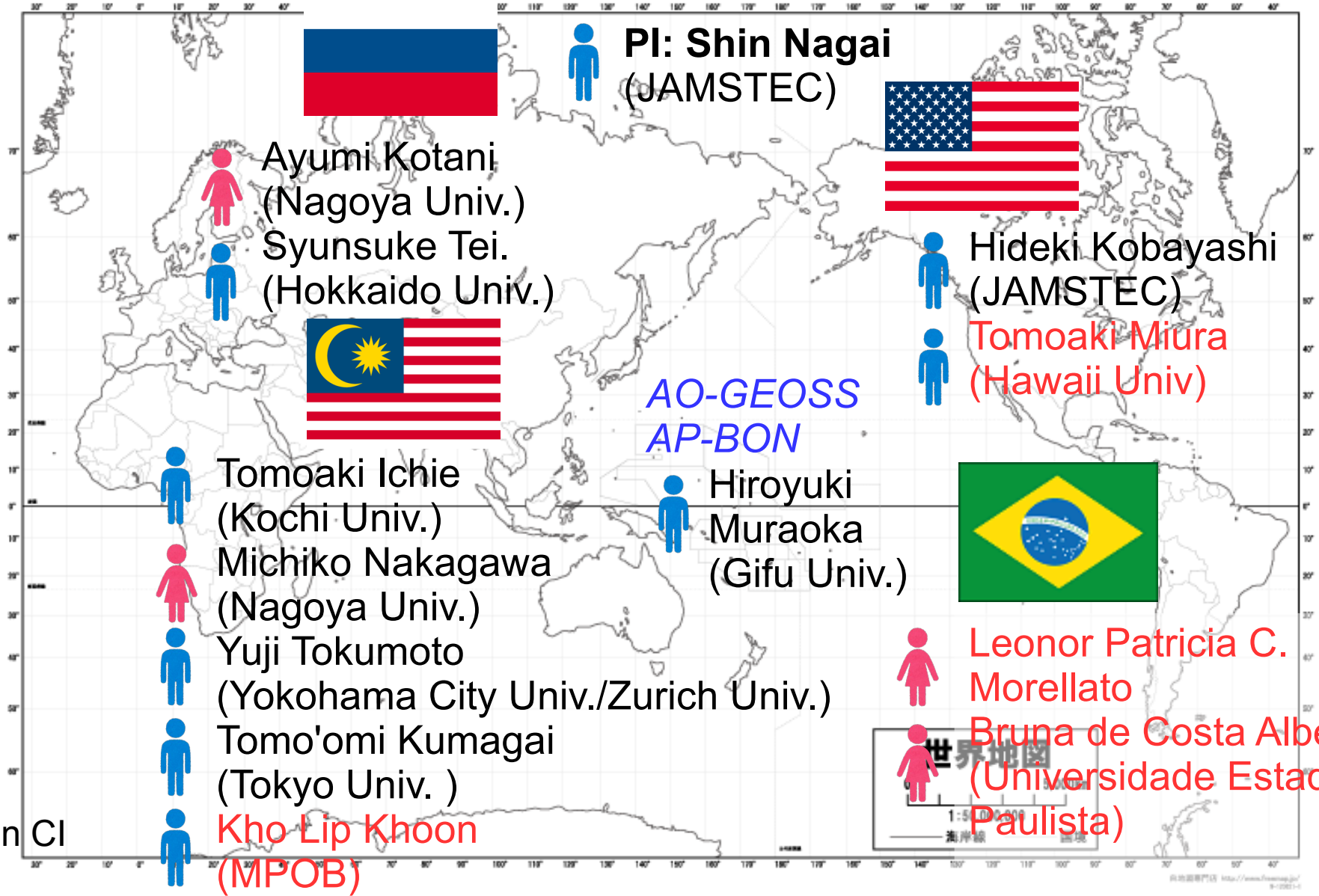
GCOM-C衛星による陸域生態系観測の高精度化を目的とした観測空白地帯における統合的地上真値の取得

[*Acquisition of ground truth data in not-well in situ observed regions for development of terrestrial ecosystem observations by GCOM-C satellite*]



* Red:
Foreign CI

Aim

In not-well in situ observed regions (i.e., tropics, islands, and Pan-Arctics),

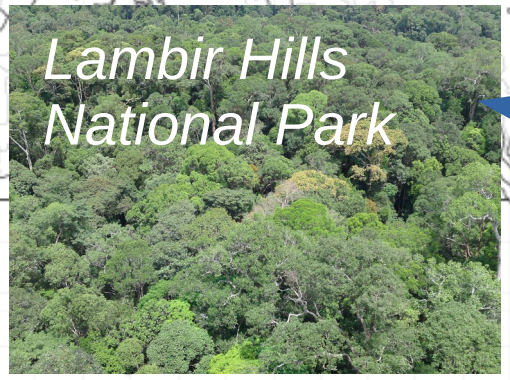
- *Obtaining ground truth data for validation and calibration of GCOM-C satellite*
- *Development of ecological understanding of spatio-temporal variability of satellite-observed* ***plant phenology*** *and* ***land cover and land use change*** *(LCLUC)*

Goal

- *Obtaining long-term continuous or new ground truth data* (**above ground biomass**, **LAI**, **FAPAR**, **vegetation index**, **phenology and sky images**, snapshots)
- *Analysis of plant phenology and LCLUC by GCOM-C observed data*
- *Collection of basic information for evaluation of spatio-temporal variability of plant phenology and LCLUC (tree species, heterogeneity of vegetation)*
- *Contribution to AP-BON, AO-GEOSS*

Study sites

Biomass: *Spasskaya Pad*, *Elegei*, *Kodac*, *Labmir Hills*, *Oil Palm*
LAI: *Spasskaya Pad*, *Elegei*, *Kodac*
FAPAR: *Elegei*, *Lambir Hills*, *Oil Palm*, *Poker Flat*



Kodac

Elegei

Tano

: Phenology / sky camera

世界地図
0 5,000km
1:50,000,000
海岸線 国境

First aim:

obtaining ground truth data for validation and calibration of GCOM-C satellite.

Plant phenology – time-lapse digital camera

FY2021

Spasskaya Pad site

Forest floor vegetation (forest floor 2m; sideways)

Lambir Hills National Park site

Lambir oil palm site

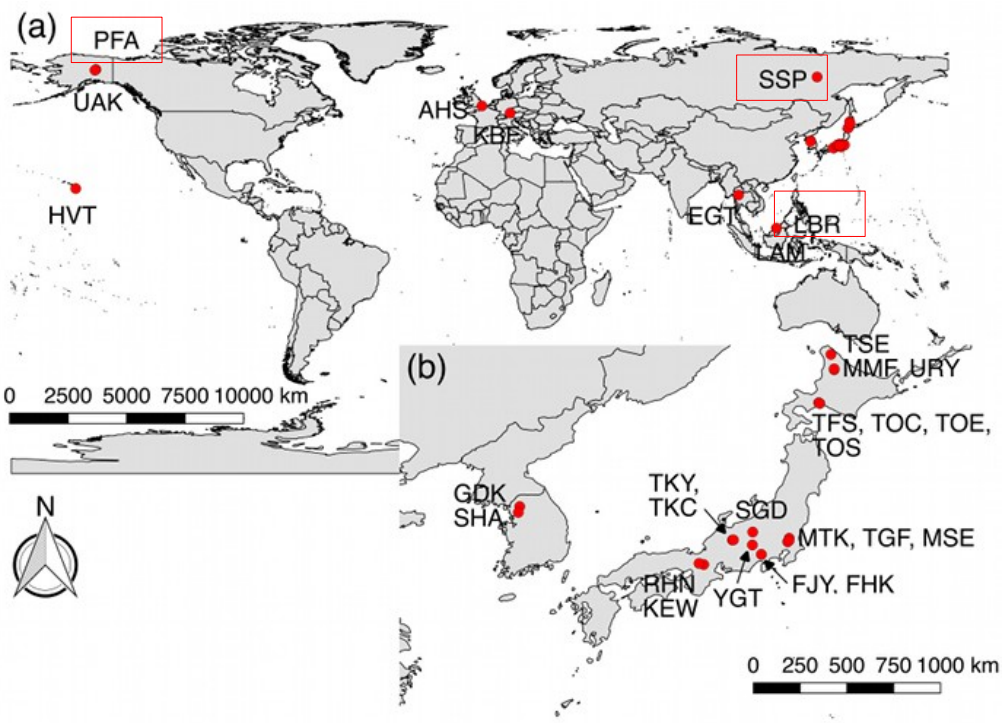
Sky and vegetation (birch) (forest floor 2m; sideways)

Vegetation (tropical rain forest) (forest canopy 64m; downwards)

Vegetation (oil palm) (forest canopy 20m; downwards)

Cloud contamination– time-lapse digital camera

FY2021



Current status:

- Alaska (PFA) OK
- Siberia (SSP) OK

  *We have not yet accepted the permission to use them.

- Borneo (LBR) ?

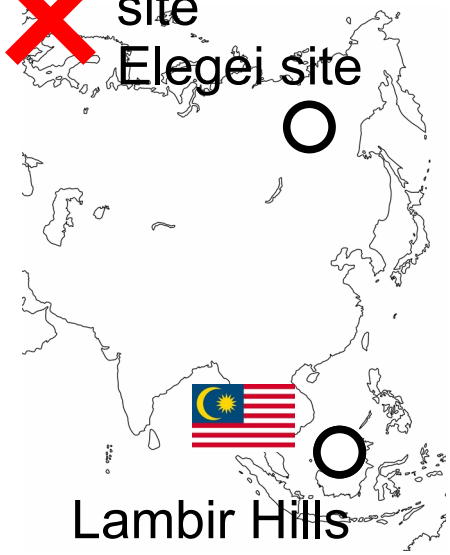
  We have not yet checked.

FAPAR – photo diode sensors

FY2021

Spa sskayapad site

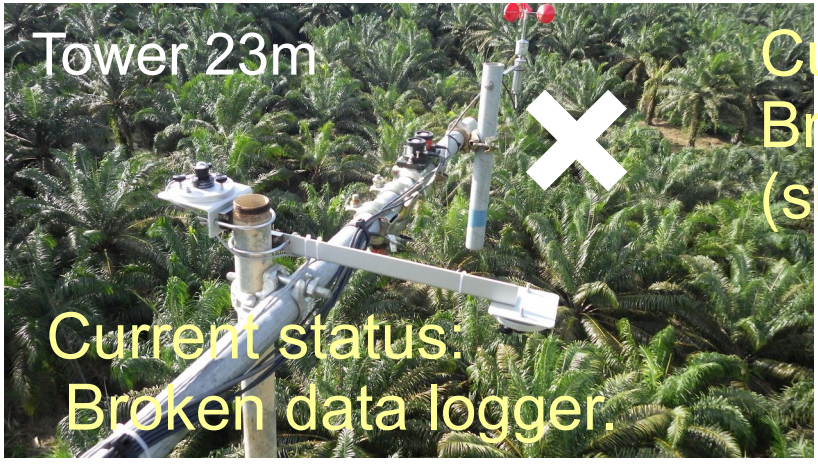
Elegei site

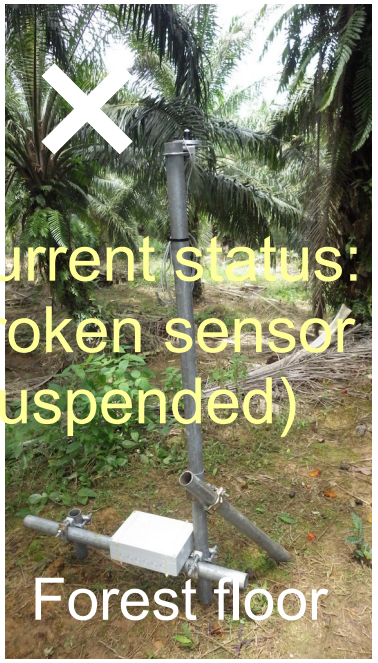


Lambir Hills National Park site

Lambir oil palm site

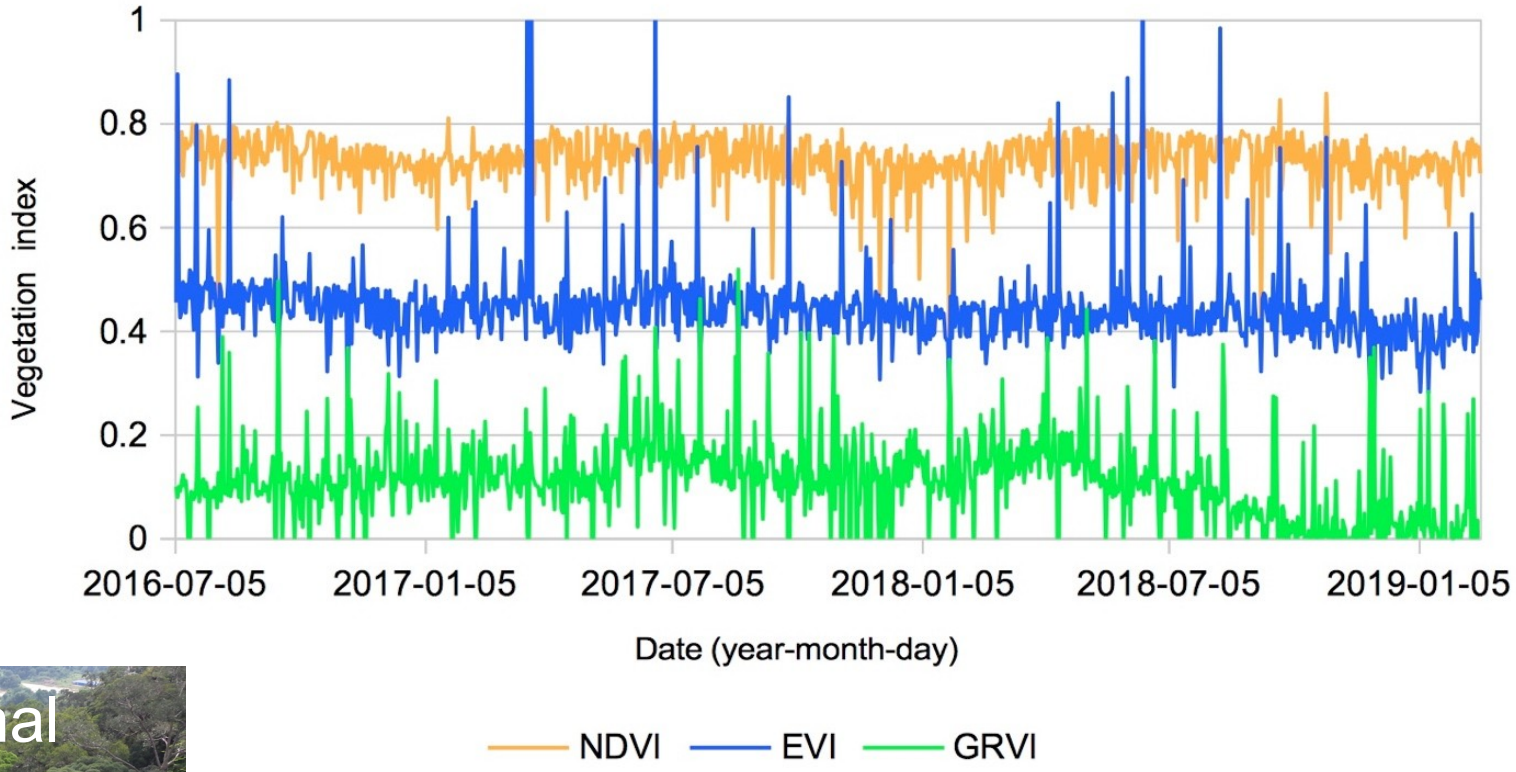
Siberian sites: Current status: not yet installed.





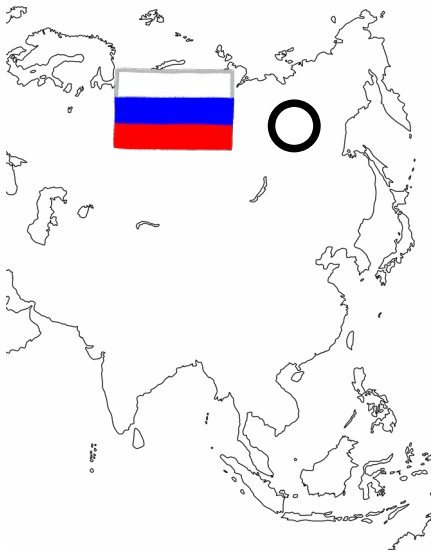
Spectral reflectance – photo diode sensors

FY2021



Above ground biomass – tree census

FY2021



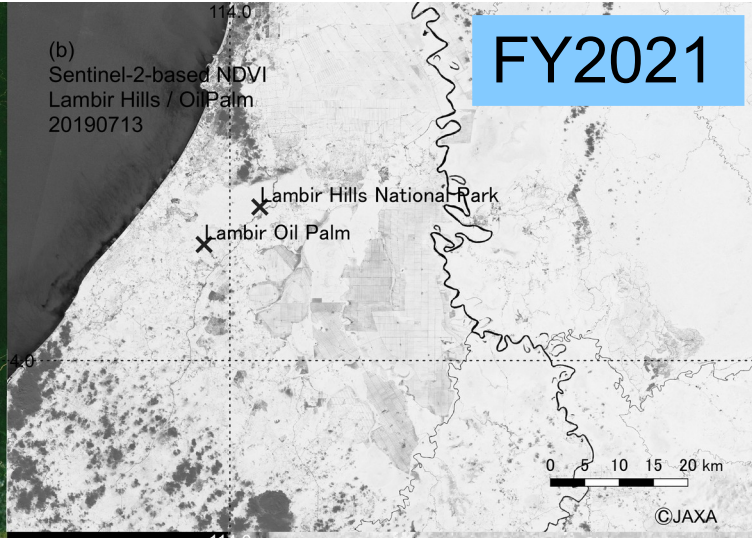
Spasskaya Pad site
in Siberia
(11-13 Aug. 2018)

2020: ×

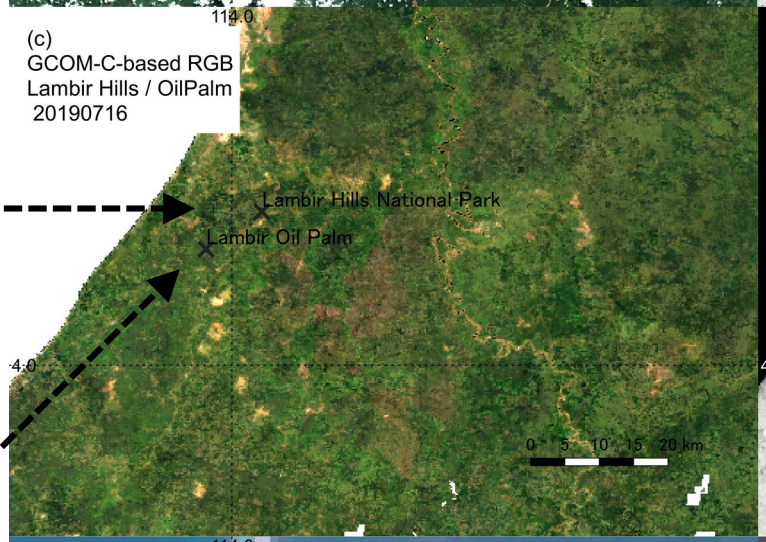
Lambir Hills
National Park site
in Borneo
(2016, 17, 18, 19)

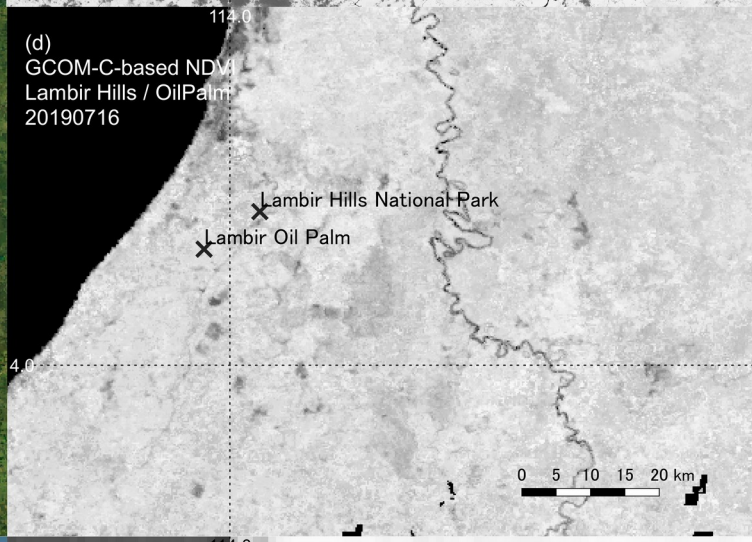
2021: ×

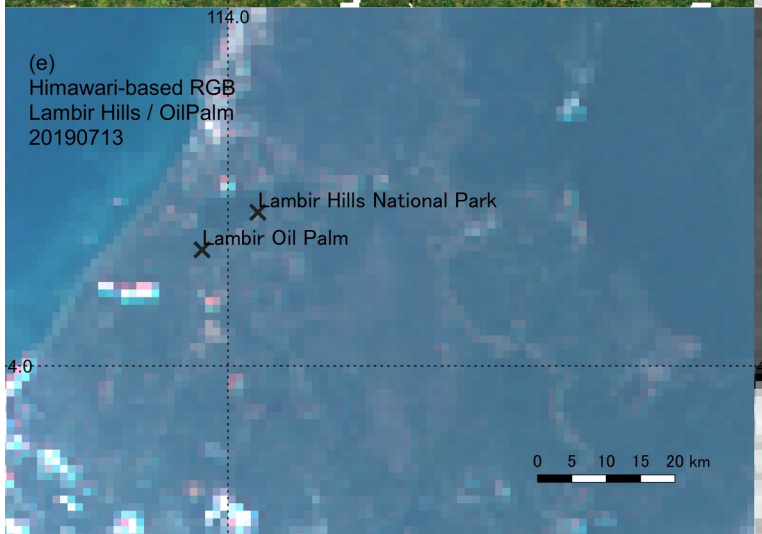
VIs observed by Sentinel-2, GCOM-C, and Himawari-8 in Borneo on 13/16 Jul. 2019.

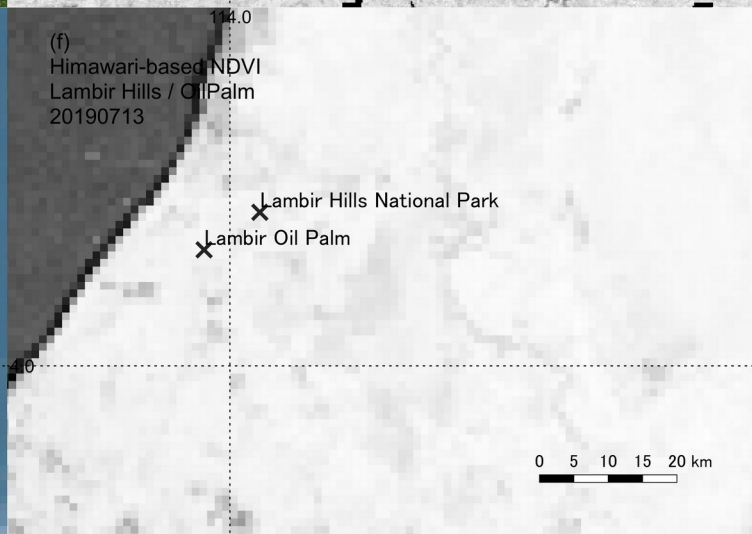


FY2021







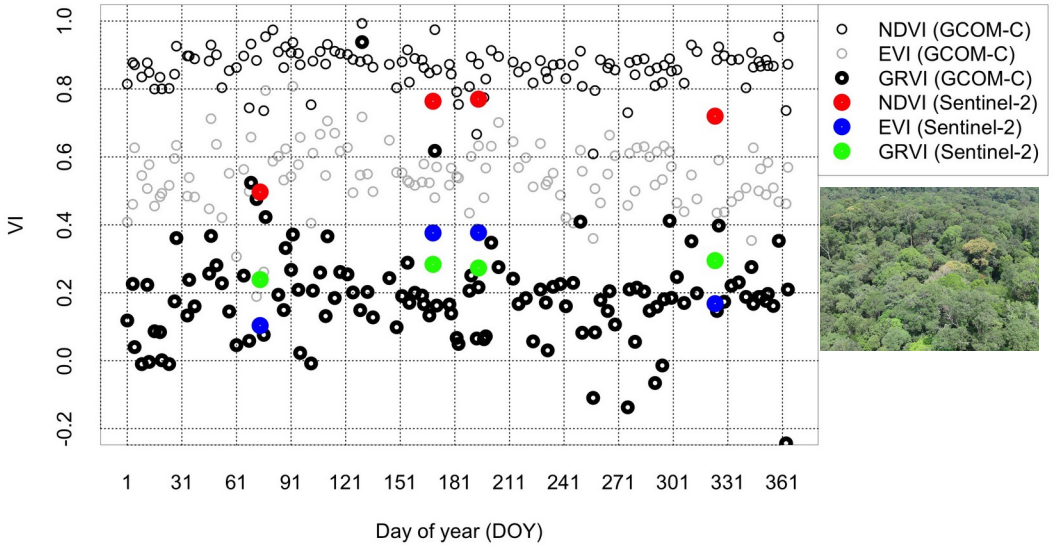


[Shin et al., in preparation]

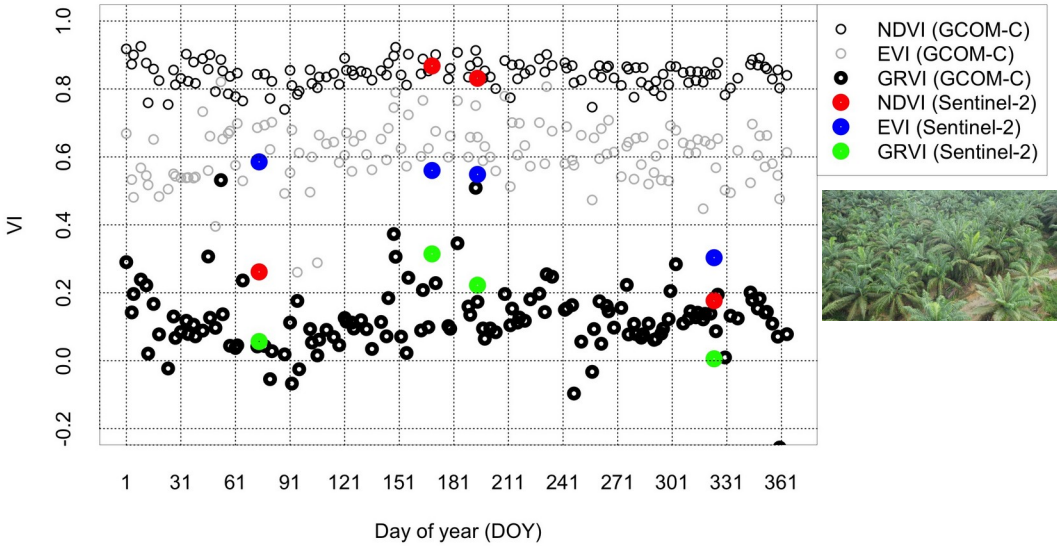
Time-series in VIs observed by Sentinel-2, GCOM-C, and Himawari-8 at tropical rain forest and oil palm in Borneo.

FY2021

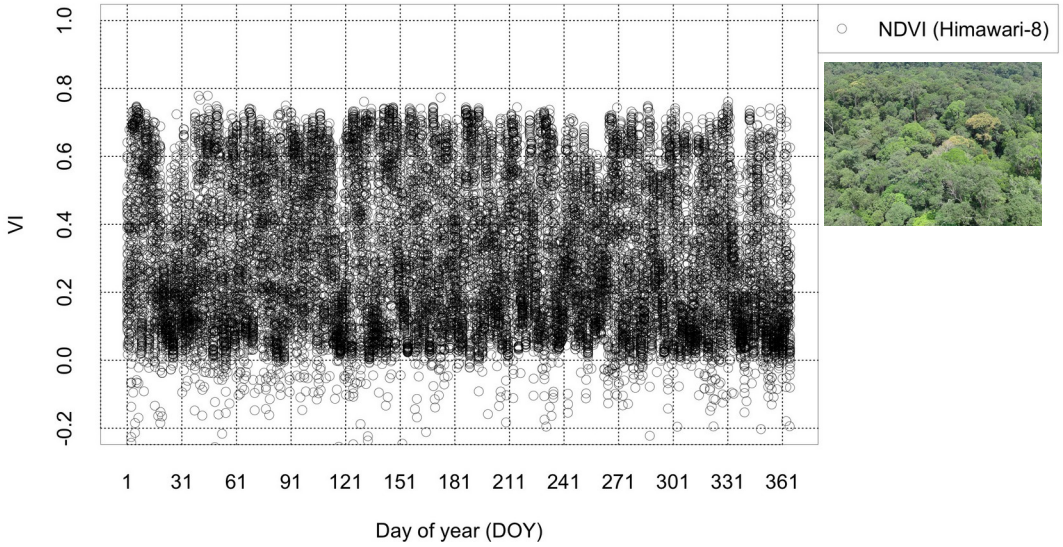
(a) Lambir Hills National Park (tropical rain forest) in 2019



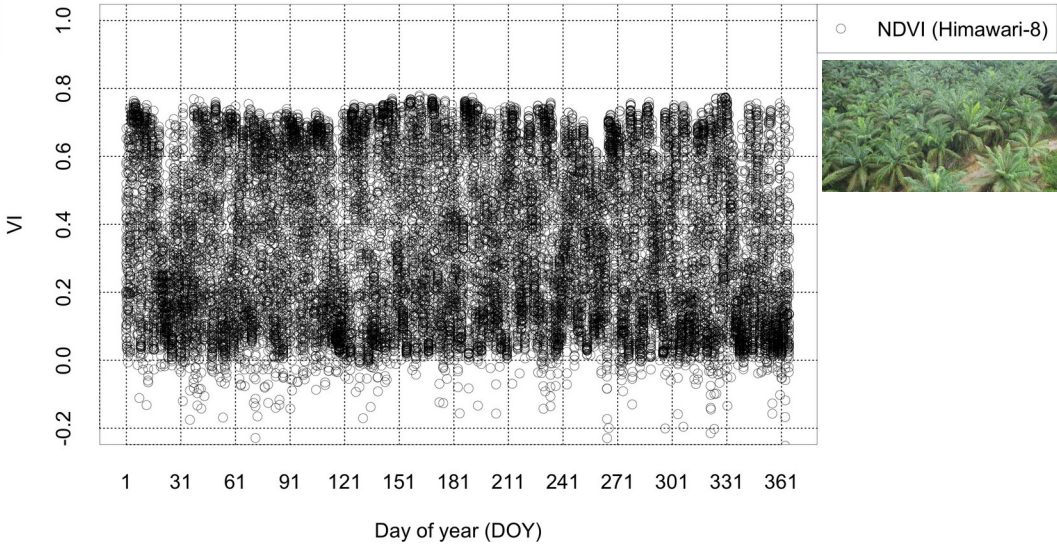
(b) Lambir oil palm plantation in 2019



(c) Lambir Hills National Park (tropical rain forest) in 2019



(d) Lambir oil palm plantation in 2019

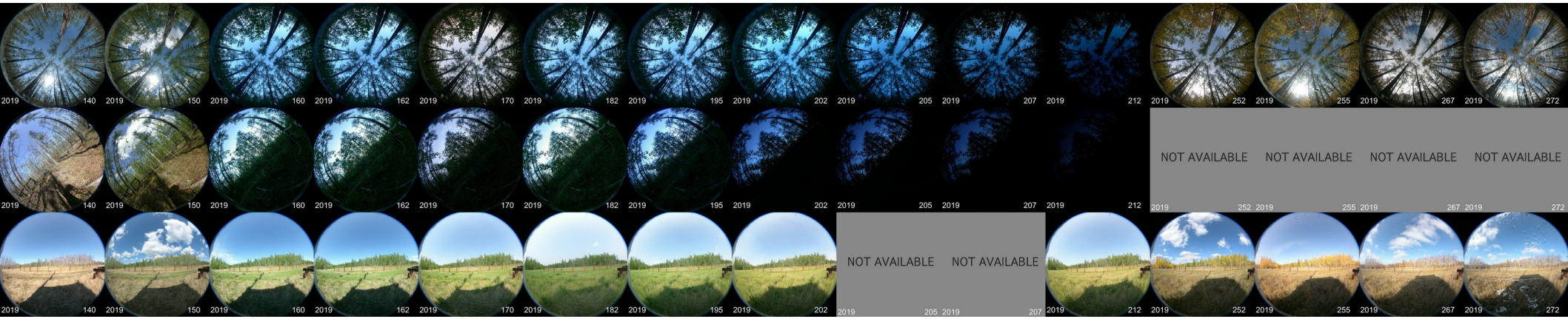


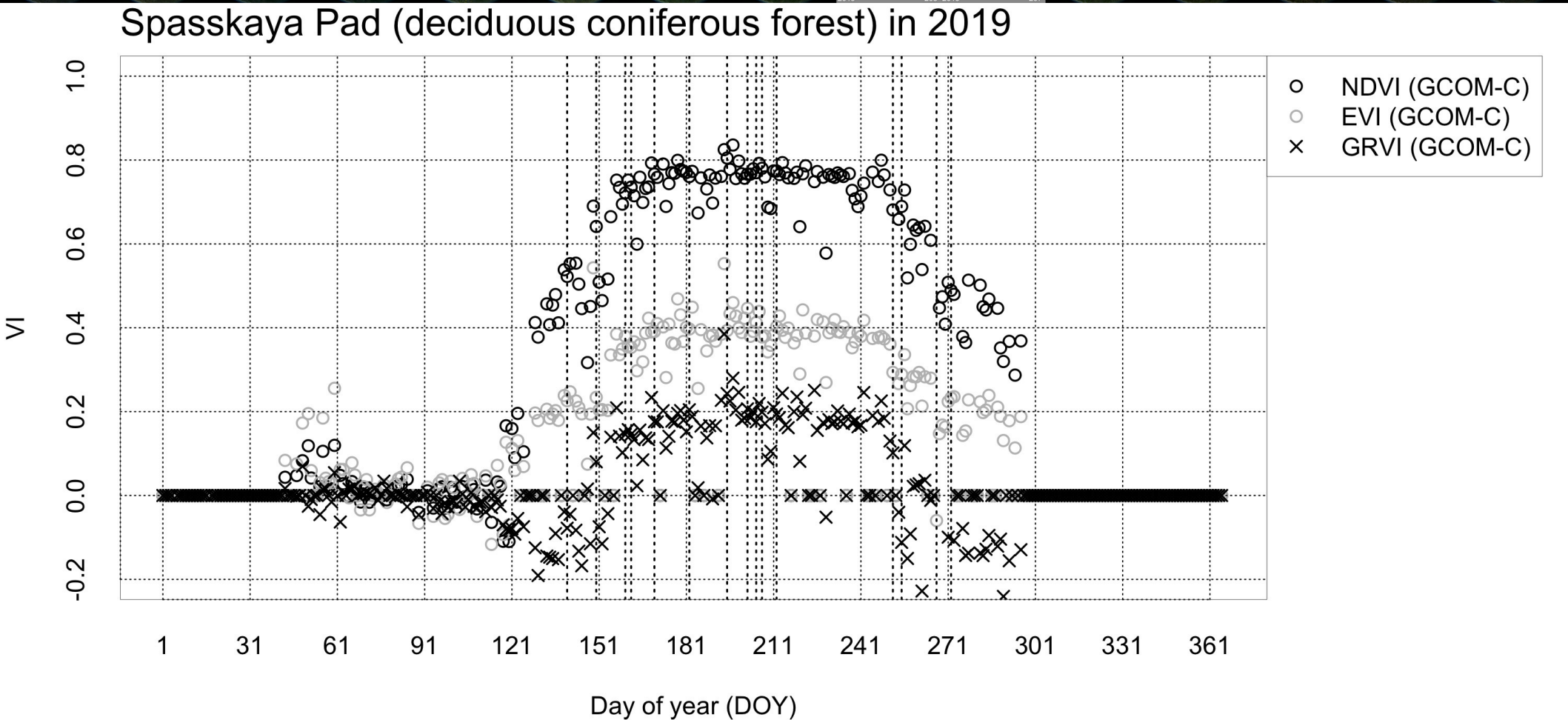
[Shin et al., in preparation]

The difference between two sites may be detected by GRVI.

Time-series in VIs observed by Sentinel-2 and GCOM-C at a deciduous coniferous forest in Eastern Siberia.

FY2021

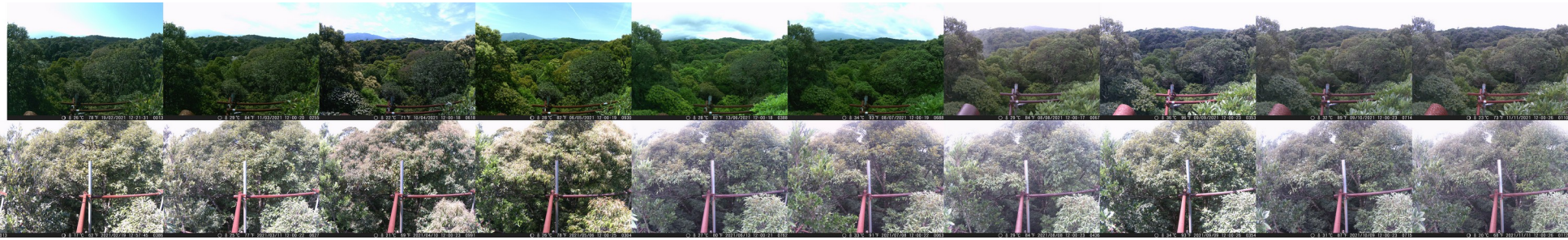




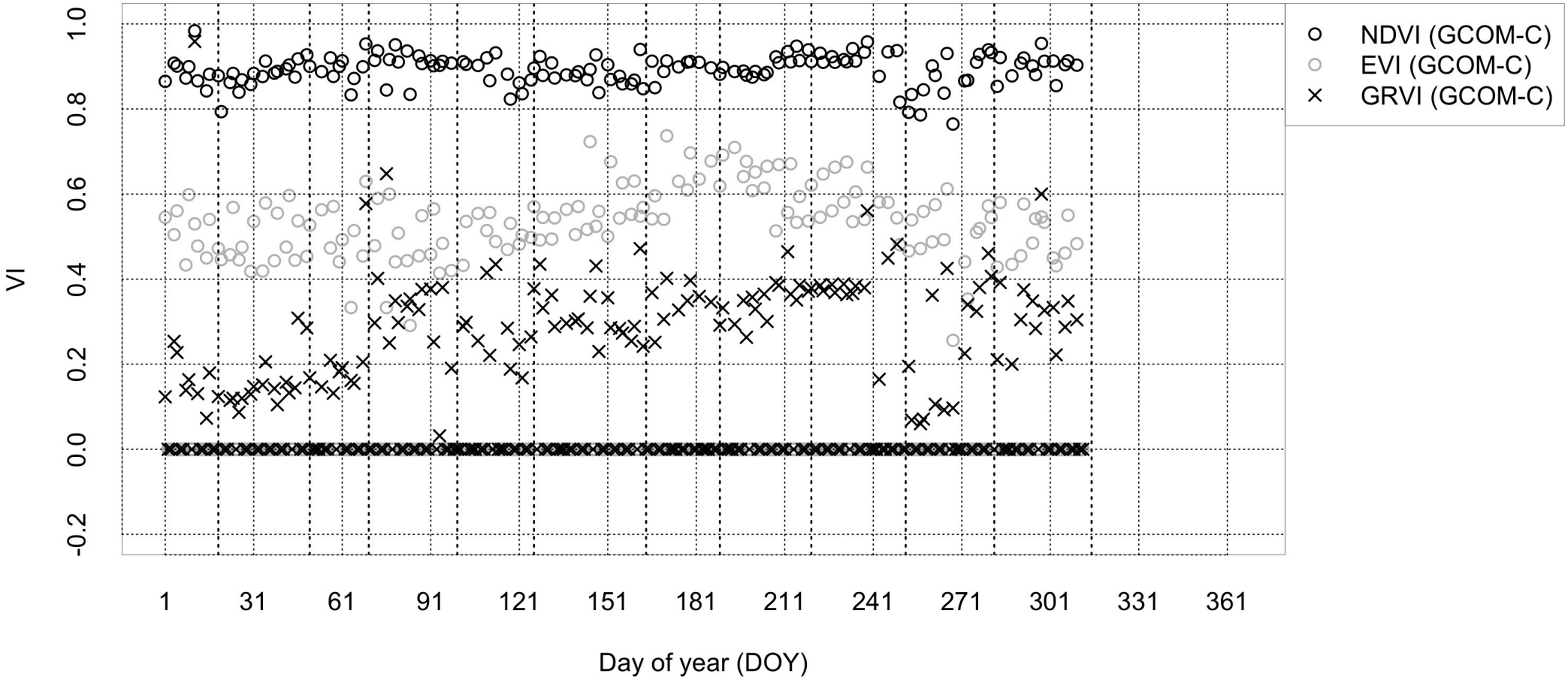
FY2021

Time-series in VIs observed by GCOM-C at a deciduous broad-leaved forest in Miyazaki, Japan.

Not available



Tano forest science station (evergreen broad-leaved forest) in 2021

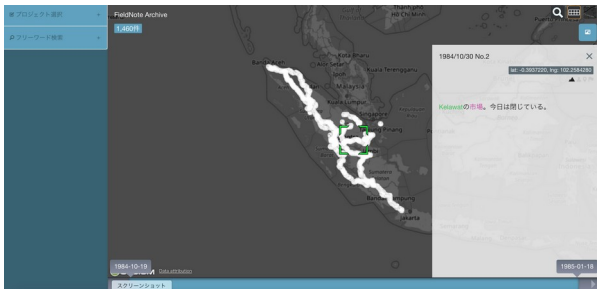


Second aim:

development of ecological understanding of spatiotemporal variability of satellite-observed plant phenology and land cover and land use change (LCLUC).

RGB composite image observed by Sentinel-2 in Sumatra in 2020.

Ground-truth of land use type based on the field notes in 1978 by Kyoto University.



FY2021

(a)

Sentinel-2-based RGB

Rubber
Banana
Cassava
Rice paddy

0 100 200 300 km

(b)

(C)

Mapillary image (k)

Mapillary image (l)

Mapillary image (m)

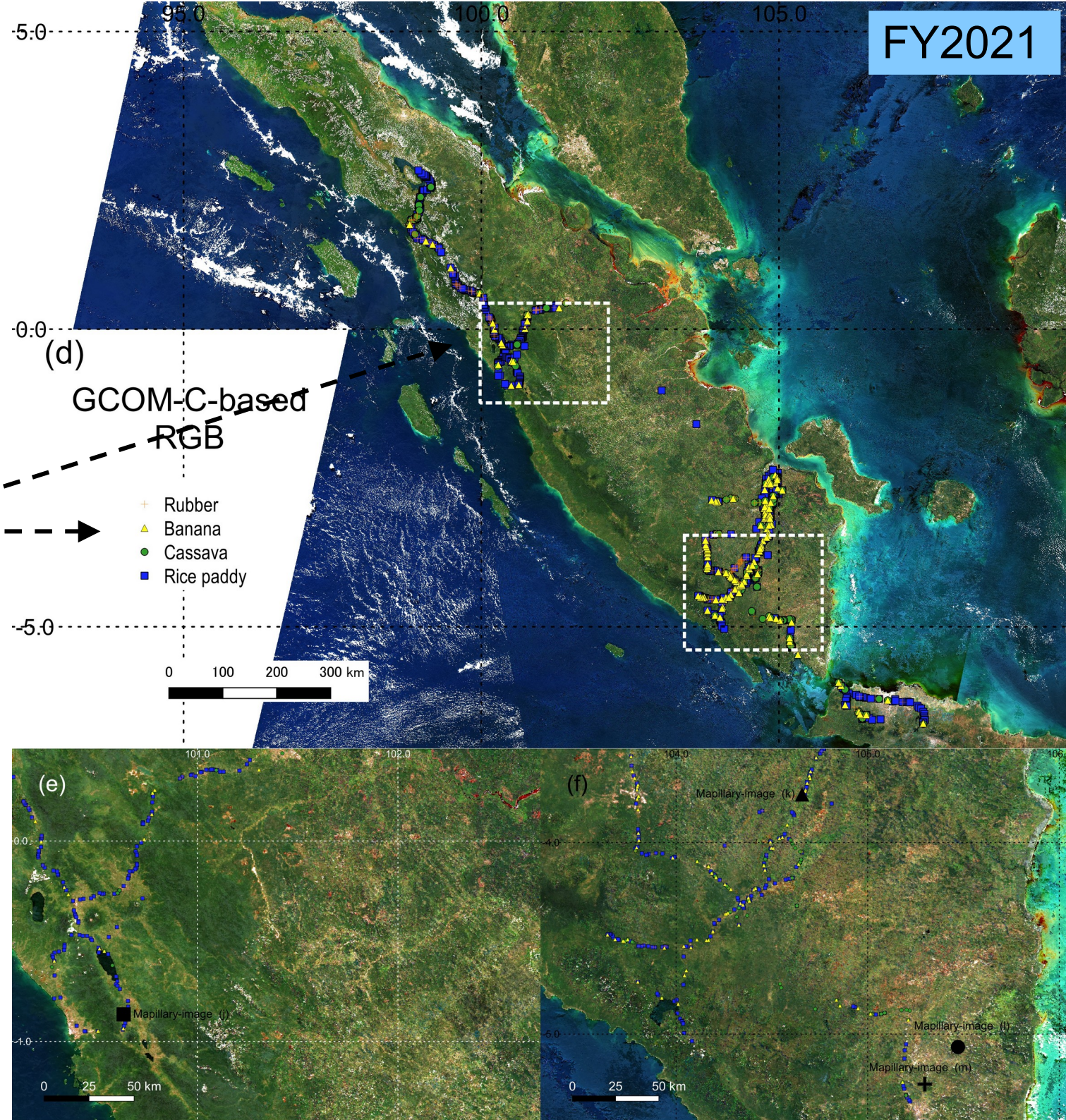
0 25 50 km

0 25 50 km

[Shin et al., in preparation]

RGB composite image observed by GCOM-C in Sumatra in 2020.

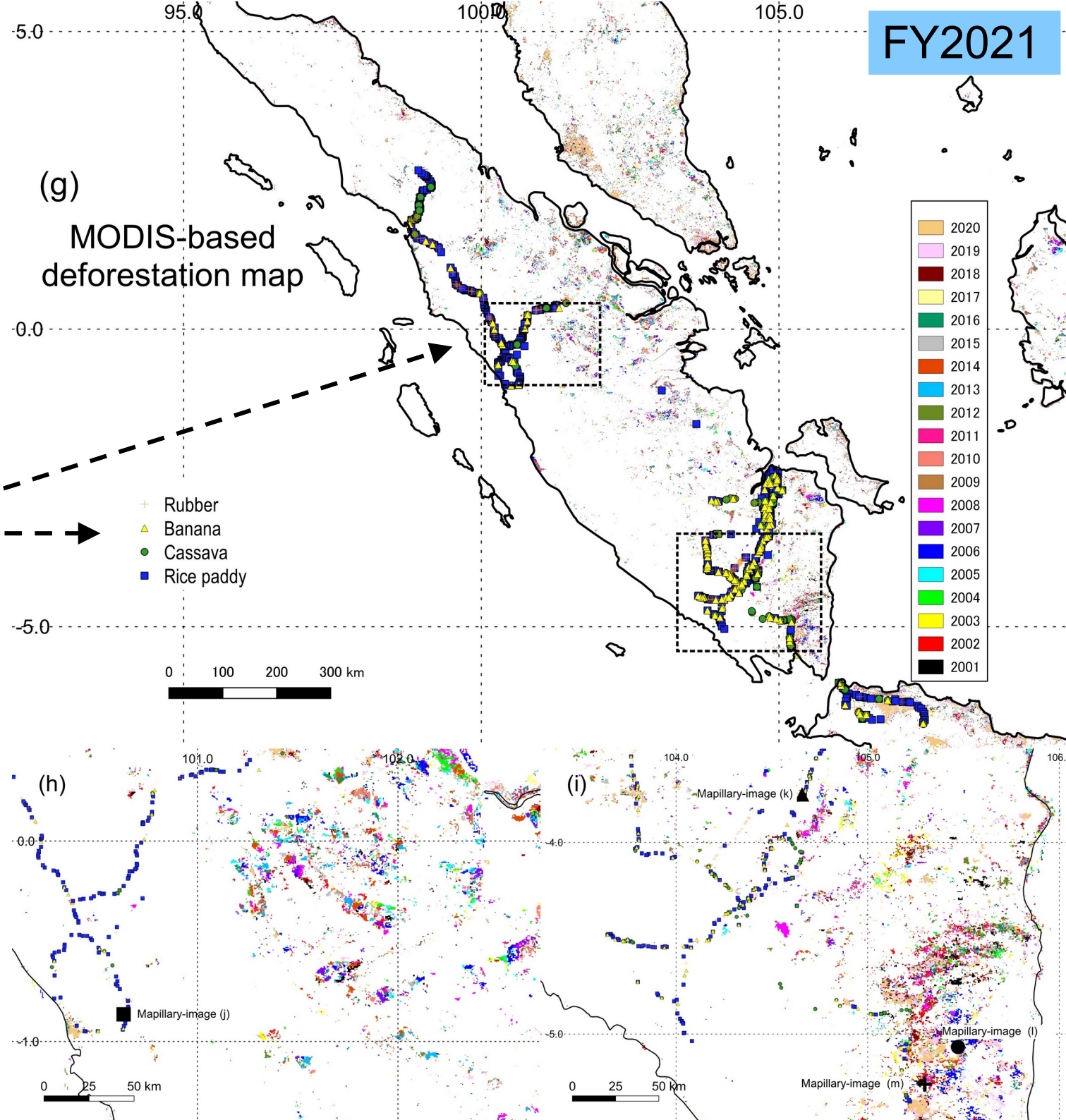
Ground-truth of land use type based on the field notes in 1978 by Kyoto University.



[Shin et al., in preparation]

Deforestation map analyzed by MODIS-observed GRVI in Sumatra during 2001 and 2020.

Ground-truth of land use type based on the field notes in 1978 by Kyoto University.



[Shin et al., in preparation]

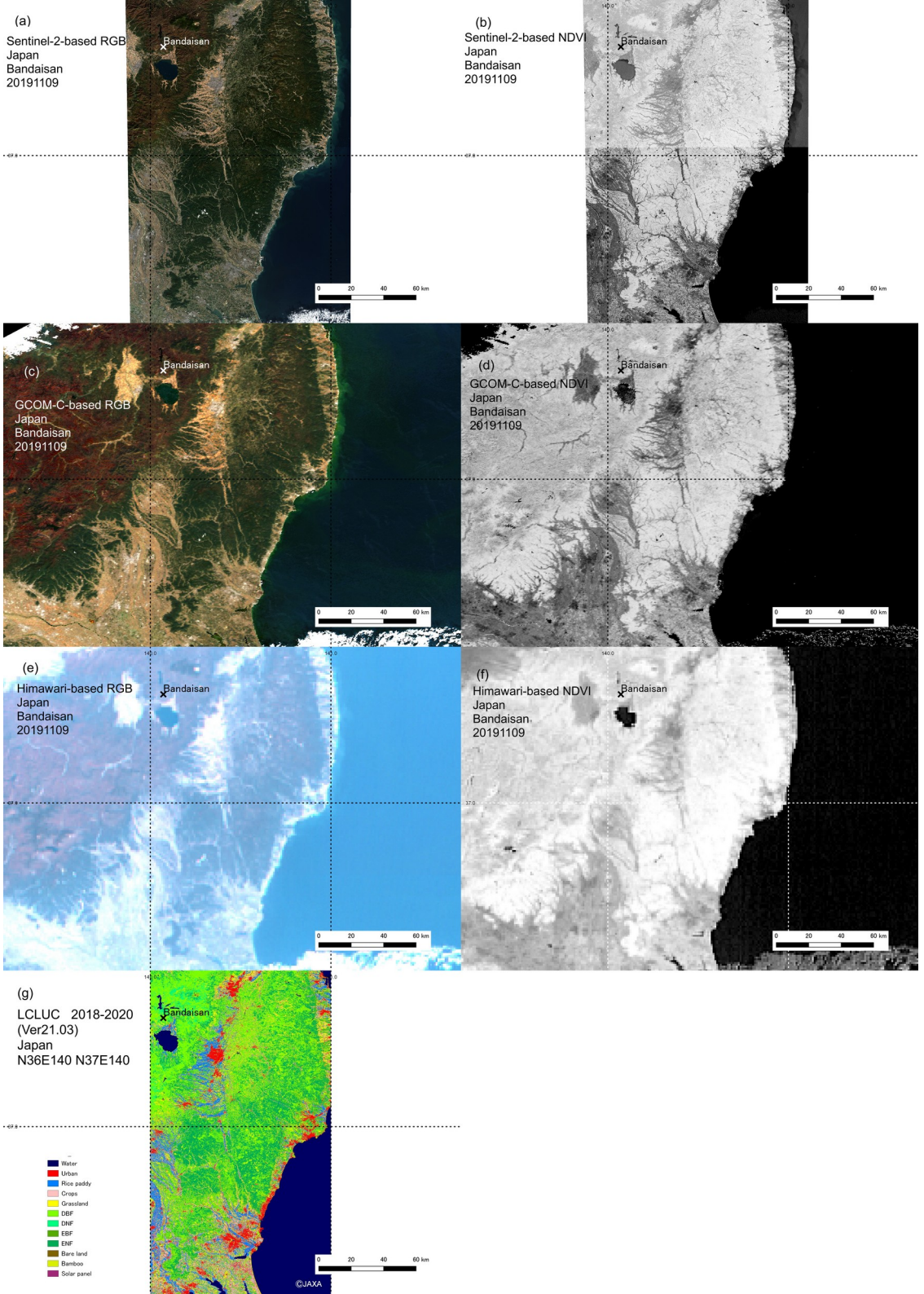
FY2021

Validation of the current land use type by "Mapillary".

[Shin et al., in preparation]

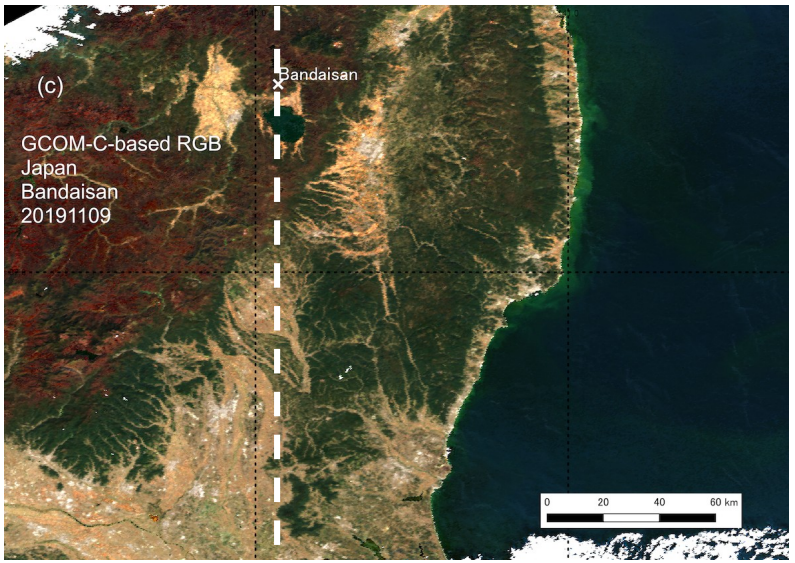
VIs observed by Sentinel-2, GCOM-C, and Himawari-8 along the latitudinal gradient on 9 Nov. 2019.

FY2021

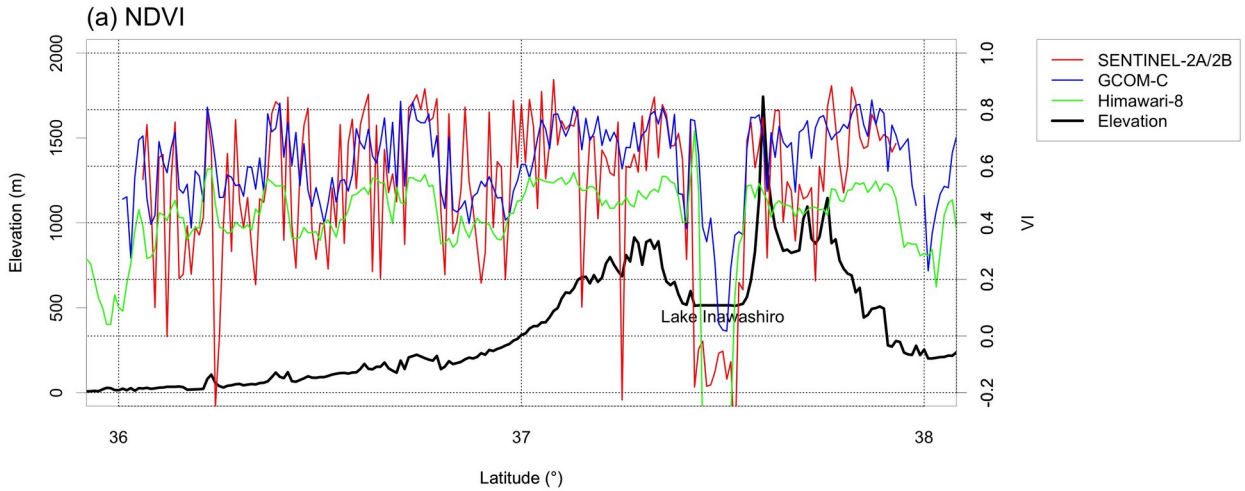


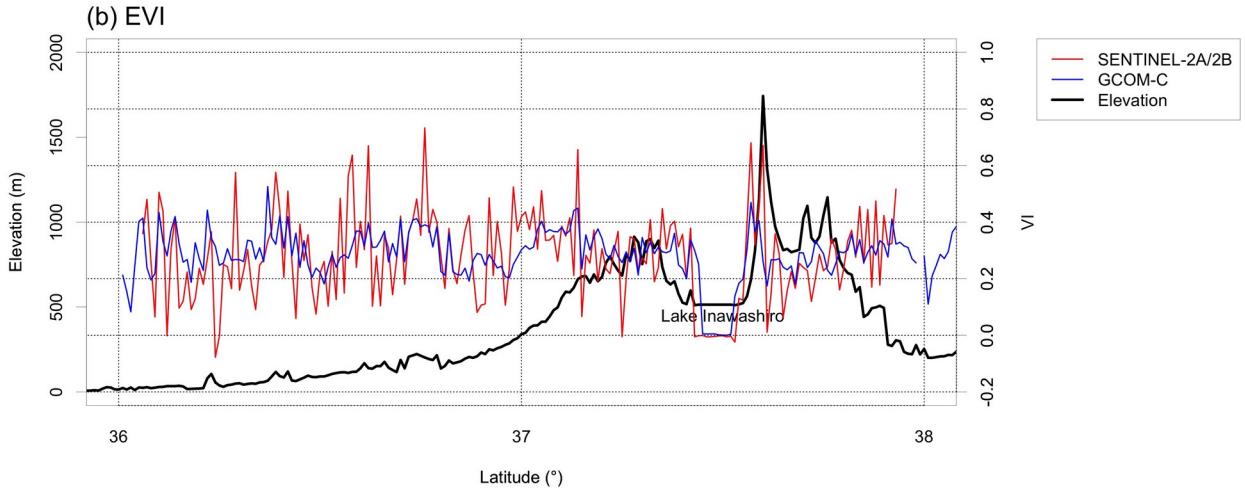
[Shin et al., in preparation]

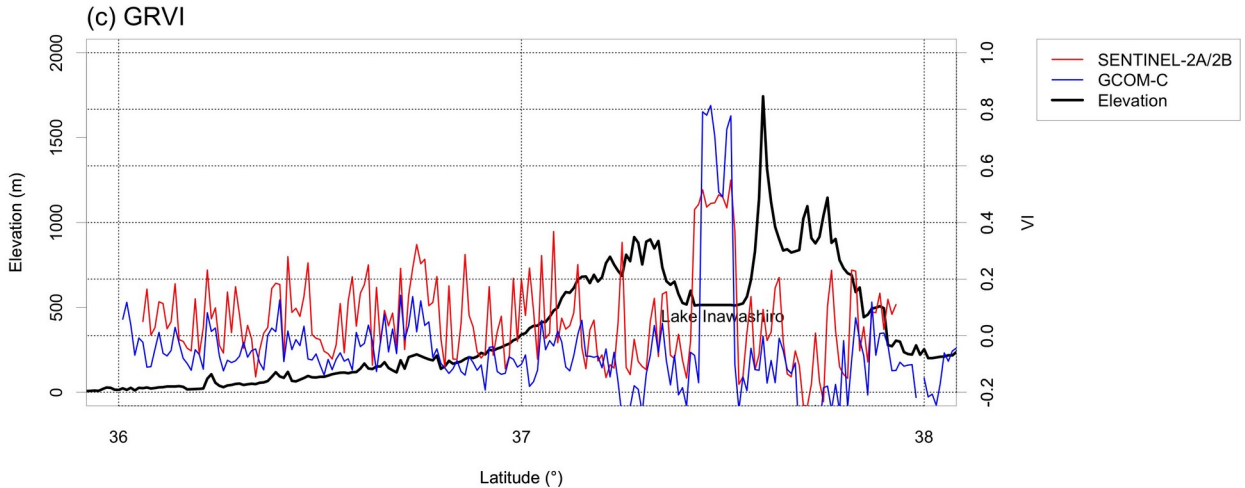
VIs observed by Sentinel-2, GCOM-C, and Himawari-8 along the latitudinal gradient (longitude: 140.072222°) on 9 Nov. 2019.



FY2021



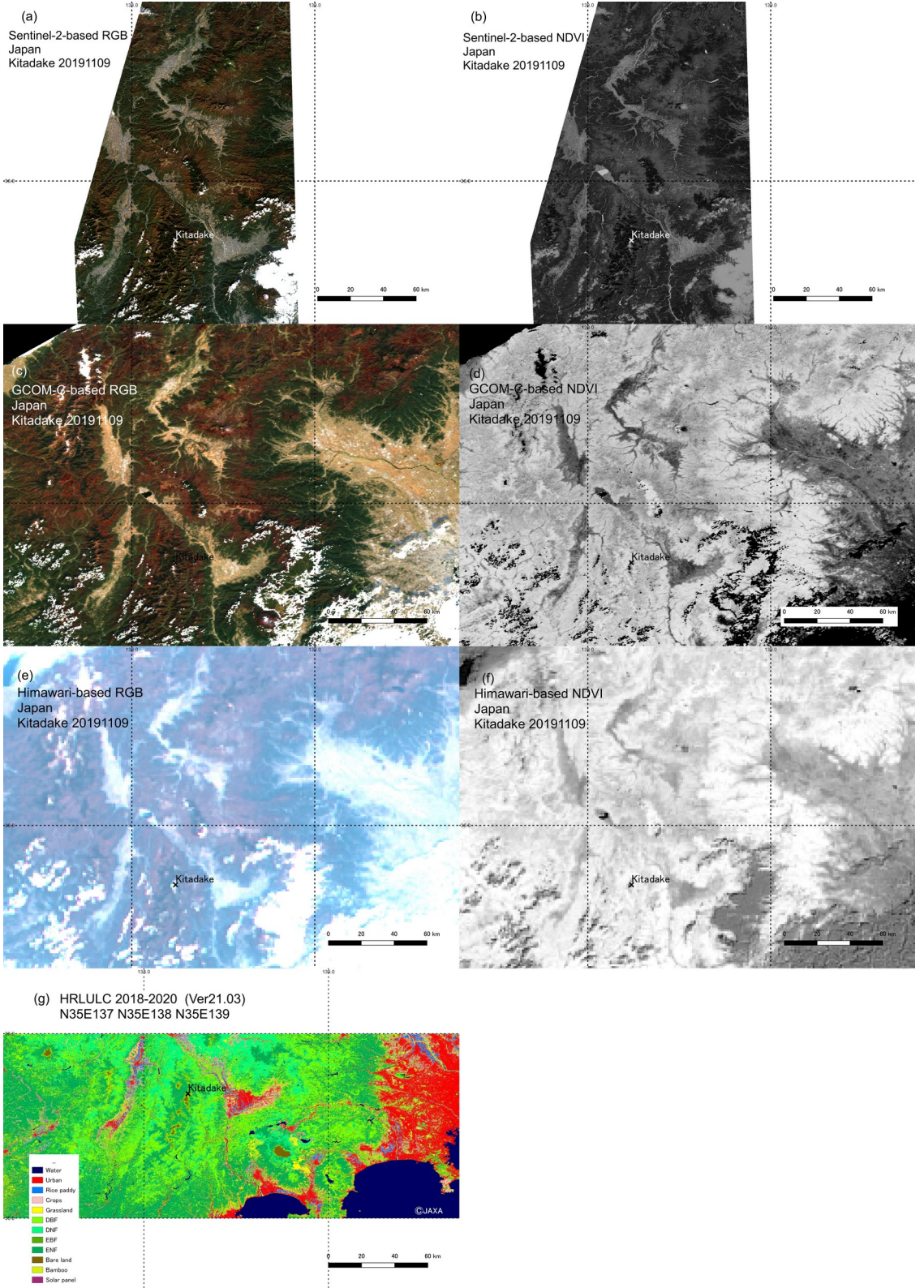




[Shin et al., in preparation]

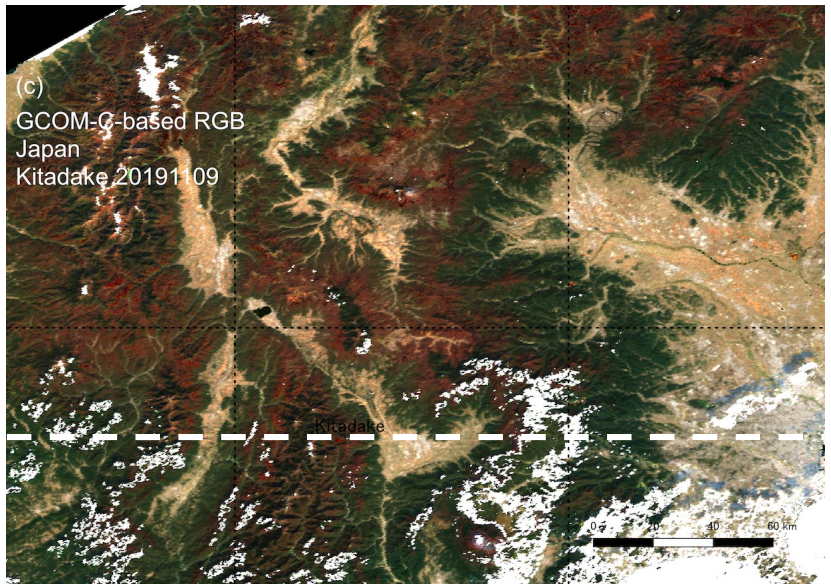
VIs observed by Sentinel-2, GCOM-C, and Himawari-8 along the altitudinal gradient on 9 Nov. 2019.

FY2021

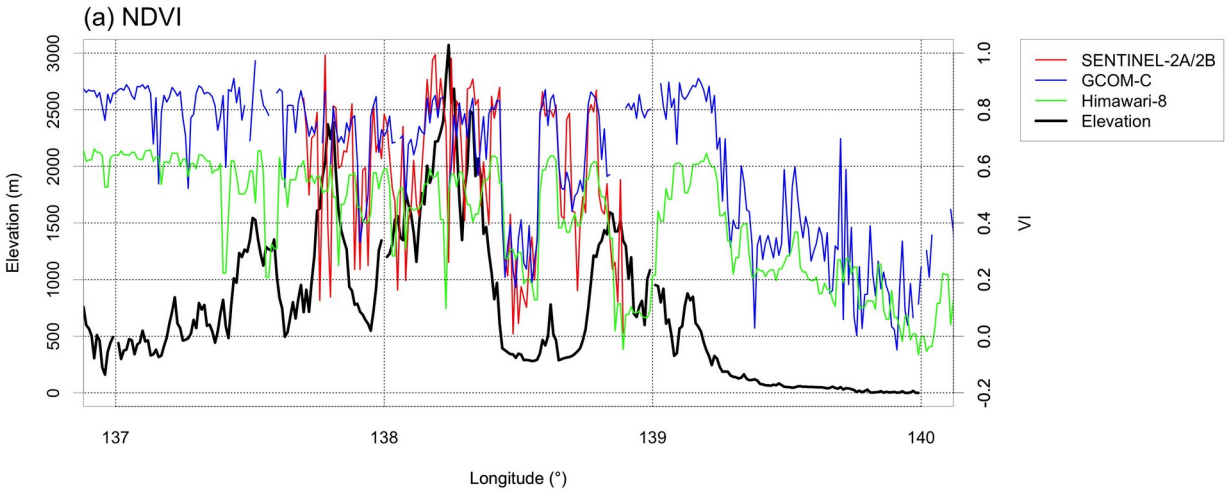


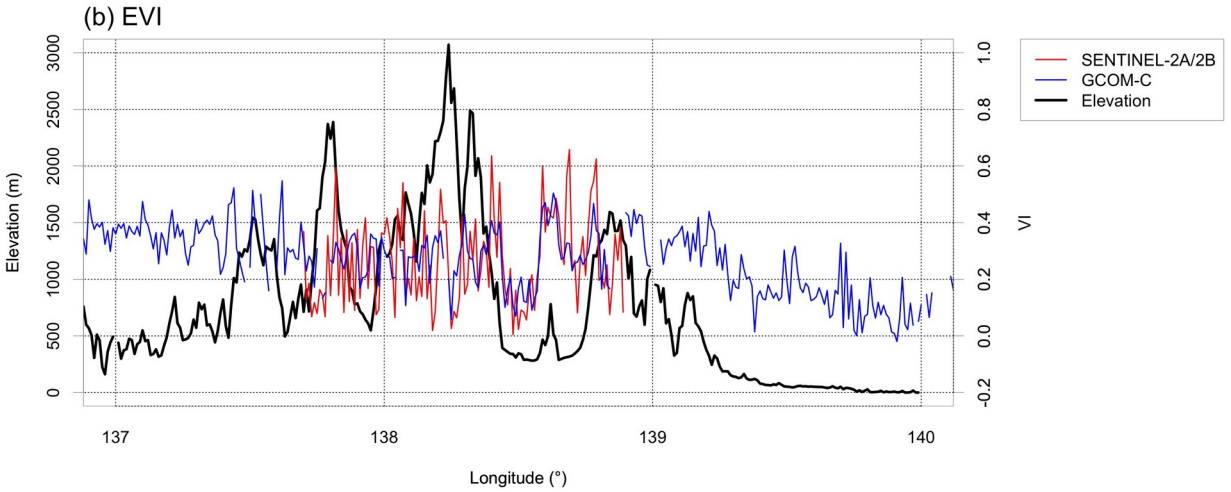
[Shin et al., in preparation]

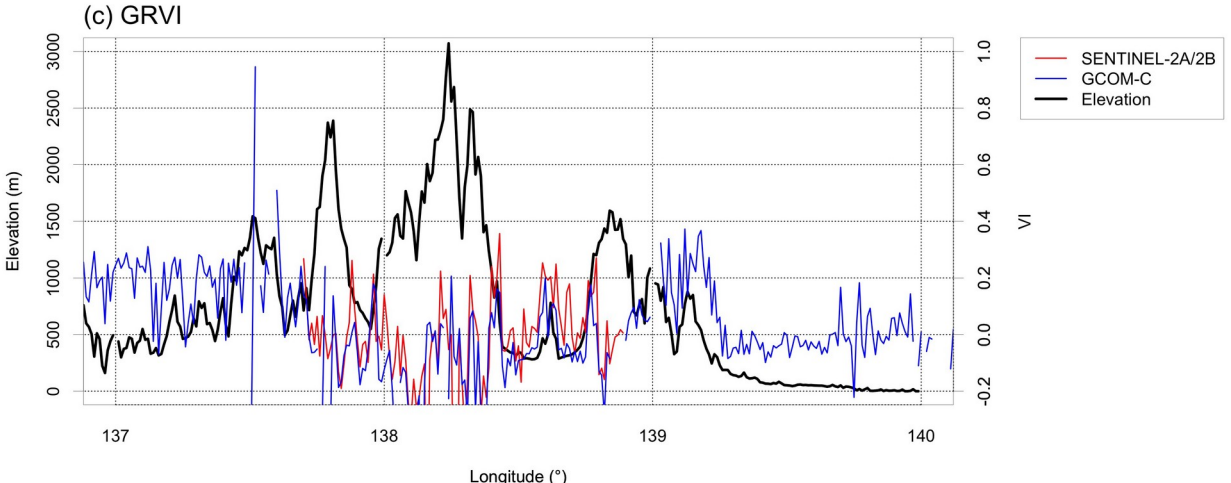
VIs observed by Sentinel-2, GCOM-C, and Himawari-8 along the altitudinal gradient (latitude: 35.67479°) on 9 Nov. 2019.



FY2021







[Shin et al., in preparation]

Thank you for your attention and supports!

- JAXA (ER2GCF104)

Taken at the crane tower at Lambir Hills National Park on 25 Nov. 2019.