Ag-Analytics

POLARIS SERVICE

API Documentation 2021

API Portal | GitHub Repo | Jupyter Notebook | Purchase

Service Overview

The POLARIS Service API offers a means to clip POLARIS data to a user-provided area of interest. POLARIS Data is a 30-m resolution soil map of the Contiguous United States and includes an array of soil parameters at certain depths along with four statistics about each parameter.

The Polaris API is broken down into a POST and a GET request. The POST request is where the boundary, soil parameters, and statistics are sent to the service. The response is the file name that can be used to retrieve GeoTiff that was generated in the back-end. The GET request consists of passing the file name from the POST request and the response is the clipped Polaris GeoTiff.
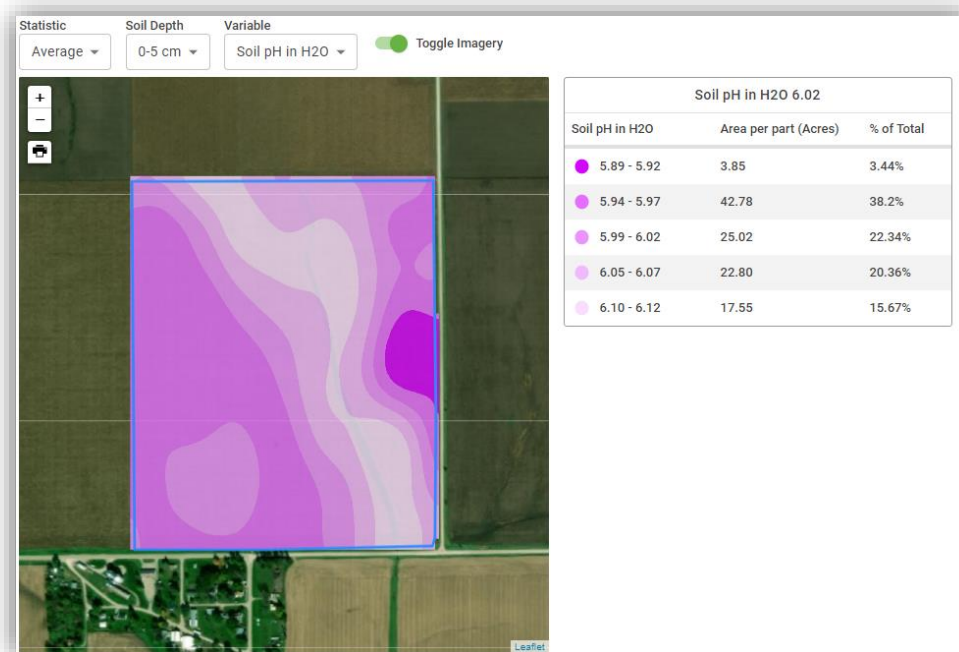
POLARIS in DataLayers

POST Request

POST Request Example – application/x-www-form-urlencoded

```
aoi=%7B%22type%22%3A%22Feature%22%2C%22geometry%22%3A%7B%22type%22%3A%22Polygon%22
%2C%22coordinates%22%3A%5B%5B%5B-121.2475204%2C+45.4668127%5D%2C%5B-
121.2484646%2C+45.4418262%5D%2C%5B-121.2119007%2C+45.4417660%5D%2C%5B-
121.2115574%2C+45.4665117%5D%2C%5B-
121.2475204%2C+45.4668127%5D%5D%5D%7D%7D&Soil_Parameter=ph&Depth_Range=15-
30&Statistic=mean&Legend_Ranges=10
```

Header Parameters

content-type: " x-www-form-urlencoded"

Ocp-Apim-Subscription-Key: Subscription keys are given upon purchase -   Purchase APIs ↗

Request Parameters

Parameter	Data Type	Required?	Default	Options	Description
aoi	GeoJSONString, .shp file, GeoTIFF	Yes	--	--	Area of interest, in the case of GeoJSON, can be multipolygon or rings.)
Soil_Parameter	String	Yes	--	See request parameter details table	Soil property to generate map of.
Depth_Range	String	Yes	--	"0-5" "5-15" "15-30" "30-60" "60-100" "100-200"	Depth range in centimeters of the soil column.
Statistic	String	Yes	--	mean, min, max, var	Statistics provided per layer and variable
Legend_Ranges	String	No	3	Any number greater than 0	PNG will have a number of colors corresponding to the number of legend ranges passed. Each color bin is spaced evenly among the points.

Request Parameter Details

Soil Parameter Details

Variable	Units	Description
silt	%	silt percentage
sand	%	sand percentage
clay	%	clay percentage
bd	g/cm^3	bulk density
awc	m^3/ m^3	available water content
theta_s	m^3/ m^3	saturated soil water content
theta_r	m^3/ m^3	residual soil water content
theta_33	m^3/ m^3	soil water content at field capacity
theta_1500	m^3/ m^3	soil water content at the wilting point
ksat	cm/hr	saturated hydraulic conductivity
resdt	cm	depth to restriction layer
ph	N/A	soil pH in H2O
om	%	organic matter
caco3	%	calcium carbonate in soil
cec	meq/100g	cation exchange capacity of soil
lambda	N/A	pore size distribution index (brooks-corey)
hb	cm	bubbling pressure (brooks-corey)
n	N/A	measure of the pore size distribution (van genuchten)
alpha	cm^{-1}	scale parameter inversely proportional to mean pore diameter (van genuchten)

Soil Statistic Details

1. **mean** – Arithmetic mean
2. **min** – Minimum
3. **max** – Maximum
4. **var** – Variance

Response Parameters

Parameter	Data Type	Description
CellSize	Int[ ]	The output raster cell size (resolution)
CoordinateSystem	String	The CoordinateSystem defines the projection for the data. A projection specifies how latitude-longitude coordinates are transformed into 2-dimension x-y coordinates.
Extent	String	The minimum and maximum X and Y coordinates of a bounding box.
Legend	Dictionary	Legend gives the following details for each range of values: 1. **color**: Hex color used for the soil parameter value 2. **Area**: Area of certain soil parameter value 3. **Count**: Number of pixels from the result raster of certain soil parameter value 4. **CountAllPixels**: Total number of pixels in the result raster 5. **Max**: maximum soil parameter value 6. **Mean**: average soil parameter value 7. **Min**: minimum soil parameter value 8. **Area:** Area of the soil parameter in acres
Max	Double	Maximum soil parameter value
Mean	Double	Average soil parameter value
Min	Double	Minimum soil parameter value
Percentile5	Double	5th percentile soil parameter value
Percentile95	Double	95th percentile soil parameter value
Product	String	The soil parameter supplied in the request (pH)
Std	Double	Standard deviation for the given soil parameter
pngb64	String	Base64 png string
FileName	String	The tif file that can be downloaded

GET Request

Request Example

The GET request to retrieve the tif image using the file name from the POST response.

```
https://ag-analytics.azure-api.net/polaris-new/?FileName= result_raster
_cdl_2016_epsg_4326_resolution_0.0001_79133.tif
```

Request Parameters

Parameter	Data Type	Required?	Default	Options	Description
FileName	text	Yes	--	.tif file	file name returned by POST request

Response Parameters

Parameter	Data Type	Description
file	.tif	Tiff file will be download to the computer of the caller with the name that was used to call the API.

Citations:

- POLARIS Data and Info: http://hydrology.cee.duke.edu/POLARIS/PROPERTIES/v1.0/
- Chaney et al, "POLARIS: A 30-meter probabilistic soil series," USGS: https://pubs.er.usgs.gov/publication/70170912

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Please contact **support@analytics.ag** or **josh@ag-analytics.org** with any comments or questions.

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