



Data Cube and its potential for forest monitoring in Vietnam

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- Forest monitoring in Vietnam
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- Present situation
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- Authorities of forest monitoring
 - Forest ranger directorate (FRD)
 - Forest Investigation and Planning Insitute (FIPI)

Forest ranger

MARD-Provinces (National Parks)-Districts-Communes

<u>FIPI:</u>

FIPI-SubFIPIs (6); 3 Reseach Centers; 1 Museum Forest ranger

MARD

Forest Investigation and Planning

Insitute (FIPI)





• FRD

- Data updated every year, but without map (table form)
- Data collected from field forest rangers; Satellite data rarely used
- Forest map updated occasionally, province by province
- FIPI
 - Forest map updated every "cycle" (normaly 5 years)
 - Data collected from staff of FIPI
 - Satellite data "must" be used. Before 2013: SPOT; After
 2013: VNREDSat 1





- Satellite-based forest monitoring system
 - JJFAST
 - Use ALOS 2 data
 - World scale
 - Updated 1 and half month
 - Experiment of SNRM/JICA project
 - Use Landsat-8 and Sentinel 2 data
 - National scale. Query for province and district
 - Updated monthly



VAST

JICA-JAXA Forest Early W ×	Vî Ant
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Image: Group dung Bookmarks Ste Football RSGIS UU <th>Av</th>	Av
◆ JAXA/EORC Forest-Non Forest Map (2016) Defore	est Data: JAXA/EORC Deforest Data: JAXA/EO

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Forest Changes Detection

English

Forest changes in the field can be detected at national level, provincial level or district level through analyzing the free-of-charge and up-todate satellite imagery data.

An experimental of SNRM/JICA Project.

1) Select Area of Interest:

Select province: Select a district: --Please select one----Please select one--

In use in provincial

- Less polygon, not "map updated"
- Should avoid cloud effected
 - Faster

In use in provincial level:

- More frequency
- More detail
- More clear "evidence"

System In use in provincial level:

- Frequency: monthly
- No cloud effected
- Easy and quick for querying
- Easy to understand

Key points:

- Forest loss detection; not map updating every month
- Combination of Radar and Optical
- data for forest loss detection

In use in provincial level:

- Less polygon, not "map updated"
- Should avoid cloud effected
- Faster





Vietnam Data Cube

- For better sharing data in Vietnam
- Technology from CSIRO
- Data from Landsat, Sentinel, ALOS-2, LOTUSat
- Vietnam Data Cube ~ Radar (SAR) Data Cube
- Operated by VNSC
- Funded by VNSC





Vietnam Data cube

Under CEOS activities (<u>http://ceos-cube.org/</u>)

The Data Cube Provides:

- 1. Ease of use and access to space-based data
- 2. Multiple dataset interoperability and spatial consistency
- Use of "Analysis Ready" Data Products vs. Unprocessed Data (leave processing to the Space Agencies)
- 4. A Shift in Paradigm from Scenes to Pixels
- 5. Efficient time series analysis and data assimilation
- Free and open access to software and APIs (Open source Software Apache 2.0)



Data Platform Architecture





Vietnam Data Cube

- Technology transfer:
 - From CSIRO: 2 workshops for technology transferring
- Hard ware
 - Server system from IMSG (200 TB)
 - Installed already
 - Ready to be launch!
- Application
 - Forest monitoring: under development; Plan to be launched: January, 2018
 - Rice monitoring: under development (will use the result from VNSC's research project); Plan to be launched: January, 2019
- Collaboration:
 - Signed MOU with FIPI (will test and report the result of forest monitoring)
 - Signed MOU with Jaxa (ALOS-2 data providing)



Present situation

- Forest loss monitoring system
 - Data
 - Satellite data
 - Forest map
 - Functions
 - Forest loss detection
 - (Map)
 - Users
 - Provincial/District government
 - Forest ranger

Progress

- Testing site:
 - Phu Tho province: in collaboration with FIPI
 - Quang Nam province: in collaboration with FIS (Forest Information system)
- Time schedule
 - Field survey: November
 - Forest loss testing data: December
 - Pre-launch: January 2018
 - System testing: Jan. to Jun., 2018

Challenges

• Data

- Ingestion of Sentinel 2: not ready
- Capacity:
 - VNSC: research oriented; FIPI operation oriented
- Fund
 - Funded by VNSC: limited

Forest monitoring algorithm

- Combination of optical data: Landsat 8 and Sentinel 2
- Combination of SAR data: ALOS-2 and Sentinel 1
- Combination of radar and optical data
- Users:
 - Not familiar with the information that system can provide

Conclusion

- Vietnam urgently need monthly forest loss detection at provincial and district level. It will help local government and forest ranger do better job on forest management.
- The system need to be provided free of charge to encourage users to apply it in their work.
- The lessons learned from Vietnam should be shared with other countries.
- The data cube based system is one effort of forest loss detection.

Thank you