CLIMATE CHANGE REPORT SERIES

A Web Service for Real-Time Weather Information in Prince Edward Island

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When referring to any data or results included in this report, the sources must be clearly and prominently stated and cited. This report should be referenced as:

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For any questions or concerns, please contact Dr. Xander Wang at: xxwang@upei.ca.

Executive Summary

Since the release of the PEI Weather and Climate App (https://weather.peiclimate.ca) in Spring 2019, we have received many requests for the real-time weather information over Prince Edward Island provided by this app. In particular, most of the requests are related to either automatically downloading the latest weather information or feeding the real-time weather information into other web-based products or services. Since the original version of the app does not have the capability to support this kind of weather data requests, here we aim to develop a generalized web service (or URL-based API) to facilitate these requests.

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Table of Contents

1. Introduction

This study focuses on the development of a web service (or URL-based API) for deriving real-time weather information in Prince Edward Island from the PEI Weather and Climate App (https://weather.peiclimate.ca). This report describes the function of this web service and its usage.

2. Web Service

The developed web service is available at the following public URL:

https://weather.peiclimate.ca/weatherAPI

The real-time weather information from this web service is returned in the format of JSON, as follows:

```
{
        "Total": ???,
        "Stations": [
                {
                        "Name": "???",
                        "Lat": ???,
                        "Lon": ???,
                        "Elevation": ???,
                        "LastUpdatedUTC": "???",
                        "Temperature": ???,
                        "DewPoint": ???,
                        …
                }
                {
                        "Name": "???",
                        "Lat": ???,
                        "Lon": ???,
                        "Elevation": ???,
                        "LastUpdatedUTC": "???",
                        "Temperature": ???,
                        "DewPoint": ???,
                        …
                }
                …
        ]
}
```

3. Usage

In order to use the web service to derive the real-time weather information in PEI, users should first contact Dr. Xander Wang at xxwang@upei.ca to create a personal token. Once the token is created, users can access the public URL with their personal tokens to obtain the latest weather information in PEI, as follows:

https://weather.peiclimate.ca/weatherAPI?token=your_personal_token

The web service also provides users with options to define what kind of weather information they want to obtain from the PEI Weather and Climate App. Table 1 lists all the supported options in the current version of the web service.

Table 1. User-defined options for real-time weather information retrieval.

Option	Returned Weather Information
all	The weather information monitored by all real-time weather stations will be returned by the web service, including temperature, dew point, humidity, wind speed, wind gust, wind direction with flag, wind direction angle, pressure, precipitation rate, condition, visibility, wind chill, solar radiation, UV, and PAR. This is the default option.
temp	Only temperature-related information will be returned by the web service, including temperature, dew point, and wind chill.
precip	Only precipitation-related information will be returned by the web service, including precipitation rate, humidity, pressure, condition, and visibility
wind	Only wind-related information will be returned by the web service, including wind speed, wind gust, wind direction with flag, and wind direction angle.
solar	Only radiation-related information will be returned by the web service, including solar radiation, UV, and PAR.

In order to use the user-defined option to specify the returned weather information from the web service, users need to add another parameter (option) to the above public URL, as follows:

https://weather.peiclimate.ca/weatherAPI?token=your_personal_token&option=???

All acceptable values for this option parameter are listed in the first column of Table 1. If no value is specified for this parameter, the web service will use "all" as the default value for this user-defined option. Figures 1-5 show some examples about the returned weather information with different user-defined options.


```
{
   "Total":38,
   "Stations":[
      {
         "Name":"North Cape",
         "Lat":47.05805556,
         "Lon":-63.99861111,
         "Elevation":8,
         "LastUpdatedUTC":"February 15, 2021 4:00 AM",
         "Temperature":-6,
         "DewPoint":-10,
         "Humidity":73,
         "WindSpeed":20.0,
         "WindGust":,
         "WindDirectionFlag":"WNW",
         "WindDirectionAngle":,
         "Pressure":1022.0,
         "PrecipitationRate":,
         "Condition":"",
         "Visibility":,
         "WindChill":-12,
         "SolarRadiation":,
         "UV":,
         "PAR":
      }{
         "Name":"Maple Plains",
         "Lat":46.3028,
         "Lon":-63.57555556,
         "Elevation":46,
         "LastUpdatedUTC":"February 15, 2021 4:00 AM",
         "Temperature":-9,
         "DewPoint":-13,
```


Figure 1. Sample output for "option=all".

```
{
   "Total":38,
   "Stations":[
      {
         "Name":"North Cape",
         "Lat":47.05805556,
         "Lon":-63.99861111,
         "Elevation":8,
         "LastUpdatedUTC":"February 15, 2021 4:00 AM",
         "Temperature":-6,
         "DewPoint":-10,
         "WindChill":-12
      }{
         "Name":"Maple Plains",
         "Lat":46.3028,
         "Lon":-63.57555556,
         "Elevation":46,
         "LastUpdatedUTC":"February 15, 2021 4:00 AM",
         "Temperature":-9,
         "DewPoint":-13,
         "WindChill":-13
      }{
         "Name":"Summerside",
         "Lat":46.44111111,
         "Lon":-63.83805556,
         "Elevation":12,
         "LastUpdatedUTC":"February 15, 2021 4:00 AM",
         "Temperature":-8,
         "DewPoint":-13,
         "WindChill":-14
      }{
         "Name":"St. Peters Bay",
         "Lat":46.45027778,
         "Lon":-62.57583333,
         "Elevation":30,
         "LastUpdatedUTC":"February 15, 2021 4:00 AM",
         "Temperature":-5,
         "DewPoint":-10,
         "WindChill":-11
      }{
         "Name":"Charlottetown Airport",
```


Figure 2. Sample output for “option=temp”.

```
{
   "Total":38,
   "Stations":[
      {
         "Name":"North Cape",
         "Lat":47.05805556,
         "Lon":-63.99861111,
         "Elevation":8,
         "LastUpdatedUTC":"February 15, 2021 4:00 AM",
         "PrecipitationRate":,
         "Humidity":73,
         "Pressure":1022.0,
         "Condition":"",
         "Visibility":
      }{
         "Name":"Maple Plains",
         "Lat":46.3028,
         "Lon":-63.57555556,
         "Elevation":46,
         "LastUpdatedUTC":"February 15, 2021 4:00 AM",
         "PrecipitationRate":,
         "Humidity":78,
         "Pressure":,
         "Condition":"",
         "Visibility":
      }{
         "Name":"Summerside",
         "Lat":46.44111111,
         "Lon":-63.83805556,
         "Elevation":12,
         "LastUpdatedUTC":"February 15, 2021 4:00 AM",
         "PrecipitationRate":,
         "Humidity":70,
         "Pressure":1024.0,
         "Condition":"",
         "Visibility":
      }{
         "Name":"St. Peters Bay",
         "Lat":46.45027778,
         "Lon":-62.57583333,
```


Figure 3. Sample output for “option=precip”.

```
{
   "Total":38,
   "Stations":[
      {
         "Name":"North Cape",
         "Lat":47.05805556,
         "Lon":-63.99861111,
         "Elevation":8,
         "LastUpdatedUTC":"February 15, 2021 4:00 AM",
         "WindSpeed":20.0,
         "WindGust":,
         "WindDirectionFlag":"WNW",
         "WindDirectionAngle":
      }{
         "Name":"Maple Plains",
         "Lat":46.3028,
         "Lon":-63.57555556,
         "Elevation":46,
         "LastUpdatedUTC":"February 15, 2021 4:00 AM",
         "WindSpeed":6.0,
         "WindGust":,
         "WindDirectionFlag":"WNW",
         "WindDirectionAngle":
      }{
         "Name":"Summerside",
         "Lat":46.44111111,
         "Lon":-63.83805556,
         "Elevation":12,
         "LastUpdatedUTC":"February 15, 2021 4:00 AM",
         "WindSpeed":12.0,
         "WindGust":,
         "WindDirectionFlag":"W",
         "WindDirectionAngle":
      }{
         "Name":"St. Peters Bay",
         "Lat":46.45027778,
         "Lon":-62.57583333,
         "Elevation":30,
         "LastUpdatedUTC":"February 15, 2021 4:00 AM",
```


Figure 4. Sample output for “option=wind”.

```
223           "Lon":-63.576,
224           "Elevation":11,
225           "LastUpdatedUTC":"February 15, 2021 4:45 AM",
226           "SolarRadiation":0.0,
227           "UV":0,
228           "PAR":
229        }{
230           "Name":"Cape Egmont",
231           "Lat":46.4067,
232           "Lon":-64.118742,
233           "Elevation":10,
234           "LastUpdatedUTC":"February 15, 2021 4:45 AM",
235           "SolarRadiation":0.0,
236           "UV":0,
237           "PAR":
238        }{
239           "Name":"Canoe Cove",
240           "Lat":46.161,
241           "Lon":-63.287,
242           "Elevation":46,
243           "LastUpdatedUTC":"February 15, 2021 4:45 AM",
244           "SolarRadiation":0.0,
245           "UV":0,
246           "PAR":
247        }{
248           "Name":"Hampton",
249           "Lat":46.2003,
250           "Lon":-63.4652,
251           "Elevation":7,
252           "LastUpdatedUTC":"February 15, 2021 4:46 AM",
253           "SolarRadiation":0.0,
254           "UV":0,
255           "PAR":
256        }{
257           "Name":"Meadowbank",
258           "Lat":46.201,
259           "Lon":-63.229,
260           "Elevation":33,
261           "LastUpdatedUTC":"February 15, 2021 4:45 AM",
262           "SolarRadiation":0.0,
```


Figure 5. Sample output for “option=solar”.

4. Conclusions

In this study, we have developed a web service to support the retrieval of real-time weather information in Prince Edward Island from the PEI Weather and Climate App (https://weather.peiclimate.ca). This web service (or URL-based API) enables users to extract the latest weather information from all real-time weather stations across PEI with predefined options. The extracted real-time weather information is returned in the format of JSON and can thus be fed into all online-based applications.

CCR

Climate Change Report Series

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