# The 63rd Autumn Conference of the Remote Sensing Society of Japan

The 63rd Autumn Conference of the Remote Sensing Society of Japan will be held as below. The details will be updated appropriately.

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## 1. Date

21 – 22 November, 2017

## 2. Venue

Rakuno Gakuen University
Address: 582, Bunkyodai-Midorimachi, Ebetsu, Hokkaido 069-8501, Japan
Access

## 3. Registration Fee:

- Member 5,000 Yen, Student Member 2,000 Yen, Non-Member 7,000 yen, including a CD-ROM of Proceedings. (Registration fee of the presenters of Special session, the members of Transdisciplinary Federation of Science and Technology, Korean Society of Remote Sensing or Chinese Society of Photogrammetry and Remote Sensing are as same as the Member and Student Member fees)
- Pre-payment of the registration fee is not accepted. Please pay it in cash at the reception of the conference on November 1st or 2nd.
- 5,400 Yen for a Proceedings(CD-ROM) only.
- No registration free for undergraduate and graduate students to attend sessions only (no proceedings).
- The Registration Fee does not include the fee of the Banquet which will be held on the 1st November, after completing sessions. The Banquet Fee is 5,000Yen (2,000Yen for student). You can pay the Banquet Fee with the Registration Fee in cash only at the reception of the conference. Or only the Banquet Fee are payable at the starting time of the Banquet.

## 4. Special Session

The application for special session plan had been closed.
The following 4 special sessions are pland in RSSJ63.

- Role of remote sensing on terrestrial ecosystem studies
- Coastal and lake optics -Before the launch of SGLI
- Ideason for Application of Remote Sensing in Agriculture
- Advancement in Snow & Ice Remote Sensing

## 5. Registration for Presentation and Paper Submission:

Registraton for Presentation has been closed.

## 6. Time Table and Programs

You can download the Time Table and Programs from the following links.

**Time Table** (Update: Nov. 16)

**Program** (Update: Nov. 16)

## 7. Note for Oral presentation

- The total of 15 min. for an oral presentation including discussion. A first bell is at 8 min, and second bell is at 10 min. to complete presentation.
- Oral presenters need to bring and use your own computers for presentation. A PC projector will be available for your presentation.

## 8. Note for Poster presentation

- Poster size shall be equal or less than B0.
- Poster for Utilization session can be presented in both days. Other posters are presented in one day (Nov. 21 or 22).
- Core time for poster presentation is 40 minutes. Presenter must stay around his/her poster during his/her core time.
- Poster room is set on both 1F Lobby and 2F Lobby. Please download and check the Time Table because the relations between poster numbers and floors are described in it.

## 9. Other Information:

- Boths for exhibits are available. Please contact the secretariat of RSSJ for details.
- Banquet will be held on the 21st November, after completing sessions.
- If you have any question for this conference, please e-mail to rssj-conf@rssj.or.jp .

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**System (Room B, Nov. 22nd (Wed.) 8 : 30-10 : 00)**



**SAR1 (Room B, Nov. 22nd (Wed.) 10 : 15-12 : 15)**



**SAR2 (Room B, Nov. 22nd (Wed.) 14 : 30-16 : 30)**

**Special Session (Ice) (Room A, Nov. 21st (Tue.) 8 : 30-10 : 00)**



**Special Session (Terrestrial Ecosystem) (Room A, Nov. 21st (Tue.) 10 : 15-12 : 15)**

**Special Session (Lake) (Room A, Nov. 21st (Tue.) 15 : 45-16 : 45)**



**Application (Room A, Nov. 22nd (Wed.) 10 : 15-12 : 15)**

**Poster Session (2)  (Room P, Nov. 22nd (Wed.) 13 : 00-14 : 20  (P37)-(P72))**
**(Core Time : Odd numbers 13 : 00-13 : 40/Even numbers 13 : 40-14 : 20)**

# Multi-Temporal Change Detection using Interferometry SAR in Kelok Sembilan West Sumatra

〇Pakhrur Razi Chiba[1], J.T.S. Sumantyo Chiba[2] , Daniele Perissin USA[3], Katia N. Urata[1]

***Abstract***: Land changing monitoring is necessary to take on the information about the instability of the land. The information can be used as a judgment for developing an urban area. In this paper, 13 images were processed using land change detection interferometry SAR technique. Amplitude and phase information of SAR image is used as change indicator of change. The result was projected to an optical image and validated by ground survey data. There are some locations have changed which is identified as a landslide.
***Keywords***: abstract, captions of figures, annual meeting.

## 1. Introduction

In remote sensing field, Synthetic Aperture Radar (SAR) satellite data can be used for several necessities. Mainly is to monitor the changing on the earth surface. In last ten years, the multi-temporal change detection processing technique is an exciting topic in remote sensing research. By using the multi-temporal acquisition satellite data, the changing in earth surface due to earthquake [1], landslide [2], subsidence [3],[4] can be observed from time to time. Therefore, this technique is useful for analyzing the characteristic of these phenomena occurring in the past.

In this paper, we investigate the changing of land in the mountainous area using multitemporal SAR image. The result was confirmed by a ground survey which is the areas was identified as a landslide.

## 2. Area of Research

The area of research is around Kelok Sembilan, Lima Puluh Kota district, West Sumatra Indonesia located in between two steep of hills. The slope of both sides of the hill approximately is $75^0$. The morphology of the area shown in Fig.1.

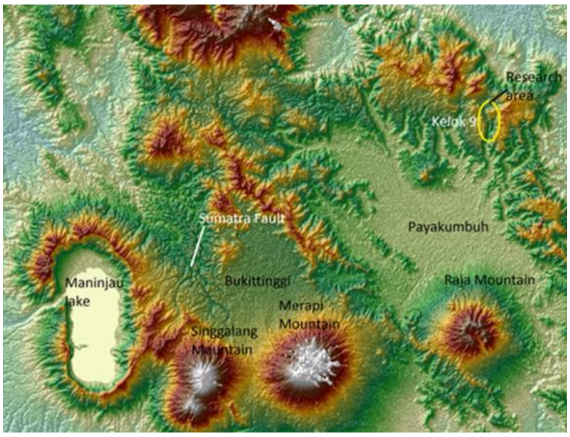



Fig. 1. Morphology area of research

## 3. Satellite Dataset and Multi-Temporal Change Detection Processing

*a. Dataset*

The satellite data used in this work is acquired by ALOS PALSAR, which taken from July 2007 to November 2010 over the area of interest. Total 13 scenes which ascending track with Fine Double Beam (FDB) mode, single polarization horizontal transmit and vertical receive (HV) [5]. The area of covered is 75x75 km$^2$ with 10 m resolution. The dataset is shown in Table 1.

TABLE 1.
SATELLITE ALOS PALSAR DATASET

| No | Acquisition Date (DD/MM/YYYY) | Mode | Normal Baseline, $B_n$ (m) | Temporal Baseline $B_t$,(Days) |
|---|---|---|---|---|
| 1 | 03072007 | FBD | 74 | -460 |
| 2 | 18082007 | FBD | -24 | -414 |
| 3 | 03102007 | FBD | 211 | -368 |
| 4 | 20052008 | FBD | 259 | -138 |
| 5 | 05072008 | FBD | 155 | -92 |
| 6 | 20082008 | FBD | 626 | -46 |
| 7 | 05102008 | FBD | 0 | 0 |
| 8 | 08072009 | FBD | 758 | 276 |
| 9 | 08102009 | FBD | -134 | 368 |
| 10 | 11072010 | FBD | 272 | 644 |
| 11 | 26082010 | FBD | 82 | 690 |
| 12 | 11102010 | FBD | 120 | 736 |
| 13 | 26112010 | FBD | 351 | 782 |

*b. Multi-Temporal Change Detection Processing*

Fundamental step pre-processing for change detection is co-registration [6]. It is for ensuring the range and azimuth geometry of all scenes are same. The flowchart of SAR data processing presented in Fig. 2.

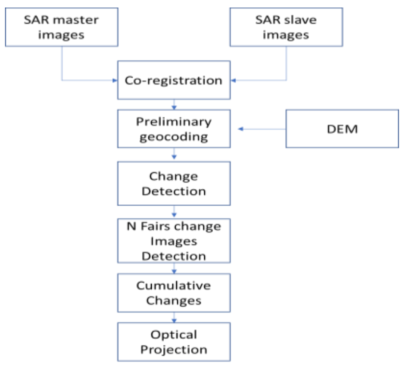
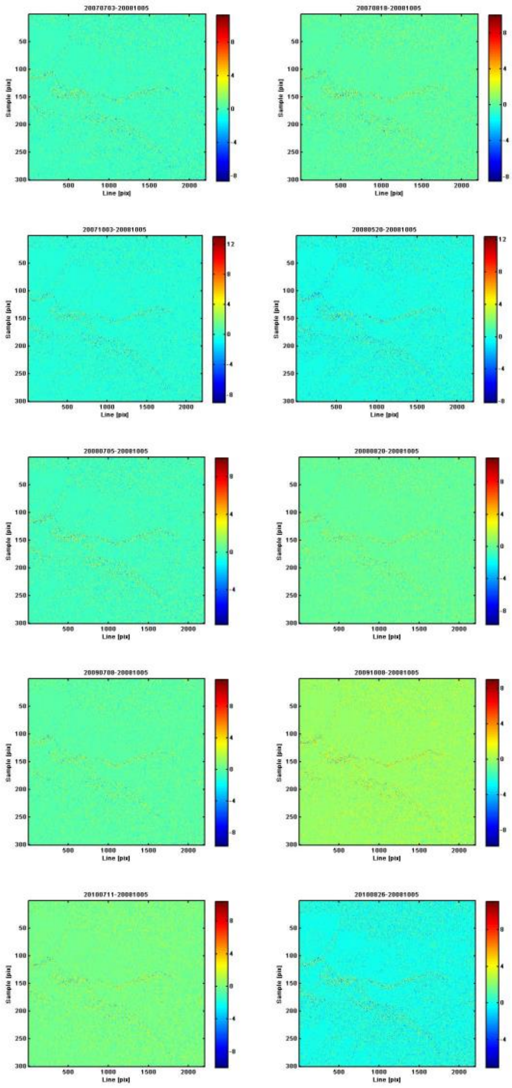



Fig. 2. The SAR Processing Flowchart

In Fig.2. Both SAR master and slave image input are in Single Look Complex (SLC) format [7]. After co-registration processing, the image was continuing to preliminary geocoding for correcting the initial orbit offset. Then followed by applying the change detection technique for producing the numbers pairs of the image changing. Afterward, every pairs image was calculated to produce the cumulative change for all scene. Finally, the result was geocoded into google earth.

## 4. Result and Discussion

Fig.3 represented the changing of the area of research for each pair master and slave image. There is 12 pair of images for acquisition time from July 2007 to November 2010.



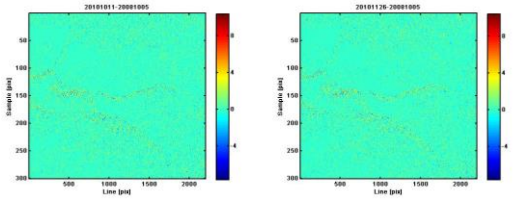


Fig. 3. The Changing of Area of Research

There are several locations has detected changing in each pair image. The cumulative change in 4 years is shown in Fig. 4.


Fig. 4. The Cumulative Change Area of Research

In Fig. 4. The white circle indicates a landslide area based on the survey carried out in September 2016. There are some changed areas that cannot be observed because some of them are located on the high hills mountainous. Based on the analyzing, multi-temporal change detection technique is not work perfectly for detection small area changing.

## 5. Conclusions and Future Work

The multi-temporal change detection technique is satisfactory for determining the instability location in the area of interest. The next research is studying the factor and characteristic of the changing on instability location.

## 6. Acknowledgment

The authors would like to thank all who have helped in this research work, including, but not limited to, Josaphat Microwave Remote Sensing Laboratory, Chiba University Excellent International Student Scholarship, JAXA Japan, SARPROZ, NASA, BNPB, BMKG.

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## 7. References


[1] U. Wegmüller, T. Strozzi, and C. Werner, “Earthquake damage mapping using the coherence of persistent scatterers,” *Eur. Sp. Agency, (Special Publ. ESA SP*, vol. SP-731, no. March, pp. 1–4, 2015.

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[4] P. Iahs, A. Ferretti, D. Colombo, A. Fumagalli, F. Novali, and A. Rucci, “InSAR data for monitoring land subsidence : time to think big,” pp. 331–334, 2015.

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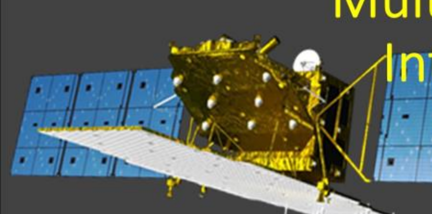
[7] D. Perissin, “Interferometric SAR Multitemporal Processing : Techniques and Applications Interferometric SAR MultiTemporal processing,” no. April, 2017.



# Multi-Temporal Change Detection using Interferometry SAR at Kelok Sembilan West Sumatra

Pakhrur Razi, Chiba[1], J.T.S. Sumantyo, Chiba[2] , D. Perissin, USA[3], Katia N. Urata[1], Chiba and B. Purbantoro, Chiba[1]


## Abstract

Land changing monitoring is necessary to take on the information about the instability of the land. The information can be used as a decision in developing an urban area and building a construction. In this paper, 13 images were processed using land change detection interferometry SAR technique. Amplitude and phase information of SAR image is used as indicator of land changing. The result was projected onto an optical image and validated by ground survey data. There are some locations have changed which is identified as a landslide.


**Keywords**: Change Detection, Interferometry SAR, Multi-Temporal, Kelok Sembilan

## 1. Introduction

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In this paper, we investigate the changing of land in the mountainous area using multitemporal SAR image. The result was confirmed by a ground survey which is the areas was identified as a landslide

## 2. Satellite Dataset

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| 2 | 20070818 | FBD | -24 | -414 |
| 3 | 20071003 | FBD | 211 | -368 |
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## 3. The Area of Research

The area of research is around Kelok Sembilan, Lima Puluh Kota district, West Sumatra, Indonesia. Which is the area located in between two steep of hills. The slope of both sides of the hill approximately is $75^0$. The morphology of the area shown in Fig.1.

Fig. 1. The Morphology of the Area of Research

## 4. Methodology

As change detection Information both amplitude and phase of SAR images are used. There is 12 pair of series images produces for acquisition time from July 2007 to November 2010.

The steps for change detection processing as Fig.2

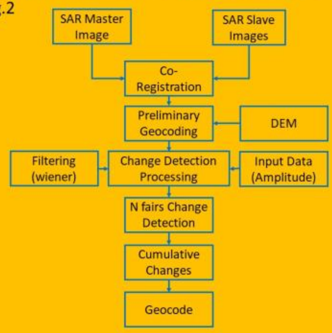
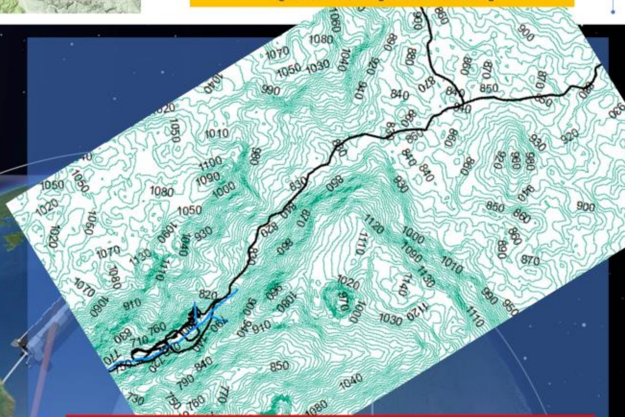



Fig. 2. Flowchart Change Detection Processing


Fig. 4. The cumulative change in 4 years observed



## Result and Discussion

Fig. 3 Represented the change of the area of research for each pair master and slave images. There are 12 pairs of SAR images for acquisition time from July 2007 to November 2010.

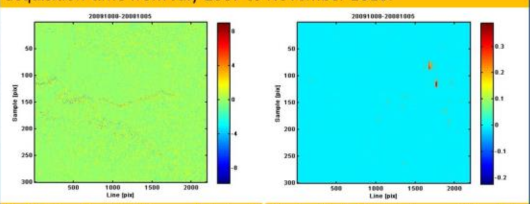



Fig.3 (a). Amplitude stability map. Red color is amplitude stable pixel while blue color is amplitude changes (b). Amplitude difference two acquisition data

There are some locations has detected change in each pairs of images. The cumulative change in 4 years is shown in Fig. 4

## Conclusions and Future Work

The multi-temporal change detection technique is satisfactory for determining the instability location in the area of interest. The next research is studying the factor and characteristic of the changing on instability location


## Acknowledgment

The authors would like to thank all who have helped in this research work, including, but not limited to, Josaphat Microwave Remote Sensing Laboratory, Chiba University Excellent International Student Scholarship, JAXA Japan, SARPROZ, NASA, BNPB, BMKG.



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