

# Turning up the Heat

An examination of changes in Arctic temperatures between 1938 and 2021

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In this report, we will compare daily weather reports from the weather station in Fort Ross, Nunavut which were recorded in 1938 to weather data recorded at Fort Ross in 2021. We aim to use these data to determine whether there is a significant difference between the daily temperature in Fort Ross in the year 1938 and the year 2021.

In order to compare these observations, we must first import the data into R.

```
dim(data_1939)
```

```
## [1] 365 31
```

```
dim(data_2021)
```

```
## [1] 365 31
```

From above, we can see that both of the datasets which we have imported have 365 observations and 31 variables in total. Although the dimensions of these datasets match, we still need to check whether the actual variables themselves match.

Table 1: Variables recorded at the Fort Ross weather station in 1939

	Variable Type	Present Values	Missing Values
Longitude (x)	double	365	0
Latitude (y)	double	365	0
Station Name	character	365	0
Climate ID	double	365	0
Date/Time	double	365	0
Year	double	365	0
Month	character	365	0
Day	character	365	0
Data Quality	logical	0	365
Max Temp (°C)	double	365	0
Max Temp Flag	logical	0	365
Min Temp (°C)	double	363	2
Min Temp Flag	character	2	363
Mean Temp (°C)	double	363	2
Mean Temp Flag	character	2	363
Heat Deg Days (°C)	double	363	2
Heat Deg Days Flag	character	2	363
Cool Deg Days (°C)	double	363	2
Cool Deg Days Flag	character	2	363
Total Rain (mm)	double	303	62

	Variable Type	Present Values	Missing Values
Total Rain Flag	logical	0	365
Total Snow (cm)	double	303	62
Total Snow Flag	logical	11	354
Total Precip (mm)	double	303	62
Total Precip Flag	logical	11	354
Snow on Grnd (cm)	logical	0	365
Snow on Grnd Flag	logical	0	365
Dir of Max Gust (10s deg)	logical	0	365
Dir of Max Gust Flag	logical	0	365
Spd of Max Gust (km/h)	logical	0	365
Spd of Max Gust Flag	logical	0	365

Table 2: Variables recorded at the Fort Ross weather station in 2021

	Variable Type	Present Values	Missing Values
Longitude (x)	double	365	0
Latitude (y)	double	365	0
Station Name	character	365	0
Climate ID	double	365	0
Date/Time	double	365	0
Year	double	365	0
Month	character	365	0
Day	character	365	0
Data Quality	logical	0	365
Max Temp (°C)	double	320	45
Max Temp Flag	character	45	320
Min Temp (°C)	double	318	47
Min Temp Flag	character	47	318
Mean Temp (°C)	double	318	47
Mean Temp Flag	character	47	318
Heat Deg Days (°C)	double	318	47
Heat Deg Days Flag	character	47	318
Cool Deg Days (°C)	double	318	47
Cool Deg Days Flag	character	47	318
Total Rain (mm)	logical	0	365
Total Rain Flag	logical	0	365
Total Snow (cm)	logical	0	365
Total Snow Flag	logical	0	365
Total Precip (mm)	double	192	173
Total Precip Flag	character	173	192
Snow on Grnd (cm)	double	228	137
Snow on Grnd Flag	logical	0	365
Dir of Max Gust (10s deg)	double	84	281
Dir of Max Gust Flag	character	238	127
Spd of Max Gust (km/h)	double	84	281
Spd of Max Gust Flag	character	238	127

Based on the legend shown on the [Government of Canada's Historical Weather Database](#)