FIG WORKING WEEK 2019

22-26 April, Hanoi, Vietnam

Presented at the FIG Working Week 2019,
April 22-26, 2019 in Hanoi, Vietnam

"Geospatial Information for a Smarter Life
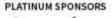and Environmental Resilience"

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Monitoring land-cover changes using multi-temporal Sentinel-1 data in U Minh Thuong National Park
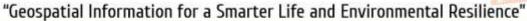
Do Thi HOAI, **Le Minh HANG**, Vietnam

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Presentation Outline

- 1. Introduction

- 2. Study area and materials

- 3. Methodology

- 4. Experimental Result and Discussion

- 5. Conclusion

INTRODUCTION

U Minh Thuong National Park in the southern province of Kien Giang is focusing on scientific research to promote its conservation.
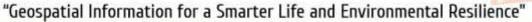
INTRODUCTION

(a)

(b)

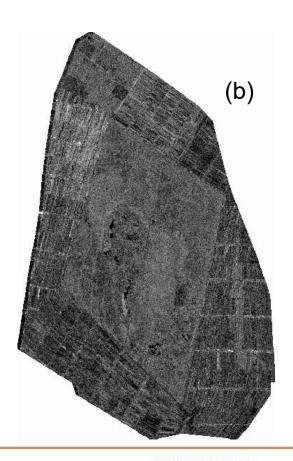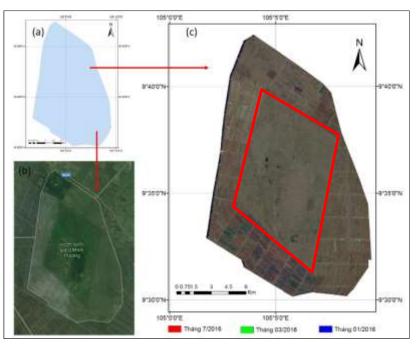## Study area

Figure 1. Location of the study area. (a) The study area; (b) U Minh Thuong National Park on high resolution satellite image (Google Earth). (c) The composite RGB of multi-temporal Sentinel-1 images in 2016 (R:G:B=7/2016:03/2016:01/2016)

Materials

Specifications	Sentinel-1 data
Acquisition time	17/01/2016; 22/02/2016; 29/03/2016;22/04/2016; 28/05/2016;09/06/2016;27/07/2016; 20/08/2016; 25/09/2016; 19/10/2016; 12/11/2016;18/12/2016
Ascending/Descending	Ascending
Mode	IW (Interferometry Wide Mode)
Band	C-band (5.46 Hz)
Polarization	VV+VH
Level processing	Level-1 GRD (Ground Range Detected)
Resolution	10x10m
Bit depth	16 bit

Materials

- The data pre-processing was performed by the SNAP toolbox with four main steps:
    - (*i*) Calibration to sigma nought;
    - (*ii*) Terrain correction by DEM of STRM;
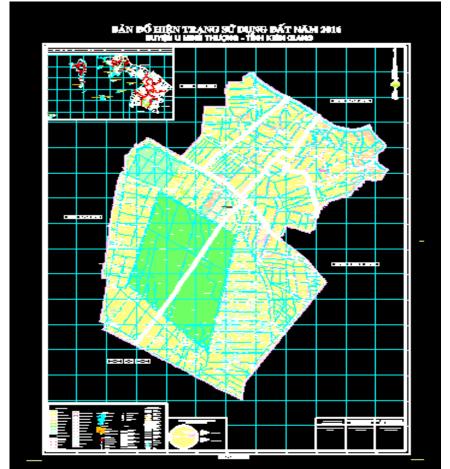   - (*iii*) Convert to dB value;
    - (*iv*) Multi-temporal filter.

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Materials

- Current land use map of U Minh Thuong district in 2015

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Methodology

- Analysis of feature land cover patterns by multi-temporal SAR images

Methodology

Figure 4. The proposed method for discriminated the changed/unchanged objects using time-series SAR images

Methodology

Figure 5. (a) Standard deviation image; (b) Mean value image; (c) Paddy rice image

Result and discussion
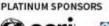

(a) The experimental result; (b) Overlay current land use map of U Minh Thuong district in 2015

Result and discussion
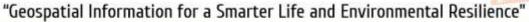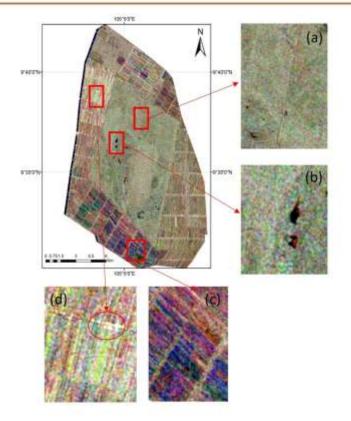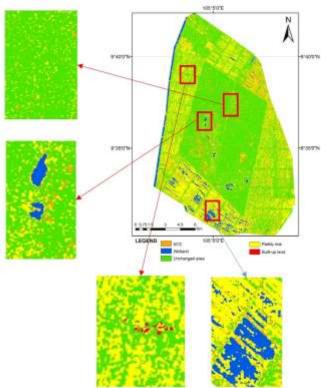
Result and discussion

	Classification data					
Reference data		NTS	Wetland	Unchanged area	Paddy rice	Built-up land	**PA (%)**
	NTS	18	3	1	0	0	**78**
	Wetland	4	20	2	0	0	**73**
	Unchanged area	0	2	22	1	0	**75**
	Paddy rice	0	2	0	15	0	**84**
	Built-up land	0	0	0	0	10	**90**
	UA (%)	**78**	**74**	**75**	**83**	**90**	

Overall accuracy 85.0%

Kappa 80.8%

CONCLUSION

- The proposed method discriminated the changed/unchanged objects and the land-cover objects in U Minh Thuong National Park by using multi-temporal Sentinel-1 images data with the accuracy 85%.

- The core zone of U Minh Thuong National Park which is conserved the biodiversity of wetland area can be monitored by multi-temporal SAR images.

- The changed objects are effected by human living in U Minh Thuong.

- The proposed method supported one of remote sensing methods for monitoring changed/unchanged land cover objects by using time-series of SAR images, especially cultivated land, paddy rice and the core zone of U Minh Thuong National Park for management and sustainable development

THANK YOU
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