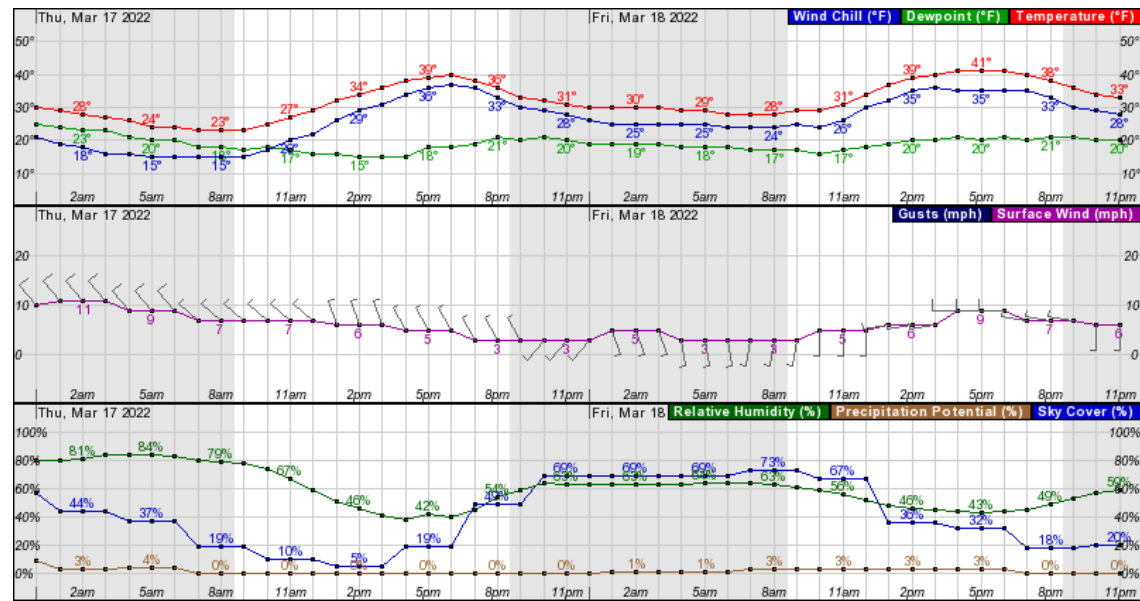


Reverse Engineering the National Weather Service Meteogram API

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Introduction

The National Weather Service [weather.gov](https://www.weather.gov) website is a great resource for weather forecasts in the United States. It provides detailed weather information with a simple, ad-free, non-bloated experience.

In particular, I have taken a liking to the NWS' meteogram format. Meteograms are a graphical representation of weather forecasts with respect to time. The NWS format is quick and easy to read.

The National Weather Service provides [a well documented API](#) for weather forecast information. Unfortunately, they do not provide an endpoint for creating these meteograms. So, I spent an evening reverse engineering and documenting the API. Enjoy!

The National Weather Service Meteogram API

National Weather Service Meteograms are PNG files served at <https://forecast.weather.gov/meteograms/Plotter.php>. There are multiple query parameters required to generate an image.

Each query parameter is documented below. Advanced parameters are described in greater detail.

key	description	default/example
lat	Forecast location latitude	40.6521

[illegible]

key	description	default/example
pqpfhr	Unknown use. Optional.	6
psnwhr	Unknown use. Optional.	6

wfo

This is the three letter [NWS Forecast Office Identifier](#) for the forecast area. For a given (lat, long) pair, you can find the identifier with the <https://api.weather.gov/points> endpoint.

```
$ curl --silent 'https://api.weather.gov/points/40.6521,-111.5067' \
  | jq -r '.properties.cwa'
SLC
```

zcode

This is the [NWS Public Forecast Zone Identifier](#) for a location. It can also be determined through the <https://api.weather.gov/points> endpoint.

```
$ curl --silent 'https://api.weather.gov/points/40.6521,-111.5067' \
  | jq -r '.properties.forecastZone[39:]'
UTZ108
```

tinfo

This is the timezone to display data in. It consists of a timezone identifier, a `Y`, and a UTC offset.

I'm pretty sure the valid timezone identifiers represent the following US time zones.

Identifier	Timezone
V	Atlantic
E	Eastern
C	Central
M	Mountain
P	Pacific
A	Alaskan
H	Hawaiian

For example `MY7` is Mountain Time with an offset of -7 hours. I believe the UTC offset is set to one hour further back than the current timezone to cover the current hour in the meteogram.

The timezone identifier seems to have no effect on the generated graph. It needs to be set to one of the letters described however.

It is not possible to set a positive UTC offset.

pcmd

The pcmd query parameter is 59 bits controlling which graphs should be included in the generated PNG file. Each bit is described below.

Bit	Graph
0	Temperature (°F)
1	Dewpoint (°F)
2	Heat Index (°F)
3	Wind Chill (°F)
4	Surface Wind
5	Sky Cover (%)
6	Precipitation Potential (%)
7	Relative Humidity (%)
8	Rain
9	Thunder
10	Snow
11	Freezing Rain
12	Sleet
13	Freezing Spray
14	Fog
15	Ceiling Height (x100ft)
16	Visibility (mi)
17	Significant Wave Height (ft)
18	Wave Period (sec)
19	Empty Graph
20	Mixing Height (x100ft)
21	Haines Index
22	Lightning Activity Level

Bit	Graph
23	Transport Wind (mph)
24	20ft Wind (mph)
25	Ventilation Rate (x1000 mph-ft)
26	Swell Height (ft)
27	Swell Period (sec)
28	Swell 2 Height (ft)
29	Swell 2 Period (sec)
30	Wind Wave Height (ft)
31	Dispersion Index
32	Pressure (in)
33	Prob Wind 15mph
34	Prob Wind 25mph
35	Prob Wind 35mph
36	Prob Wind 45mph
37	Prob Wind Gust 20mph
38	Prob Wind Gust 30mph
39	Prob Wind Gust 40mph
40	Prob Wind Gust 50mph
41	Prob Wind Gust 60mph
42	6hr Prob QPF 0.1
43	6hr Prob QPF 0.25
44	6hr Prob QPF 0.5
45	6hr Prob QPF 1.00
46	6hr Prob QPF 2.00
47	6hr Prob Snow 0.1in
48	6hr Prob Snow 1in
49	6hr Prob Snow 3in

Bit	Graph
50	6hr Prob Snow 6in
51	6hr Prob Snow 12in
52	Grassland Fire Danger Index
53	Thunder Potential
54	Davis Stability Index
55	Atmospheric Dispersion Index
56	Low Visibility Ourrence Risk Index
57	Turner Stability Index
58	Red Flag Threat Index

indu

This parameter consists of up to four values setting the units of the following graphs. Each value is separated by an `!`.

Bit	Graph	0	1	2	3
0	Surface Wind	kt	mph	km/h	ms/
1	Transport Wind	kt	mph	km/h	m/s
2	20ft Wind	kt	mph	km/h	m/s
3	Mixing Height	ft	m	no label (ft)	no label (ft)

For example, `0!1!2!1` :

- Sets `Surface Wind` to `kt`
- Sets `Transport Wind` to `mph`
- Sets `20ft Wind` to `km/h`
- Sets `Mixing Height` to `m`

Example

Putting all the query parameters together, we can generate the following live Meteogram[1] for [Park City, Utah](#).