

Benefits of EO for Forest Management: An Experience from Japan

June 2024

Sentinel Benefits Study Workshop

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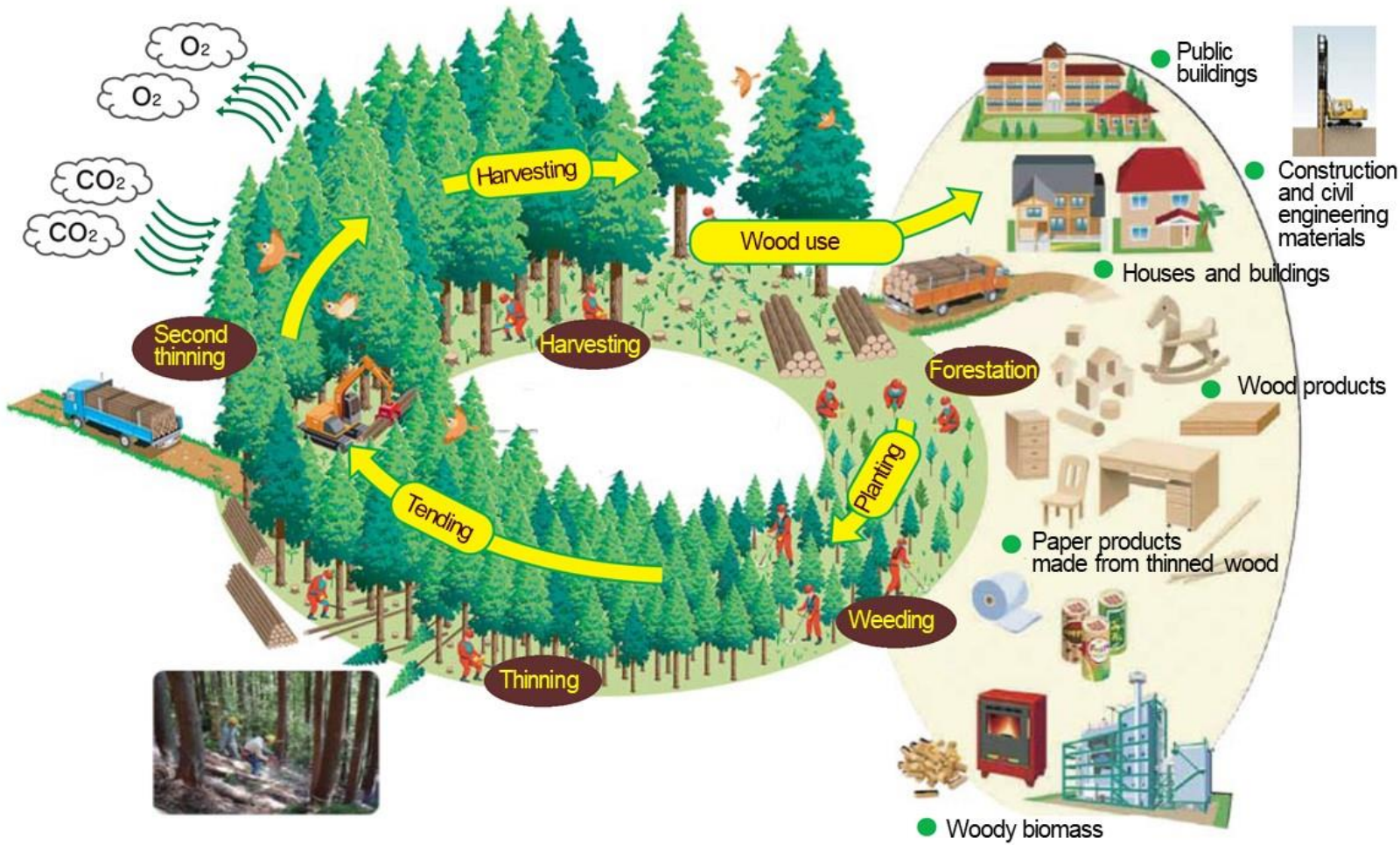
Forestry Agency of Japan

Forests and forestry in Japan

Forests cover 2/3 of national land (25 Mha)

- 40% planted forests
- 57% privately owned (>690K forestry households)
- Small-scale ownership, whereabouts partially unknown

“Green growth” through sustainable and cyclic use of forest resources



Need for efficient forest management

Local governments play critical role

- 47 prefectures, >1,600 municipalities
- Manage local forest resources
- Enforce laws and regulations: e.g. prior notification or permission required for logging activities

Satellite-based forest cover change detection initiatives

- FAMOST by Forestry Agency
- ALOS-2 based detection by JAXA, FFPRI and Ibaraki Pref
- Commercial satellite-based systems by private companies



FAMOST: forest change detection program

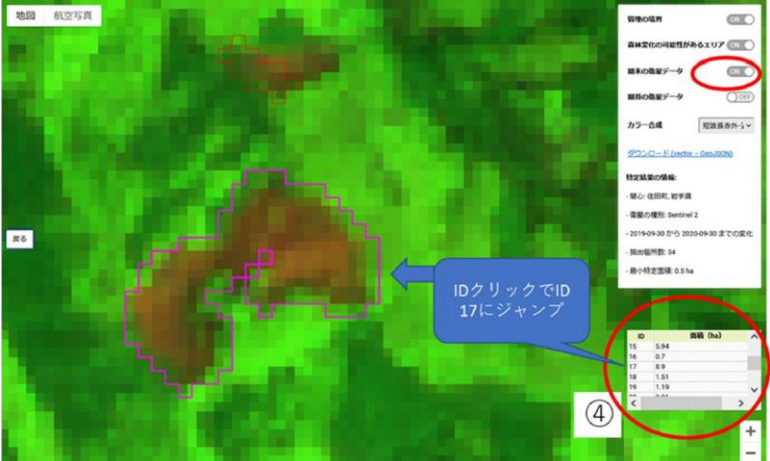
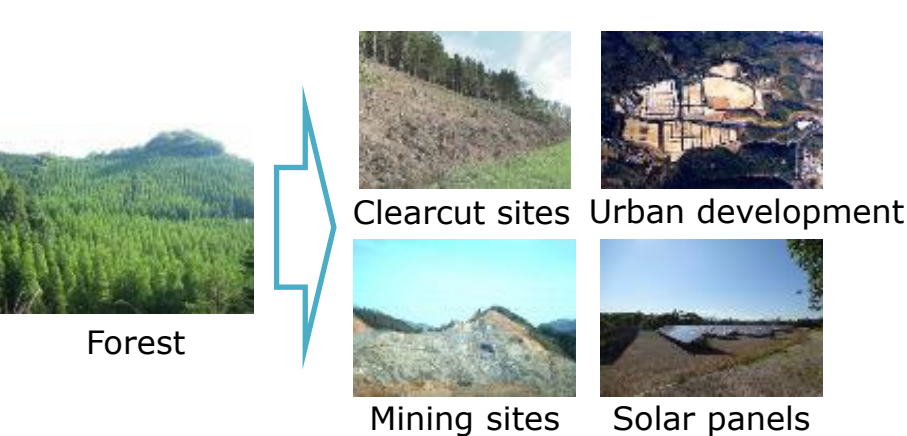
Developed by FA in 2021:

- GEE based
- Optical data: Sentinel 2, Landsat 8/9
- Change detection using normalized difference indices

Accuracy

- Changes of 0.25ha or more detectable
- Approx. 80% of accuracy

Forest and
Agriculture
Monitoring
Observation with
Satellite
Technology



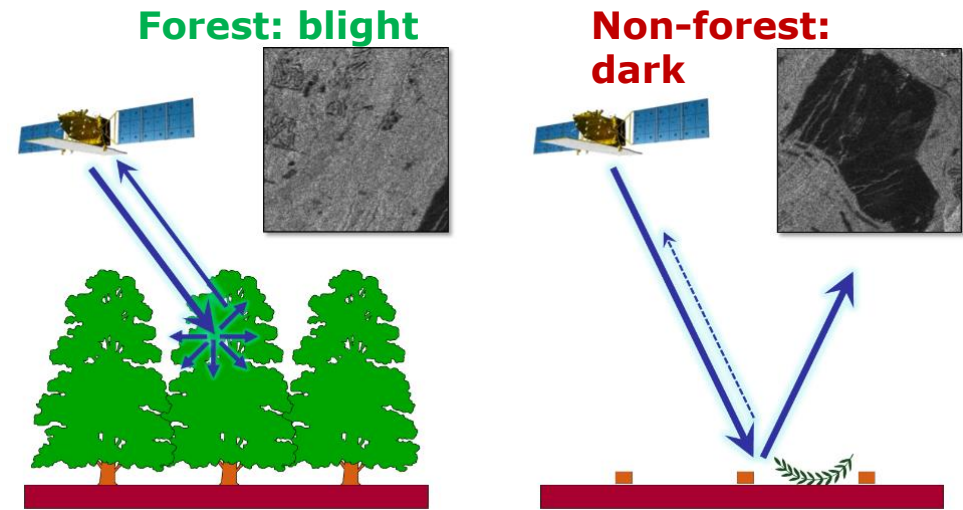
Forest change detection with SAR

Collaborative work by JAXA, FFPRI* and Ibaraki Prefecture

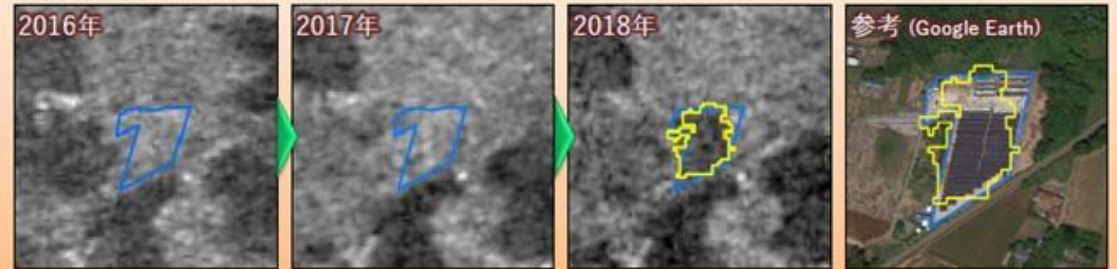
- SAR data: ALOS-2/PALSAR-2 (6m res)
- Not affected by clouds or rainfall
- Reliability level ($A \gg D$) added to detected results – to prioritize areas for field checks

Accuracy

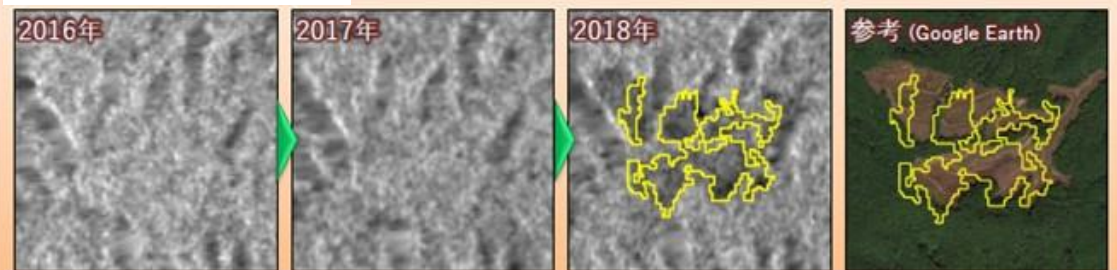
- >90% at areas with field checks



Solar panels



Clear-cuts



*FFPRI: Forestry and Forest Products Research Institute

Benefits and challenges

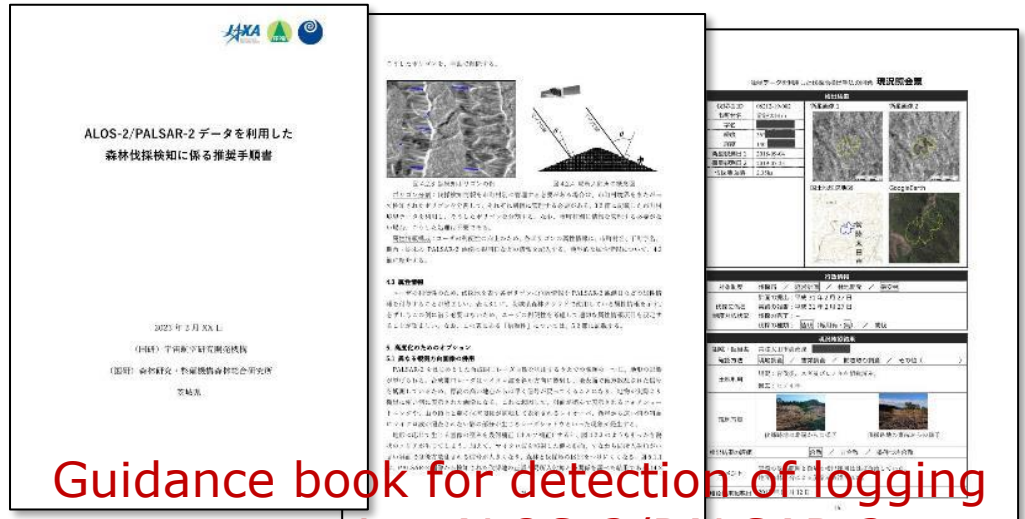
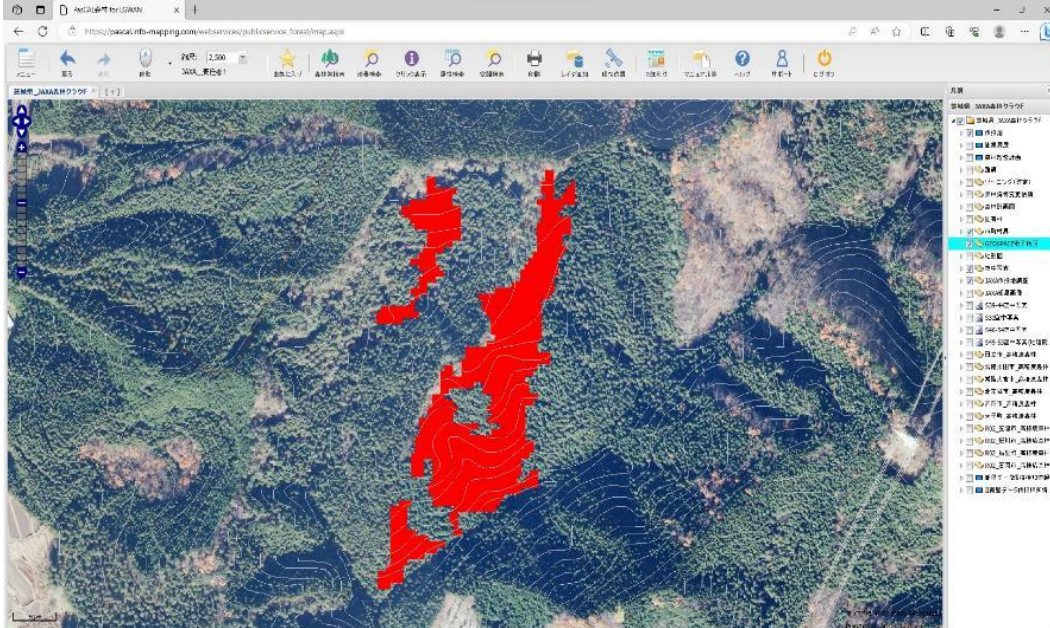
Toward more efficient/effective forest management by local governments

- Detected results shared and used on GIS systems
- Efficiently identify areas of unauthorized logging
- Deter future illegal logging activities

Guidance book for local governments published in Feb 2024

Remaining challenges

- Exact area estimation needs improvement
- Cost, technology dissemination

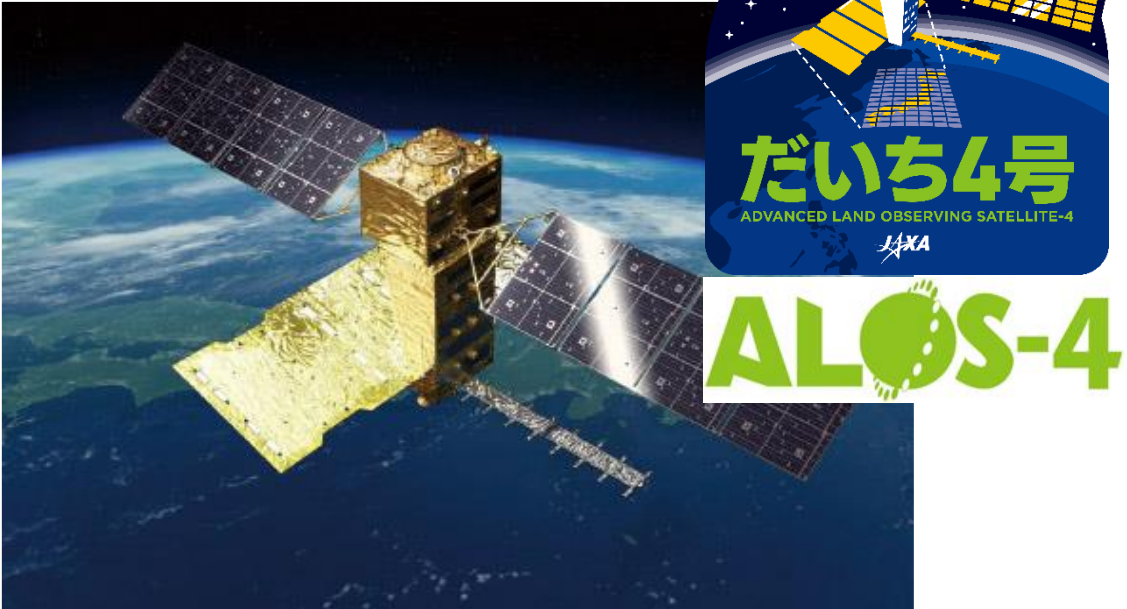


Guidance book for detection of logging areas using ALOS-2/PALSAR-2

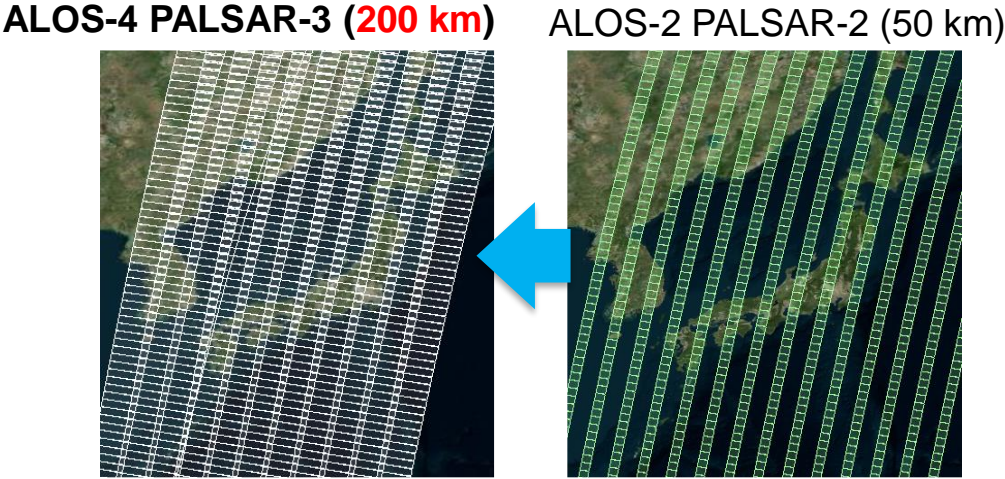
ALOS-4 PALSAR-3

ALOS-4 to be launched on 30 June..!

- More accurate & nationwide operation of forest change detection system expected



Coverage of 1 repeat cycle (14 days)



Swath width of PALSAR-3/-2

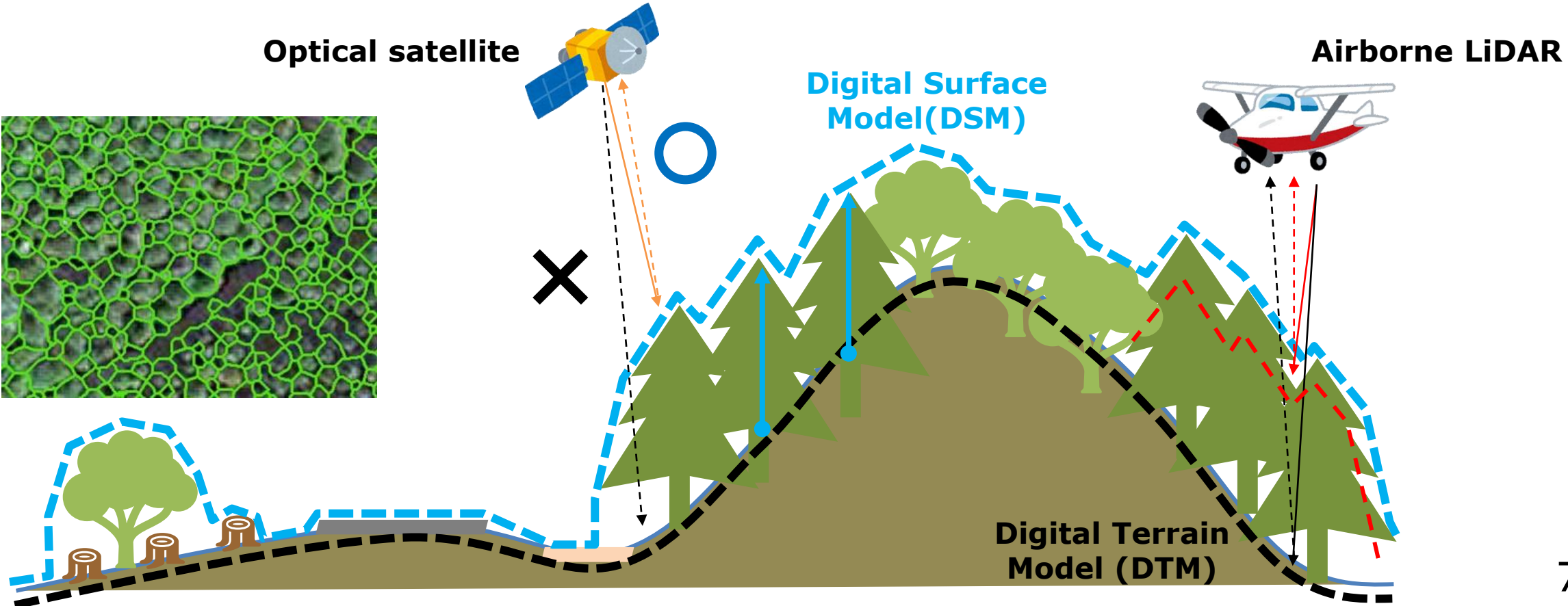
Modes	PALSAR-3		PALSAR-2
Stripmap (res. 3 / 6 / 10 m)	<u>100-200 km</u>	←	30-70 km
ScanSAR (res. 25m*)	<u>700 km</u>	←	350-490 km
Spotlight (res. 1 x 3 m)	<u>35km x 35km</u>	←	25km x 25km

*single look

Emerging needs for high accuracy

CO2 removals, carbon credits

- More accurate, more frequent, wider coverage...
- Tree species, height, density, volume...



Thank you

