

3.0 Results

3.1 Minimum Tempertaure

Across Canada in the month of May, the minimum temperatures (Figure 5) before the fire varied from -8 to 20 degrees Celsius. Notably, the provinces of the Northwest Territories, Alberta, British Columbia, Saskatchewan, and Ontario exhibited high minimum temperature values exceeding 10 degrees Celsius, while locations such as Yukon experienced lower minimum temperatures.

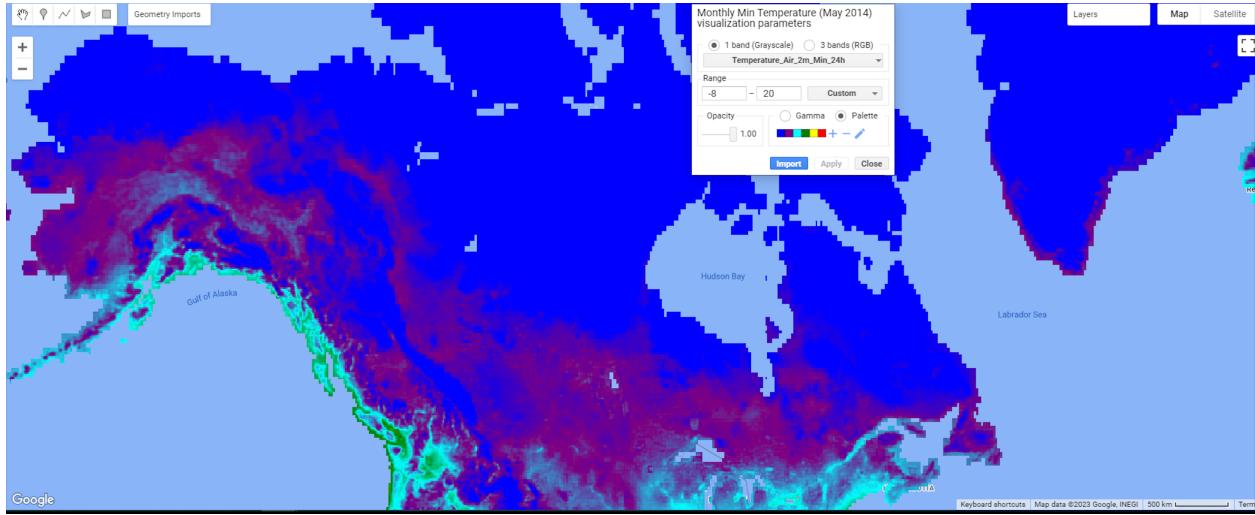


Figure 1: Minimum Air Temperature in Canada for the month of May, 2014

3.2 Mean Tempertaure

The mean temperature values, as depicted in Figure 5 for the month of May, closely paralleled the minimum temperature. Across lakes and rivers, the mean temperature values were lower. In contrast, regions such as the Northwest Territories, Alberta, British Columbia, Saskatchewan, and Ontario exhibited notably higher mean temperature values exceeding 20 degrees Celsius.

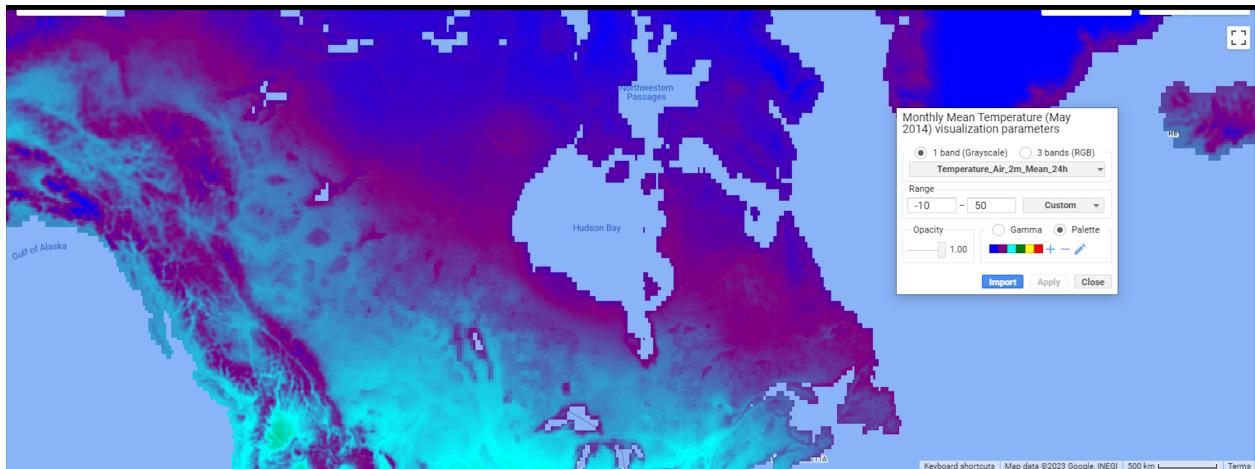


Figure 2: Mean Air Temperature in Canada for the month of May, 2014

3.3 Maximum Temperature

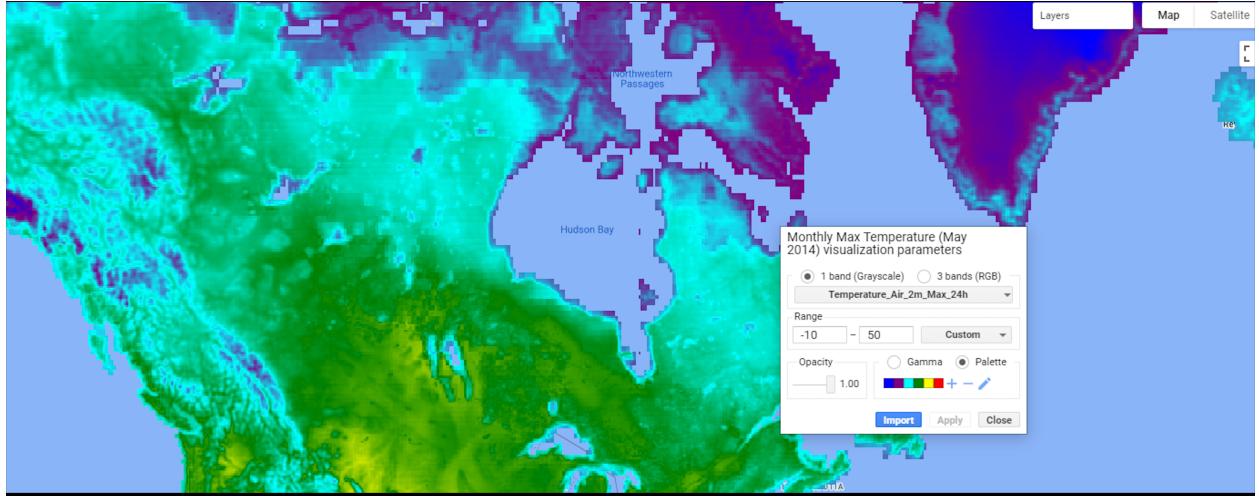


Figure 3: Minimum Air Temperature in Canada for the month of May, 2014

3.4 Prefire Tree Cover

According to Figure X, regions surrounding the boreal forests exhibited elevated prefire tree cover. Specifically, the provinces of Ontario and British Columbia demonstrated higher pre-fire tree cover compared to other provinces in Canada, as illustrated in the figure. In contrast, the prefire tree cover in the vicinity of the unmanaged boreal forest was notably lower.



Figure 4: Minimum Air Temperature in Canada for the month of May, 2014

3.5 Mean Area burned

When the fire ignited in May, the Slave Lake region in the provinces of the Northwest Territories was affected. The extent of the burned area varied across the provinces in Canada, as depicted in Figure X. The severity of the burn was more pronounced in the provinces of Alberta, the Northwest Territories, and Saskatchewan, where dNBR values higher than 0.5 were observed.

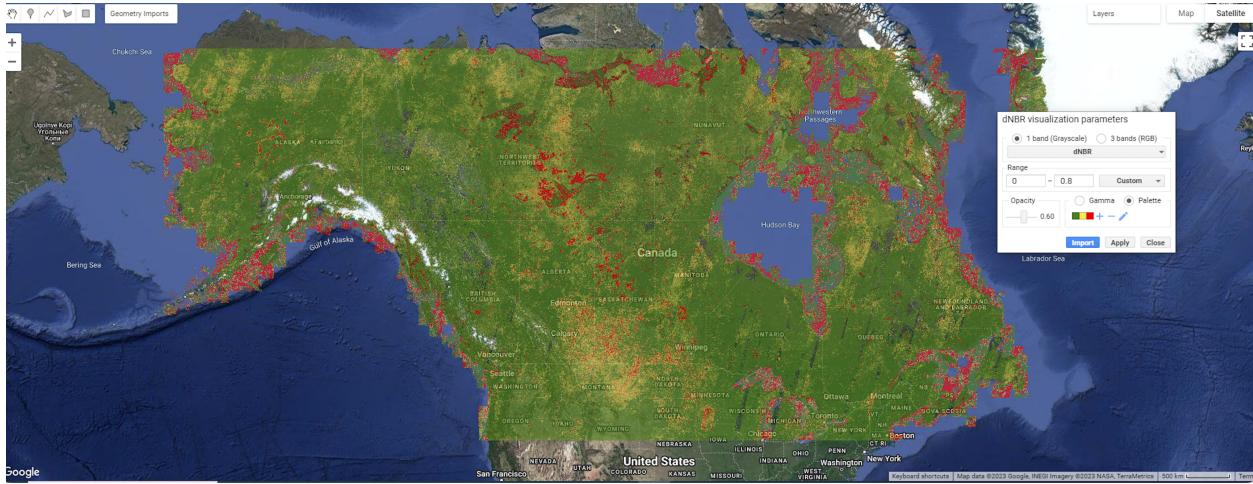


Figure 5: Area burned in Canada for the month of May, 2014

In contrast, regions such as Ontario, British Columbia, and Yukon experienced lower burn severity during the month of May 2014.

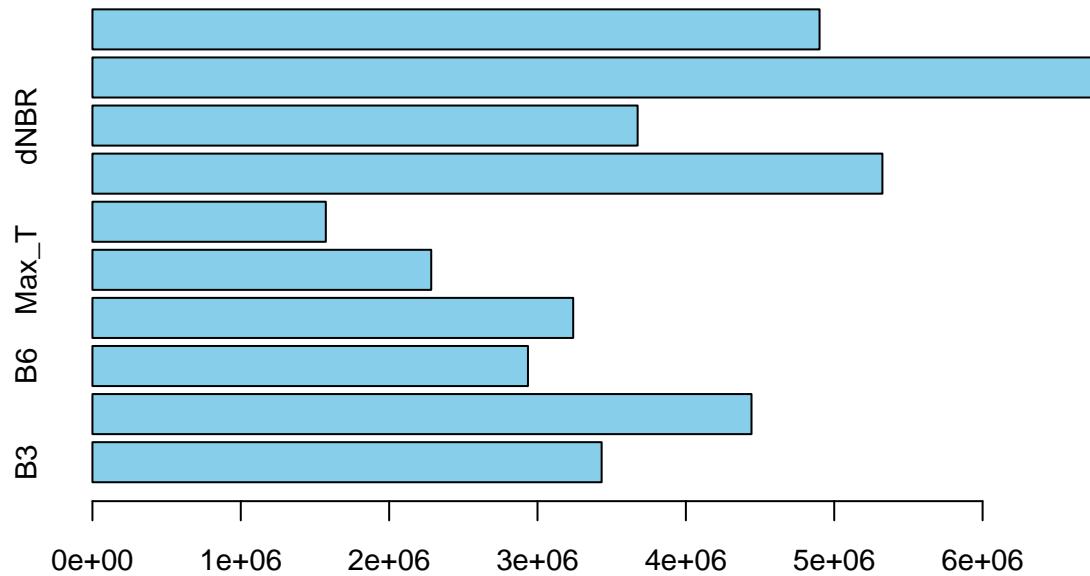
Carbon emitted and variable of importance for predicting C emissions

Utilizing a Random Forest regression model with ranger for predicting carbon emissions across fires in Canada revealed that prefire tree cover, Landsat band 3, Landsat band 5, maximum temperature, and dNBR (difference Normalized Burn Ratio) emerged as the most influential variables in explaining carbon emissions within Canada's boreal forest (refer to Figure X). The model demonstrated a mean and explained 38% of the variance in combustion events.

```
## Mean Absolute Error (MAE): 205.7412
```

```
##          B3          B5          B6        Gness      Max_T    Mean_RH    Mean_T
## 3432168  4442350  2935600  3240675  2283578  1573098  5324778
##      dNBR Canopcover       GDEM
## 3674875  6739883  4901051
```

Variable Importance



```
## R-squared: 0.3838116
```

The model had a (MAE): 205.7412. Using this model output, C emitted across the 2023 fires will be predicted for Canada's forest.