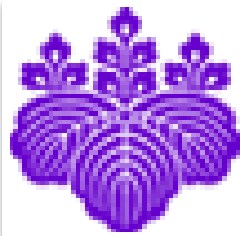


Monitoring spatiotemporal patterns of urbanization using satellite remote sensing data

~ A collaborative research with JAXA ~



University of Tsukuba
筑波大学



宇宙航空研究開発機構
Japan Aerospace Exploration Agency

This collaboration is under
the framework of 3rd
Research Announcement

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Presentation outline

1. Project introduction
2. ALOS Data Characteristics
3. ALOS Applications

1. Project introduction: Goal

Purpose of this research is to conduct comprehensive analysis on spatiotemporal patterns of urbanization and its impact to environment using remote sensing approaches.

1. Project introduction: Time frame

Two years period (April 2010 ~ March 2012)

- Data acquisition: April-2010 ~ March-2011
- JAXA Pls Symposium: Nov 2010 (Tokyo), Nov 2011 (TBD)
- Final report submission: March 2012

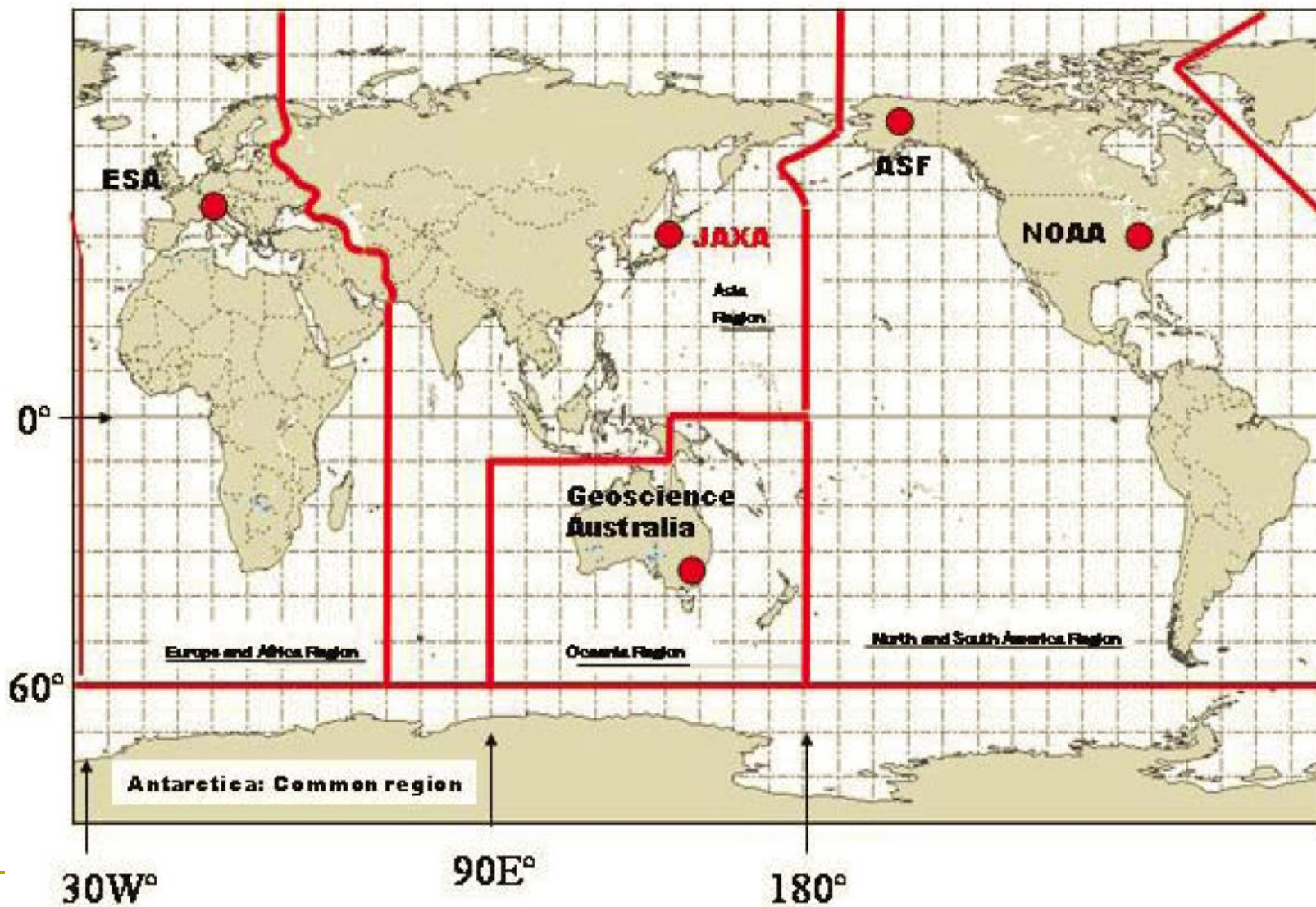
1. Project introduction: Data

Following satellite data are available

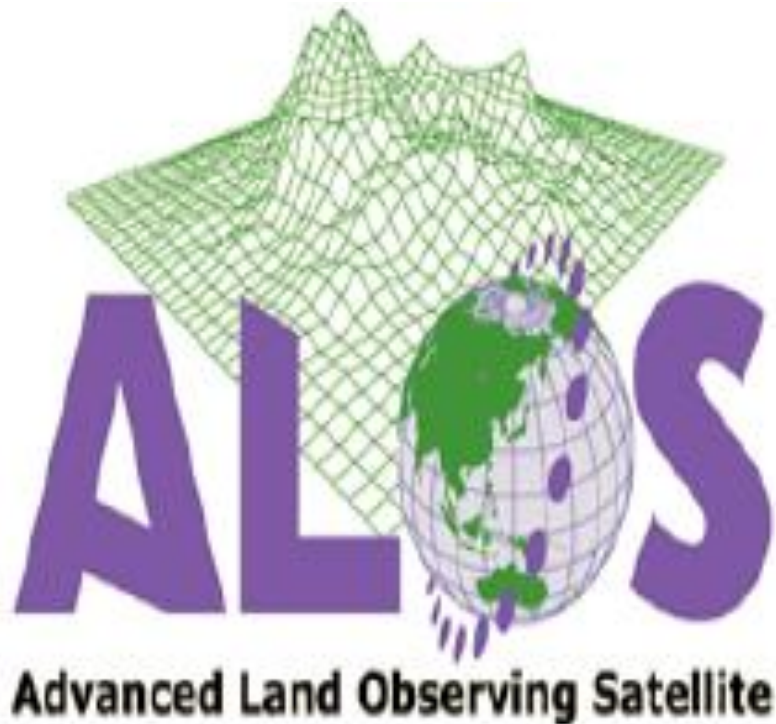
Data:

- ❑ Marine Observation Satellite (MOS) (global)
- ❑ Japanese Earth Resources Satellite (JERS) (global)
- ❑ Advanced Earth Observing Satellite (ADEOS) (global)
- ❑ Tropical Rainfall Measuring Mission (TRMM) (global)
- ❑ ERS, LANDSAT, SPOT, RADARSAT, IRS (only around Japan)
- ❑ ALOS (Asia region, JAXA node)

1. Project introduction: ALOS Data Node



2. ALOS



General information :

- Launched: 24 Jan 2006
- Altitude: 691.65km
- Repeat cycle: 46 days
- Data types: 3
- Data availability: 2006~2010

<http://www.eorc.jaxa.jp/ALOS/en/index.htm>

2. ALOS: Instruments

ALOS has three remote sensing instruments:

- Panchromatic Remote-Sensing Instrument for Stereo Mapping (PRISM) for generating Digital Surface Models (DSMs).
 - Resolution: 2.5m
 - Scene coverage: 70km and 35km
 - Sensor characteristics: 1 Panchromatic band

2. ALOS: Instruments

ALOS has three remote sensing instruments:

- Advanced Visible and Near Infrared Radiometer type 2 (AVNIR-2) for multispectral land coverage observation.
 - Resolution: 10m
 - Scene coverage: 70km
 - Sensor characteristics: Color, 4 bands
 - Blue: Band 1 (0.42 - 0.50 μm)
 - Green: Band 2 (0.52 - 0.60 μm)
 - Red: Band 3 (0.61 - 0.69 μm)
 - Infra Red: Band 4 (0.76 - 0.89 μm)

2. ALOS: Instruments

ALOS has three remote sensing instruments:

- Phased Array type L-band Synthetic Aperture Radar (PALSAR) for 24-hour, all-weather land observation.
 - Resolution: 10~20m; 30m; 100m
 - Scene coverage: 70km; 30km; 250~350km

2. ALOS: Data products

Common

Level	Definition	Note
Raw	Demodulated bit stream	Packetized Temporarily archived
0	Frame synchronization and PN decoding of CADUs and R-S Error Detection and Correction of VCDUs Extracted mission telemetry, orbit, and attitude data are stored on separate files.	Compressed (except for PALSAR) Permanently archived Level for distribution to Data Node

PRISM

Level	Definition	Note
1A	Uncompressed, reconstructed digital counts appended with radiometric calibration coefficients and geometric correction coefficients (appended but not applied). Individual files for forward, nadir, and backward looking data.	
1B1	Radiometrically calibrated data at Sensor input	
1B2	Geometrically corrected data Options G: Systematically Geo-coded (No option: Geo-referenced)	Map projection Resampling Pixel spacing

2. ALOS: Data products

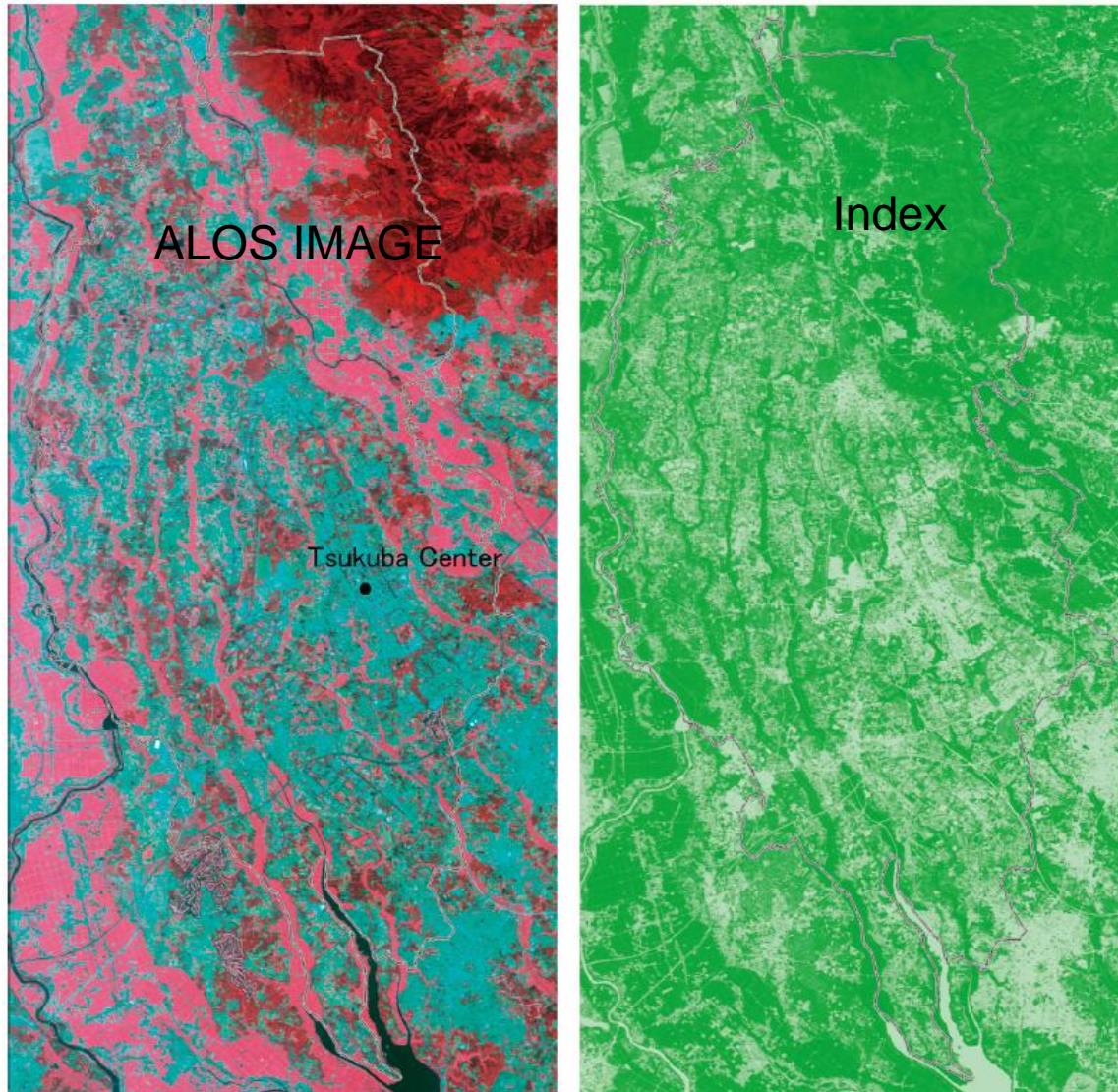
AVNIR-2

Level	Definition	Note
1A	Uncompressed, reconstructed digital counts appended with radiometric calibration coefficients and geometric correction coefficients (appended but not applied).	
1B1	Radiometrically calibrated data at Sensor input	
1B2	Geometrically corrected data Options G: Systematically Geo-coded (No option: Geo-referenced) D: Correction with coarse DEM	Map projection Resampling Pixel spacing

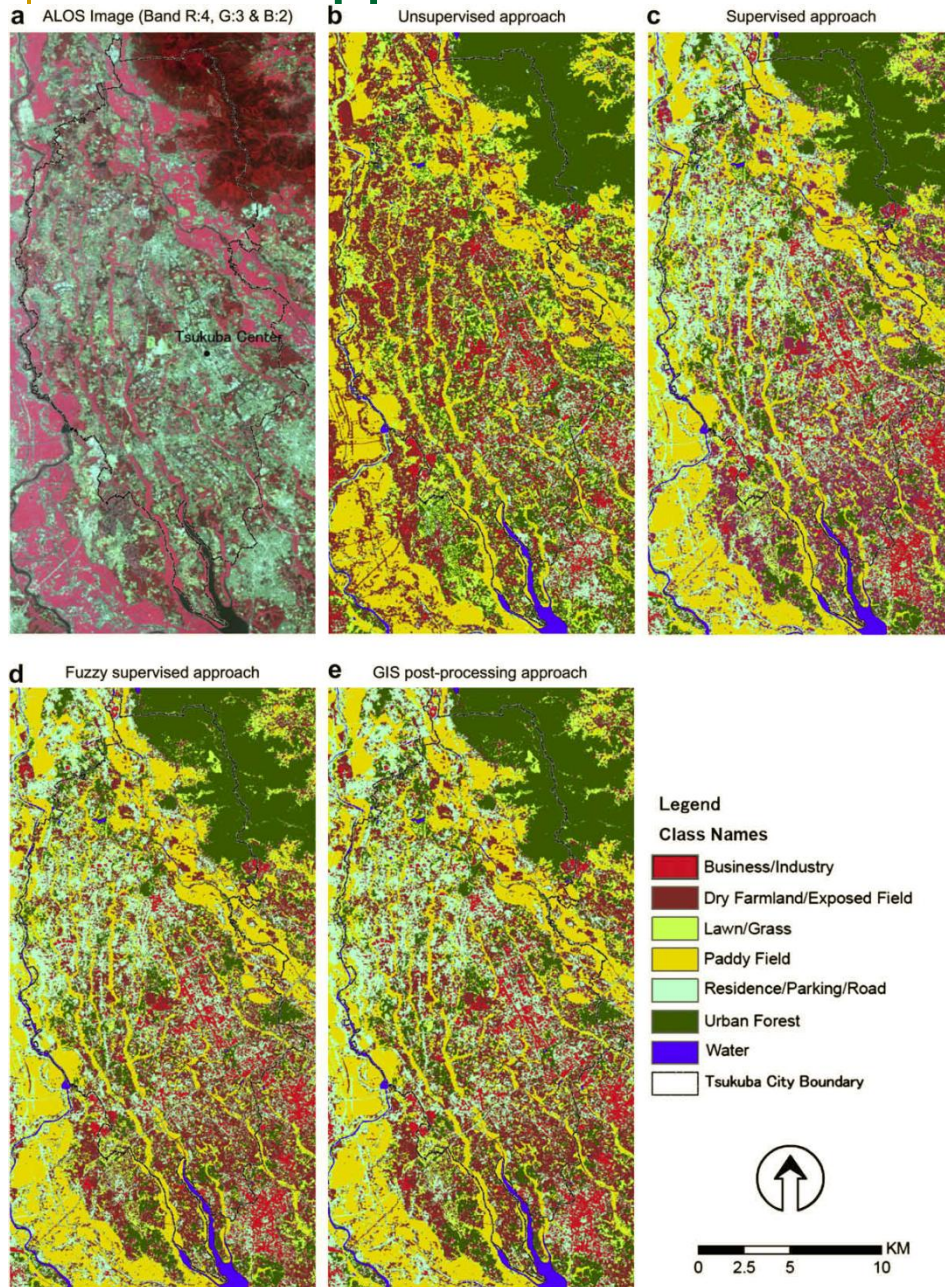
PALSAR

Level	Definition	Note
1.0	Reconstructed, unprocessed signal data appended with radiometric and geometric correction coefficients (appended but not applied). In Polarimetric Mode, polarimetric data is separated.	
1.1	Range and azimuth compressed complex data on slant range. Full resolution	Beam modes: Full resolution mode, Low data rate mode, Polarimetric mode SLC: Single Look Complex Used for interferometry
1.5	Multi-look processed image projected to map coordinates. Option G: Systematically Geo-coded (No option: Geo-referenced)	Map projection Resampling Pixel spacing

3. ALOS Applications: Vegetation monitoring in Tsukuba



3. ALOS Applications: Land use detection in Tsukuba




Source: Thapa and Murayama 2009


3. ALOS Applications: Walkability



Source: <http://giswin.geo.tsukuba.ac.jp/sis/walkability/index.htm>

3. ALOS Applications: Eco-friendly walk score calculator

**TSUKUBA CITY**
Eco-friendly Walk Score Calculator
Choosing a place to live with GIS

DIVISION OF SPATIAL INFORMATION SCIENCE
UNIVERSITY OF TSUKUBA 

Get Score by Address
天王台1丁目 ▼ 4573-57 ▼
400 ▼ [Sect Distance in m \(Optional\)](#)

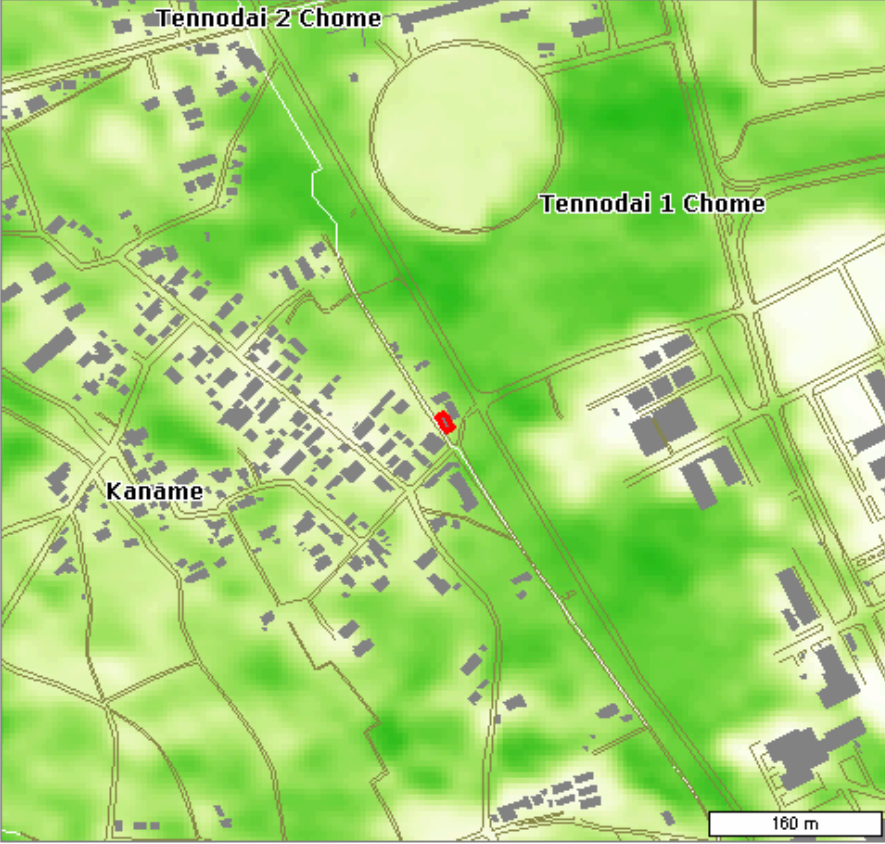
Set Output
☒ Greenness ☐ Facility

Facility Setting
☒ Use All ☐ Use Selected

Facility

サービス業

☐ 生活関連サービス業
☐ 専門サービス業
☐ 医療・社会保障/社会保険・社会福
☐ 生活関連サービス業/クリーニング
☐ 情報・通信産業
☐ 専門サービス業/設計・デザイン業
☐ 専門サービス業/その他の専門サ
☐ 教育・文化・スポーツ産業/教育産
☐ ビジネス関連サービス業/リース・レ




Tennodai 2 Chome

Tennodai 1 Chome

Kaname

160 m

Get your score in here
Search Address:
天王台1丁目-4573-57
Search Radius: 400 m
Greenness Score: 67
☒ Show distance from each shop

☐ Facility ☐ Building ☒ Greenness  **Get Score by Block** 稲荷前 ▼