

# Hands on materials for mapping seagrass using Seagrass Mapper / Seagrass Trainer

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Genki Terauchi

Northwest Pacific Region Environmental Cooperation Center /  
NOWPAP CEARAC

December, 2021

# Hands on practice on Day 3

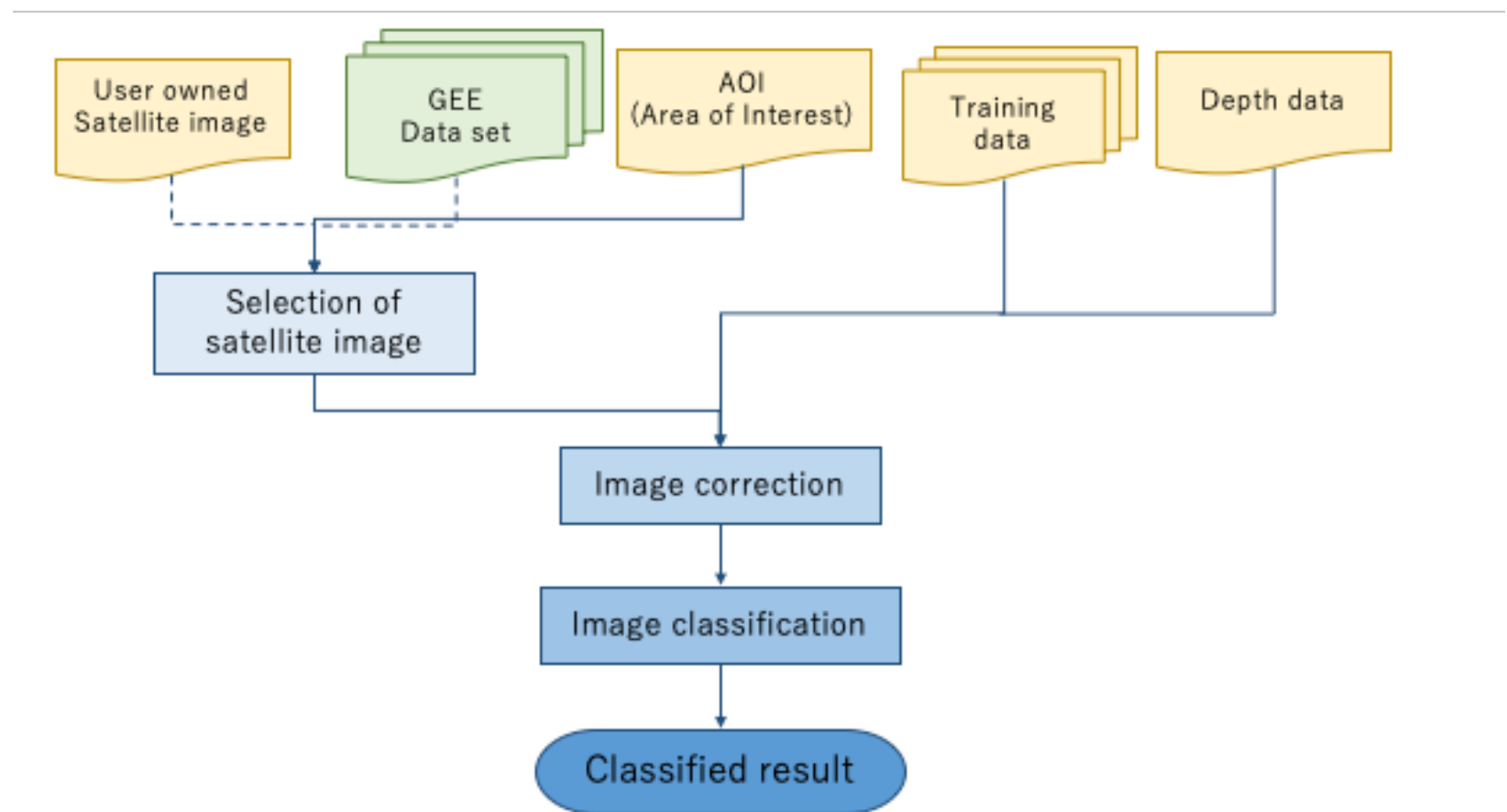
1. Load sample training data sets of June 2015 in Nanao Bay  
sample\_nanao\_1506
2. Run classification with Seagrass Mapper's User's manual page 18 to 23

[https://mapseagrass.org/wordpress/wp-content/uploads/2021/05/Manual\\_SeagrassMapper\\_eng\\_ver1.pdf](https://mapseagrass.org/wordpress/wp-content/uploads/2021/05/Manual_SeagrassMapper_eng_ver1.pdf)

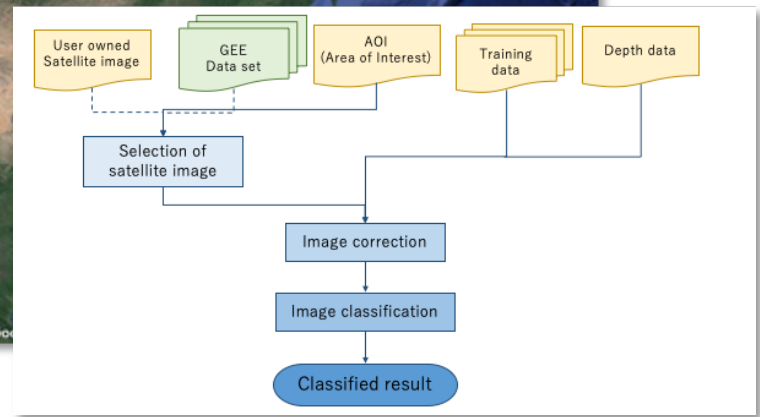
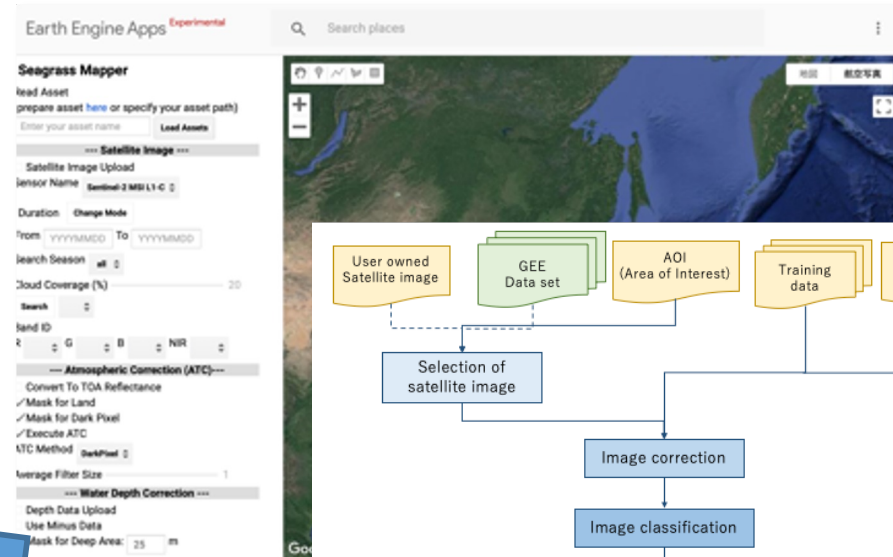
3. Run classification with Seagrass Trainer's manual page 36 to 48

[https://mapseagrass.org/wordpress/wp-content/uploads/2021/05/Manual\\_SeagrassMapper\\_eng\\_ver1.pdf](https://mapseagrass.org/wordpress/wp-content/uploads/2021/05/Manual_SeagrassMapper_eng_ver1.pdf)

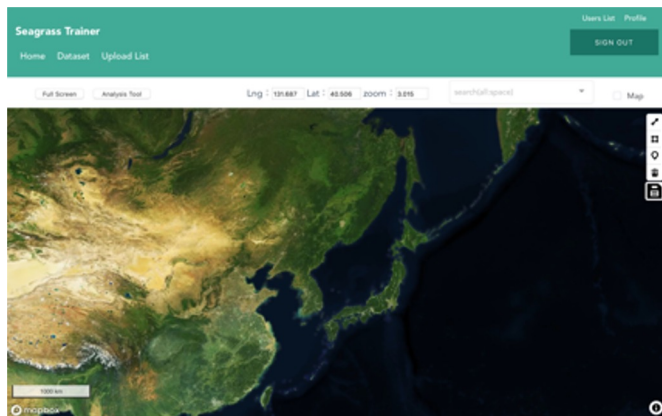
# Procedure of satellite image analysis in Seagrass Mapper



# Procedure of satellite image analysis in Seagrass Trainer with Seagrass Mapper



Seagrass Mapper



Seagrass Trainer

Order



Return

# Setting parameters for classifying satellite images

The screenshot displays the Earth Engine Apps interface for the Seagrass Mapper application. The left sidebar contains the parameter configuration panel, which is highlighted with a green border. The main map area shows a satellite image of a coastal region with a white box indicating 'Assets loaded.' and a search bar at the top.

**Earth Engine Apps** Search places

**Seagrass Mapper**

Read Asset  
(prepare asset here or specify your asset path)  
sample\_nanao\_1506 Load Assets

--- Satellite Image ---

Use Satellite Image Uploaded

Sensor Name Sentinel-2 MSI L1-C

Duration Change Mode

From 20150623 To YYYYMMDD

Search Season all

Cloud Coverage (%) 20

Search

Band ID R B4

**Parameters Setting**

Con

Mas

Mask for Dark Pixel

Execute ATC

ATC Method DarkPixel

Average Filter Size 1

--- Water Depth Correction ---

Depth Data Uploaded

Use Negative Data

Mask for Deep Area: 25 m

Execute Tidal Correction

Nearby Station Code

--- Water Column Correction (WCC)---

Execute WCC

WCC Method DII

--- Classification ---

Number of Classes 3

Supervised Classification

Classification Method

Assets loaded.

地図 航空写真

Google

キーボードショートカット 画像 ©2021 TerraMetrics | 2 km | 利用規約 地図の誤りを報告する

# Reading asset in Seagrass Mapper

## Seagrass Mapper

Read Asset

(prepare asset here or specify your asset path)

Enter asset name  
sample\_nanao\_1506

**Load Assets**

# Finding satellite images timely close to training data

--- Satellite Image ---

Use Satellite Image Uploaded

Sensor Name

Duration

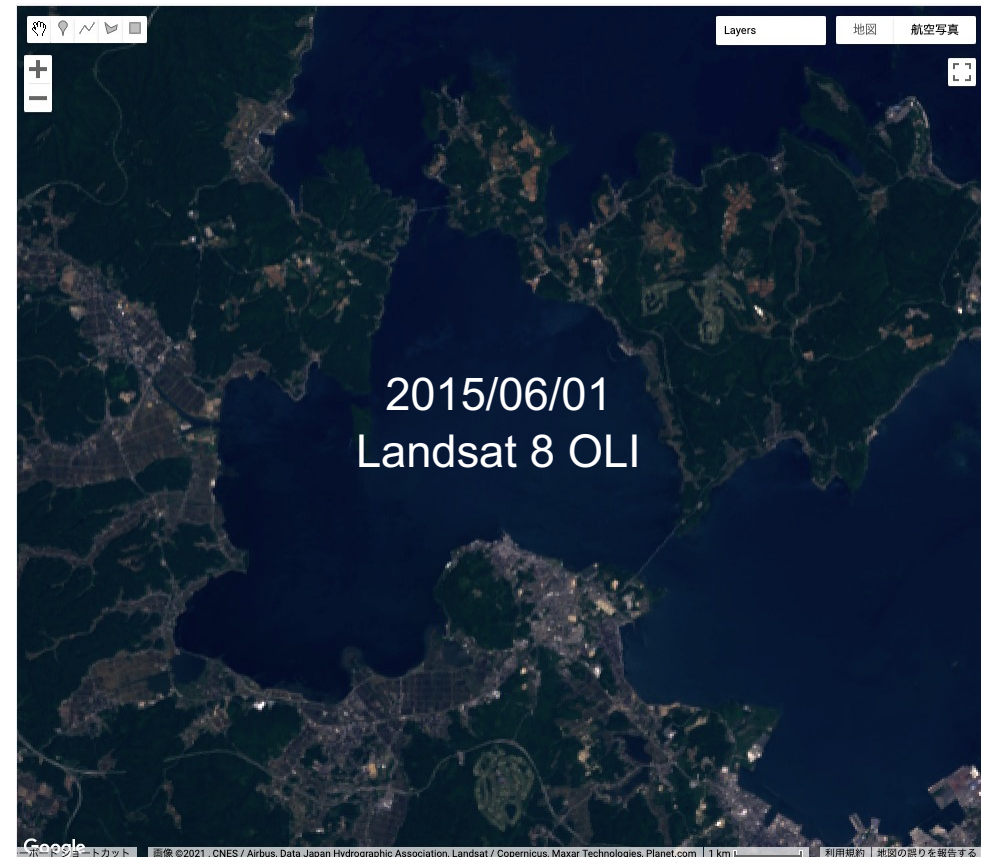
From  To

Search Season

Cloud Coverage (%)

Band ID

R  G  B  NIR



# Setting atmospheric correction parameters

## --- Atmospheric Correction (ATC)---

1.  Convert To TOA Reflectance
2.  Mask for Land
3.  Mask for Dark Pixel
4.  Execute ATC
5. ATC Method
6. Average Filter Size

1. Tick if you want to convert your own prepared data to top of atmospheric data
2. Tick if you want to mask land
3. Tick if you want mask dark pixels (recommend to test)
4. Tick if you want to apply atmospheric correction (ATC)
5. Choose ATC method from DarkPixel or NIRModel method  
(Usually DarkPixel method is recommended, but if image has some brighter spots it is recommend to use NIRModel method)
6. Choose average filter size in pixel for smoothing.



# Setting water depth correction parameters

## --- Water Depth Correction ---

1.  Depth Data Uploaded
2.  Use Negative Data
3.  Mask for Deep Area:  m
4.  Execute Tidal Correction
5. Nearby Station Code

1. Tick if you are using depth data uploaded
2. Use if your depth data include negative values
3. Specify depth for masking image
4. Tick if you are executing tidal correction
5. Specify station code for tidal correction

(Choose from Japan Metrological Agency station code or specify your own prepared station name)

# Setting water column correction parameters

1.  Execute WCC

2. WCC Method

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1. Tick if you are executing water column correction (WCC)
2. Choose the WCC method from DII (depth invariant index) method or BRI (Bottom Reflectance Method)

# Setting image classification parameters

--- Classification ---

1. Number of Classes
2.  Supervised Classification
3. Classification Method
4. Sampling Scale
5. Training Rate (%)
6.  Training Data Split by Each Class
7. Majority Filter Size

Run

1. Specify number of class from your prepared training data for supervised classification
2. Tick if you are using your training data for supervised classification
3. Choose classification method from Random Forest, Decision Tree, Support Vector Machines or MaxEnt matching your training data. In case no supervised classification is chosen, WekaKMeans method will automatically applied.
4. Set sampling scale for reading training data. Usually Original is recommended.
5. Set ratio to use training data for classification in percentage.
6. Tick if the same sampling rate is applied by each class
7. Set majority filter size for smoothing

# Checking classified image on Seagrass Mapper

Earth Engine Apps
Search place
Classified Map
Accuracy Assessment

### Seagrass Mapper

Read Asset  
(prepare asset here or specify your asset path)

sample\_nanao\_1506 Load Assets

--- Satellite Image ---

Use Satellite Image Uploaded

Sensor Name Landsat 8 Tier1 TOA Reflectance

Duration Change Mode

From 20150601 To YYYYMMDD

Search Season all

Cloud Coverage (%) 20

Search LC08\_109034\_20150601

Band ID

R B4 G B3 B B2 NIR B5

--- Atmospheric Correction (ATC) ---

Convert To TOA Reflectance

Mask for Land

Mask for Dark Pixel

Execute ATC

ATC Method DarkPixel

Average Filter Size 1

--- Water Depth Correction ---

Depth Data Uploaded

Use Negative Data

Mask for Deep Area: 10 m

Execute Tidal Correction

Nearby Station Code

--- Water Column Correction (WCC) ---

Execute WCC

WCC Method BRI

--- Classification ---

Number of Classes 5

Layers 地图 航空写真

**Accuracy:** 77.03%

**Tau Coefficient:** 0.695694

**Analysis: Actual, UA**

1: 21,0,4,3,3 : 67.74%

2: 0,12,0,2,0 : 85.71%

3: 2,0,1,1,0 : 25.00%

4: 7,1,4,55,2 : 79.71%

5: 5,0,0,0,25 : 83.33%

PA: 60.00%,92.31%,11.11%,90.16%,83.33%

--- Producer's accuracy

\*UA: User's

### Area calculation

**ClassName**

1: Train\_CLS1

2: Train\_CLS2

3: Train\_CLS3

4: Train\_CLS4

5: Train\_CLS5

**Total Area by Class (in AOI for area calculation)**

Class	Area (ha)
1	~600
2	~500
3	~100
4	~1100
5	~400

# Accuracy assessment

## Confusion matrix

	Class determined from <b>training data (actual data)</b>				
	Class	Seagrass	Sandy bottom	Seaweed	Total
Class determined from <b>mapping result (predicted by model)</b>	Seagrass	68	48	10	126
	Sandy bottom	68	169	10	247
	Seaweed	2	7	7	16
Total		138	224	27	389

Imagine two different maps in your head; **real world** and **predicted**. Diagonals represent pixels classified correctly according to training data and off-diagonals indicates misclassified pixels.

- Overall accuracy: overall ratio of correctly classified pixel in training data. In this example, overall accuracy is 62.72%;  $(68 + 169 + 7) / 389 \times 100$ .
- Tau coefficient: reliability index for overall accuracy

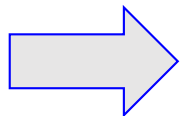
# Accuracy assessment

		Class determined from <b>training data (actual data)</b>				
		Class	Seagrass	Sandy bottom	Seaweed	Total
Class determined from <b>mapping result (predicted by model)</b>	Seagrass		68	48	10	126
	Sandy bottom		68	169	10	247
	Seaweed		2	7	7	16
Total			138	224	27	389



- Producer's Accuracy: How well can the situation on the seafloor be mapped?

Seagrass  $68 / 138 \times 100 = 49.28\%$ , Sandy bottom  $169 / 224 \times 100 = 75.43\%$ , Seaweed  $7 / 27 \times 100 = 25.93\%$



- User's accuracy : How well the predicted class matches on the seafloor.

Seagrass  $68 / 126 \times 100 = 53.97\%$ , Sandy bottom  $169 / 247 \times 100 = 68.38\%$ , Seaweed  $7 / 16 \times 100 = 43.75\%$

# Hands on practice Day 2

- 1. Read sample asset folder (sample\_nanao\_1506) and run classification in Nanano Bay with different parameters set up
- 2. Read your uploaded asset folder and run classification with different parameters setting