

Application of Remote Sensing Technology for Environmental Field in Indonesia

~Detection of Disaster Impacts and Monitoring of Land Use Changes from the Space~

INDONESIA - JAPAN
ENVIRONMENTAL WEEK 14, January 2021

PASCO CORPORATION Company Profile

“Surveying the Earth to Create the Future”

- Geospatial Information Solution Services for Japan and overseas
- National Spatial Data Infrastructure for Smart City and Countermeasures against Global Warming

Measure the Earth from all Perspectives



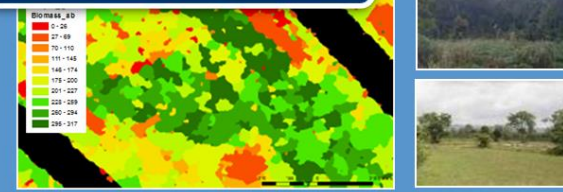
Processing · Analysis + IoT, AI, Big Data

- | | | | |
|--|---|---|---|
| Managing and preserving national territory | Maintaining and managing infrastructure | Natural disaster and environmental response | Increasing administrative work efficiency |
| Market analysis and forecast | Managing and handling risk | Productivity Improvement | Managing cultural assets |

Road Maintenance



Protecting Deforestation and Degraded Forests



Supporting National Spatial Data Infrastructure (NSDI)



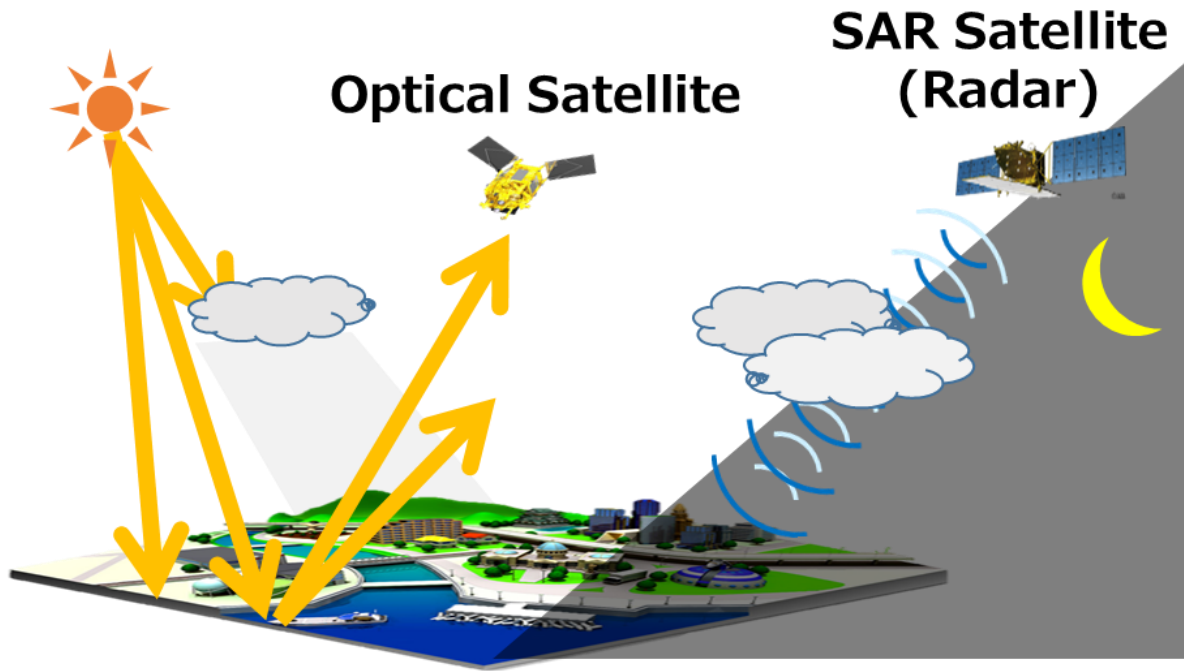
Supporting Disaster Countermeasures



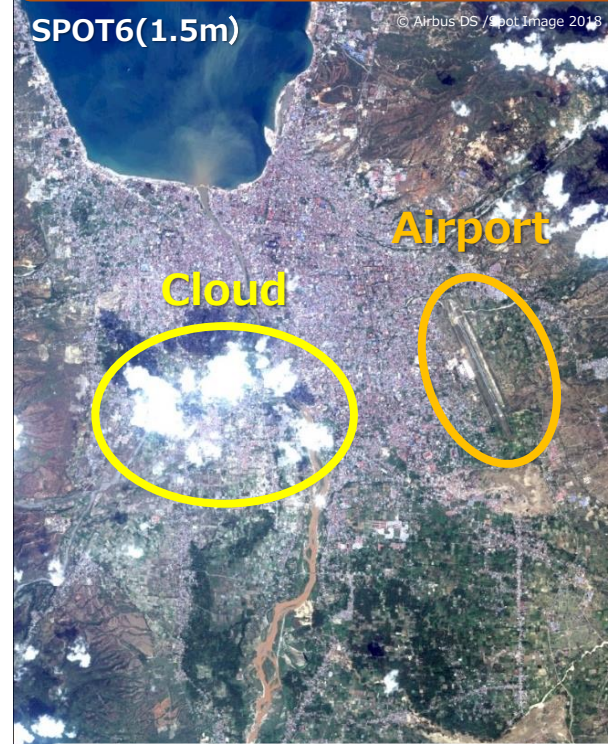
Earth Observation Satellite

Our satellite business mainly deals with two types of the earth observation satellites.

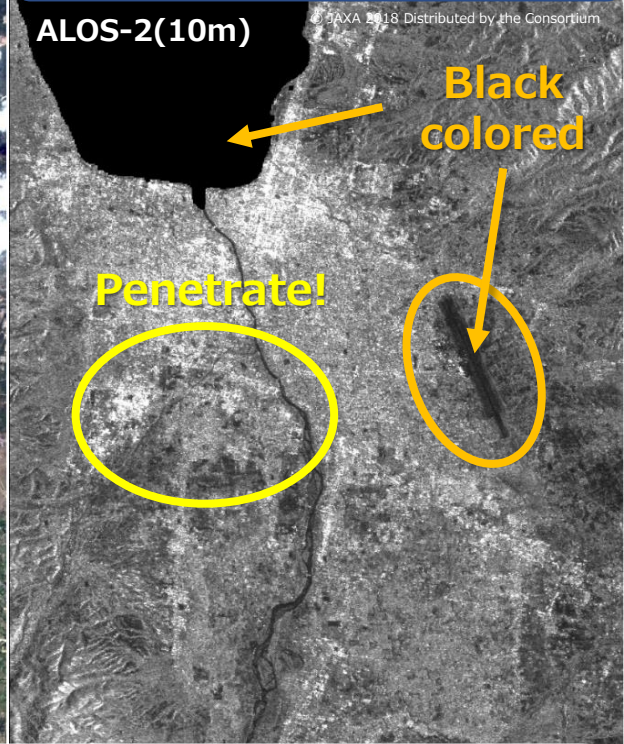
- **OPTICAL** satellite: expresses things in a form close to what humans see
- **SAR** satellite: visualizes conditions that humans cannot perceive



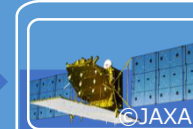
Optical Satellite



SAR Satellite



ALOS/PALSAR
(Optical & SAR)
2006-2011



ALOS-2/PALSAR-2
(SAR) 2014-2021

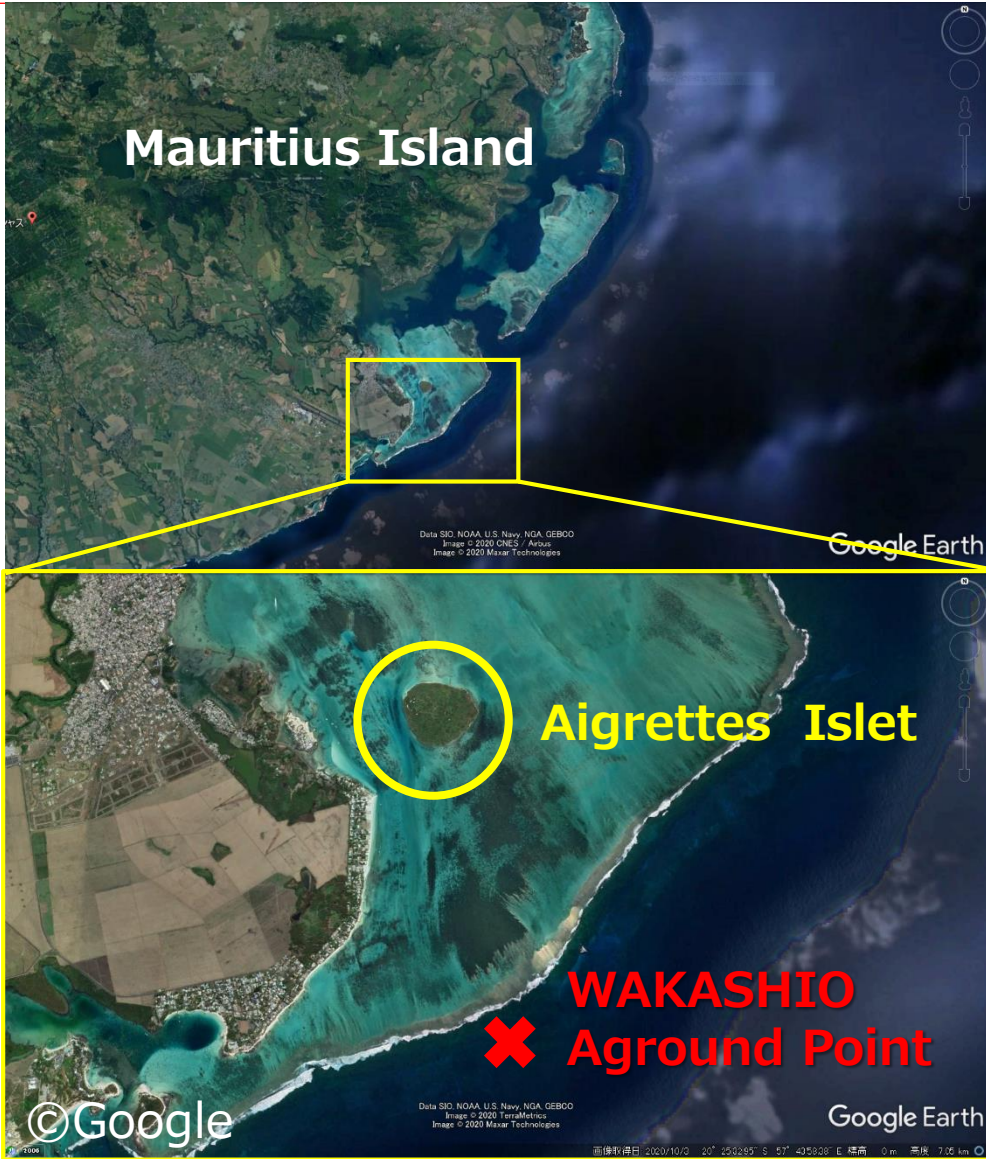


ALOS-3
(Optical) 2021-2027



ALOS-4/PALSAR-4
(SAR) 2021-2028

Oil Spill detection in Mauritius



Oil leaking from stranded ship toward the island



August 15:
Before Cargo Ship Split

August 23:
Wreckage of a part of
a cargo ship



Flood and Oil Spill detection in Saga, Japan

ISSUE

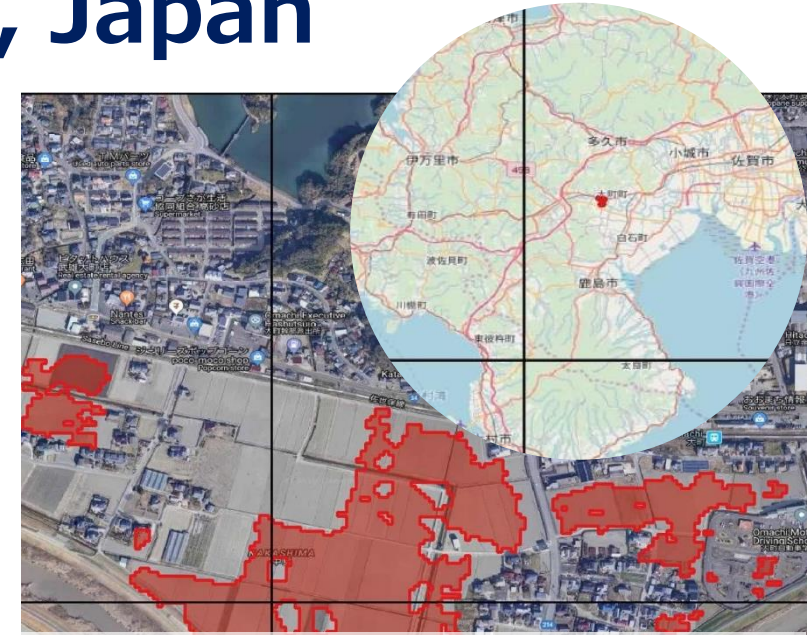
In August 2019, about 54,000 liters of oil spilled from the factory in Saga Prefecture due to heavy rain.

APPROACH

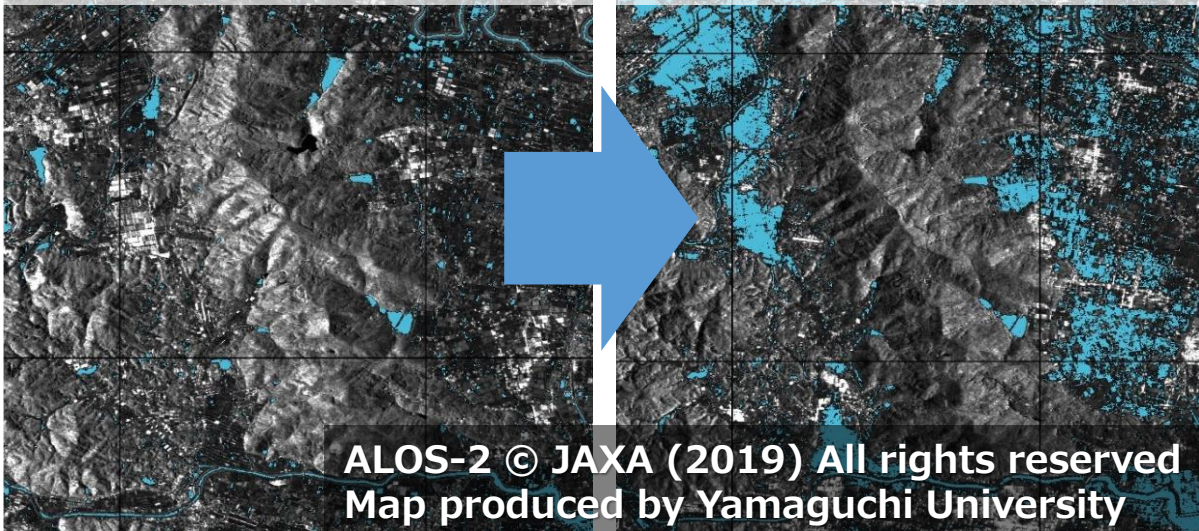
Using SAR images before and after the accident, it is possible to grasp the extent of flooding and oil spill by the difference of reflection intensity.

EFFECT

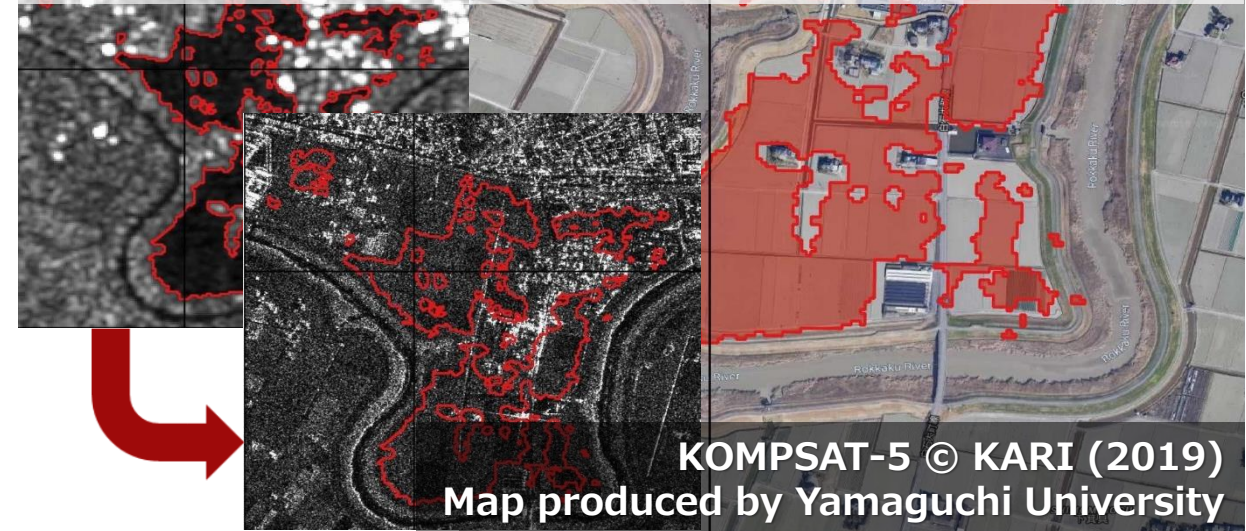
Estimate the damage of flooding and oil spilling and to prevent oil spreading and to make plans for collection, disposal, etc.



Flooding detection by ALOS-2



Oil spill detection by KOMPSAT-5



Coastline Monitoring in Northern Java

ISSUE

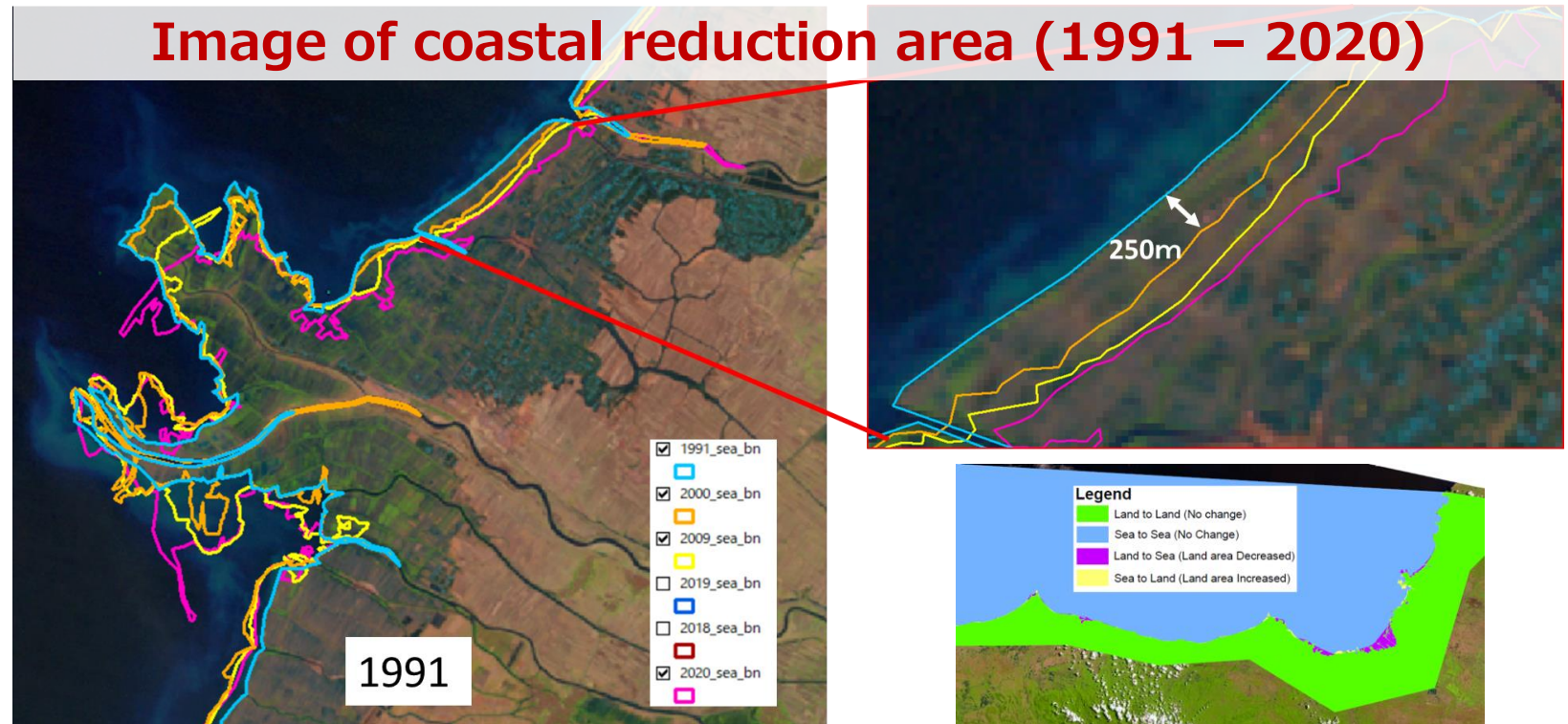
Shoreline recession has become a severe problem in recent years due to the accelerated utilization of coastal areas. It is necessary to assess the damage in coastal regions effectively.

APPROACH

To quantitatively analyze the shoreline change and the natural coast's decrease rate, we carried out time series analysis using free satellite images.

EFFECT

A time series analysis using satellite images shows that the coastline has receded by 250 m.



Seagrass Survey in Seribu

ISSUE

An efficient monitoring method for seagrass beds is needed.

APPROACH

The high-resolution optical satellite enables periodic monitoring.

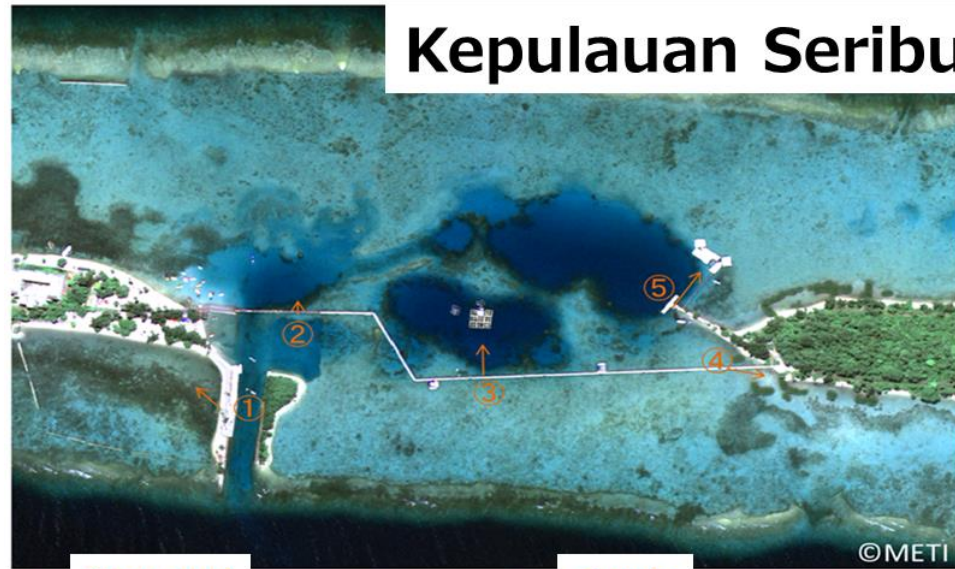
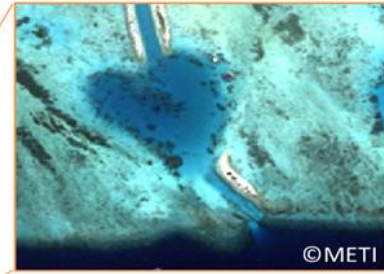
EFFECT

Time-Series data is required to understand the decline and recovery of seagrass beds over a wide area.

- **Seaweed, corals, mangroves, and piers** are identified.
- Satellite images and photos make it possible to grasp the distribution of seagrass beds over a wide area as a time-series image, and includes the purpose of monitoring the habitats of various organisms such as corals, mangroves, and lagoons.



Lagoon

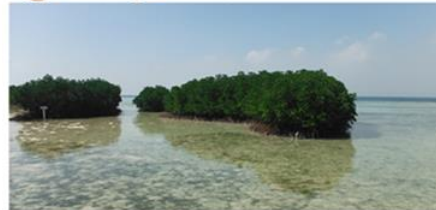


Kepulauan Seribu

Corals, Aquaculture Facilities



Mangroves



Pier



Seaweed



Corals



Land Subsidence in Jakarta

ISSUE

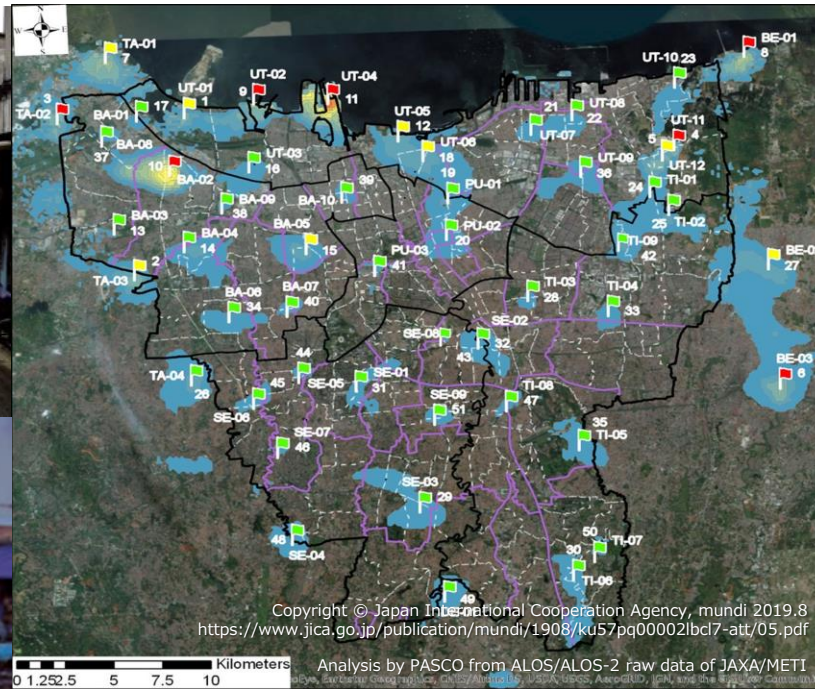
Large-scale land subsidence occurred due to groundwater extraction, and evidence was needed to grasp the situation in time series for countermeasures.

APPROACH

Using SAR satellite, it is possible to grasp the settlement from the relative error in time series over a wide area.

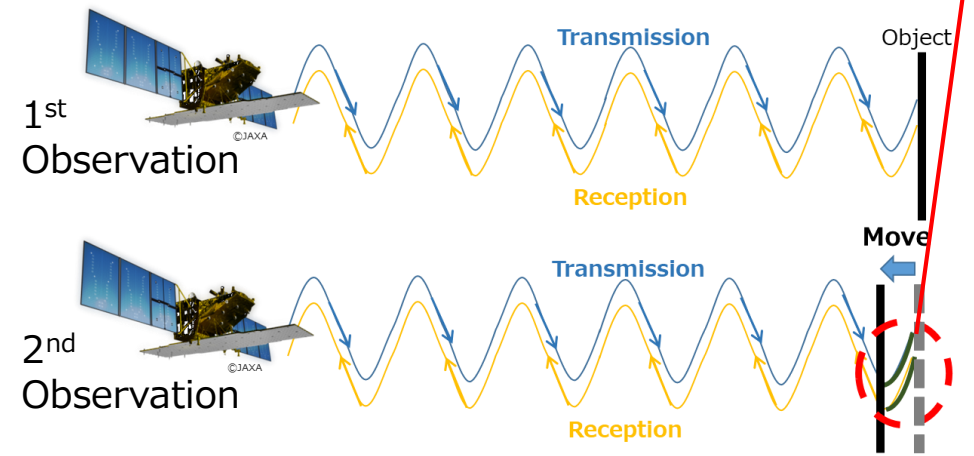
EFFECT

Recognize the historical subsidence and the government will promote consensus building, and DKIJKT and the Ministry of Public Works work for countermeasures.



Using 2 times SAR images, deformation can be detected!

Difference in phases of two observations



Assessment of Damage caused by the Sulawesi Earthquake

ISSUE

Need to quickly grasp the area and range of landslide, and its terrain characteristic in Central Sulawesi caused by the Sulawesi Island earthquake in September 2018.

APPROACH

By superimposing the contour lines generated from the pre-disaster image and the satellite info, people can analyze the relationship between the change of the land condition and the topography.

EFFECT

Identifying tsunami inundation areas and large landslide areas can be possible. Using satellite enables analysis of land trends at disaster sites and contribute to rapid recovery planning.

"2018 Sulawesi Earthquake, Indonesia"



"2018 Sulawesi Earthquake, Indonesia"



Deforestation (JJ-FAST: JICA-JAXA Forest Early Warning System)

ISSUE

The world's forests, mainly tropical forests, have decreased by an average of 4.7 million hectares per year between 2010 to 2020.

From Global Forest Resources Assessment 2020 URL: <http://www.fao.org/3/ca9825en/CA9825EN.pdf>

APPROACH

Monitoring of deforestation can be conducted **every 45 days** by periodic observation over a wide area using SAR satellites that penetrate clouds.

EFFECT

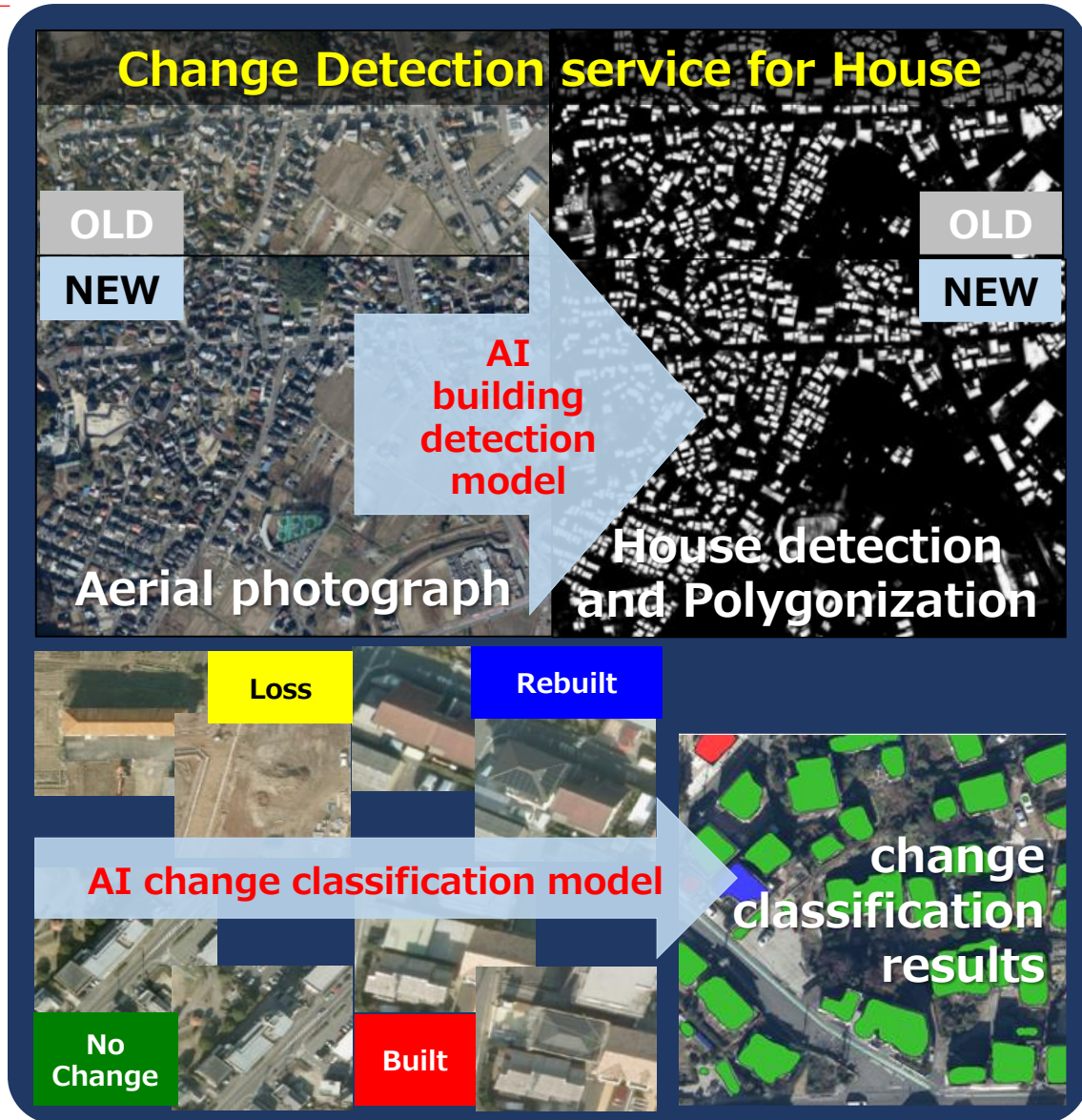
JJ-FAST users have access to the Internet, and they can see how tropical forests are changing.

Status of logging and changes in tropical forests

Japan Aerospace Exploration Agency
URL: https://www.jaxa.jp/press/2016/11/20161114_jjfast_j.html

The screenshot displays the JJ-FAST web interface. At the top, there is a navigation bar with links for 'home', 'map', 'system', 'initiative', and 'topics'. Below this is a header section with the title 'JICA-JAXA Forest Early Warning System in the Tropics' and a prominent banner that reads 'Watching on Deforestation'. The main content area features a world map with a red box highlighting the region of Southeast Asia. Below the world map is a larger, more detailed map of Central Java, Indonesia, showing deforestation data with various colored overlays (red, yellow, green) and a grid. A sidebar on the right contains a search bar and several filter options, including 'Center of 1x1 deg grid', 'Level Deforest Point (Class: 1 Level Over)', 'Level Deforest Point (Quality: 100% Over)', and 'All Deforest Point (Over)'. The bottom of the interface includes a footer with the text 'JICA-JAXA Forest Early Warning System in the Tropics' and the URL: <https://www.eorc.jaxa.jp/jjfast/>.

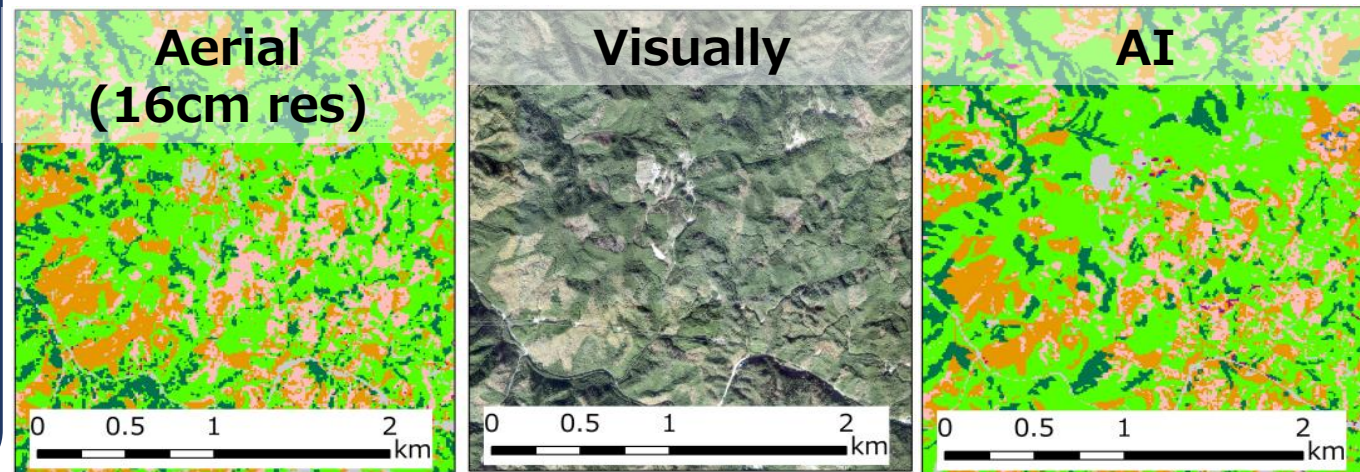
Future Services ;AI x Platform for Geospatial Analysis



Classification of Tree species

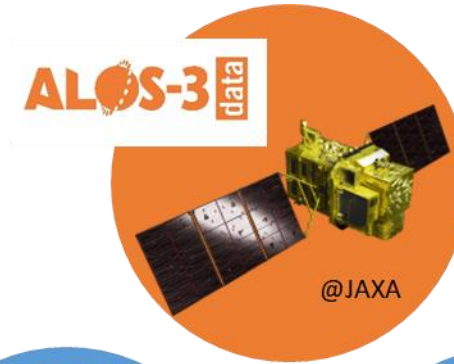
- Specialized engineers used to identify species using aerial photographs, but it has become possible to identify species at a lower cost by utilizing AI and satellite images.

Accuracy of **90%** at a specific position

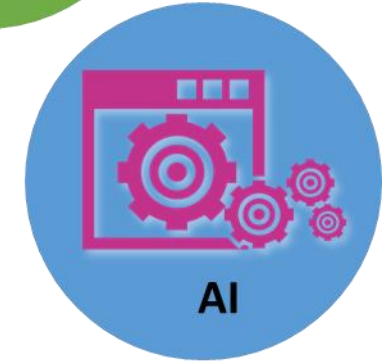
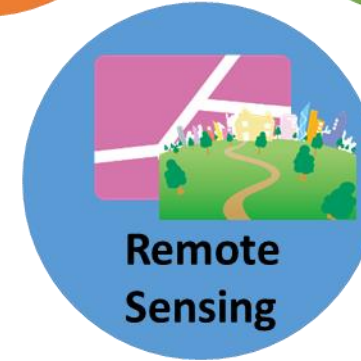


CLOSING

Provision of
DATA resources



Provision of
TECHNICAL resources



With local office
and partners

Further information for technical services and partnership

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**We provide our best services to contribute
Indonesia's environmental conservation efforts.**