



# VEGA Step by Step Manual (1)

Visualizing Earth tool by Google Earth Engine Apps (VEGA) is a web-based application empowered by Google Earth Engine (GEE) which allows you to browse and visualize Landsat-8 and Sentinel-2 archives without downloading the data or installing any software.

Users of GEE usually write JavaScript code, but VEGA doesn't require JavaScript knowledge. You can select options or input numbers on the control panel.

## VEGA Visualizing Earth

Control Panel

**VEGA**

Visualizing Earth tool by Google Earth Engine Apps  
GEEアプリを用いた地球可視化ツール

This tool is for displaying Landsat-8 and Sentinel-2 data at a specified period with the color composition and reducer of your choice.

**1: Please select the dataset.**

Select a dataset

**2: Please choose a method for band(s) visualization.**

2-1: To view a single band (grayscale) image, please select a band from the dropdown menu below.

Select a value...

2-2: To view a 3 bands (red-green-blue) color composite image, please write down the bands combination in red, green, and blue order as shown in the example.

ex: B4-B3-B2

**To reset the visualization method use the reset bottom.**

Reset visualization method



# VEGA Step by Step Manual (2)

## 1: Please select the dataset.

Select a dataset

### 1. Selecting the dataset from the data list

- LANDSAT/LC08/C01/T1\_SR → [Landsat-8 Tier1 Data](#)
- LANDSAT/LC08/C01/T2 → [Landsat-8 Tier2 Data](#)
- COPERNICUS/S2\_SR → [Sentinel-2 Data](#)

#### Tips (Landsat Data)

Landsat data is categorized into Tier1 and Tier2. For those who use VEGA first time, we recommend you to select Tier1.

## 2: Please choose a method for band(s) visualization.

2-1: To view a single band (grayscale) image, please select a band from the dropdown menu below.

Select a value...

2-2: To view a 3 bands (red-green-blue) color composite image, please write down the bands combination in red, green, and blue order as shown in the example.

ex: B4-B3-B2

To reset the visualization method use the reset bottom.

Reset visualization method

### 2. Selecting the visualization method and the band(s)

- To visualize black & white image by single band. → [see 2-1](#)
- To visualize color image by multiple bands. → [see 2-2](#)

#### 2-1 Selecting a band to visualize black & white (grayscale) image

- Choose the band from the drop-down menu. (Leave 2-2 text box blank)

#### 2-2 Selecting three bands for color composition visualization

- Write down respective composition in the “Red-Green-Blue” order, capital-scale letter, and separated by a hyphen(-) in the text box ( ex: B4-B3-B2).

#### Tips (Band Information)

Information on the selectable bands for 2-2 is available at the next slide, or you can also refer them if you press 2-1 “Choose a band” button (Make sure not to choose one of them) .

To reset and switch between visualization methods, press Reset button.



# Bands Specifications for Each Dataset

## Landsat 8 collection, Tier 1, Surface reflectance

Band Name	Wavelength	Description
<b>B1</b>	0.435-0.451 $\mu\text{m}$	Ultra blue-surface reflectance
<b>B2</b>	0.452-0.512 $\mu\text{m}$	Blue-surface reflectance
<b>B3</b>	0.533-0.590 $\mu\text{m}$	Green-surface reflectance
<b>B4</b>	0.636-0.673 $\mu\text{m}$	Red-surface reflectance
<b>B5</b>	0.851-0.879 $\mu\text{m}$	Near infrared-surface reflectance
<b>B6</b>	1.566-1.651 $\mu\text{m}$	Shortwave infrared 1-surface reflectance
<b>B7</b>	2.107-2.294 $\mu\text{m}$	Shortwave infrared 2-surface reflectance
<b>B10</b>	10.60-11.19 $\mu\text{m}$	Brightness temperature
<b>B11</b>	11.50-12.51 $\mu\text{m}$	Brightness temperature

## Landsat 8 collection, Raw Scenes, Tier 2

Band Name	Wavelength	Description
<b>B1</b>	0.43 - 0.45 $\mu\text{m}$	Coastal aerosol
<b>B2</b>	0.45 - 0.51 $\mu\text{m}$	Blue
<b>B3</b>	0.53 - 0.59 $\mu\text{m}$	Green
<b>B4</b>	0.64 - 0.67 $\mu\text{m}$	Red
<b>B5</b>	0.85 - 0.88 $\mu\text{m}$	Near infrared
<b>B6</b>	1.57 - 1.65 $\mu\text{m}$	Shortwave infrared 1
<b>B7</b>	2.11 - 2.29 $\mu\text{m}$	Shortwave infrared 2
<b>B8</b>	0.52 - 0.90 $\mu\text{m}$	Band 8 Panchromatic
<b>B9</b>	1.36 - 1.38 $\mu\text{m}$	Cirrus
<b>B10</b>	10.60 - 11.19 $\mu\text{m}$	Thermal infrared 1, resampled from 100m to 30m
<b>B11</b>	11.50 - 12.51 $\mu\text{m}$	Thermal infrared 2, resampled from 100m to 30m

## Sentinel-2, Multispectral Instrument, Level-2A

Band Name	Wavelength	Description
<b>B1</b>	443.9nm (S2A) / 442.3nm (S2B)	Aerosols
<b>B2</b>	496.6nm (S2A) / 492.1nm (S2B)	Blue
<b>B3</b>	560nm (S2A) / 559nm (S2B)	Green
<b>B4</b>	664.5nm (S2A) / 665nm (S2B)	Red
<b>B5</b>	703.9nm (S2A) / 703.8nm (S2B)	Red Edge 1
<b>B6</b>	740.2nm (S2A) / 739.1nm (S2B)	Red Edge 2
<b>B7</b>	782.5nm (S2A) / 779.7nm (S2B)	Red Edge 3
<b>B8</b>	835.1nm (S2A) / 833nm (S2B)	Near infrared
<b>B8A</b>	864.8nm (S2A) / 864nm (S2B)	Red Edge 4
<b>B9</b>	945nm (S2A) / 943.2nm (S2B)	Water vapor
<b>B11</b>	1613.7nm (S2A) / 1610.4nm (S2B)	Shortwave infrared 1
<b>B12</b>	2202.4nm (S2A) / 2185.7nm (S2B)	Shortwave infrared 2



# VEGA Step by Step Manual (3)

**3: Please specify the minimum and maximum pixel value to be displayed in the text box (reflectance x 10000).**

Min value(s) ex: 1band: 0, 3bands: 0-0-0

Max value(s) ex: 1band: 3000, 3bands: 3000-4000-5000

**3. Assigning minimum and maximum pixel value ranges**

- Write down minimum value(s) in the upper text box, and maximum value(s) in the lower text box.
- If you chose single-band visualization method (2-1), min and max values take only one value each, however, if you chose RGB visualization (2-2), min and max values take three values in the order of RGB bands which are separated using hyphen (-) (ex: 3000-2500-3000)

### **Tips (Pixel Values)**

0 for Min and 3000 for Max are recommended for those who use VEGA first time. Same values for 3 bands are OK. Then, you can change the values and see how the image is going to look like.

**4: Please enter the observation period (start and end dates) as shown in the example.**

Starting date ex: 2018-01-01

Ending date ex: 2020-01-01

**4. Specifying the period of observation**

- Write down the starting date of observation in the upper text box, and the ending date in the lower text box.
- The dates must be written in the YYYY-MM-DD format and must be separated only by hyphen (ex: 2018-11-25).

### **Tips (Period of Observation)**

The first Landsat-8 data injected in GEE is observed on 2013-04-11 and Sentinel-2 data is on 2017-03-28. Therefore, make sure write down the starting dates after the first observation dates.



# VEGA Step by Step Manual (4)

## 5: Please select the data composition method.

Select a reducer

### 5. Selecting Data Composition Method

- You can choose reducer (function) to composite the collection as a single image. Available methods are:
  - ✓ Median
  - ✓ Mean
  - ✓ Minimum
  - ✓ Maximum
  - ✓ Latest observation (No reducer)
  - ✓ Earliest observation (No reducer)

## 6: For cloud masking, please check the box.

Cloud Masking

### 6. Specifying the cloud masking status.

- If you want to mask cloud cover to generate a cloud free image, check “Cloud Masking” box.

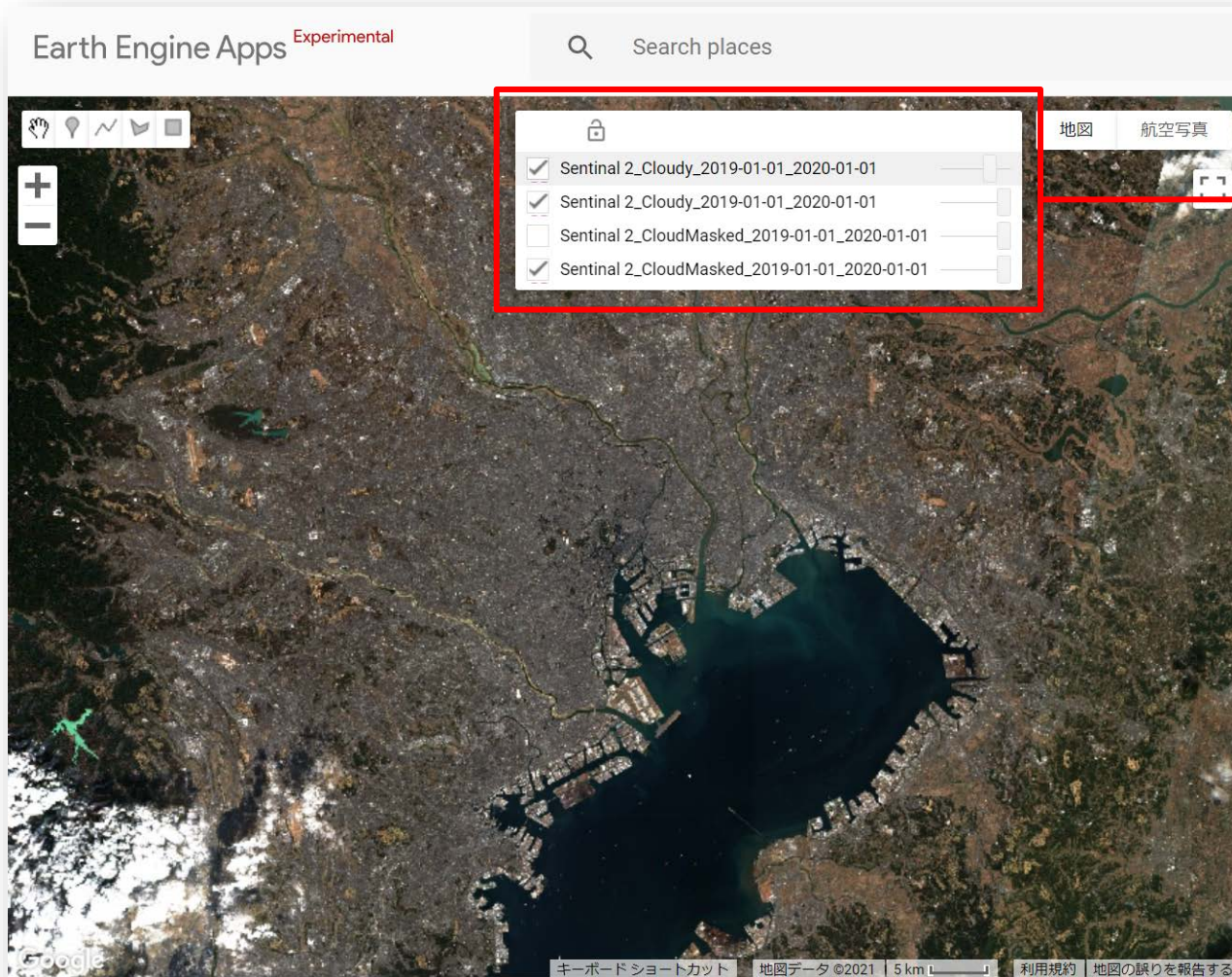
## 7: Please press the loading button to display the image.

Load image

### 7. Load the Image

- You can load the image according to specifications assigned in previous sections.

# VEGA Step by Step Manual (5)



## 8. Comparison of Visualized Images

- VEGA shows and overlays the last four assigned images (new image will be top layer) and earlier images will not be shown.
- If you want to hide layers, uncheck its check box.
- You can change the transparency of each layer by moving its slider.
- After loading the image, by checking on any part of the image, you can check the latitude, longitude and pixel values of the top layer.



For more information on VEGA  
and the related training courses,  
visit our website at  
<https://rs-training.jp/> or contact RESTEC