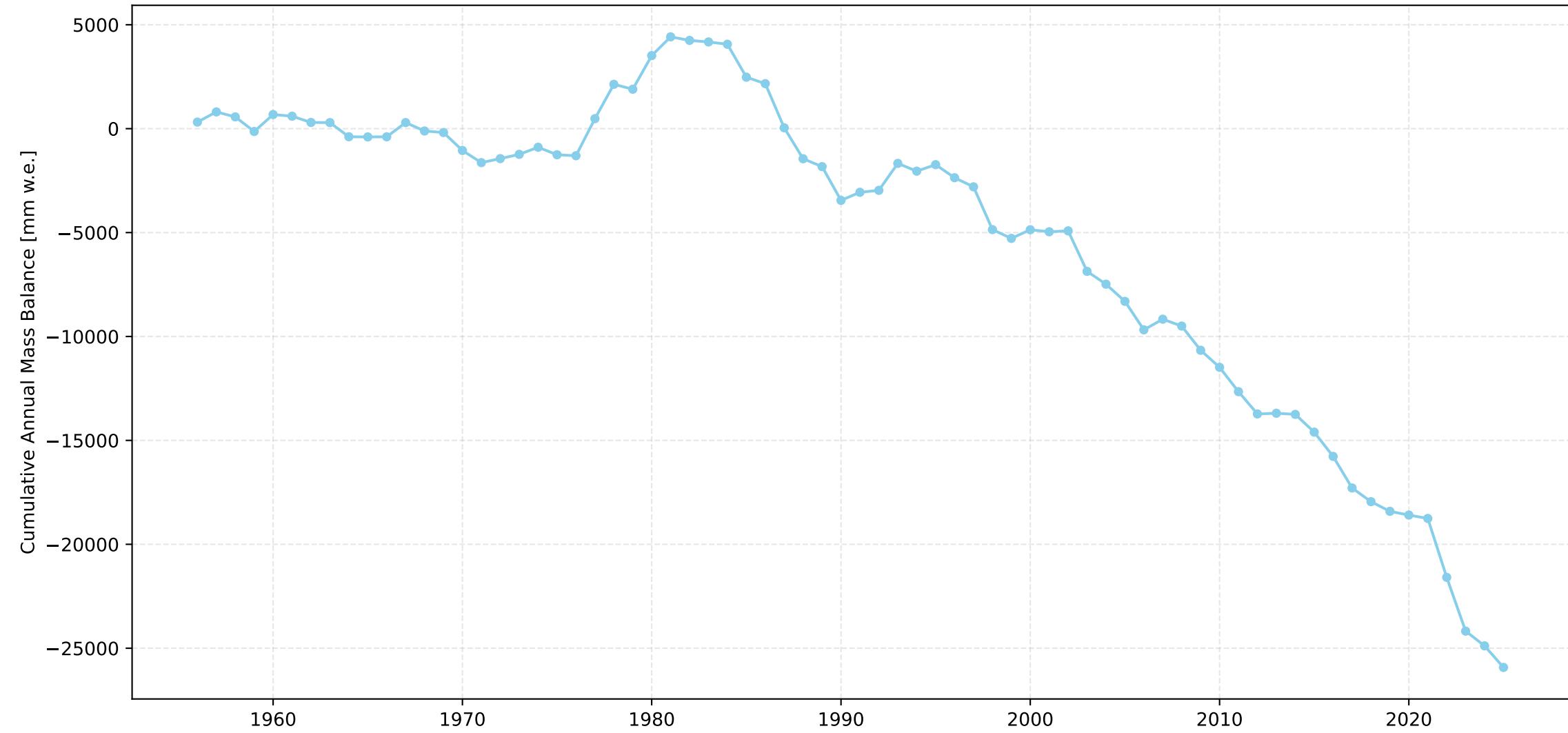
Hohlaubgletscher Cumulative Length Change Over Time



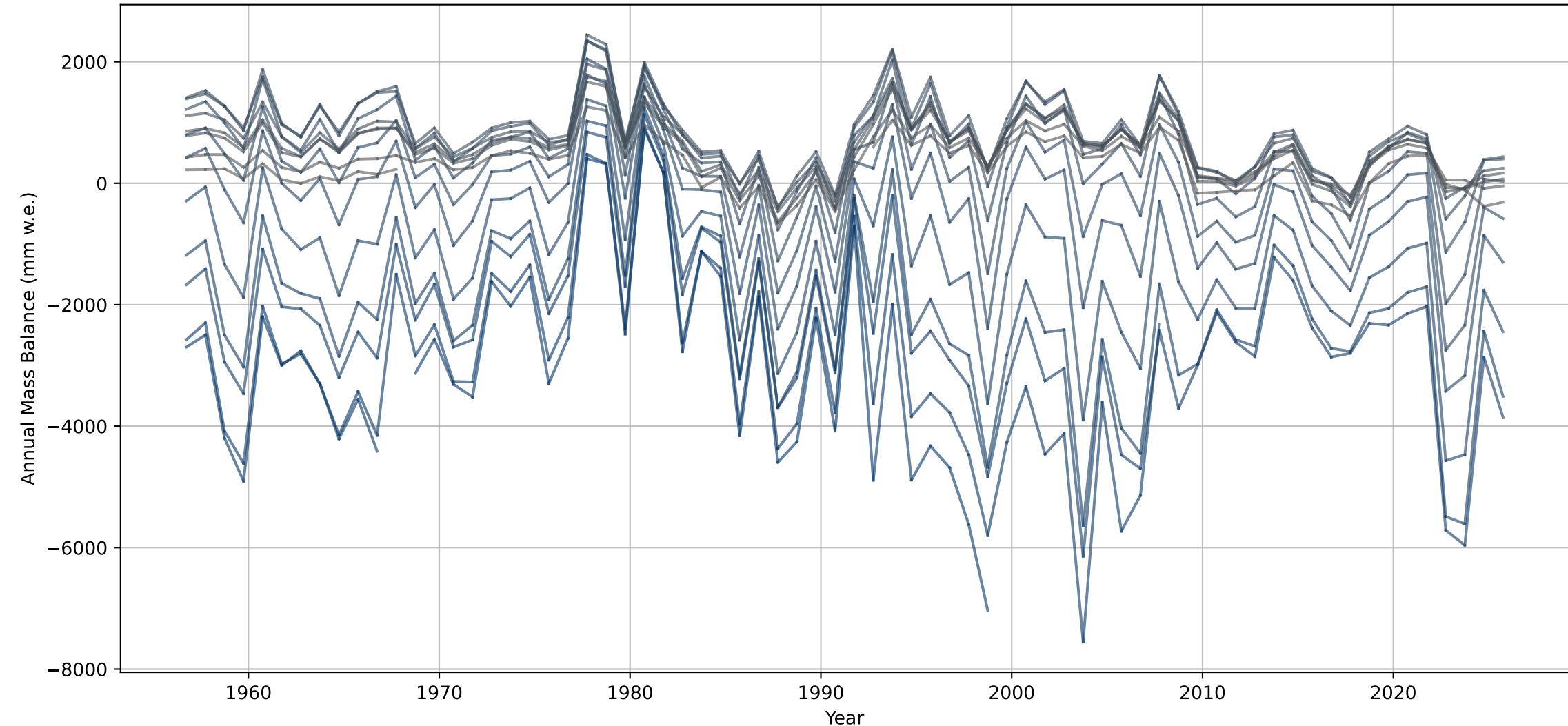
Hohlaubgletscher Annual Mass Balance Over Time



Hohlaubgletscher Cumulative Annual Mass Balance Over Time



Annual Mass Balance for each Elevation Bin over Time - Hohlaubgletscher



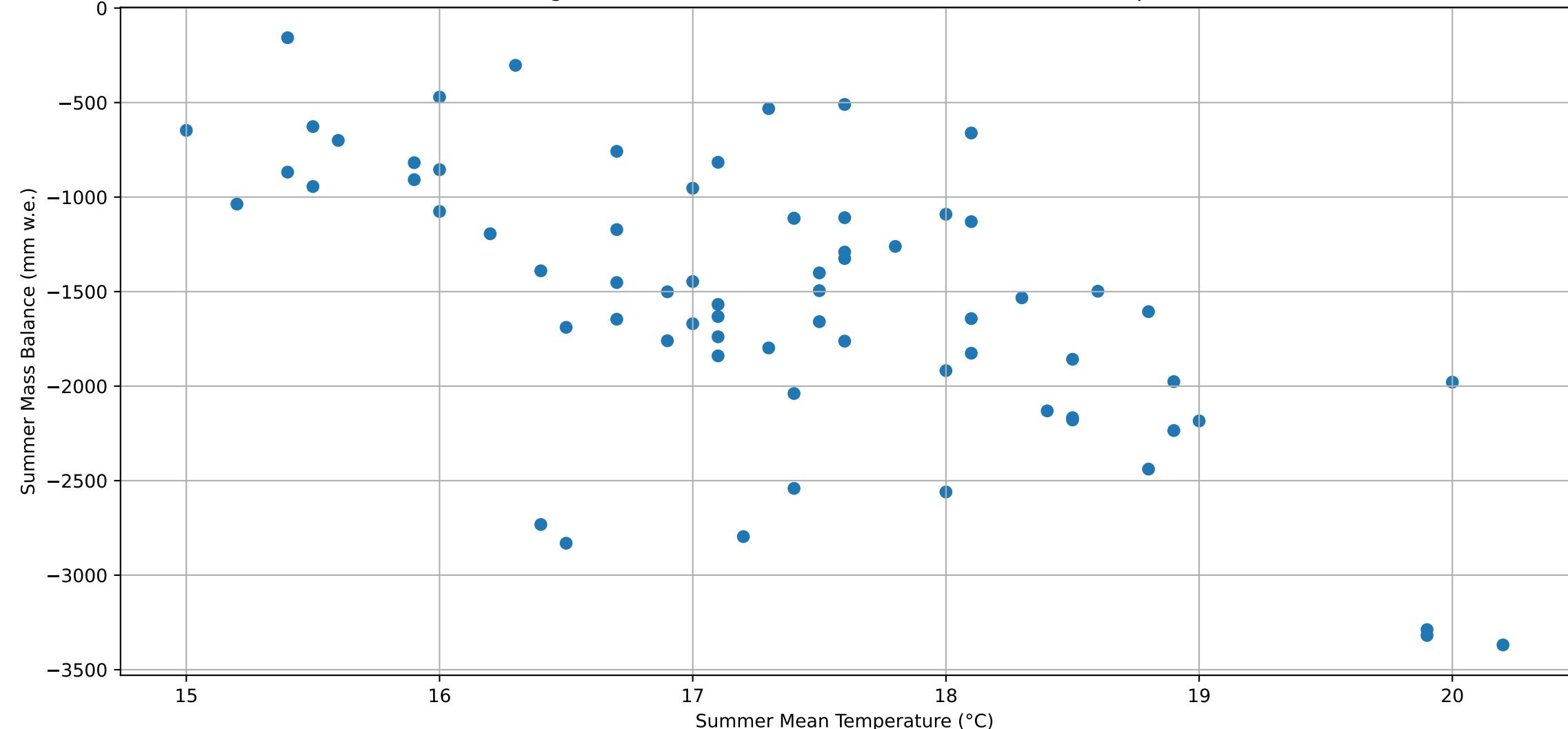
Sion Summer Mean Temperature



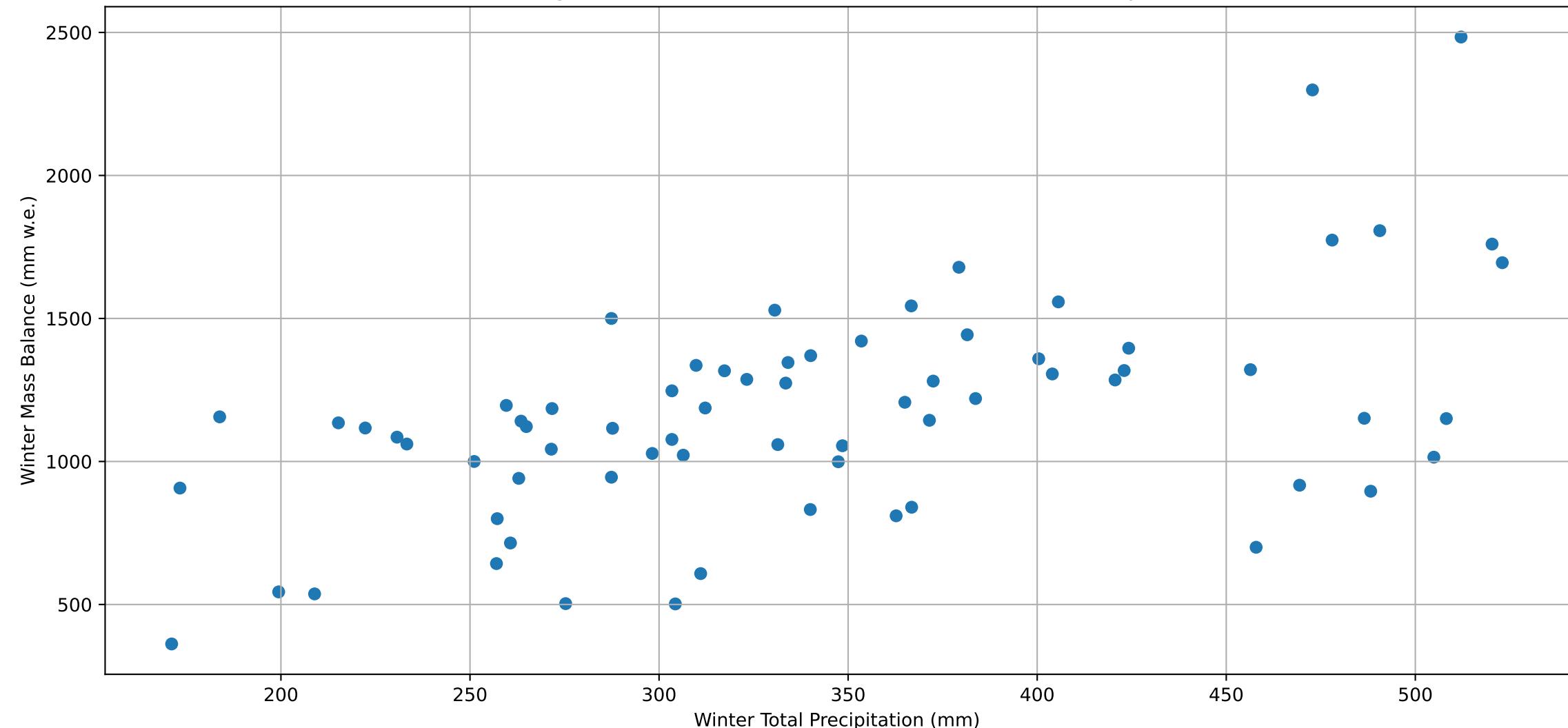
Sion Winter Total Precipitation



Hohlaubgletscher Summer Mass Balance with relation to Temperature



Hohlaubgletscher Winter Mass Balance with relation to Precipitation



Regression: Monthly 1961-1990

=====
MONTHLY DEVIATIONS for Hohlaubgletscher 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	-0.551877	7.340182e-07	True
3	august_td	-0.467402	4.515425e-05	True
1	june_td	-0.444657	1.150260e-04	True
4	september_td	-0.414801	3.566138e-04	True
0	may_td	-0.388732	8.821633e-04	True
5	october_pd	0.192638	1.101076e-01	False
9	february_pd	0.154829	2.006150e-01	False
11	april_pd	-0.141633	2.421798e-01	False
6	november_pd	0.101388	4.036308e-01	False
7	december_pd	0.082763	4.957804e-01	False
10	march_pd	0.064021	5.985187e-01	False
8	january_pd	0.014279	9.066076e-01	False

Number of observations: 70

Regression Summary:

OLS Regression Results

Dep. Variable:	annual mass balance (mm w.e.)	R-squared:	0.518
Model:	OLS	Adj. R-squared:	0.417
Method:	Least Squares	F-statistic:	5.105
Date:	Wed, 17 Dec 2025	Prob (F-statistic):	1.05e-05
Time:	14:27:36	Log-Likelihood:	-549.81
No. Observations:	70	AIC:	1126.
Df Residuals:	57	BIC:	1155.
Df Model:	12		
Covariance Type:	nonrobust		

	coef	std err	t	P> t	[0.025	0.975]
const	49.3592	107.418	0.460	0.648	-165.741	264.459
may_td	-51.7296	66.025	-0.783	0.437	-183.942	80.483
june_td	-16.4373	62.241	-0.264	0.793	-141.073	108.198
july_td	-161.9487	66.779	-2.425	0.018	-295.671	-28.226
august_td	-132.5787	78.796	-1.683	0.098	-290.364	25.207
september_td	-121.8690	62.697	-1.944	0.057	-247.418	3.680
october_pd	7.0823	3.071	2.306	0.025	0.932	13.232
november_pd	2.8305	2.282	1.240	0.220	-1.739	7.400
december_pd	4.4549	1.907	2.336	0.023	0.636	8.274
january_pd	0.6375	2.321	0.275	0.785	-4.010	5.285
february_pd	1.2869	1.802	0.714	0.478	-2.322	4.896
march_pd	-0.7323	2.653	-0.276	0.784	-6.045	4.581
april_pd	-4.2385	4.053	-1.046	0.300	-12.354	3.877

Omnibus:	3.799	Durbin-Watson:	1.573
Prob(Omnibus):	0.150	Jarque-Bera (JB):	3.408
Skew:	-0.540	Prob(JB):	0.182
Kurtosis:	3.006	Cond. No.	68.7

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

Regression: Optimal 1961-1990

=====
OPTIMAL SEASONAL DEVIATIONS for Hohlaubgletscher 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	-0.602347	3.457786e-08	True
1	opt_season_pd	0.272364	2.254596e-02	True

Number of observations: 70

Regression Summary:

OLS Regression Results

Dep. Variable:	annual mass balance (mm w.e.)	R-squared:	0.407
Model:	OLS	Adj. R-squared:	0.390
Method:	Least Squares	F-statistic:	23.04
Date:	Wed, 17 Dec 2025	Prob (F-statistic):	2.43e-08
Time:	14:27:36	Log-Likelihood:	-557.04
No. Observations:	70	AIC:	1120.
Df Residuals:	67	BIC:	1127.
Df Model:	2		
Covariance Type:	nonrobust		

	coef	std err	t	P> t	[0.025	0.975]
const	47.5984	105.330	0.452	0.653	-162.641	257.838
opt_season_td	-410.3203	66.837	-6.139	0.000	-543.727	-276.913
opt_season_pd	2.3534	1.047	2.247	0.028	0.263	4.444

Omnibus:	8.352	Durbin-Watson:	1.542
Prob(Omnibus):	0.015	Jarque-Bera (JB):	8.071
Skew:	-0.661	Prob(JB):	0.0177
Kurtosis:	4.009	Cond. No.	111.

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

Regression: Seasonal 1961-1990

```
=====
SUMMER/WINTER SEASONAL DEVIATIONS for Hohlaubgletscher 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	-0.630517	4.928413e-09	True
1 winter_pd	0.227639	5.806108e-02	False

Number of observations: 70

Regression Summary:

OLS Regression Results

Dep. Variable:	annual mass balance (mm w.e.)	R-squared:	0.434
Model:	OLS	Adj. R-squared:	0.417
Method:	Least Squares	F-statistic:	25.65
Date:	Wed, 17 Dec 2025	Prob (F-statistic):	5.35e-09
Time:	14:27:36	Log-Likelihood:	-555.45
No. Observations:	70	AIC:	1117.
Df Residuals:	67	BIC:	1124.
Df Model:	2		
Covariance Type:	nonrobust		

	coef	std err	t	P> t	[0.025	0.975]
const	87.4437	104.438	0.837	0.405	-121.015	295.902
summer_td	-474.8311	70.647	-6.721	0.000	-615.844	-333.818
winter_pd	1.8549	0.897	2.067	0.043	0.064	3.646

Omnibus:	6.635	Durbin-Watson:	1.541
Prob(Omnibus):	0.036	Jarque-Bera (JB):	5.868
Skew:	-0.605	Prob(JB):	0.0532
Kurtosis:	3.740	Cond. No.	132.

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

Regression: Monthly 1991-2020

=====
MONTHLY DEVIATIONS for Hohlaubgletscher 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	-0.551877	7.340182e-07	True
3	august_td	-0.467402	4.515425e-05	True
1	june_td	-0.444657	1.150260e-04	True
4	september_td	-0.414801	3.566138e-04	True
0	may_td	-0.388732	8.821633e-04	True
5	october_pd	0.192638	1.101076e-01	False
9	february_pd	0.154829	2.006150e-01	False
11	april_pd	-0.141633	2.421798e-01	False
6	november_pd	0.101388	4.036308e-01	False
7	december_pd	0.082763	4.957804e-01	False
10	march_pd	0.064021	5.985187e-01	False
8	january_pd	0.014279	9.066076e-01	False

Number of observations: 70

Regression Summary:

OLS Regression Results

Dep. Variable:	annual mass balance (mm w.e.)	R-squared:	0.518
Model:	OLS	Adj. R-squared:	0.417
Method:	Least Squares	F-statistic:	5.105
Date:	Wed, 17 Dec 2025	Prob (F-statistic):	1.05e-05
Time:	14:27:36	Log-Likelihood:	-549.81
No. Observations:	70	AIC:	1126.
Df Residuals:	57	BIC:	1155.
Df Model:	12		
Covariance Type:	nonrobust		

	coef	std err	t	P> t	[0.025	0.975]
const	-761.0987	100.998	-7.536	0.000	-963.343	-558.854
may_td	-51.7296	66.025	-0.783	0.437	-183.942	80.483
june_td	-16.4373	62.241	-0.264	0.793	-141.073	108.198
july_td	-161.9487	66.779	-2.425	0.018	-295.671	-28.226
august_td	-132.5787	78.796	-1.683	0.098	-290.364	25.207
september_td	-121.8690	62.697	-1.944	0.057	-247.418	3.680
october_pd	7.0823	3.071	2.306	0.025	0.932	13.232
november_pd	2.8305	2.282	1.240	0.220	-1.739	7.400
december_pd	4.4549	1.907	2.336	0.023	0.636	8.274
january_pd	0.6375	2.321	0.275	0.785	-4.010	5.285
february_pd	1.2869	1.802	0.714	0.478	-2.322	4.896
march_pd	-0.7323	2.653	-0.276	0.784	-6.045	4.581
april_pd	-4.2385	4.053	-1.046	0.300	-12.354	3.877

Omnibus:	3.799	Durbin-Watson:	1.573
Prob(Omnibus):	0.150	Jarque-Bera (JB):	3.408
Skew:	-0.540	Prob(JB):	0.182
Kurtosis:	3.006	Cond. No.	65.8

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

Regression: Optimal 1991-2020

```
=====
OPTIMAL SEASONAL DEVIATIONS for Hohlaubgletscher 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	-0.605611	2.786038e-08	True
1	opt_season_pd	0.272364	2.254596e-02	True

Number of observations: 70

Regression Summary:

OLS Regression Results

Dep. Variable:	annual mass balance (mm w.e.)	R-squared:	0.409
Model:	OLS	Adj. R-squared:	0.392
Method:	Least Squares	F-statistic:	23.21
Date:	Wed, 17 Dec 2025	Prob (F-statistic):	2.19e-08
Time:	14:27:36	Log-Likelihood:	-556.93
No. Observations:	70	AIC:	1120.
Df Residuals:	67	BIC:	1127.
Df Model:	2		
Covariance Type:	nonrobust		

	coef	std err	t	P> t	[0.025	0.975]
const	-749.6822	101.557	-7.382	0.000	-952.390	-546.974
opt_season_td	-414.5566	67.243	-6.165	0.000	-548.774	-280.339
opt_season_pd	2.2984	1.047	2.196	0.032	0.209	4.387

Omnibus:	7.664	Durbin-Watson:	1.534
Prob(Omnibus):	0.022	Jarque-Bera (JB):	7.203
Skew:	-0.628	Prob(JB):	0.0273
Kurtosis:	3.944	Cond. No.	107.

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

Regression: Seasonal 1991-2020

```
=====
SUMMER/WINTER SEASONAL DEVIATIONS for Hohlaubgletscher 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	-0.628791	5.584849e-09	True
1 winter_pd	0.227639	5.806108e-02	False

Number of observations: 70

Regression Summary:

OLS Regression Results

Dep. Variable:	annual mass balance (mm w.e.)	R-squared:	0.431
Model:	OLS	Adj. R-squared:	0.414
Method:	Least Squares	F-statistic:	25.33
Date:	Wed, 17 Dec 2025	Prob (F-statistic):	6.41e-09
Time:	14:27:36	Log-Likelihood:	-555.64
No. Observations:	70	AIC:	1117.
Df Residuals:	67	BIC:	1124.
Df Model:	2		
Covariance Type:	nonrobust		

	coef	std err	t	P> t	[0.025	0.975]
const	-763.8050	99.610	-7.668	0.000	-962.627	-564.983
summer_td	-472.5222	70.779	-6.676	0.000	-613.797	-331.247
winter_pd	1.8323	0.900	2.036	0.046	0.036	3.629

Omnibus:	6.431	Durbin-Watson:	1.533
Prob(Omnibus):	0.040	Jarque-Bera (JB):	5.631
Skew:	-0.599	Prob(JB):	0.0599
Kurtosis:	3.704	Cond. No.	124.

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