

Cleaned Historical Observations

Atmospheric G2

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Welcome!

Welcome to the Atmospheric G2 Cleaned Historical API! We hope this answers any questions you have and allows you to get to work quickly with our global, versatile datasets. If you have any questions, please reach out to your AG2 account manager. *Documentation for the previous version of this product can be found [here](#).*

Getting Started

The method which may be used to access the AG2 global data sets programmatically is via a REST web services data request. First, establish an account with AG2 where a unique key will be created and provided. You may have multiple accounts. Each key is configured to allow up to X number of calls per year which was discussed and agreed upon in conversations with your AG2 account manager. The definition of a call is below.

Call Definition

An API call is **defined as 7 days or less** of data. For example, if you request 14 days of data it would be counted as **2 calls** against your annual call allowance.

Call Volume

The API call volume limit is a **maximum of 250 API calls per minute**. Exceeding this limit will result in an error message being returned and the client being unable to retrieve data for a minute.

Call Exceedance

Client's access to the Cleaned Historical API will be disabled once the Client's annual entitlement is **exceeded**.

Disclaimer

There is a **max of 1 year of historical data allowed per request**. If you request more than 1 year of data your end date will be shortened. You would receive data from your start date to 1 year out.

As is standard in URIs, all parameters are separated using the ampersand (&) character. Certain parameters are required to initiate a weather request. The list of required and optional parameters and their possible values are in tables below for station and gridded data. If no weather fields are specified, default fields will be returned based on the units requested or defaulted.

Station Data: Hourly, Daily, & Monthly

Data can be requested for either a specific station or from the nearest point on the global observation grid. Data updates 4x per day. Use the following API call to retrieve the complete list of global stations for which data is available:

<https://cleanedobservations.atmosphericg2.com/v3/hourlystation/stationlist?userKey=XXXXXXXXXXXXXXXXXX>

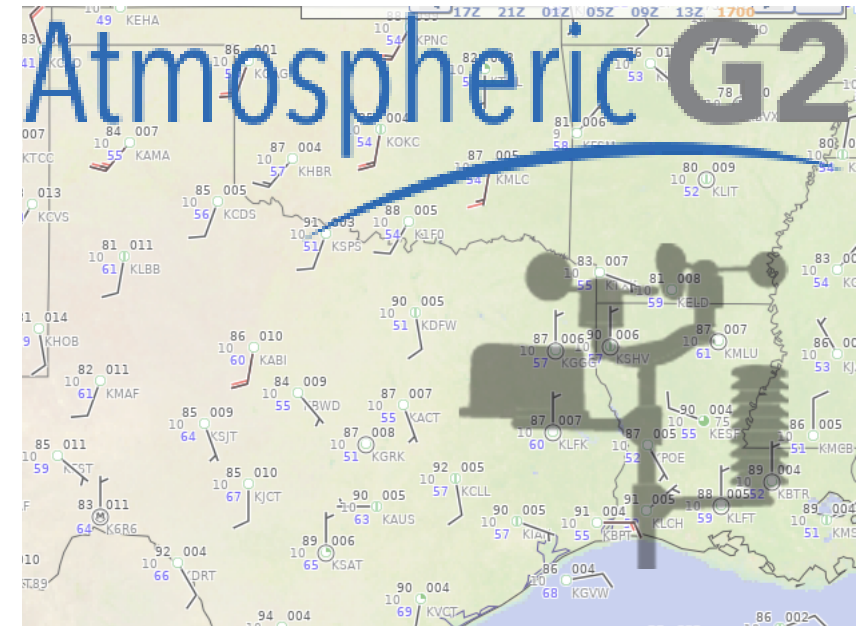
Start all calls with the following Endpoint: <https://cleanedobservations.atmosphericg2.com/v3/hourlystation/> After this, you will define your parameters.

Required Station Parameters (each separated by &, see examples on next page):

- **userKey** — this unique client identifier is assigned by AG2
- **location** – Can be either a Lat/Lon pair or a Station ID
 - Lat/Lon are coordinates of a location – The distance is calculated and data is returned from the closest station; no data is returned if location is more than 50 miles from the nearest station
 - eg: **lat=42.303&lon=-99.062**
 - Station ID can be one of the following:
 - Enhanced ID – A 15 character string containing with 4-letter leading identifier and lat/lon following eg: **station=SYNPN3861E02743**
 - ICAO Code – 4-letter station code eg: **station=KBOS**
- **startDate** — “mm/dd/yyyy” Indicates the starting date for weather request (Start date is first hour of requested date)
 - For gap-filled data (see below), the value could be any date from 1/1/1950 to today
 - For formatted data (see below), the value could be any date from station start to today
- **endDate** — “mm/dd/yyyy” indicates the ending date for weather request
 - For gap-filled data (see below), the value could be any date from 1/2/1950 to today
 - For formatted data (see below), the value could be any date from station start (+1 day) to tomorrow
 - The end date is excluded from the data return (i.e. an end date of 1/4/2020 will return data through 1/3/2020)

Optional Station Parameters (separated by &):

- **data** – The desired type of data to be requested
 - **gapfilled - Default**
 - Can provide data from 1/1/1950 to the present day for all global sites
 - Contains source term for each variable
 - Contains a separate “finalizedData” field you must include in your call if specifying any weather fields
 - **formatted**
 - Will only provide raw data from the station start date to the present day
 - Has “orgSource” variable instead of “finalizedData”



Gap Filled

Weather station data gaps are filled with modeled or re-analysis data. “finalizedData” field must be called and will be **true** once gapfilling and QC are applied (1-2 month latency), and will be **false** until then.

Formatted

This is the raw METAR weather station data that may have missing data and is not QCed, but will be formatted for consistent units. “orgSource” can be METAR, Synop, ISD, & Environment Canada

Gridded Data: Hourly, Daily, & Monthly

Data can be requested for either a lat/lon coordinate, grid cell, or zipcode on the global observation grid. Data resolution is 30x30 km or 18.6 x 18.6 miles and is updated 4x per day.

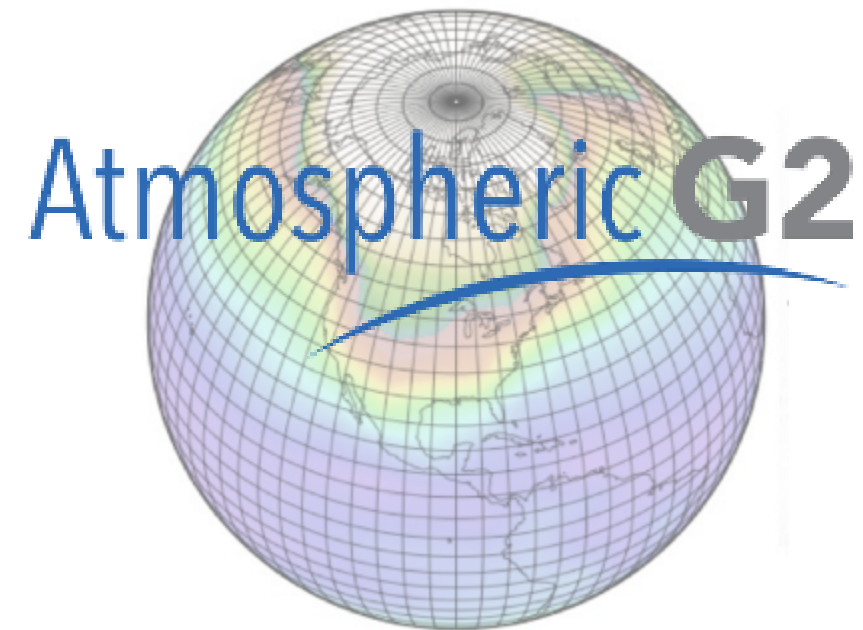
Start all calls with the following endpoint : <https://cleanedobservations.atmosphericg2.com/v3/gridded?> After this, you will define your parameters.

Required Gridded Parameters (each separated by &, see examples on next page):

- **userKey** — this unique client identifier is assigned by AG2
- **location** — Can be either a Lat/Lon pair, Site or Zipcode
 - Lat/Lon are coordinates of a location
 - Site is the 10-digit number representing the grid cell
 - Zipcode represents a U.S. zipcode
- **startDate** — “mm/dd/yyyy” Indicates the starting date for weather request (Start date is first hour of requested date)
 - Can be any date from 1/1/1979 to today
- **endDate** — “mm/dd/yyyy” indicates the ending date for weather request
 - Can be any date from 1/2/1979 to today
 - The end date is excluded from the data return (i.e. an end date of 1/4/2020 will return data through 1/3/2020)

Optional Gridded Parameters (separated by &):

- **interval** — The desired temporal resolution of the data being retrieved. Accepted values are:
 - **hourly - Default**
 - **daily**
 - **monthly**
- **units** — The desired units in which to express the data being retrieved. Accepted values are:
 - **metric - Default**
 - **imperial**
- **format** — The desired format in which to return the data being retrieved. Accepted values are:
 - **json - Default**
 - **xml**
 - **csv**
- **time** — Specify the time unit the requested data is returned in. Accepted values are:
 - **gmt** (Greenwich mean time) — **Default**
 - **lwt** (local wall time, will notice one duplicate and missing hour once each per year for LWT only if DST applies)
- **fields** — Specify the specific set of variables to return in the data being retrieved. Accepted values when requesting hourly and daily data are listed in the tables that [begin on page 6](#). You can specify more than one variable by separating each value by a comma, i.e. **fields=windSpeedMph,surfaceTemperatureFahrenheit**. *If no fields are specified, the [Default Fields](#) listed in the table on page 6 will be returned based on the value entered for the “units” parameter.* “fields=all” can be used to retrieve all possible response variables.



Weather Fields	Station			Gridded			Parameter Unit Required	Description
	Hourly	Daily	Monthly	Hourly	Daily	Monthly		
dateHrGmt	X^			X^				Greenwich Mean Time (GMT) date-time (also known as Universal Time)
dateHrLwt	X^			X^				Valid local date-time (Local wall time {includes daylight savings time})
date	X^	X		X^	X*			Valid local date
Temperature								
surfaceTemperature(Units)	X^	X*	X*	X^	X*	X*	Fahrenheit/ Celsius	Surface air (dry bulb) temperature at 2 meters
surfaceDewpointTemperature(Units)	X^	X*	X*	X^	X*	X*	Fahrenheit/ Celsius	Atmospheric humidity metric (temperature at which dew will form)
apparentTemperature(Units)	X			X^	X*		Fahrenheit/ Celsius	Air temperature that includes impact of wind and humidity at 10 meters. Instantaneous reading at time shown, Fahrenheit (°F) or Celsius (°C).
windChillTemperature(Units)	X			X^	X*		Fahrenheit/ Celsius	Air temperature that includes impact of wind at 10 meters. Instantaneous reading at time shown, Fahrenheit (°F) or Celsius (°C).
heatIndex(Units)	X			X^	X*		Fahrenheit/ Celsius	Air temperature that includes impact of relative humidity at 2 meters. Instantaneous reading at time shown, Fahrenheit (°F) or Celsius (°C).
surfaceWetBulbTemperature(Units)	X			X^	X*	X*	Fahrenheit/ Celsius	Atmospheric humidity metric (evaporative cooling potential of moist surface) at 2 meters. Instantaneous reading at time shown, Fahrenheit (°F) or Celsius (°C).
temperature80meter(Units)	X						Fahrenheit/ Celsius	A measure of atmospheric sensible heat content at 80 meters. Instantaneous reading at time shown, Fahrenheit (°F) or Celsius (°C).
dewpointTemperature80meter(Units)	X						Fahrenheit/ Celsius	Atmospheric humidity metric (temperature at which dew will form) at 80 meters. Instantaneous reading at time shown, Fahrenheit (°F) or Celsius (°C).
temperature100meter(Units)	X						Fahrenheit/ Celsius	A measure of atmospheric sensible heat content at 100 meters. Instantaneous reading at time shown, Fahrenheit (°F) or Celsius (°C).
dewpointTemperature100meter(Units)	X						Fahrenheit/ Celsius	Atmospheric humidity metric (temperature at which dew will form) at 100 meters. Instantaneous reading at time shown, Fahrenheit (°F) or Celsius (°C).
InstantaneousSurfaceTemperatureCelsius		X*	X*					Highest or lowest temperature recorded in Celsius (°C).
InstantaneousSurfaceTemperatureTimestamp		X*	X*					Time of highest or lowest temperature recorded

InstantaneousSurfaceTemperatureSource		X*	X*					Source of highest or lowest temperature recorded
Humidity & Precipitation								
relativeHumidityPercent	X^	X*	X*	X^	X*	X*		Percent of water vapor in the air relative to its saturation point
precipitationPreviousHour(Units)	X^	X**	X**	X^	X**	X**	Inches/ Millimeters	Liquid equivalent for types: warm rain, freezing rain, sleet, snow over the past Hour
Weather Fields	Station Hourly Daily Monthly			Gridded Hourly Daily Monthly			Parameter Unit Required	Description
snowPreviousHour(Units)	X^	X**	X**	X			Inches/ Millimeters	Total snowfall over the past Hour
Snowfall(Units)				X^	X**		Inches/ Centimeters	Total Snowfall
specificHumidityRatio	X							Ratio between the mass of water vapor in kilograms against the mass of air in kilograms within a unit volume of air at 2 meters, dimensionless.
surfaceWaterMixingGkg	X							Ratio between the mass of water vapor in grams against the mass of dry air in kilograms within a unit volume of air at 2 meters, grams per kilogram (gkg).
relativeHumidity80meterPercent	X							Percent of water vapor in the air relative to its saturation point at 80 meters. Instantaneous reading at time shown, percentage (%).
specificHumidity80meterRatio	X							Ratio between the mass of water vapor in kilograms against the mass of air in kilograms within a unit volume of air at 80m, dimensionless.
waterMixing80meterGkg	X							Ratio between the mass of water vapor in grams against the mass of dry air in kilograms within a unit volume of air at 80m, grams per kilogram (gkg).
relativeHumidity100meterPercent	X							Percent of water vapor in the air relative to its saturation point at 100 meters. Instantaneous reading at time shown, percentage (%).
specificHumidity100meterRatio	X							Ratio between the mass of water vapor in kilograms against the mass of air in kilograms within a unit volume of air at 100m, dimensionless.
waterMixing100meterGkg	X							Ratio between the mass of water vapor in grams against the mass of dry air in kilograms within a unit volume of air at 100m, grams per kilogram (gkg).
precipitationType	X							Integer code describing precipitation type - 0 none, 1 rain, 2 snow, 4 freezing rain, 8 ice pellets. If more than one type then integers are added e.g. 3 rain & snow.
rainPreviousHour(Units)	X						Inches/ Millimeters	Total accumulated rain in the previous hour, inches (in) or millimeters (mm).

icePelletPreviousHour(Units)	X						Inches/ Millimeters	Total accumulated ice pellets in the previous hour, inches (in) or millimeters (mm).
freezingRainPreviousHour(Units)	X						Inches/ Millimeters	Total accumulated freezing rain in the previous hour, inches (in) or millimeters (mm).
specificHumidity				X				Daily water vapor content at 2m (kg/kg)
precipitationRateMillimetersPerHour				X				Hourly measure of precipitation intensity. Average for previous hour (mm/hr)
Weather Fields	Station			Gridded			Parameter	Description
	Hourly	Daily	Monthly	Hourly	Daily	Monthly	Unit Required	
categoricalFreezingRain				X				Indicator of precipitation falling as freezing rain (1=yes; 0=no) Not available in daily or monthly increments. Instantaneous reading at time shown (index)
categoricalRain				X				Indicator of precipitation falling as rain (1=yes; 0=no) Not available in daily or monthly increments. Instantaneous reading at time shown (index)
categoricalSnow				X				Indicator of precipitation falling as snow (1=yes; 0=no) Not available in daily or monthly increments. Instantaneous reading at time shown (index)
categoricalIcePellet				X				Indicator of precipitation falling as ice/graupel (1=yes; 0=no) Not available in daily or monthly increments. Instantaneous reading at time shown (index)
snowCoverPercent				X				Percentage of surface covered with snow. Average for previous hour (percent)
snowDepth(Units)				X			Feet/ Meters	Calculated snow depth at the surface
iceCover				X				Surface ice coverage (index)
iceThickness(Units)				X			Feet/ Meters	Depth of ice on the surface
Pressure								
surfaceAirPressure(Units)	X^	X*	X*	X^	X*	X*	Millibars/ Kilopascals	Atmospheric pressure at the Surface
mslPressure(Units)	X^	X*	X*	X^	X*		Millibars/ Kilopascals	Mean Sea Level Pressure
pressure80meter(Units)	X						Millibars/ Kilopascals	Atmospheric pressure at 80m. Instantaneous reading at time shown, millibars (mb) or kilopascals (kPa).
pressure100meter(Units)	X						Millibars/ Kilopascals	Atmospheric pressure at 100m. Instantaneous reading at time shown, millibars (mb) or kilopascals (kPa).
Wind								
windSpeed(Units)	X^	X*	X*	X^	X*	X*	Mph/ Kph	Unobstructed wind speed at 10 meters
windDirectionDegrees	X^	X*	X*	X^	X*	X*		Upwind direction (e.g., wind from east = 90, from south = 180, etc.) at 10 meters

surfaceWindGust(Units)	X^	X*	X*	X	X*		Mph/ Kph	Unobstructed wind gusts at 10 meters
windDirection80meterDegrees	X							Upwind direction (e.g., wind from east = 90, from south = 180, etc.) at 80 meters. Two-minute average up-wind direction at time shown, degrees.
windSpeed80meter(Units)	X						Mph/ Kph	Instantaneous wind speed at 80 meters for the time shown, miles per hour (mph) or kilometers per hour (kph).
Weather Fields	Station			Gridded			Parameter	Description
		Hourly	Daily	Monthly	Hourly	Daily	Monthly	Unit Required
windDirection100meterDegrees	X							Upwind direction (e.g., wind from east = 90, from south = 180, etc.) at 100 meters. Two-minute average up-wind direction at time shown, degrees.
windSpeed100meter(Units)	X						Mph/ Kph	Instantaneous wind speed at 100 meters for the time shown, miles per hour (mph) or kilometers per hour (kph).
frictionVelocitySurfaceMps	X							Magnitude of stress at the surface, expressed as a velocity, meters per second (mps).
oneHundredMeterWindSpeed(Units)		X	X	X			Mph/ Kph	Wind speed at 100m (Kph)
maxInstantaneousWindSpeedKph		X	X					Highest measured wind speed in kph
maxInstantaneousWindSpeedTimestamp		X	X					Time of highest measured wind speed
maxInstantaneousWindSpeedSource		X	X					Source of highest measured wind speed
maxInstantaneousWindGustKph		X	X					Highest measured wind speed gust in kph
maxInstantaneousWindGustTimestamp		X	X					Time of highest measured wind gust
maxInstantaneousWindGustSource		X	X					Source of highest measured wind gust
Clouds, Solar, & More								
cloudCoveragePercent	X^	X*	X*	X^	X*	X*		Percentage of the sky covered by clouds
referenceEvapotranspiration(Units)				X^	X		Inches/ Millimeters	Reference Evapotranspiration (inches/hour) or (millimeters/hour)
downwardSolarRadiationWsqm	X			X^	X**	X**		Total solar radiation reaching the surface of the earth (GHI), Watts per square meter (Wpm^2).
directNormalIrradianceWsqm	X			X^	X**	X**		Solar radiation reaching the surface of the earth along a direct path, Watts per square meter (Wpm^2).
diffuseHorizontalRadiationWsqm	X			X^	X**	X**		Solar radiation reaching the surface of the earth along a direct path, Watts per square meter (Wpm^2).
surfaceAirDensityKgcbm	X							Mass of air per unit volume at 2 meters, kilograms per cubic meter (kgpm^3).
airDensity80meterKgcbm	X							Mass of air per unit volume at 80 meters, kilograms per cubic meter (kgpm^3).

airDensity100meterKgcbm	X						Mass of air per unit volume at 100 meters, Kilograms per Cubic Meter (kgpm ³).	
totalCloudCoverLowPercent	X			X			Total cloud cover up to 6,000 feet. Average for previous hour, percentage (%).	
totalCloudCoverMiddlePercent	X			X			Total cloud cover between 6,000 feet and 20,000 feet. Average for previous hour, percentage (%).	
totalCloudCoverHighPercent	X						Total cloud above 20,000 feet. Average for previous hour, percentage (%).	
visibility(Units)	X					Miles/ Kilometers	The greatest distance at which it is just possible to see and identify with the naked eye at the surface, miles (mi) or kilometers (km).	
presentWeather	X						Instantaneous observed weather types, text.	
horizontalDirectNormalIrradianceSurfaceWsqm	X						The horizontal component of the solar radiation reaching the surface along a direct path, Watts per square meter (Wpm ²).	
Weather Fields	Station			Gridded			Parameter	Description
	Hourly	Daily	Monthly	Hourly	Daily	Monthly	Unit Required	
potentialEvapotranspirationMicrometersPerHour				X		X		Maximum evaporation rate possible (sum of evaporation and plant transpiration)
seaSurfaceTemperature(Units)				X			Fahrenheit/ Celsius	Ground or Sea Surface Temperature
downwardTerrestrialRadiationWsqm				X				Long-wave radiation flux incident on a plane parallel to the Earth's surface (w/m ²)
directNormalInfraredRadiationWsqm				X				Same as DirectNormalIrradianceWsqm
netRadiationWsqm				X		X		Sum of incoming/outgoing solar and terrestrial radiation (w/m ²)
albedoPercent				X				Fraction of radiation reflected at the surface (percent)
surfaceGeopotentialHeight(Units)				X			Feet/ Meters	Surface height at mean sea-level pressure (m)
surfaceSensibleHeatFluxWsqm				X				Rate of sensible heat energy transfer at the surface. Average or accumulated energy for previous hour (w/m ²)
surfaceLatentHeatFluxWsqm				X				Rate of latent heat energy transfer at the surface. Average or accumulated energy for previous hour (w/m ²)
convectiveAvailablePotentialEnergyJulesPerKilogram				X				Energy available for convective (storm) development in boundary layer. Average for previous hour (J/kg)
totalOzoneDobsonUnits				X				Atmospheric column ozone density. Average for previous hour (DU = Dobson Units)
planetaryBoundaryLayerHeightMeters				X				The depth of the lowest layer of the atmosphere. In this layer, friction affects the wind speed and direction. Depth, meters.

groundHeatFluxWsqm				X				Rate of heat energy transfer at the surface. Average or accumulated energy for previous hour (w/m^2)
Ground								
surfaceWaterRunOff(Units)				X			Inches/ Millimeters	Precipitation in previous hour expected to run off (not be absorbed)
zeroToTenLiquidSoilMoisturePercent				X				Layer-average by volume
zeroToTenSoilTemperature(Units)				X			Fahrenheit/ Celsius	Layer-average
tenToFortyLiquidSoilMoisturePercent				X				Layer-average by volume
fortyToOneHundredLiquidSoilMoisturePercent				X				Layer-average by volume
tenToFortySoilTemperature(Units)				X			Fahrenheit/ Celsius	Layer-average
Weather Fields	Station			Gridded			Parameter	Description
	Hourly	Daily	Monthly	Hourly	Daily	Monthly	Unit Required	
fortyToOneHundredSoilTemperature(Units)				X			Fahrenheit/ Celsius	Layer-average
bareSoilEvaporationWsqm				X				Water movement and evaporation through vegetation (w/m^2)
zeroToTwoHundredLiquidSoilMoisturePercent				X				Layer-average by volume (percent)
vegetationCoveragePercent				X				Percent of surface covered by vegetation. Not available in Daily or Monthly increments (percent)
vegetationType				X				Categorized description of vegetation content at the surface. Not available in Daily or Monthly increments, Vegetation Type Index (SiB analysis)
soilType				X				Categorized description of soil content. Not available in Daily or Monthly increments, Soil Type Index (Zobler Analysis)
surfaceSlopeType				X				Categorized description of the change in surface height. Not available in Daily or Monthly increments (index)
surfaceRoughness(Units)				X			Feet/ Meters	Descriptor of surface texture (i.e. an indicator for the strength of frictional drag). Not available in Daily or Monthly increments

^	Default fields if none are specified in the API call
*	Daily fields need prefix of Min, Max, or Avg ahead of parameter name
**	Daily fields need prefix of Min, Max, Avg, or Sum ahead of parameter name

Degree Day Data

Certain parameters are required to initiate a weather request. As is standard in URIs, all parameters are separated using the ampersand (&) character. The list of parameters and their possible values are enumerated below.

Start all calls with the following endpoint: <https://cleanedobservations.atmosphericg2.com/v3/degreeday> After this, you will define your parameters.

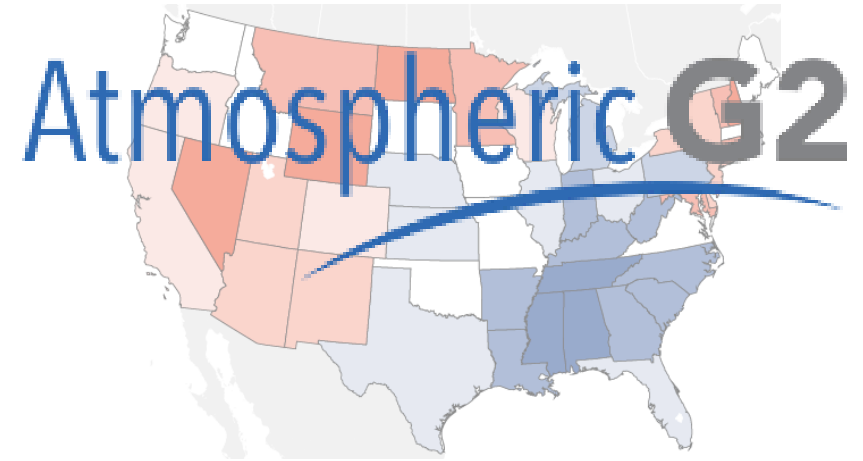
Required Degree Day Parameters (each separated by &, see examples on next page):

- **userKey** - this unique client identifier is assigned by AG2
- **lat/long** - latitude/longitude for which data is being requested for, eg: **lat=42.303&lon=-99.062**
- **startDate** - "mm/dd/yyyy" Indicates the starting date for weather request (Start date is first hour of requested date)
 - Can be any date from 1/1/1979 to today
- **endDate** - "mm/dd/yyyy" indicates the ending date for weather request (End date is first hour of date requested, data will be returned between the first hour of start date and first hour of end date. Make the end date an extra day if you would like data for that day.)
 - Can be any date from 1/2/1979 to today
- **units** - The desired units in which to express the data being retrieved. Accepted values are:
 - **Imperial**
 - **metric**
- **format** - The desired format in which to return the data being retrieved. Accepted values are:
 - **Json- Default**
 - **xml**
 - **csv**

Optional Degree Day Parameters (separated by &):

- **crop** – Specific to Growing Degree Days and Killing Degree Days. Currently accepted values are:
 - **Corn - Default**
 - **Wheat**
 - **Potato**
 - **Cotton**
 - **Peanut**
- **basetemp** – The base temperature to be used in the Growing/Killing Degree Day calculation. The value can be provided in either Fahrenheit or Celsius but needs to be consistent with the value used for the "units" parameter. If both the "crop" and "basetemp" parameters are not provided a Default value of 50F is used. Otherwise, the default "basetemp" for the entered crop will be used which are listed below within the Definitions section.

Degree Day Definitions



- **Cooling Degree Days** - Difference of average daily temperature and 65 F / 18 C. If positive, equals the difference. Else is 0.
- **Heating Degree Days** - Difference of 65 F / 18 C and average daily temperature. If positive, equals the difference. Else is 0.
- **Growing/Killing Degree Days** - Difference from average daily temperature from base temperature of a crop (base temperature is defined by crop). Equals 0 if average daily temperature is below 32 F / 0 C or above 86 F / 30 C.
- **Default basetemp based on crop:**
 - Corn: 50 F / 10 C
 - Wheat: 40 F / 4 C
 - Cotton: 60 F / 16 C
 - Peanut: 56 F / 13 C
 - Potato: 45 F / 7 C

Date Range Restriction

There is a max of 1 year of historical data allowed per request. If you request more than 1 year of data your end date will be shortened. You would receive data from your start date to 1 year out.

Examples:

Heating/Cooling Degree Days

[https://cleanedobservations.atmosphericg2.com/v3/degreeday/\[42.134,-78.132\]?startDate=05/01/2015&endDate=05/02/2015&units=imperial&format=json&userKey=\[userKey\]](https://cleanedobservations.atmosphericg2.com/v3/degreeday/[42.134,-78.132]?startDate=05/01/2015&endDate=05/02/2015&units=imperial&format=json&userKey=[userKey])

Growing/Killing Degree Days for Corn with a basetemp of 55F:

[https://cleanedobservations.atmosphericg2.com/v3/degreeday/\[42.134,-78.132\]?startDate=05/01/2015&endDate=05/02/2015&units=imperial&crop=corn&basetemp=55&format=json&userKey=\[userKey\]](https://cleanedobservations.atmosphericg2.com/v3/degreeday/[42.134,-78.132]?startDate=05/01/2015&endDate=05/02/2015&units=imperial&crop=corn&basetemp=55&format=json&userKey=[userKey])

