COMP1204: Data Management
Coursework One: Hurricane Monitoring

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1 Introduction

As data scientists for the National Oceanographic and Atmospheric Administraiton Centre, I was assigned to the tropical cyclone tracking team. As a data scientist I have been tasked with extracting storm data from the tropical cyclone reports and producing maps of where the cyclones have taken place.

2 Create CSV Script

Here's my script:

create_csv.sh

```
#!/bin/bash
csv_input_path=$1
tmp_csv_output=$2

#I used \ to continue command on next line

echo "Timestamp,Latitude,Longitude,MinSeaLevelPressure,MaxIntensity" > $tmp_csv_output
dtg="$(grep -R "<dtg>" $csv_input_path | sed 's/.*<dtg>//g' | sed 's/[</dtg>]//g')"
grep -R "<lat>" $csv_input_path| sed 's/.*<lat>//g' | sed 's/[</lat>]//g' > lat.csv
grep -R "<lon>" $csv_input_path | sed 's/.*<lon>//g' | sed 's/[</lon>]//g' > lon.csv
grep -R "<minSeaLevelPres>" $csv_input_path | sed 's/.*<minSeaLevelPres>//g' | \
sed 's/[</minSeaLevelPres>]//g' > minSeaLevelPres.csv
grep -R "<intensity>" $csv_input_path | sed 's/.*<intensity>//g' | \
sed 's/[</intensity>]//g' > intensity.csv

lat="$(sed "s/$/ N/" lat.csv)"
lon="$(sed "s/$/ W/" lon.csv)"
minSeaLevelPres="$(sed "s/$/ mb/" minSeaLevelPres.csv)"
maxIntensity="$(sed "s/$/ knots/" intensity.csv)"

paste -d',' <(echo "$dtg") <(echo "$lat") <(echo "$lon") <(echo "$minSeaLevelPres") \
<(echo "$maxIntensity") >> $tmp_csv_output

rm lat.csv
rm lon.csv
rm minSeaLevelPres.csv
rm intensity.csv
```

I will now explain my code in small boxes each in its own independent sections:

#!/bin/bash

```
#!/bin/bash
csv_input_path=$1
tmp_csv_output=$2

#!/bin/bash
tells the terminal that when you run the script it should use bash to execute it
csv_input_path=$1
tmp_csv_output=$2
These two lines of code allow inputs to be enntered into the script
```

#!/bin/bash

```
echo "Timestamp,Latitude,Longitude,MinSeaLevelPressure,MaxIntensity" > $tmp_csv_output
dtg="$(grep -R "<dtg>" $csv_input_path | sed 's/.*<dtg>//g' | sed 's/[</dtg>]//g')"
grep -R "<lat>" $csv_input_path| sed 's/.*<lat>//g' | sed 's/[</lat>]//g' > lat.csv
grep -R "<lon>" $csv_input_path | sed 's/.*<lon>//g' | sed 's/[</lon>]//g' > lon.csv
grep -R "<minSeaLevelPres>" $csv_input_path | sed 's/.*<minSeaLevelPres>//g' | \
sed 's/[</minSeaLevelPres>]//g' > minSeaLevelPres.csv
grep -R "<intensity>" $csv_input_path | sed 's/.*<intensity>//g' | \
sed 's/[</intensity>]//g' > intensity.csv

echo "Timestamp,Latitude,Longitude,MinSeaLevelPressure,MaxIntensity" > $tmp_csv_output
This command prints the tag headers
dtg="$(grep -R "<dtg>" $csv_input_path | sed 's/.*<dtg>//g' | sed 's/[</dtg>]//g')"
grep -R "<lat>" $csv_input_path| sed 's/.*<lat>//g' | sed 's/[</lat>]//g' > lat.csv
grep -R "<lon>" $csv_input_path | sed 's/.*<lon>//g' | sed 's/[</lon>]//g' > lon.csv
grep -R "<minSeaLevelPres>" $csv_input_path | sed 's/.*<minSeaLevelPres>//g' | \
sed 's/[</minSeaLevelPres>]//g' > minSeaLevelPres.csv
grep -R "<intensity>" $csv_input_path | sed 's/.*<intensity>//g' | \
sed 's/[</intensity>]//g' > intensity.csv
```

3 Storm Plots

3.1 Storm Plot 1

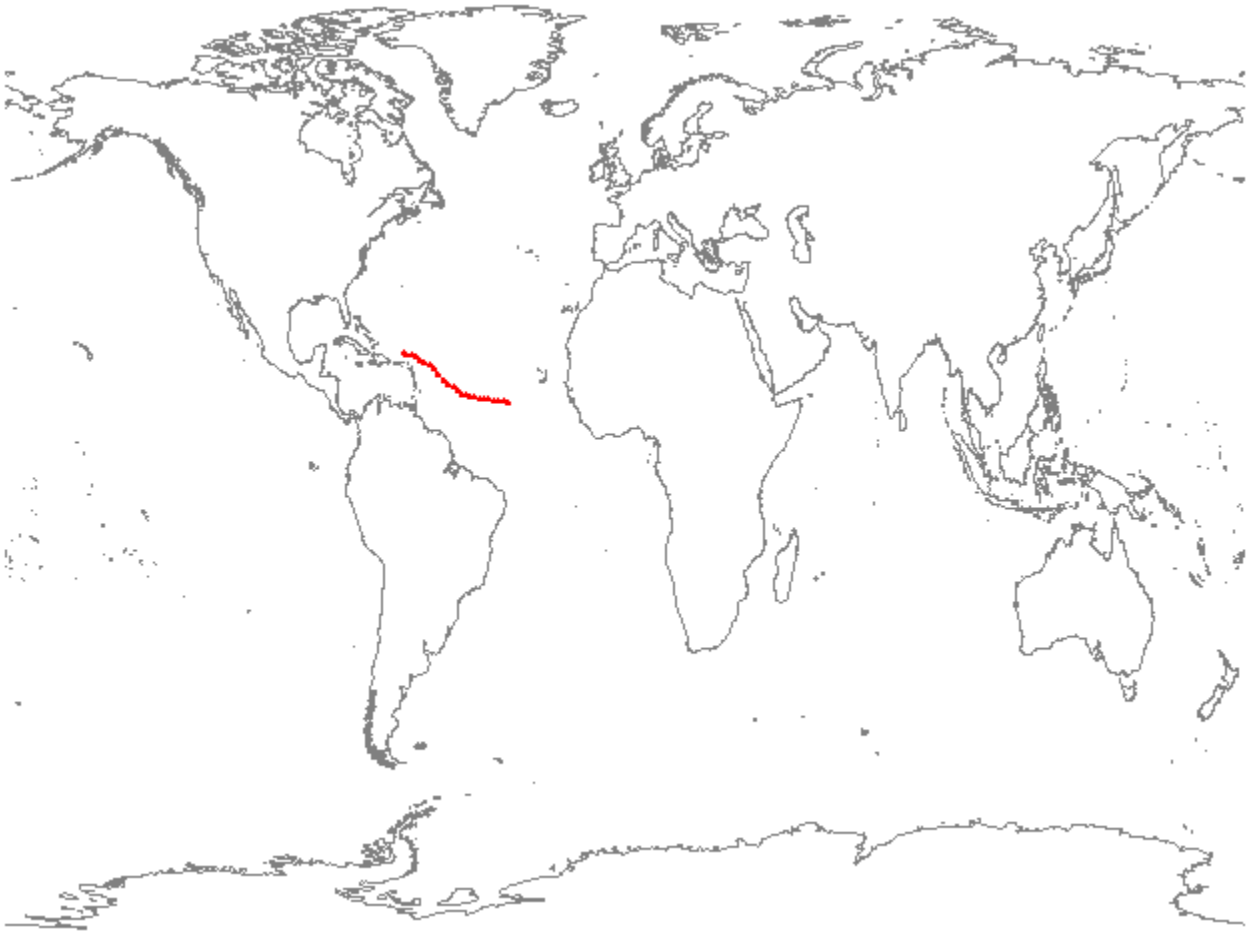

Figure 1: al112020.kml

3.2 Storm Plot 2

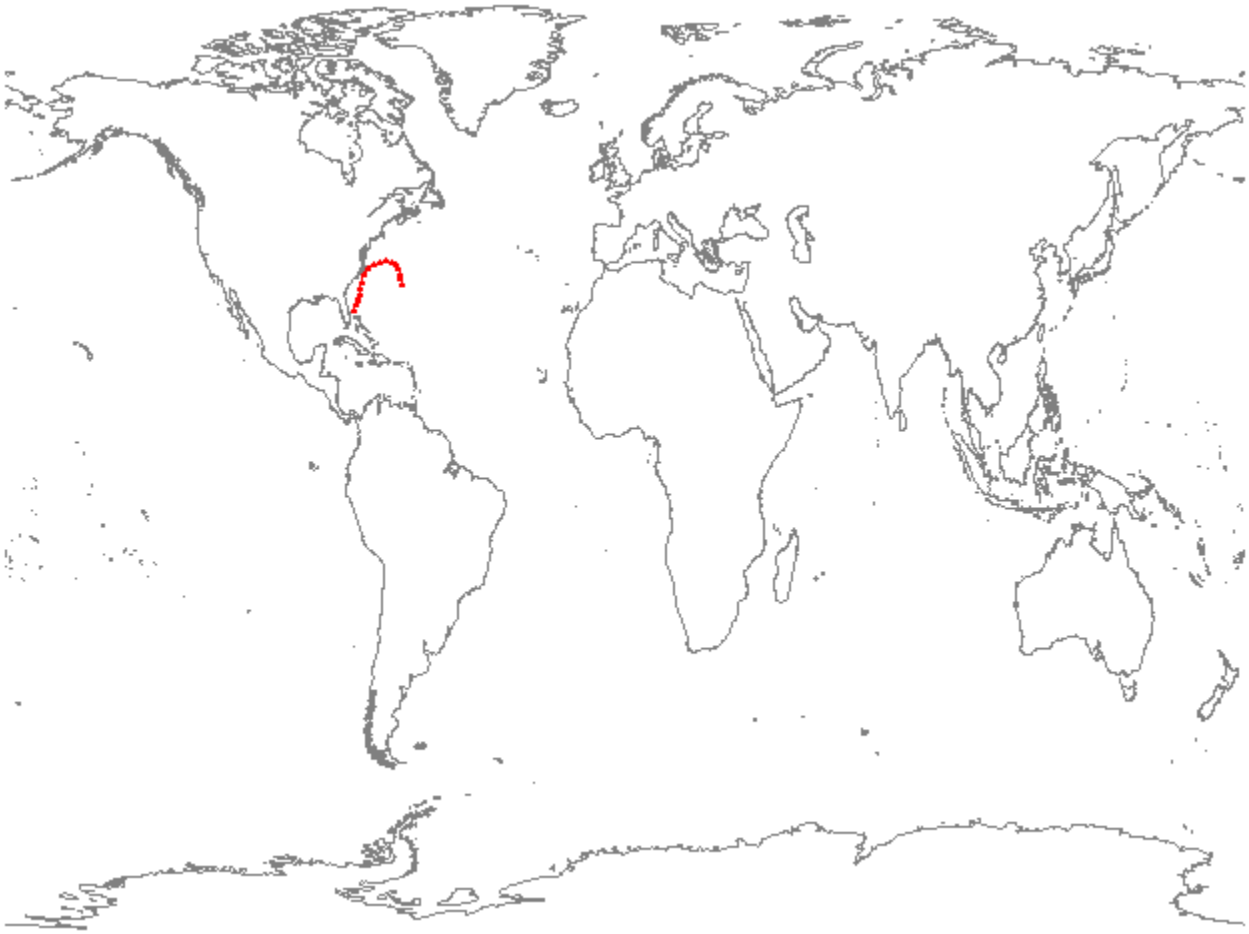

Figure 2: al012020.kml

3.3 Storm Plot 3

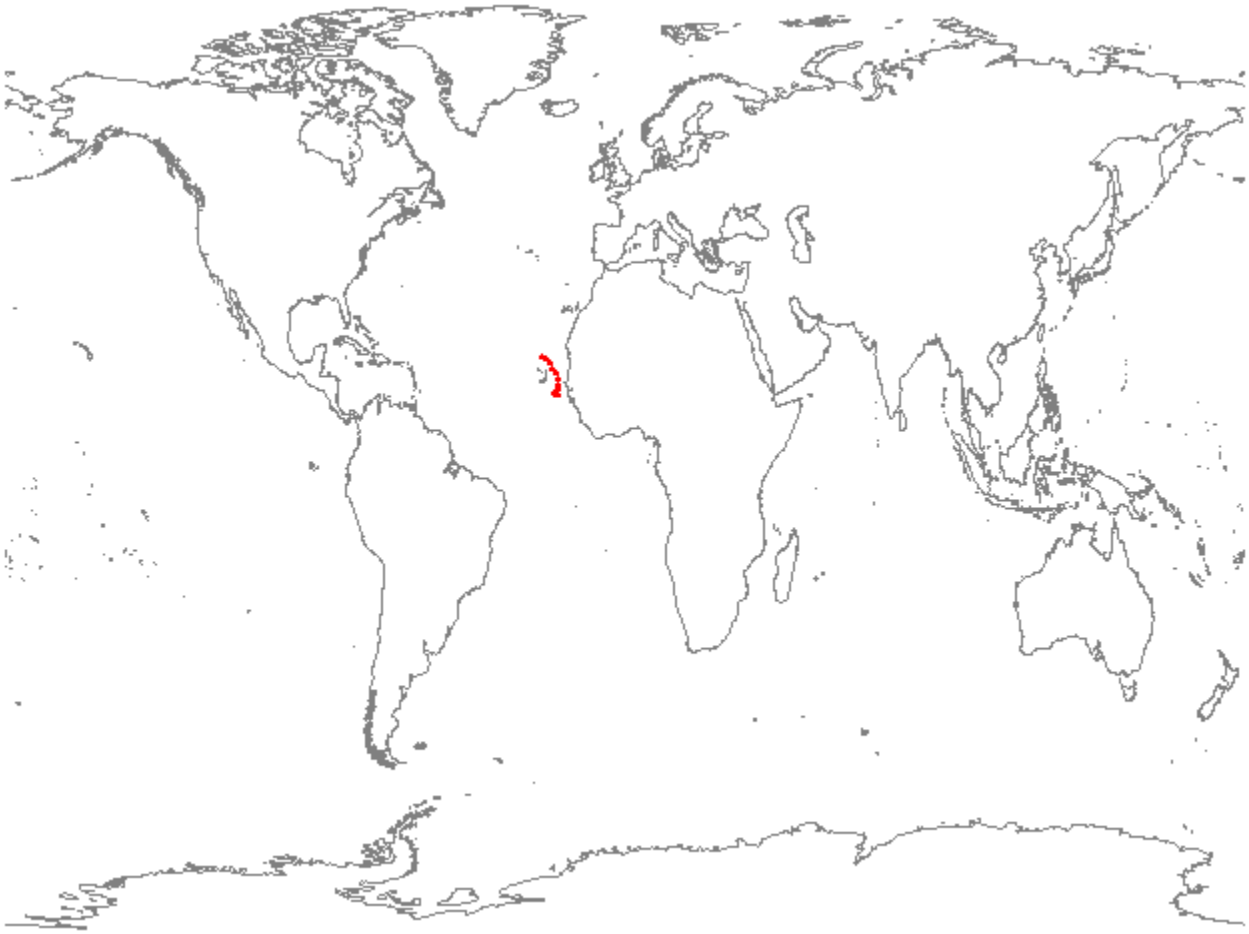

Figure 3: al102020.kml

4 Git Usage

Python Code for Plotting CSV Data

```
import pandas as pd
import matplotlib.pyplot as plt
import os
import glob
import math
user_key = 1773

def plot_all_csv_pressure():
    path = os.getcwd()
    csv_files = glob.glob(os.path.join(path, '*.csv'))

    for f in csv_files:
        storm = pd.read_csv(f)
        storm['Pressure'].plot()
        plt.show()

def plot_all_csv_intensity():
    path = os.getcwd()
    csv_files = glob.glob(os.path.join(path, '*.csv'))

    for f in csv_files:
        storm = pd.read_csv(f)
        storm['Intensity'].plot()
        plt.show()
```