

Standard Site-Based Historical Observations API User Document

Version 1.0

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Audience Geography Background Technology

This API is intended for web and mobile platforms. Worldwide. This API is a REST-based web service.

Response Format

This TWC API can return either JSON or XML formatted responses.

Icon Codes, Weather Phrases and Images

For the mapping of icon codes, weather phrases and images please refer to the Icon Code, Weather Phrases and Images document.

Translations

This TWC API handles the translation of phrases. However, when formatting a request URL a valid language must be passed along (see the language code table for the supported codes).

Fields Translated

wx phrase

pressure desc

uv desc

Data Lifetime - Caching & Expiration

Standard HTTP Cache-Control headers are used to define caching length. The TTL value is provided in the HTTP Header as an absolute time value using the "Expires" parameter, for example: "Expires: Fri, 12 Jul 2013 12:00:00 GMT" The response provides a data element expire_time_gmt. The value in this data element should be used to expire and remove a record from your system.

URL Construction

Please refer to the TWC API Common Usage document for a tutorial on URL construction and URL references.

Unit of Measure Requirement

The unit of measure for the response. The following values are supported:

• e = English units

• m = Metric units

• h = Hybrid units (UK)

Overview

The Historical Observations API will return past weather observations, up to 1 month (31 days maximum) between the start and end dates parameters. The observations are from METAR and SYNOP reporting stations. Reporting stations report weather observations at different intervals. Some observations are reported hourly, some every 3 hours, every 6 hours, etc. Some stations do not report during nighttime hours. The reporting times per day for each reporting station can also vary. Therefore, this API will simply return all reported weather observations received for a given location and day.

Understanding Weather Observations

Implementing the Observations data feeds (*Current Conditions, Time Series, and Historical Observations*) require your applications to perform basic processing in order to properly ingest and parse Weather observations from physical devices deployed worldwide (weather data collected from METAR, SYNOP, BUOY, CMAN devices).

Observations Composition and Implementation

All three types of weather observations data feeds return the same set of data elements, providing information on temperature, precipitation, wind, barometric pressure, visibility, ultraviolet (UV) radiation, and other related observation elements including observation station, observation date/time, weather icon codes and phrases. The primary distinction in composition and implementation is the requested time period of the observation, which will result in one or more observation datasets as summarized in the table below.

Observation Subclass	Use Case Description	Time Period	Time Parameter(s)
Historical	past weather observations, up to one month (31 days max) of archived data for the location and date or daterange requested Limitation: Archived observation data varies significantly by station and location. The earliest date of data recorded is from January 1931, but not all months from this time forward are available.	One-month (up to 31 days) in the past	Example 1: Single Start Date- parameter "startDate"= 20140704 returns the observations recorded for the day of July 4, 2014 local time Example 2: Retrieve by date range:: parameter "startDate" = 20120701 and parameter "endDate" =20120731 returns all observations recorded for the month of July 2012 Example 3: Retrieve oldest observation records (if the data is available for the location): Boise, ID location: location_id: "83701:4:US" parameter "startDate" = 19310101 and parameter "endDate" =19310131 returns all the recorded observations for the month of January 1931

Site-based Historical Observations

Access to retained site-based and synthetic data will be distributed on-demand in historical data feeds. Past weather observations, up to one month (31 days max) of archived data for the location and date or daterange requested.

Limitation: Archived observation data varies significantly by station and location. The earliest date of data recorded is from January 1931, but not all months from this time forward are available. Observations per station within a 24 hour period varies due to station operation requirements (i.e. modified operating hours, number of observations recorded per hour, maintenance issues, etc).

Historical Observations Data and Their Limitations

Historical observations are "archived" and originate from METAR and SYNOP observation stations/devices. Although there is archived observation data dating back to January 1931 from some METAR stations, the available historical data is not contiguous for all months in a given year, for every year, and for all locations. Please be aware that there is a large volume of historical records that can be retrieved. However there are gaps in which a "no data found" message will be displayed for a period. When observation data is provided, it is recommended that processing rules be applied to ensure the desired ordering of the observations (oldest to newest, newest to oldest) using the observation date/time element in the feed. Reporting stations report weather observations at different intervals. Some observations are reported hourly, some every 3 hours, every 6 hours, etc. Some stations do not report during nighttime hours.

• Please Note: that minimum and maximum temperature values are often null. The National Weather Service in the U.S. did not begin to provide these elements until recent years.

URL Format

The Historical Weather Observations API uses a command requiring a location id and location type or a latitude/longitude parameters. Additionally, there are parameters to specify various units of measures (UOM) and to return data for a specific date or date range.

Request Types:	URL Examples:
Request by geocode	Return historical observation for selected latitude/longitude pair 33.40,83.19,for a specific date range, in english units of measure
(latitude/longitude)	https://api.weather.com/v1/geocode/33.4/-83.19/observations/historical.json?units=e&startDate=20140615&endDate=20140704&apiKey=yourApiKey
Request by Station ID	Return historical observation for selected location id USGA0028, for a specific date range, in English (imperial) units of measure
	https://api.weather.com/v1/location/USGA0028:1:US/observations/historical.json?units=e&startDate=20140615&endDate=20140704&apiKey=yourApiKey
Request by Postal Code	Return historical observation for selected postal code 30339, for a specific date, in English (imperial) units of measure
	https://api.weather.com/v1/location/30339:4:US/observations/historical.json?units=e&startDate=20140615&apiKey=yourApiKey

Data Elements & Rule Definitions

Each data element has three rules associated with it as defined below.

This Rule	does this	and answers this
Usage Rule	Determines whether a data element is required or optional. If it is optional, determines whether or not you can substitute it with a different data element.	Must I use this data element or can I replace it with a different one?
Processing Rule	Defines how to process a data element so the results are correct.	If I use this data element, how do I process it?
Display Rule	Defines the proper display format for a data element.	How do I display this data element?

Data Element Descriptions

Outbound JSON/XML	Description	Туре	Length	Range or Values	Null	Sample	Usage	Processing	Display
Metadata						-			
Link to the API Commor	n Usage & Style Guide for desc	cription of	standard S	SUN API Metadata (also ca	alled Ec	ho Parameters)			
Observation									
key	Primary data field to group or access data	string	10	same as observation ID	N	KATL	required	none	do not display
class	data identifier	string	20	default	N	observation	required	none	do not display
expire_time_gmt	Absolute expiration time and used to implement a common, system wide method of data and cache expiration.	epoch	11		N	1373914800	required	none	do not display
obs_id	Observation station ID	string	10		N	KATL	required	none	do not display
obs_name	Observation station name	string	80		N	Hartsfield-Jackson Airport	required	none	display as provided
valid_time_gmt	Valid time of observation as a Unix epoch value (seconds since start of 1970, UTC)	epoch	11		N	1504300026	required	Sort by the observation date/time (oldest to newest, newest to oldest) and convert to the range appropriate for your application Examples: US Range: MM/DD/YYYY HH:MM:SS US Range: MM/DD/YYYY European Range: DD/MM/YYYY	display as formatted by your application
day_ind	Daytime or nighttime of the local apparent time of the location	string	1	D = Day, N = Night, X = Missing (for extreme northern and southern hemisphere	Y	D	optional	none	do not display
wx_icon	The two-digit number to represent the observed weather conditions. Refer to the Icon Code, Weather Phrases and Images document	integer	3	0 to 48	Y	47	required	use this number to associate to the weather icon	do not display
icon_extd	The four-digit number to represent the observed weather conditions. Refer to the lcon Code, Weather Phrases and Images document	integer	4		N	5500	required	use this number to associate to the weather icon	do not display

temp	The temperature of the air, at the time of the observation, measured by a thermometer 1.5 meters (4.5 feet) above the ground that is shaded from the other elements.	integer	6 -140 to 140	Y	62	required	none	Display as provided in degrees Fahrenheit or degrees Celsius based on the Unit of Measure in the API request. Always display the unit of temperature (°F or °C) with the value.
max_temp	High temperature in the last 24 hours	integer	6 -140 to 140	Y	81	optional	none	Always display the unit of temperature (°F or °C) with the value.
min_temp	Low temperature in the last 24 hours	integer	6 -140 to 140	Y	48	optional	none	Always display the unit of temperature (°F or °C) with the value.
dewpt	The temperature which air must be cooled at constant pressure to reach saturation. The Dew Point is also an indirect measure of the humidity of the air. The Dew Point will never exceed the Temperature. When the Dew Point and Temperature are equal, clouds or fog will typically form. The closer the values of Temperature and Dew Point, the higher the relative humidity.	integer	3 -80 to 100 (°F) or -62 to 37 (°C)	Y	60	optional	none	Display as provided in degrees Fahrenheit or degrees Celsius based on the Unit of Measure in the API request. Always display the unit of temperature (°F or °C) with the value.
rh	The relative humidity of the air, which is defined as the ratio of the amount of water vapor in the air to the amount of vapor required to bring the air to saturation at a constant temperature. Relative humidity is always expressed as a percentage.	integer	3 0 to 100	Y	91	optional	none	You must display the percent sign "%" after the value.
feels_like	An apparent temperature. It represents what the air temperature "feels like" on exposed human skin due to the combined effect of the wind chill or heat index.	integer	4 -140 to 140	Y	60	optional	none	When the temperature is 40°F or lower the Feels Like value represents the computed Wind Chill so display the Wind Chill value. When the temperature is 70°F or higher, the Feels Like value represents the computed Heat Index so display the Heat Index value. For temperatures between 40°F and 70°F, the Feels Like value and Temperature are the same, regardless of wind speed and humidity, so display the Temperature value.

heat_index	An apparent temperature. It represents what the air temperature "feels like" on exposed human skin due to the combined effect of warm temperatures and high humidity. When the temperature is 70°F or higher, the Feels Like value represents the computed Heat Index. For temperatures between 40°F and 70°F, the Feels Like value and Temperature are the same, regardless of wind speed and humidity, so use the Temperature value.	integer	4		Y	70	optional	Display Heat Index only when the Heat Index value in your data feed is more than 21°C or 70°F.	Always display the unit of temperature (°F or °C) with the value.
wc	An apparent temperature. It represents what the air temperature "feels like" on exposed human skin due to the combined effect of the cold temperatures and wind speed. When the temperature is 61°F or lower the Feels Like value represents the computed Wind Chill so display the Wind Chill value. For temperatures between 61°F and 75°F, the Feels Like value and Temperature are the same, regardless of wind speed and humidity, so display the Temperature value.	integer	6	Use only if temperature is below 40 degrees Fahrenheit OR below 5 degrees Celsius	Y	-25	optional	Display Wind Chill only when the Wind Chill value in your data feed is less than 5°C or 40°F.	Always display the unit of temperature (°F or °C) with the value.
wx_phrase	A text description of the observed weather conditions at the reporting station	string	32	257 phrases	Y	Mostly sunny	required	none	display as provided
qualifier	Weather description qualifier code	string	6		Y	QQ0063	optional	none	do not display
qualifier_svrty	Weather description qualifier severity	string	1	1 (low) to 6 (high)	Y	1	optional	none	display as provided
blunt_phrase	Weather description qualifier short phrase	string	32		Y	Warmer than yesterday.	optional	none	display as provided
terse_phrase	Weather description qualifier terse phrase	string	50		Y	Dangerous wind chills. Limit outdoor exposure.	optional	none	display as provided

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pressure	Barometric pressure is the pressure exerted by the atmosphere at the earth's surface, due to the weight of the air. This value is read directly from an instrument called a mercury barometer and its units are expressed in millibars (equivalent to HectoPascals).	double	10,2	Y	30.06	optional	none	Display the value using up to one decimal and always use the unit of measure millibars or its abbreviation "mb." The Barometric Pressure should be labeled using one of the following: Pressure, Atmospheric Pressure, Surface Pressure, or Barometric Pressure
pressure_desc	A phrase describing the change in the barometric pressure reading over the last hour.	string	255 Steady, Rising, Rapidly Rising, Falling, Rapidly Falling	Y	Steady	Required if you choose to display any type of atmospheric pressure readings	none	display the numeric value and then the change in pressure description. 30.21 inches and steady or 1017.5 mb and rising rapidly
pressure_tend	The change in the barometric pressure reading over the last hour expressed as an integer.	integer	1 0 = Steady 1 = Rising or Rapidly Rising 2 = Falling or Rapidly Falling	Y	0	Required if you choose to display any type of atmospheric pressure readings	none	do not display
clds	Cloud cover description code	string	3 SKC, CLR, SCT, FEW, BKN, OVC	Y	SKC	optional	none	display as provided
vis	The horizontal visibility at the observation point. Visibilities can be reported as fractional values particularly when visibility is less than 2 miles. Visibilities greater than 10 statute miles(16.1 kilometers) which are considered "unlimited" are reported as "999" in your feed. You can also find visibility values that equal zero. This occurrence is not wrong. Dense fogs and heavy snows can produce values near zero. Fog, smoke, heavy rain and other weather phenomena can reduce	double	6,3 0 to 999 or null; For greater than 1 = no decimal. For less than 1 = 2 (Metric) & 2 (Imperial) decimal places.	Y	10, 0.25 (Metric) 0.25 (Imperial)	optional	Whenever the value is "999", your application should display the visibility field as "unlimited".	display as provided

	visibility to near zero miles or kilometers.								
wspd	Wind Speed. The wind is treated as a vector; hence, winds must have direction and magnitude (speed). The wind information reported in the hourly current conditions corresponds to a 10-minute average called the sustained wind speed. Sudden or brief variations in the wind speed are known as "wind gusts" and are reported in a separate data field. Wind directions are always expressed as "from whence the wind blows" meaning that a North wind blows from North to South. If you face North in a North wind the wind is at your face. Face southward and the North wind is at your back.	integer	4		Y	15	optional	none	Display the Wind Speed with its Wind Direction. Use the value as it appears in the data feed (numeric value) and always display its unit of measure, either the fully spelled version or its abbreviation. Examples Wind: from the Southeast at 8 miles per hour. Wind: from the Northwest at 12 kilometers/hour.
gust	Wind gust speed. This data field contains information about sudden and temporary variations of the average Wind Speed. The report always shows the maximum wind gust speed recorded during the observation period. It is a required display field if Wind Speed is shown. The speed of the gust can be expressed in miles per hour or kilometers per hour.	integer	4		Y	35	optional		Display the Wind Speed with its Wind Direction. Use the value as it appears in the data feed (numeric value) and always display its unit of measure, either the fully spelled version or its abbreviation. Examples Wind: from the East at 10 miles per hour, gusting to 25 miles per hour. Wind: from the West at 17 kilometers per hour, gusting to 25 kilometers per hour.
wdir	The direction from which the wind blows expressed in degrees. The magnetic direction varies from 1 to 360 degrees, where 360° indicates the North, 90° the East, 180° the South, 270° the West, and so forth. A 'null' value represents no determinable wind direction.	integer	4	1 to 360	Y	45	Optional. We recommend you use the Cardinal Wind Direction unless your audience (usually pilots, military, sailing enthusiasts, etc.) are familiar with and	No processing needed unless you wish to expand the data feed value into a full phrase (recommended).	Wind Direction should always be displayed along with the Wind Speed, including Wind Gusts if present. Use either Magnetic Wind Direction or Cardinal Wind Direction, but not both. We recommend you use the full spelling of the wind direction value contained in the feed (North, South, Southeast, etc.).

							understand Magnetic Wind Direction.		
wdir_cardinal	This field contains the cardinal direction from which the wind blows in an abbreviated form. Wind directions are always expressed as "from whence the wind blows" meaning that a North wind blows from North to South. If you face North in a North wind, the wind is at your face. Face southward and the North wind is at your back.	string	4	N , NNE , NE, ENE, E, ESE, SE, SSE, S, SSW, SW, WSW, W, WNW, NW, NNW, CALM, VAR	Y	ENE	required	none	display as provided
precip_total	Precipitation amount in the last rolling 24 hour period	decimal	5,2	0.00 to 99.99	Y	0.3	optional	none	display as provided with correct unit of measure (inches or centimeters or millimeters)
precip_hrly	Precipitation for the last hour	float	1,2	0.00 to 99.99	Y	0.5	optional	none	display as provided with the correct unit of measure (inches or centimeters)
snow_hrly	Snow increasing rapidly in inches or centimeters per hour depending on whether or not the snowfall is reported by METAR or TECCI (synthetic observations). METAR snow accumulation for the last hour is in inches and TECCI is in centimeters.	float	4,1	0 to 15	Y	1.0	optional	none	display as provided with the correct unit of measure (inches or centimeters)
uv_index	Ultraviolet index	integer	3	0 to 11 and 999	Y	7	optional	No processing needed unless the data value is greater than or equal to 11, convert the value to "10+".	display as provided
uv_desc	Ultraviolet index description	string	20	Extreme, High, Low, Minimal, Moderate, No Report, Not Available	Y	High	optional	none	display as provided
clds	Cloud cover description code	string	3	SKC, CLR, SCT, FEW, BKN, OVC	N	SKC			

water_temp	Water temperature	integer	3	25 to 100	Y 80	
primary_wave_period	Primary wave period	integer	2	0-99	Y 13	
primary_wave_height	Primary wave height	decimal	5	0-99.99	Y 3.28	
primary_swell_period	Primary swell period	integer	2	0-99	Y 13	
primary_swell_height	Primary swell height	decimal	5	0-99.99	Y 1.64	
H. F. of	Discount Hotels			0.1.050	V 400	
primary_swell_direction	Primary swell direction	integer	3	0 to 359	Y 190	
secondary_swell_period	Secondary swell period	integer	2	0-99	Y null	
secondary_swell_period	Secondary swell period	integer	2	0-99	i iiuii	
secondary_swell_height	Secondary swell height	decimal	5	0-99.99	Y null	
	Jessensany on on mongrid	300,,,,,	ŭ			
secondary_swell_direction	Secondary swell direction	integer	3	0 to 359	Y null	
,						

Data Element Explanation - Pressure

METAR reports pressure at sea level in two ways: one way is named "sea level pressure" and the other one is named "altimeter". They both mean the same thing, but they are calculated from the pressure at station level in two different ways. The altimeter one is better for aviation purposes.

• METAR does not report station pressure.

• SYNOP reports both pressure at sea level and station pressure.

For field named "mslp":

- for METAR we upload the sea level pressure. If it doesn't exist, we upload the altimeter pressure.
- for SYNOP we upload the sea level pressure. If it doesn't exist, we upload the station pressure.

For field named "pressure":

- for METAR, we upload the station pressure derived from altimeter pressure by reversing the altimeter equation. The equation needs only altimeter pressure and station elevation. We cannot use sea level pressure as starting point, because they did not make fully public exactly how they derive "sea level pressure" from pressure actually measured by station.
- for SYNOP, we upload the station pressure as reported.

Response Field Maintenance

TWC strives to minimize the impact of changes in our weather content to your applications. TWC will not remove, rename or change the data type (int, string) of any data fields in the API response. However, TWC may add new data fields without notice.

Note: Outbound File Format: If data is null, then the data element tag will be displayed with the value "null". If the data value is an empty string, the element tag will return the tag and the value will have no value displayed (XML) or display double quotes with no data (JSON).

Response Examples

Extensible Markup Language (XML)	JavaScript Object Notation (JSON)
xml version='1.0' encoding='UTF-8'?	{
<response></response>	`metadata": {
-metadata>	"language": "en-US",
<language>en-US</language>	"transaction_id": "1474388670432:-282484419",
<pre><transaction id="">1474388826044:-894530863</transaction></pre> /transaction id>	"version": "1",
<version>1</version>	"latitude": 33.4,
	"longitude": -83.19,
<longitude>-83.19</longitude>	"units": "e",
<units>e</units>	"expire_time_gmt": 1474392270,
<pre><expire_time_gmt>1474392426</expire_time_gmt></pre>	"status_code": 200
<status_code>200</status_code>	},
	"observations": [
<pre><observations></observations></pre>	{
<pre><observation key="K3J7"></observation></pre>	"key": "K3J7",
<class>observation</class>	"class": "observation",
<expire_time_gmt>1402812900</expire_time_gmt>	"expire_time_gmt": 1402812900,
<obs_id>K3J7</obs_id>	"obs_id": "K3J7",
<obs_name>Greensboro</obs_name>	"obs_name": "Greensboro",
<valid_time_gmt>1402805700</valid_time_gmt>	"valid_time_gmt": 1402805700,
<day_ind>N</day_ind>	"day_ind": "N",
<temp>72</temp>	"temp": 72,
<wx_icon>33</wx_icon>	"wx_icon": 33,
<icon_extd>3300</icon_extd>	"icon_extd": 3300,
<wx_phrase></wx_phrase>	"wx_phrase": "Fair",
Fair	"pressure_tend": null,
	"pressure_desc": null,

```
cpressure tend />
                                                                                                                                                                                                                                                                               "dewPt": 66,
                coressure desc />
                                                                                                                                                                                                                                                                               "heat index": 72.
                <dewPt>66</dewPt>
                                                                                                                                                                                                                                                                              "rh": 83.
                <heat index>72</heat index>
                                                                                                                                                                                                                                                                               "pressure": 29.29.
                <rh>83</rh>
                                                                                                                                                                                                                                                                               "vis": 10.
                <29.29</pressure>
                                                                                                                                                                                                                                                                              "wc": 72.
                                                                                                                                                                                                                                                                              "wdir": null.
                <vis>10</vis>
                <wc>72</wc>
                                                                                                                                                                                                                                                                               "wdir cardinal": "CALM",
                <wdir/>
                                                                                                                                                                                                                                                                               "aust": null.
                <wdir cardinal>
                                                                                                                                                                                                                                                                              "wspd": 0,
                     <![CDATA[CALM]]>
                                                                                                                                                                                                                                                                              "max temp": null,
                </wdir cardinal>
                                                                                                                                                                                                                                                                               "min temp": null,
                <gust />
                                                                                                                                                                                                                                                                              "precip_total": null,
                <wspd>0</wspd>
                                                                                                                                                                                                                                                                              "precip hrly": 0,
                <max temp/>
                                                                                                                                                                                                                                                                              "snow hrly": null,
                <min temp />
                                                                                                                                                                                                                                                                              "uv desc": "Low",
                                                                                                                                                                                                                                                                              "feels like": 72,
                cip total />
                cip_hrly>0</precip_hrly>
                                                                                                                                                                                                                                                                              "uv index": 0,
                                                                                                                                                                                                                                                                              "qualifier": null,
                <snow hrly />
                <uv desc>
                                                                                                                                                                                                                                                                               "qualifier svrty": null,
                     <![CDATA[Low]]>
                                                                                                                                                                                                                                                                              "blunt_phrase": null,
                                                                                                                                                                                                                                                                               "terse phrase": null,
                </uv desc>
                <feels like>72</feels like>
                                                                                                                                                                                                                                                                               "clds": "CLR".
                <uv index>0</uv index>
                                                                                                                                                                                                                                                                              "water temp": null,
                <qualifier />
                                                                                                                                                                                                                                                                              "primary wave period": null,
                                                                                                                                                                                                                                                                              "primary_wave_height": null,
                <qualifier svrty />
                                                                                                                                                                                                                                                                              "primary swell period": null,
                <blue>blunt phrase />
                <terse phrase />
                                                                                                                                                                                                                                                                               "primary swell height": null,
                <clds>CLR</clds>
                                                                                                                                                                                                                                                                              "primary swell direction": null,
                <water temp/>
                                                                                                                                                                                                                                                                              "secondary_swell_period": null,
                                                                                                                                                                                                                                                                              "secondary swell height": null,
                <primary_wave_period />
                continuous c
                                                                                                                                                                                                                                                                              "secondary swell direction": null
                cprimary_swell_period />
                                                                                                                                                                                                                                                                             // Response Collapsed for Presentation Purposes
                cprimary swell height/>
                cprimary swell direction />
                <secondary swell period />
                <secondary_swell_height />
                <secondary swell direction />
           </observation>
      // Response Collapsed for Presentation Purposes
</response>
```

Display Example

