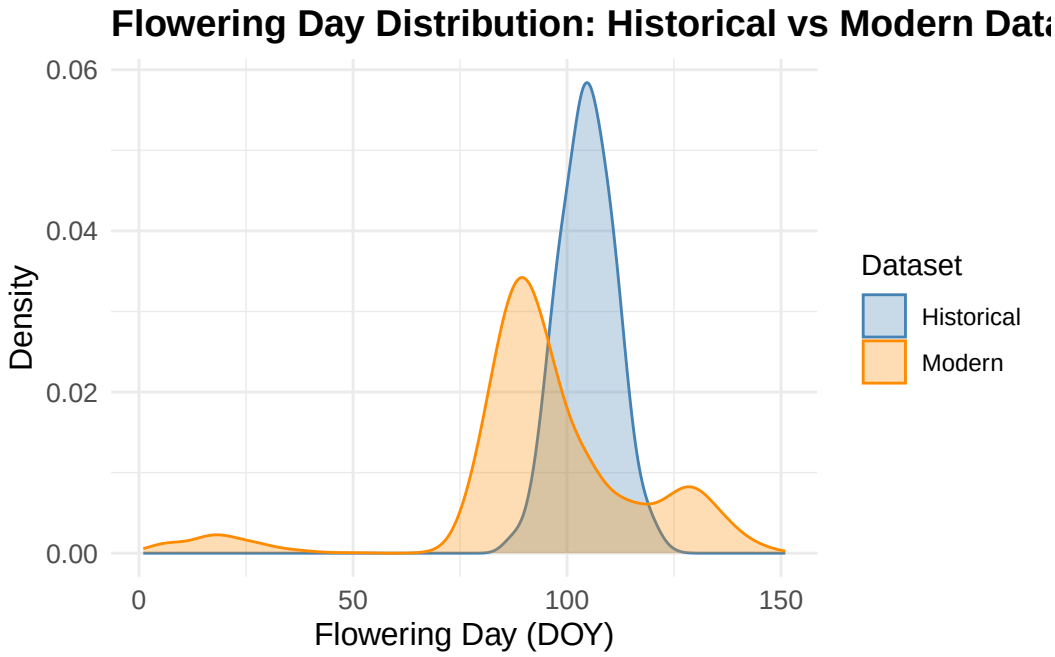
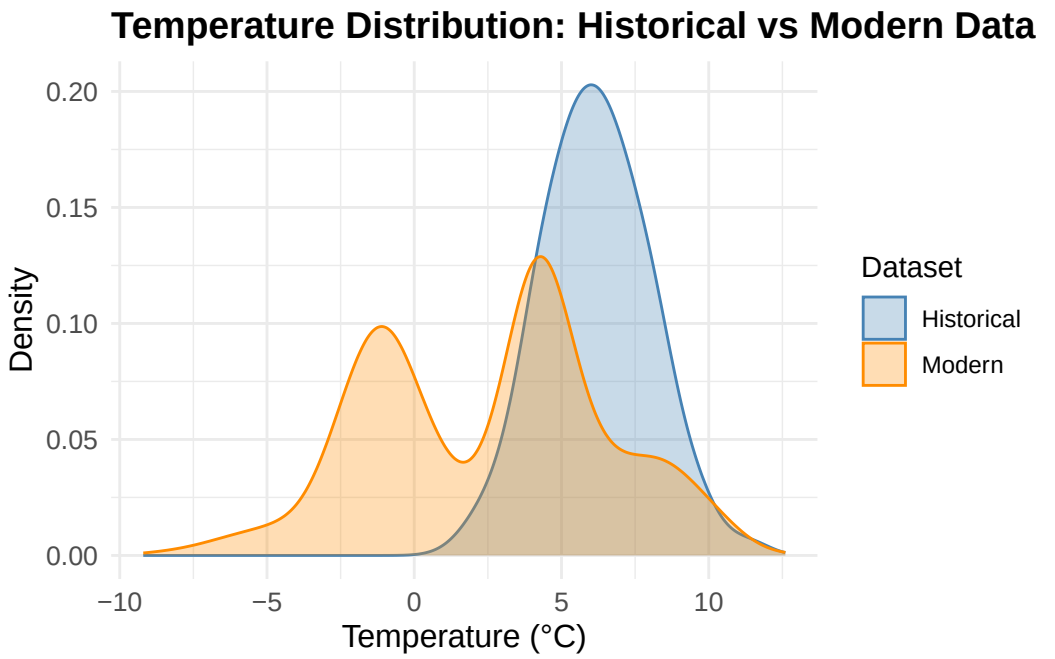
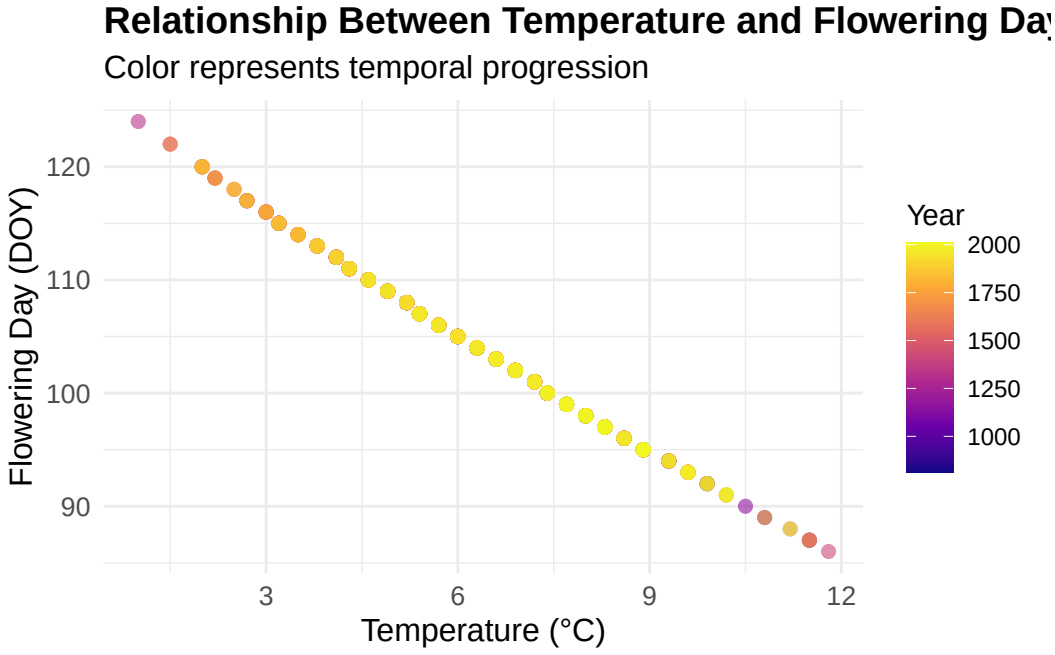
Table of contents



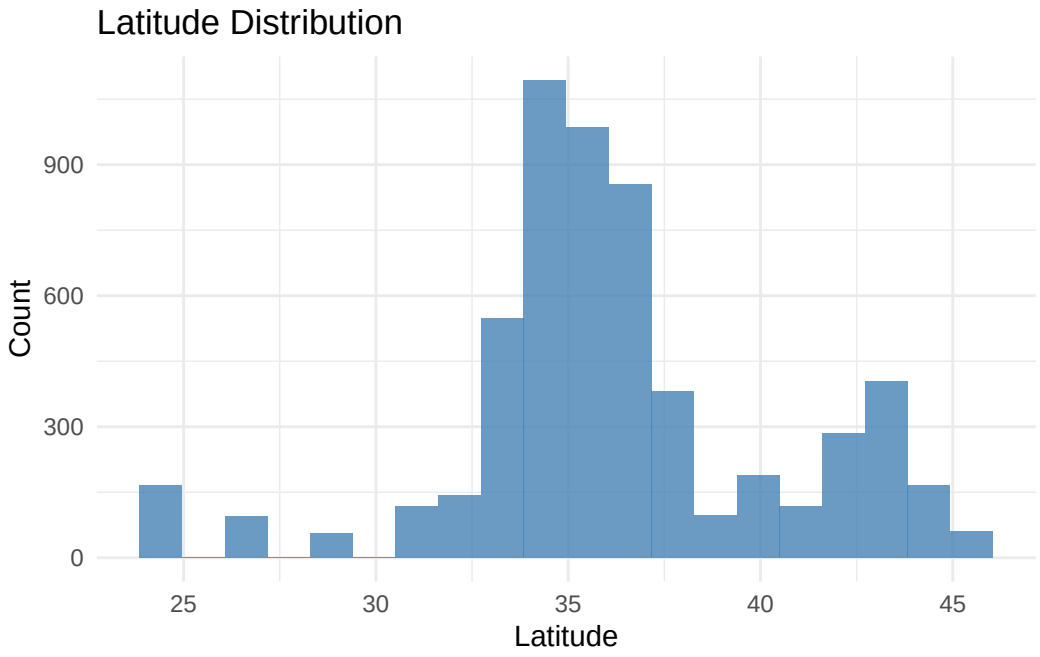
2.4 Predictor Variables

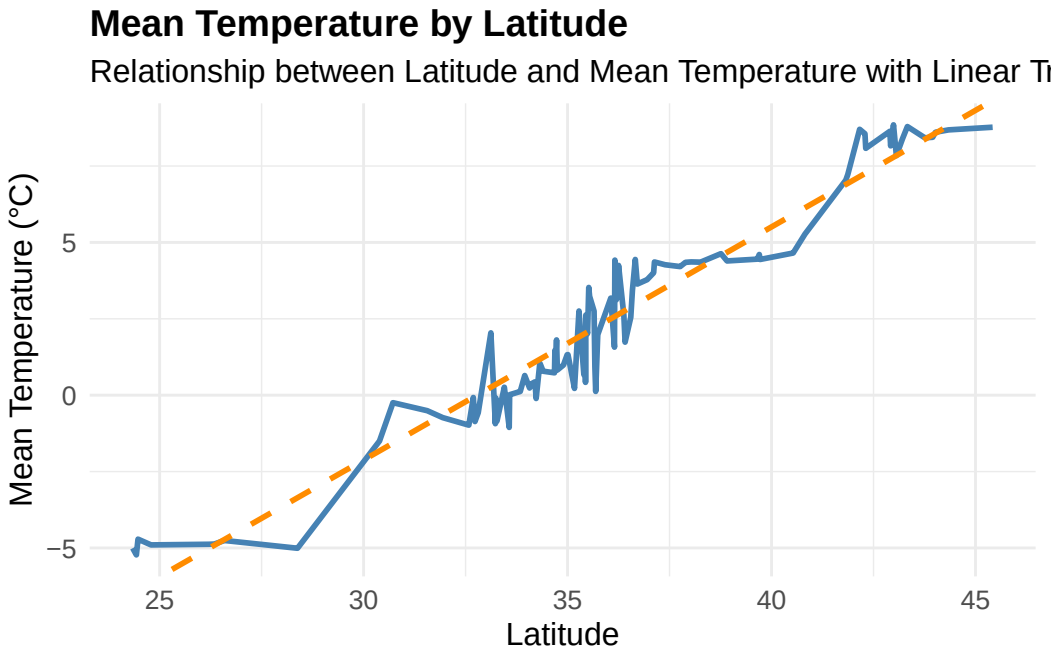
2.4.1 Temperature

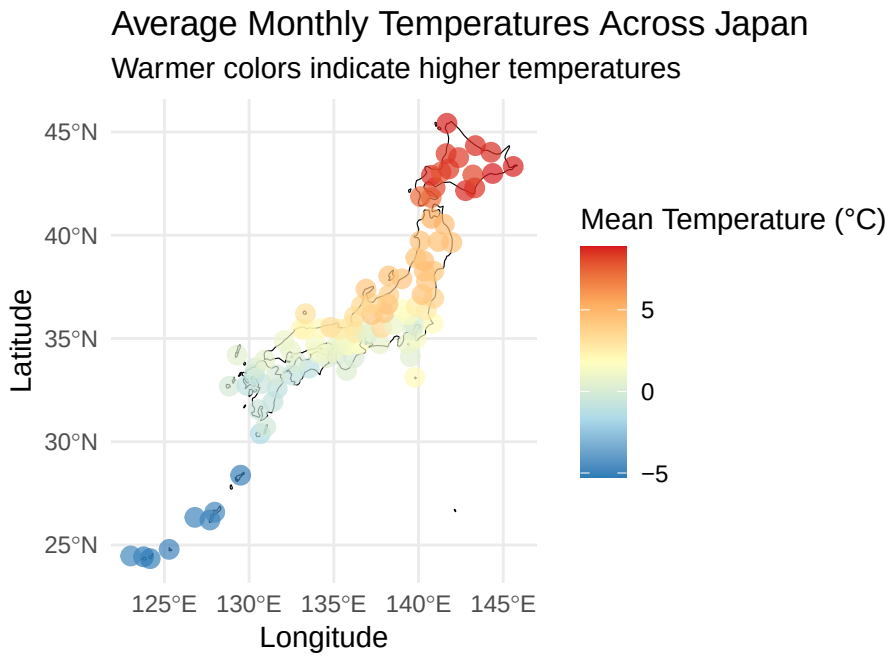




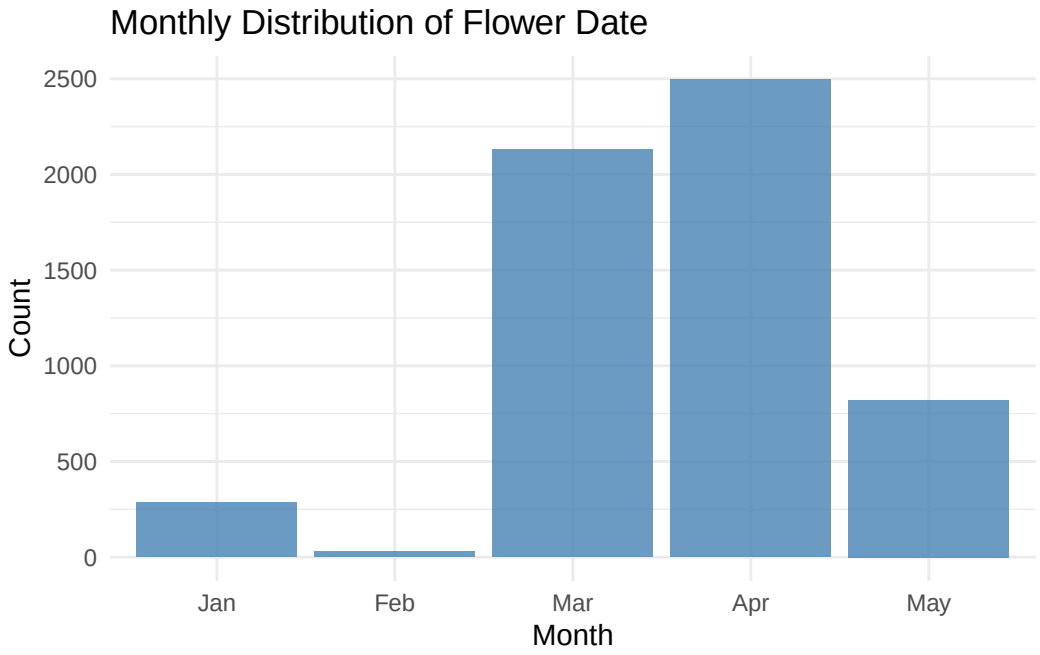
2.4.2 Latitude

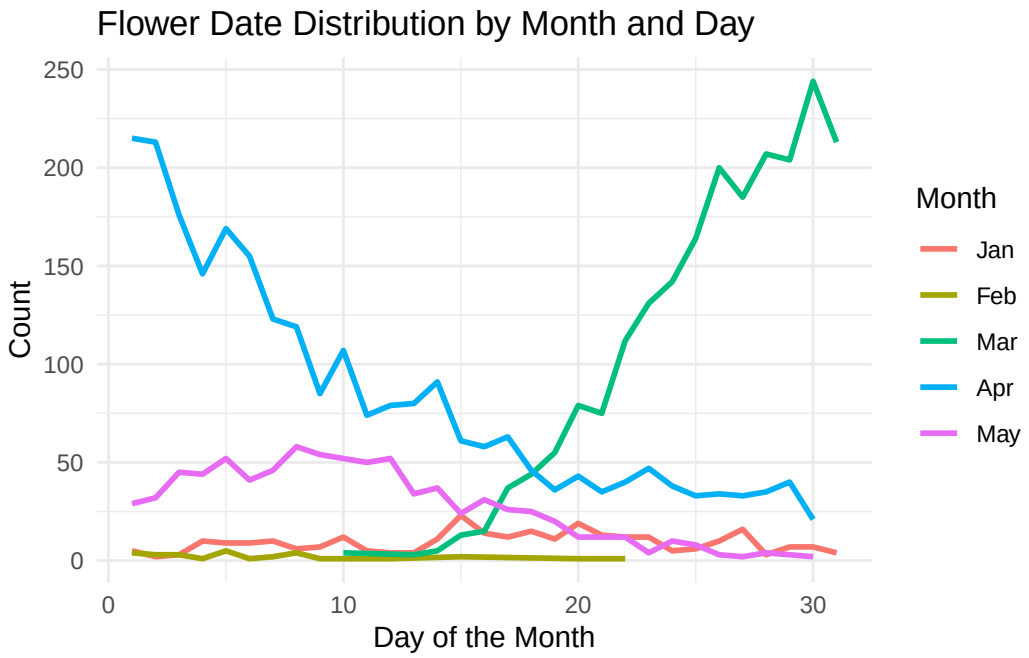


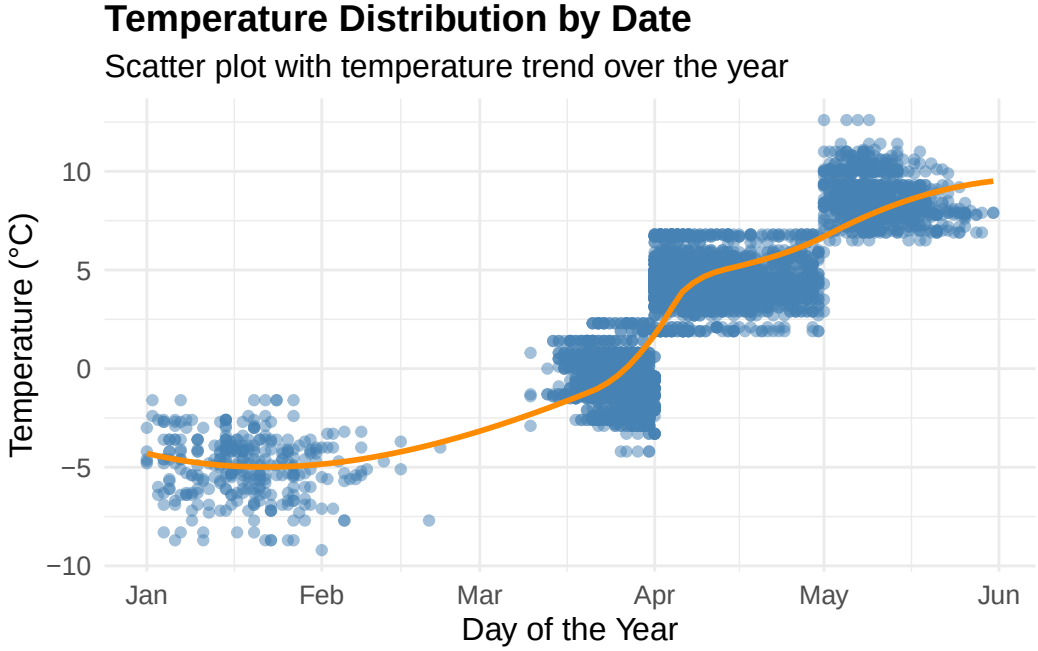


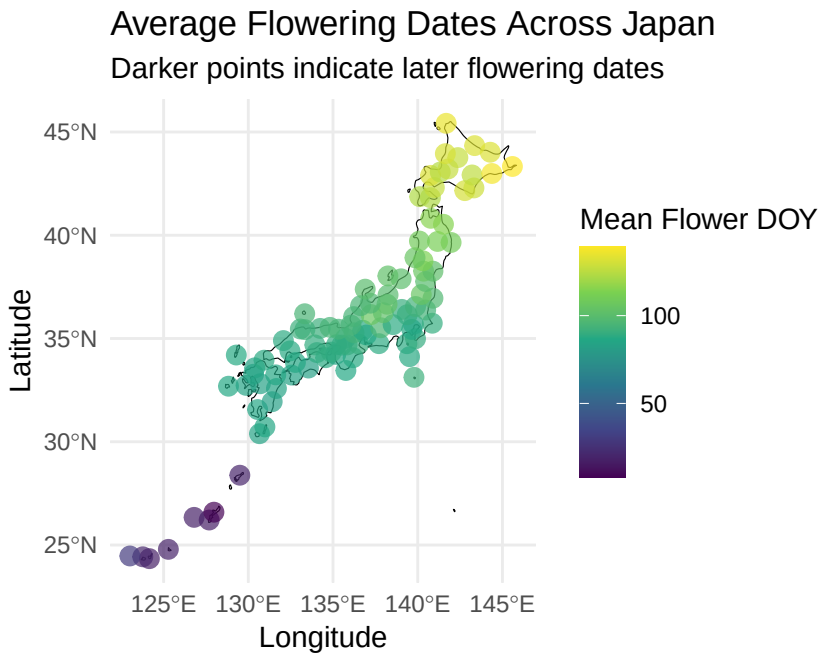


2.4.3 Time of Blossom



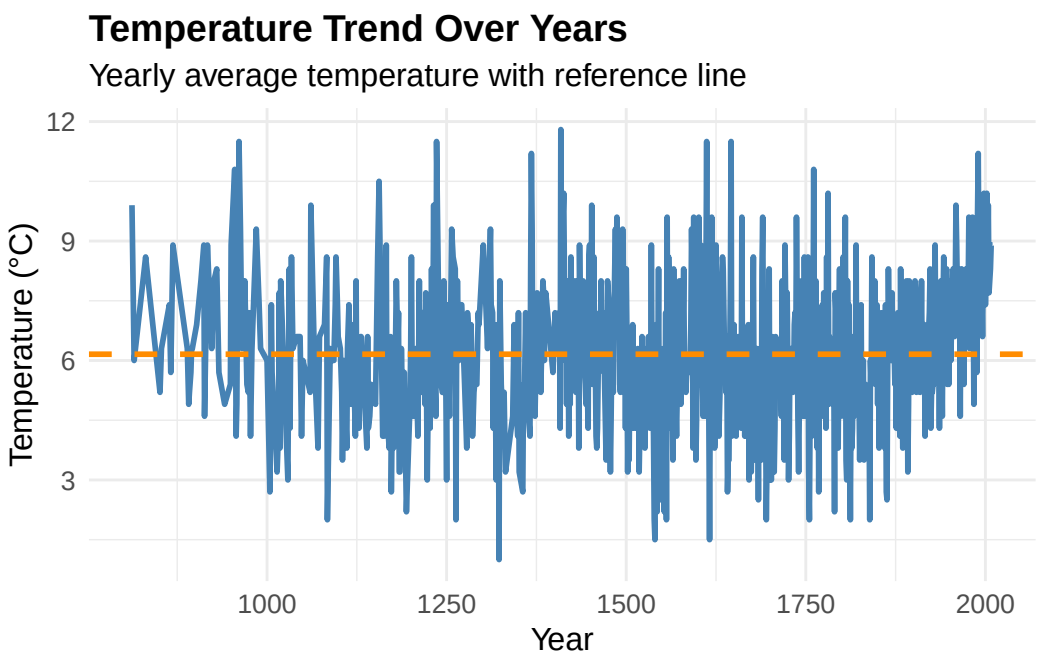

Flower Date Distribution by Month and Day
Count
Day of the Month
Month
Jan
Feb
Mar
Apr
May
0
50
100
150
200
250
0
10
20
30


Temperature Distribution by Date
Scatter plot with temperature trend over the year
Temperature (°C)
Day of the Year
10
5
0
−5
−10
Jan
Feb
Mar
Apr
May
Jun

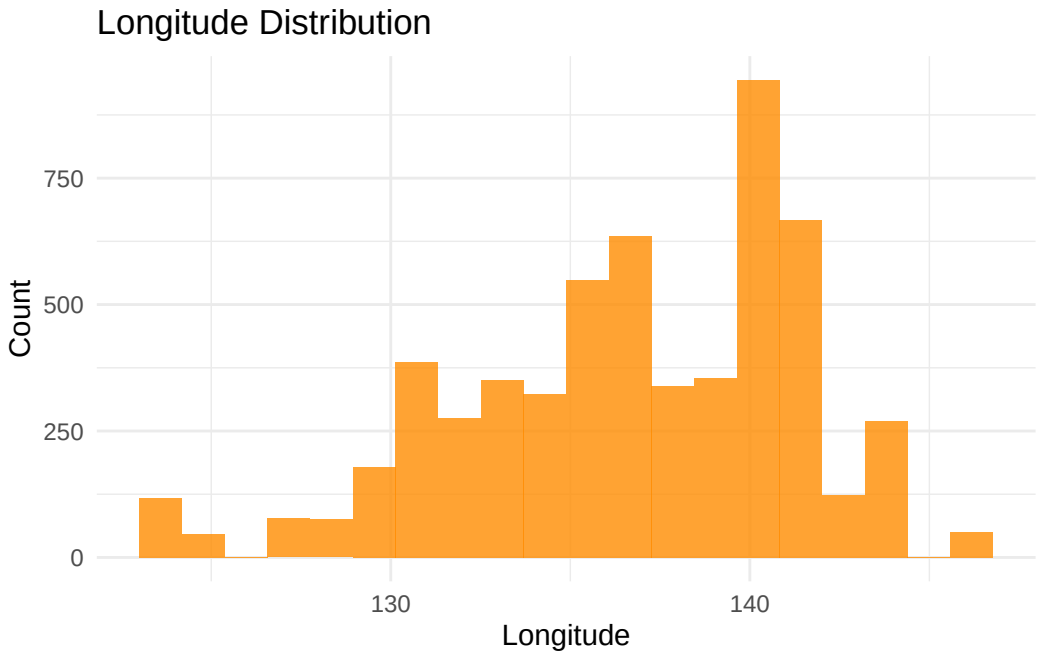


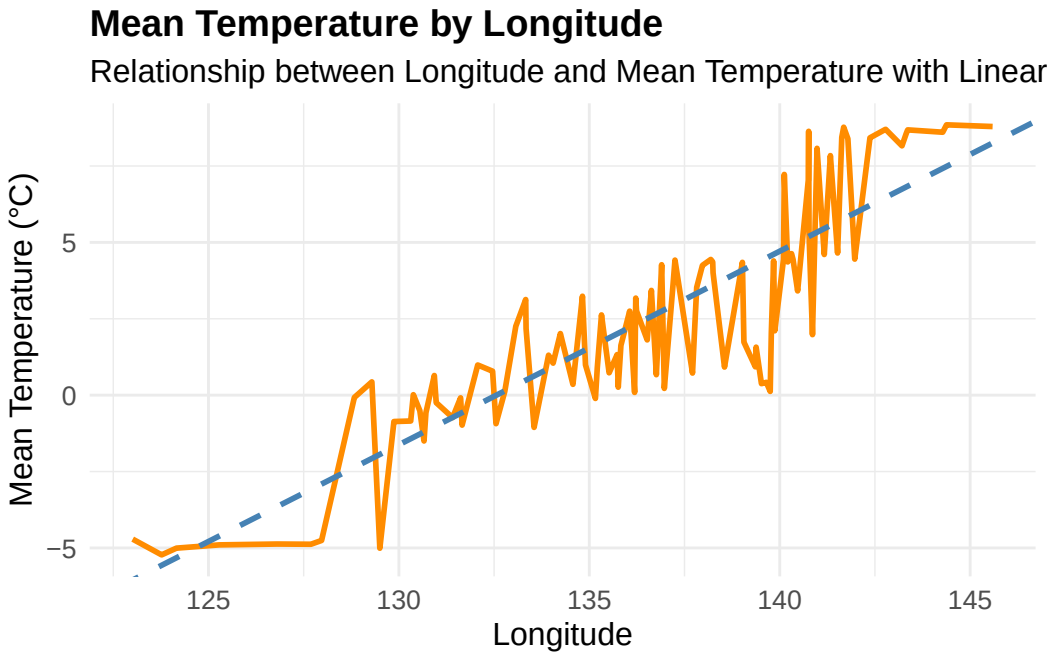
2.5 Excluded Variables

2.5.1 Year



2.5.2 Longitude





3 Model

3.1 Alternative Model

$$\text{Alternative Model: mean\_temp\_month} = \beta_1 \cdot \text{latitude} + \beta_2 \cdot \text{longitude} + \beta_0 \tag{1}$$

where:

- latitude $\in [20, 50]$, representing geographical latitude in degrees (°N).
- longitude $\in [120, 150]$, representing geographical longitude in degrees (°E).
- β_1 and β_2 are coefficients for latitude and longitude, respectively.
- β_0 is the intercept term.
- Both latitude and longitude are numerical variables.

	Model Summary	
Variable	Estimate	P-Value
latitude	0.778101	<2e-16
longitude	-0.003319	0.806
R-squared	0.672200	
Adjusted R-squared	0.672100	

3.2 Model 1

$$\text{Model 1: flower\_doy} = \beta_1 \cdot \text{temp} + \beta_0 \tag{2}$$

where:

- temp $\in [1, 12]$, representing the temperature range in degrees Celsius (°C).
- β_1 is the coefficient of the variable temp, and β_0 is the intercept term.
- The variable temp is a numerical variable.

3.3 Model 2

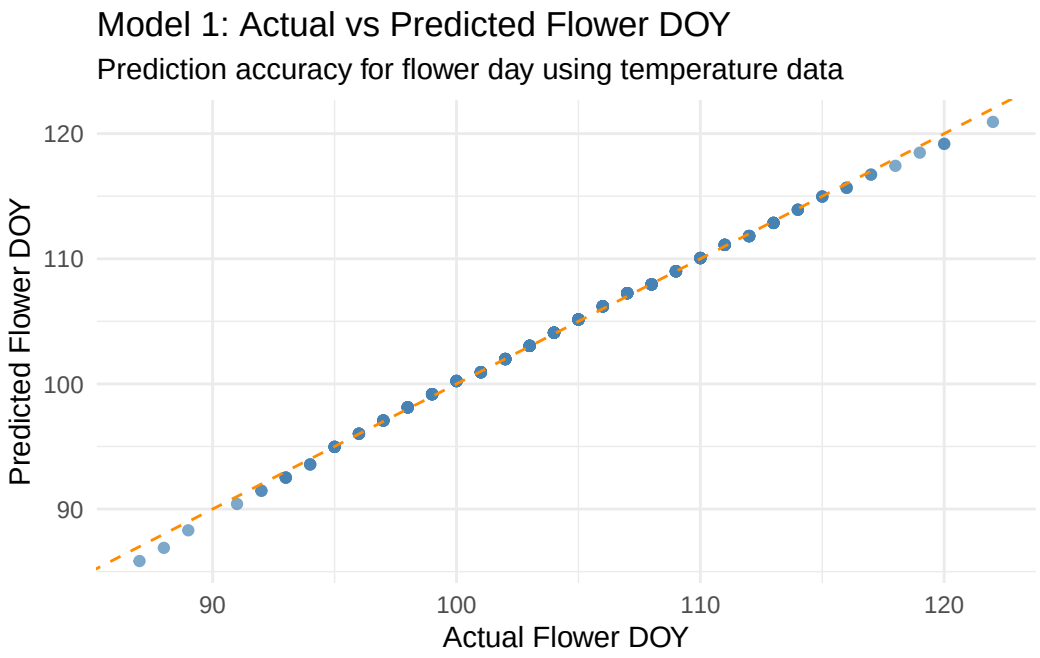
$$\text{Model 2: } \text{mean\_temp\_month} = \beta_1 \cdot \text{day} + \beta_2 \cdot \text{latitude} + \beta_3 \cdot \text{month} + \beta_0 \tag{3}$$

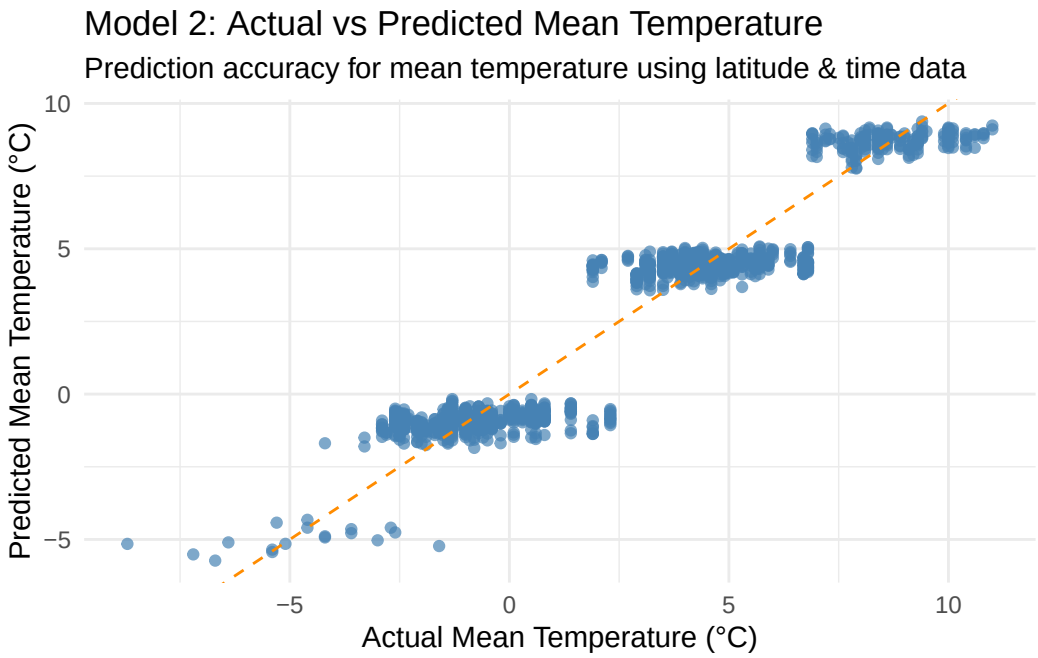
where:

- latitude $\in [20, 50]$, representing geographical latitude in degrees (°N).
- day $\in [1, 31]$, representing the day of the month.
- month is a categorical variable representing months (January to May).
- β_1, β_2, β_3 are coefficients of the linear model, and β_0 is the intercept term.
- All variables are numerical variables, except for month, which is a categorical variable.

4 Result

4.1 Model Result





4.2 Example of Prediction

	Prediction Summary	
Metric	Actual	Predicted
Mean Temperature (°C)	3.9	4.254538
Flower DOY	119.0	111.271828

5 Discussion

5.1 Limitation

5.2 Interpretation and Future Research Directions

6 Appendix

6.1 Survey Methodology Overview

6.2 Idealized Survey

6.3 Model Details

`Residuals for Model 1:`

Residuals for Model 1	
Statistic	Value
Min	-0.25208
1Q	-0.14651
Median	-0.04095
3Q	0.04606
Max	1.30709

`Coefficients for Model 1:`

Coefficients for Model 1				
Variable	Estimate	Std. Error	t Value	P-Value
(Intercept)	126.202188	0.034396	3669.1	<2e-16
temp	-3.509279	0.005355	-655.3	<2e-16

`Model Summary for Model 1:`

Model Summary for Model 1	
Metric	Value
Residual Standard Error	0.2337 on 572 degrees of freedom
Multiple R-squared	0.9987
Adjusted R-squared	0.9987
F-statistic	4.294e+05 on 1 and 572 DF
P-value	<2e-16

`Residuals for Model 2:`

Residuals for Model 2	
Statistic	Value
Min	-4.2185
1Q	-0.6993
Median	-0.0729
3Q	0.6641
Max	4.1114

`Coefficients for Model 2:`

Coefficients for Model 2				
Variable	Estimate	Std. Error	t Value	P-Value
(Intercept)	-9.000439	0.289464	-31.093	<2e-16
day	-0.049223	0.003291	-14.956	<2e-16
latitude	0.189083	0.012089	15.637	<2e-16
month2	-0.617982	0.219831	-2.811	0.00496
month3	2.869383	0.114364	25.088	<2e-16
month4	6.966108	0.164984	42.223	<2e-16
month5	10.047363	0.237453	42.313	<2e-16

`Model Summary for Model 2:`

Model Summary for Model 2	
Metric	Value
Residual Standard Error	1.116 on 4256 degrees of freedom
Multiple R-squared	0.9255
Adjusted R-squared	0.9254
F-statistic	8814 on 6 and 4256 DF
P-value	<2e-16