



**1st Joint Project Team Meeting for Sentinel Asia STEP 3
(JPTM2013)**

27th-29th November, 2013, Bangkok, Thailand

Lao PDR Country Report

The Success Story Using the Space

Data and the Issues of Recovery Phase

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Outline



Flash Flood in Sekong Province 2009



Flash flood in Attapu province 2009

1. Introduce to RSC;
2. Vision;
3. Organization Chart;
4. The success story of Sentinel Asia & others activities of RSC;
5. Expected /Discussion and
6. Future work plan of RSC 2014-2015.

Introduce to RSC

- With confirmation of the First Session of the Seventh National Assembly in Vientiane, dated 15 June 2011, the Water Resources and Environment Administration (WREA) had been to new ministry, namely: Ministry of Natural Resources and Environment (MONRE).
- **Remote Sensing Center (RSC)**, Natural Resources and Environment Institute (NREI), under the Ministry of Natural Resources and Environment (MONRE).
- One of the main duties of RSC **is to be the main coordinator and manager of the Natural Resources, Environment and Natural Disaster Research using RS and GIS at the national level.**

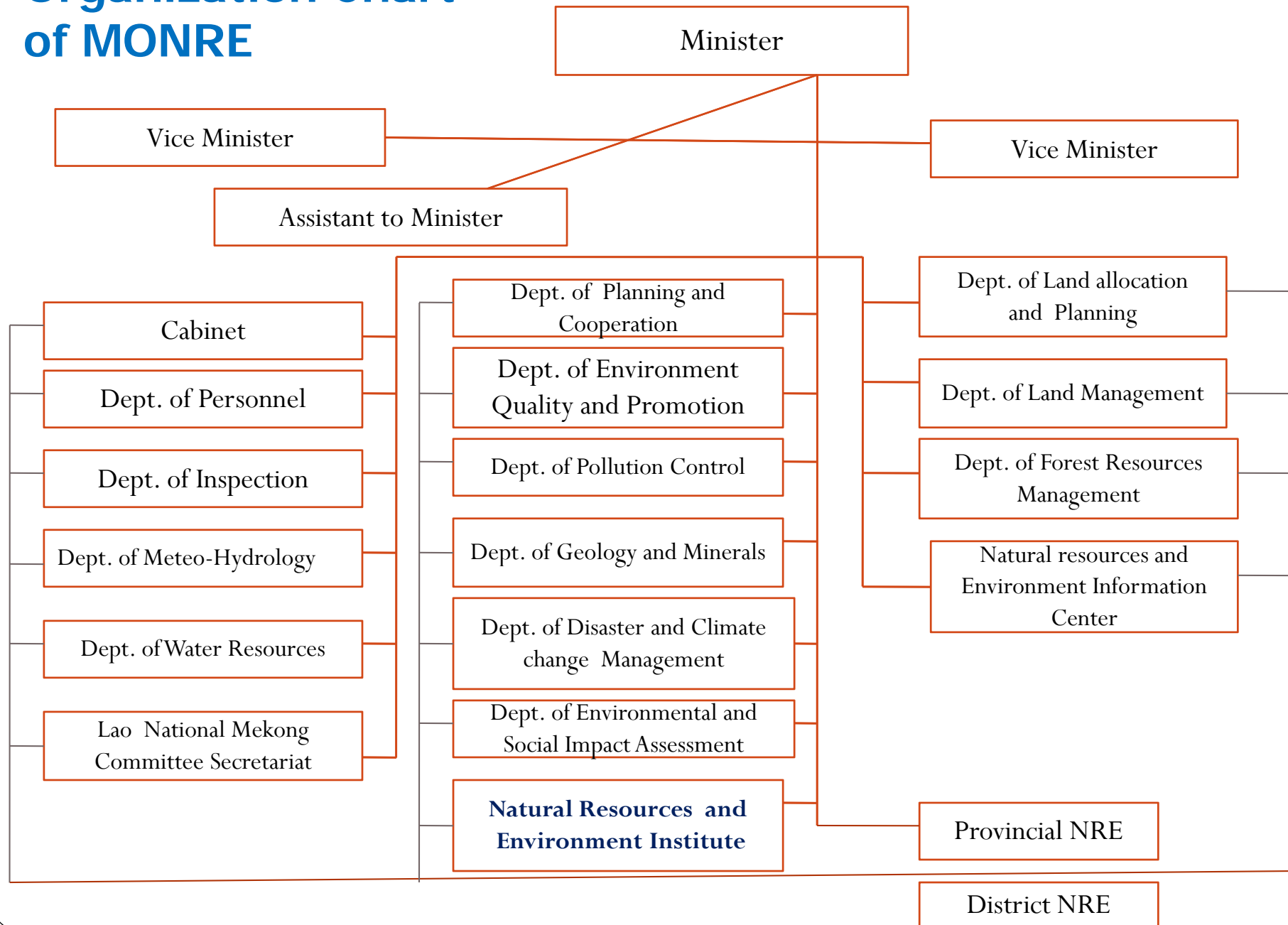
Introduce to RSC

- It is coordinating with other relevant institutions such as Ministry of Science and Technology, the Department of Meteorology and Hydrology on warning in Lao PDR, the Department of Water Resources ,Department of Disaster and Climate Change for the policies on Disaster and Climate Change, LNMC/MRCs for flood, drought , land cover change etc...around the Mekong river, Ministry of Agriculture and Forest on the forest policy and We are also responsible to the National Committee Members on GIS between National Geographic Department and line agency in Lao PDR.

Vision

To be a center of the national focal point on the applications of Remote Sensing and GIS in natural resources and environment as well as natural disaster research.

Organization Chart of MONRE



Disaster from Food and Drought Period 14 years ago

No	Year	Types of Damage	Damage Cost (US\$)	Place of Damage
1	1999	Flood	7.450.000	Central
2	2000	Flood	12.500.000	Central and Southern
3	2001	<i>Flash flood</i>	8.000.000	Central and Southern
4	2002	<i>Large flood ,Flash flood and land- slight</i>	24.454.546	Northern, Central and Southern
5	2003	Drought	16.500.000	Northern and Central
6	2004	Flood	20.750.000	Southern
7	2005	<i>Flash flood and land- slight</i>	218.304.000	Central and Southern
8	2006	<i>Flood and Strong Wind</i>	3.207.968	Northern, Central and Southern
9	2007	<i>Flood and Drought</i>	997.960	Central
10	2008	<i>Large flood</i>	485.902.186	Northern and Central hern
11	2009	Flash flood		Southern part
12	2011	Flood		Northern and southern
13	2013	Large flood		Southern part

Main Activities: What we have done?

- Emergency observation in case of major disasters;
- ALOS accepts observation request to JAXA/ ADRC and AIT
- Wildfire monitoring by MODIS: Technology transfer from GIC/AIT
- Flood monitoring:
- Research/Training/Mini-project for utilization of satellite image for environment monitoring and disaster monitoring.

Success story of Sentinel Asia in Laos

Emergency Request:

1. The observation request User Name (UN) and Password (PW), by Sentinel Asia website and submit EOR completed form as well as request to the ADRC/JAXA;
2. Sharing information between line agency and research node such as AIT, JAXA, ADRC, etc;
3. Report to the Water Ministry of Natural Resources and Environment-MoNRE.

Sentinel Asia/ Flood Monitoring

1. RSC, NREI, MoNRE Responsible for the National Working Group of the flood information in Lao PDR
2. Data sharing between line government agency and international organization
3. Monitor and Access the area of flood/real time/before / after



**Flooding
Vientiane**

11-15 August



11-15 Aug, 2008

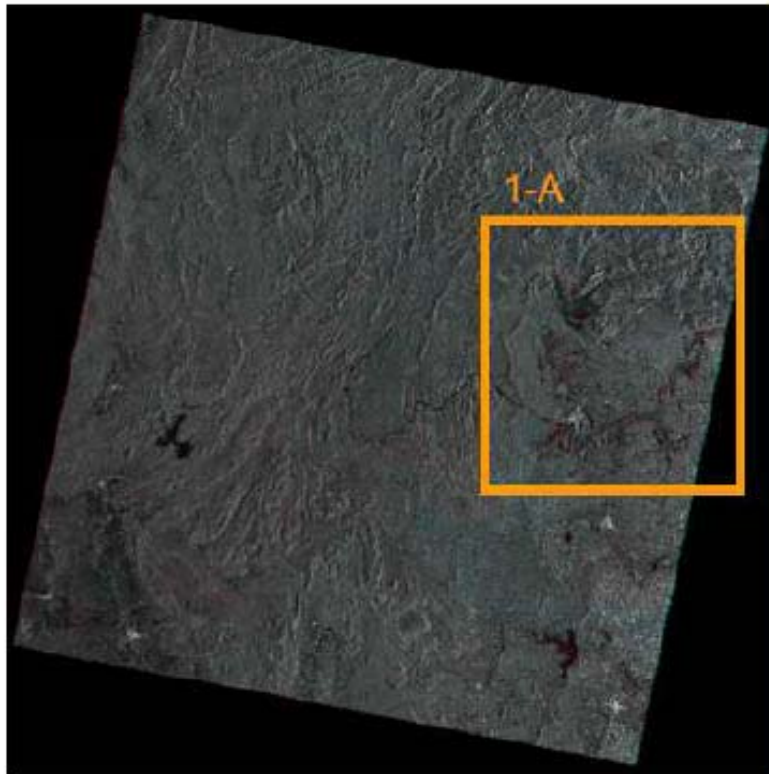


Lat: 17° 53' 51 Long: 102° 36' 47.83

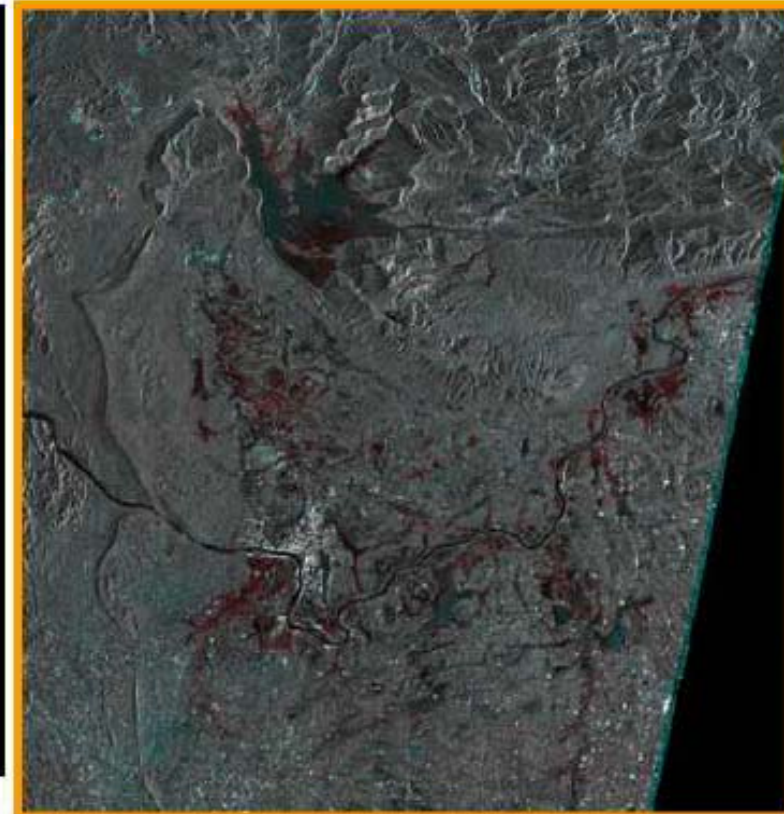
Nov 14, 2008, Bo-O, Vientiane

Request Sentinel Asia in case emergency: Coordinate, Pictures, sharing data information...

Flooded area detected from ALOS PALSAR ScanSAR



RGB color composite image of PALSAR ScansAR
R:G:B=2007/08/18:2008/08/20:2008/08/20
(R:G:B=pre:post:post-disaster)



Enlarged view of area 1-A
Flooded area can be estimated as red colored area.

Access the Sentinel Asia through sharing data information

Sentinel-Asia Project - Disaster Management Support System - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Local Groups Messenger Mail MySpace News

Address: <http://jams.adrc.or.jp/adrc/MyMap/adrcIndex.jsp?satelliteid=442>

Sentinel-Asia Project - Disaster Management Support System

Home Search Photos Search Sat Images Help Lang: English User/Pass: Login

Satellite Image

Displayed and Overlaid Data

Map Data

- DCW(Vman0):
- GSI DM25000 (Japan only):

Other Information

- ALOS AVNIR-2(2008/08/13 03:47)
- 10EM
- LAND COVER
- Population

Lat: 17d 55m 18.276s N, Lon: 102d 36m 6.476s E

Copyright © JAXA, NGA

Add Other Information Output to PDF

[Download this image from HTTP site] [screen display] [Close]

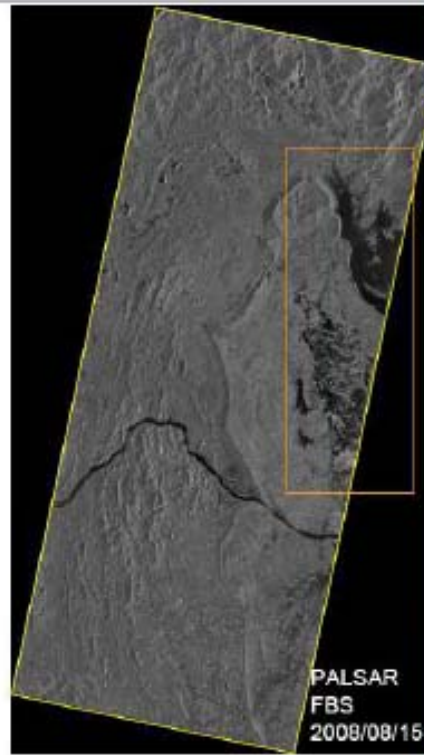
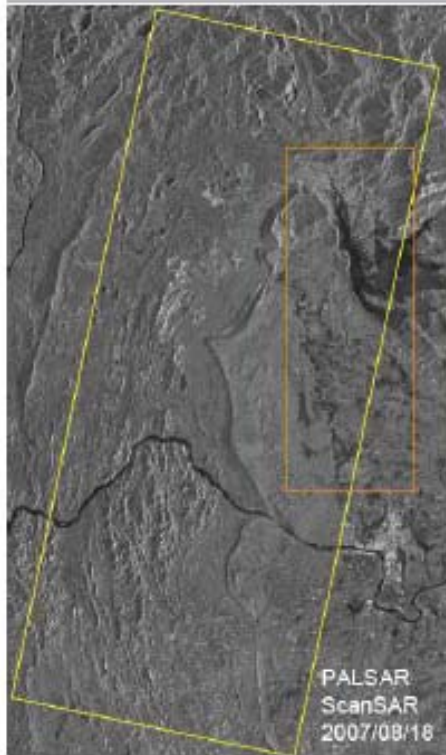
RSC/JAXA/ADRC: Field survey on flood area in Vientiane Capital City and Vientiane Province

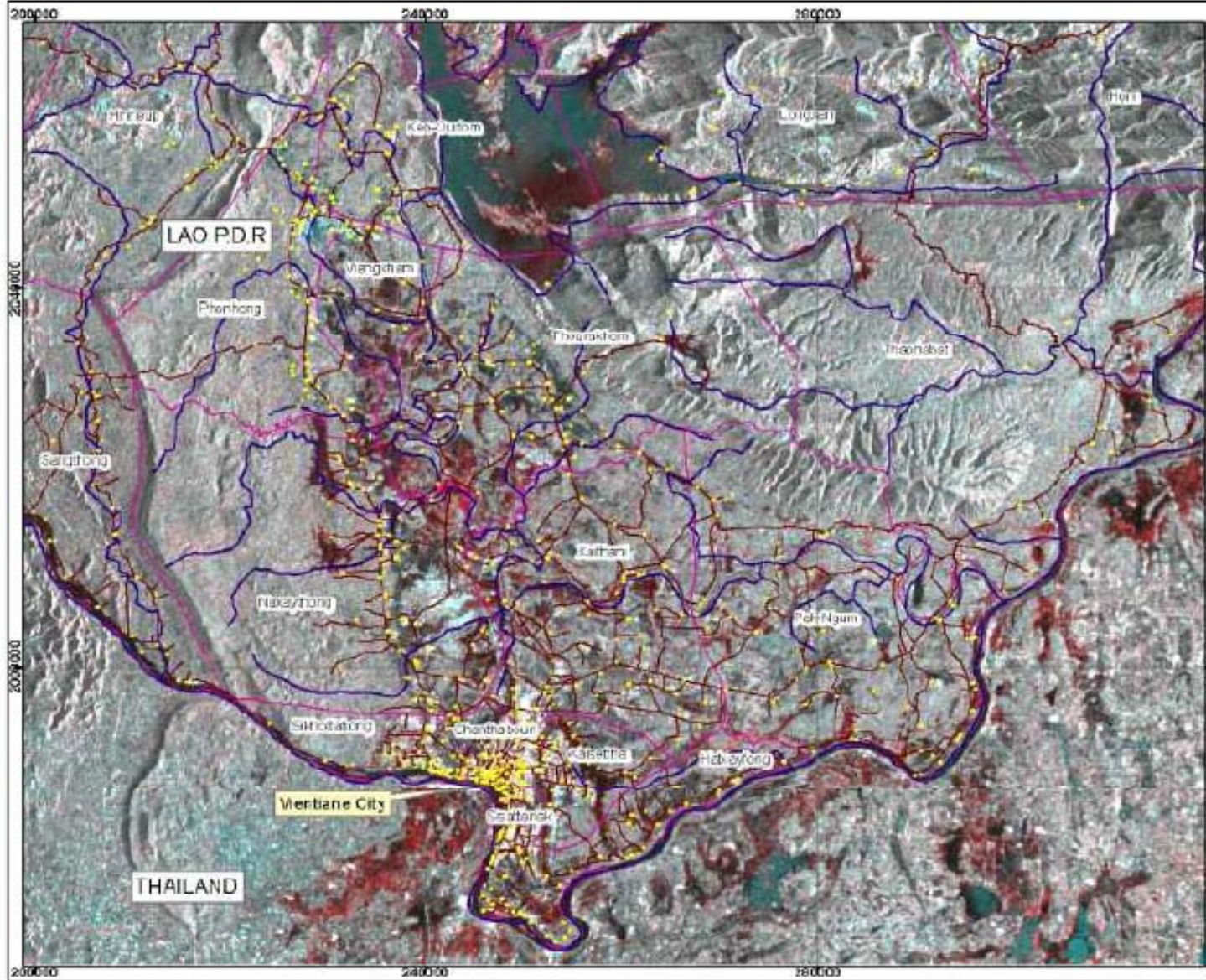


Nov 13, 2008



Field survey :
ADRC/JAXA/RSC





Flood in Laos

Legend

- Village
- River
- Road
- District Boundary

Satellite: ALOS
 Sensor: PALSAR ScanSAR
 © JAXA, METI

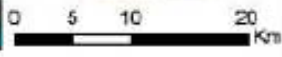
RGB Color Composite Image
 R:G:B=2007/08/18 : 2008/08
 /20 : 2008/08/20

Flooded area can be
 visualized from red to
 blackish red color patches

Datum: WGS84
 Projection: UTM Zone 48N

Scale: 1 : 500,000

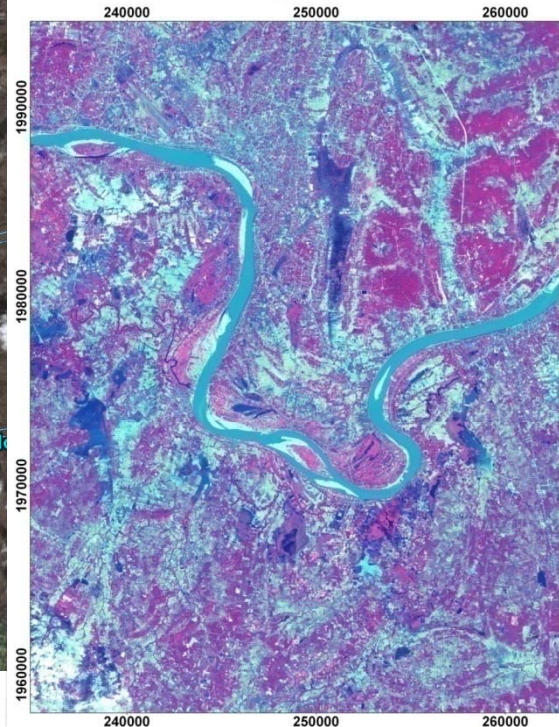
Data: Sentinel Asia-
 Disaster Management
 Support System in the
 Asia-Pacific Region



•Laos/GIC-AIT: Flood Hazard Mapping Using ALOS/PALSAR, 2009-2010



ALOS AVNIR2 (Dry Date, Dec 29, 2009)
Parts of Haxaphone District, LaoPDR
RGB:432



0 1.25 2.5 5 7.5 10 Kilometers

UTM 48 N



Mekong River

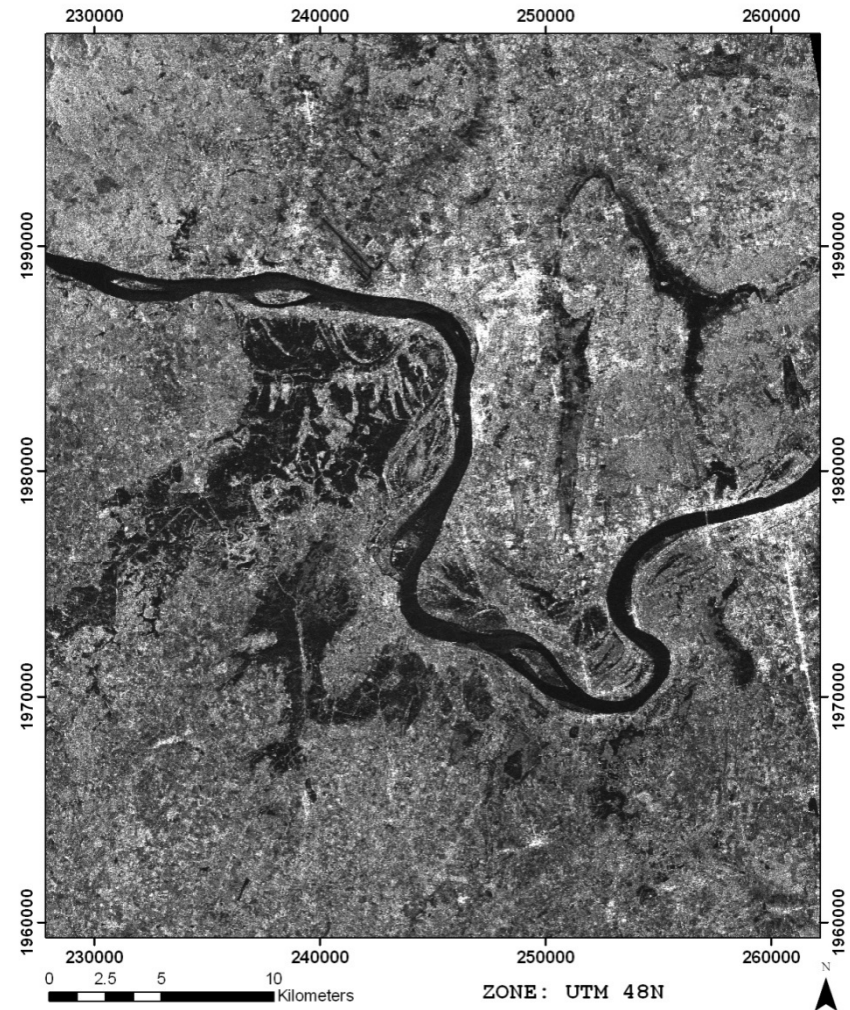
Hatsayphon District, Vientiane
11-15 August 2008

Available satellite Images

ALOS PALSAR (Wet Date, Sept 3, 2008)
Parts of Hatsayphong District, Lao PDR
Polarization: HH



ALOS PALSAR (Wet Date, Sept 3, 2008)
Parts of Hatsayphong District, Lao PDR
Polarization: HV



Field Survey on Ketsana Tropical Storm-Flooded in Attapu Province, Lao PDR , September 30, 2009.



City of Samakkheesay
Attapu province



07 June 2010



Flash Flood June 2011: Few days



**Flash Flood,
Xiengkhouang Province
26 June, 2011**

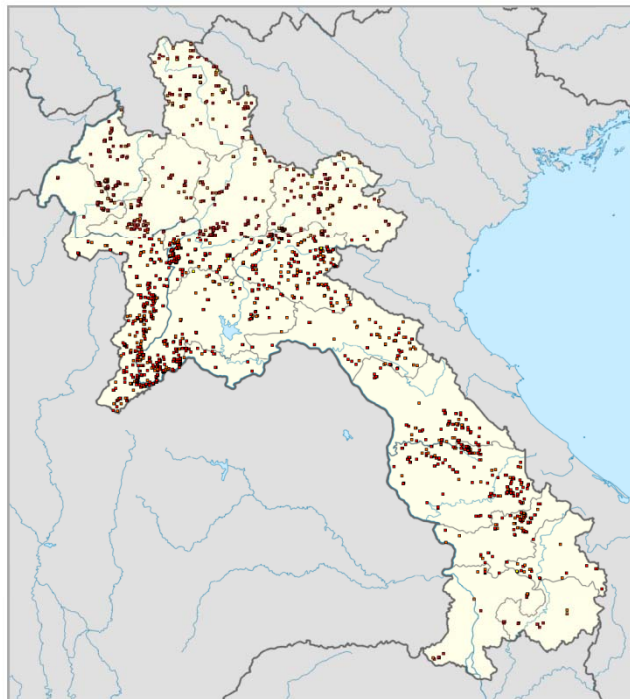
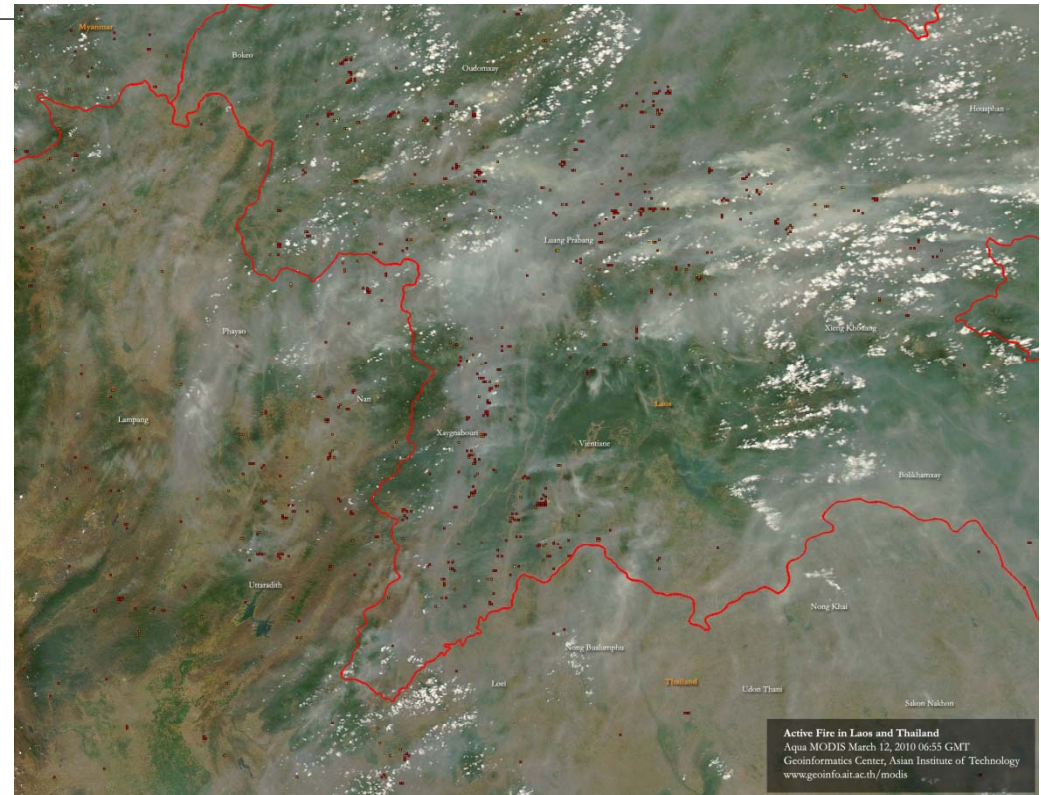


**Flash Flood,
Xayabury Province
26 June, 2011**

Technical Transfer from GIC/AIT-RSC, 2009-2010

Overview of the MODIS Fire Information System for Laos

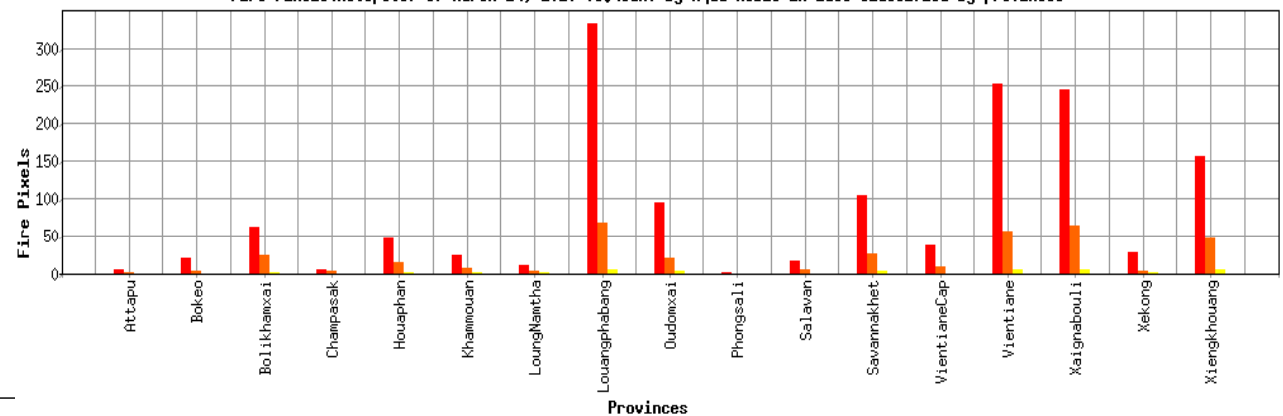
The AIT MODIS Fire Information System for Laos is a near real-time automatic system. The structure is very similar to the existing regional system. It consists of *Product Generation, Visualization, and Database and Statistical Analysis* systems. The system uses the output information, which



http://www.geoinfo.ait.ac.th/mod14/index_lao0.php

Wildfire Information, 14 March 2010

Fire Pixels(Hotspots) of March 14, 2010 06:43GMT by Aqua MODIS in Laos classified by provinces



Wildfire: Field survey and dissemination



Luangprabang, 23 Mrach, 2010



- AIT/RSC
- WERO
- Area-
- Village
- WREA,
- Minister
- Report
- Policy
-



Discussion, 26 March 2010



Luangprabang, 23 Mrach, 2010

Sentinel Asia: Capacity Building

Lao PDR have successful Participated JAXA/Mini-Project/Research by following Topics :

1. JAXA/AIT/Mini-project/Research on RS/GIS: Flood Risk Map Using RS&GIS Case Study of Champhone District, Savannakhet Province, Lao PDR, 2006-2007
2. Flood Hazard Mapping using HEC-RAS, Remote Sensing and GIS, Case study of Se Champhone River in Savannakhet, Lao PDR. 2007-2008
3. Flood Hazard Mapping of Nam Ngum River Lao PDR Using RS, GIS and HECRAS, 2008-2009 (M&H/NDMO);
4. Flood Hazard mapping using ALOS/ PALSAR, Hatxayfong District in Vientiane Capital City, 2009-2010
5. Drought Risk Mapping using Remote Sensing and GIS
Case Study: Champhone District in Savannakhet Province, Lao PDR.
2010-2011.

Example

JAXA/AIT/Mini-project/Research, Result, 2009-2010

Flood Hazard Mapping 2009-2010

Potential Use of ALOS/ PALSAR in Flood Hazard mapping

Study Area
The study area is parts of Hababoung district in Vientiane province in Laos PDR. It is within the map extent of 17° 52' 20" Lat to 17° 53' 51" 20" Lat and 102° 36' 47.83" Long to 102° 37' 19.23" Long. This district is bordering Thailand with the Mekong river flowing through them. In Vientiane Capital, Hababoung District has the largest agricultural land but it often experiences serious impacts from the floods which are caused by the Mekong River in every season each year. In 2008, approximately 5.125 hectares of paddy fields in the District were damaged.

Data Used
The data used in this study were:
- ALOS PALSAR dry date (June 2, 2008) - HH and HV polarizations
- ALOS PALSAR wet date (September, 2008) - HH and HV polarizations
- ALOS AVNIR2 (December 29, 2008)
- GIS data including:
- District Boundary of Vientiane Province
- DEM of the study area

The main objective of this study is:-
Flood extent mapping in the year 2008 using ALOS PALSAR images of the study area.

The sub objective is:-
To see change of BS from dry to wet season in:
- Forest
- Marly Land
- Paddy
- Urban built up area

Images in Hand
Being water levels in the Mekong River floods the parts of Hababoung District.
Year 2008 flood was a devastating one. Almost 8 million hectares of rice crop in the region was affected by the flooding (2008).
Started at 11 August until 17 August, 2008.

Data Requirement

- Hydrologic Data
1. Daily average or peak instantaneous discharge - water level data (M3/sec or cfs) (named) for a historical period of minimum 10 years at:
a. Upstream gauge station
b. Downstream gauge station
- Topographic Data
1. DEM of the study area (contour or spot heights, not more than 5m interval contour)
- Location of the Upstream gauge station
- Location of the Downstream gauge station

GIS Data

- Watershed Boundary Map
- River boundary
- Location of bridge and other obstructions with height information
- Location of storage reservoir
- Heights of Levees and roads
- Building footprints with height information
- Landuse Map

Satellite Image

- Optical Satellite image covering the study area (Medium to high Resolution)

Flood Hazard mapping Using Hec-Ras

Results Probability Distribution plots for the discharge of upstream.

Available Data

- Hydrologic Data
Daily average discharge data for a historical period of (1913-2003) at the upstream station (Source: MNC, Vientiane)
- Topographic Data
<http://www.pdcm.net/arcswat/arcswatregister.asp>
- R bathymetry information of the river reach, (Cross sections at 4km interval starting from downstream, without coordinates) (Source: MNC, Vientiane)
- Location of the Upstream gauge station

Potential Use of ALOS/ PALSAR in Flood Hazard mapping A Case study- Viengkham District, LaoPDR

Study Area
The study area is parts of Viengkham district in Vientiane province in Lao PDR. It is within the map extent of 18° 22' 55.1" Lat to 18° 21' 56.38" Lat and 102° 32' 14.8" Long to 102° 32' 56.17" Long. This district is bordering Koo-Oudom in the north, Phoukhong in the west, Thadakhom in the east. In Vientiane province, Viengkham District has the largest agricultural land but it often experiences serious impacts from the floods which are caused by the Namangan River in every season each year. In 2008, approximately 285 hectares of agricultural in the District were damaged.

Field Visit and Discussion.

No.	Landuse type	Area (ha)	Percentage (%)
1	Forest	10,000	10.0
2	Marly Land	20,000	20.0
3	Paddy	30,000	30.0
4	Urban built up area	40,000	40.0

Range of BS per Landuse type

Landuse type	Min BS	Max BS	Average BS
Forest	0.85	1.32	1.08
Marly Land	0.85	1.32	1.08
Paddy	0.85	1.32	1.08
Urban built up area	0.85	1.32	1.08

Methodology:

Field Visit and Analysis

Results

Tab 3 Table showing the area of Flood in Km² for the 4 Landuse types in Viengkham District

Landuse type	Min BS	Max BS	Average BS
Forest	0.85	1.32	1.08
Marly Land	0.85	1.32	1.08
Paddy	0.85	1.32	1.08
Urban built up area	0.85	1.32	1.08

Sentinel Asia STEP 2



The 4th Sentinel Asia System Operation Training was held on 10-12 February 2009 in Vientiane

- Sponsor by JAXA
- Organized by RSC/WERI/WREA
- attended by 13 Asia Pacific countries including 6 ASEAN

Member States namely Indonesia, Lao PDR, Malaysia, Philippines, Thailand and Viet Nam.



The 5th Sentinel Asia System Operation Training was held in Colombo, Sri Lanka in 22 – 26 February 2010.

The 6th SAS Operation Training was held in July, 2010, Bangkok, Thailand..

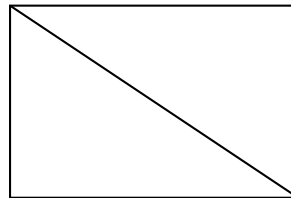
Lao PDR would like to participate the next SA training.

ER 2013:

Flash flood in the southern part of Lao PDR RSC would like to submit ER again for the research

Lat: 18° 24"

Long: 103° 40



Lat: 18° 23"

Long: 103° 42

Flood in Saravanh Province, Lao PDR, 2013.

The heavy rain in Saravan province during 18-24 September, 2013 caused flood in to three district such as Vapi district, Khongsedone district and Saravan district around Xedone basin area.

About 187 villages and 10,683 household affected by flooded. (Vientiane May newspaper dated 06 November 2013)

Expectation and Discussion

1. There is limited of knowledge on RS , lack of satellite data information/real time disaster we need SA support Satellite image after disaster.
2. Lack of budget to go the field survey during real time disaster (Flood, drought and fire information);
3. Enhancement of National – provincial staff capacity building especially Remote Sensing and GIS for applying image processing to improve knowledge such as flood, drought, forest fire and land slide classification;.
4. Joint Project Research between SA Members/JAXA/ADRC/AIT: Flood, drought, wildfire monitoring and water and climate change by using satellite data;
5. Continue Participate next SA meeting;
6. RSC Will continue SA-STEP3/APRSAF-19.

Future Work Plan: 2014-2015

RSC, NREI, MONRE

1. Emergency Request by using ER form;
2. Flood Risk Mapping of Saravan province, Lao PDR
3. Flood Mapping in the southern part of Lao PDR.
4. Research/Training/: (RS/GIS/GPS), focus on Rubber plantation in Luangnamtha ;
5. Land Cover Map and Land use in Savannakhet Province.
6. Fire Monitoring of Luangprabang Province;
7. RSC, NREI, MoNRE would like to continue Sentinel Asia STEP3 and promotion related to the utilization on space for disaster reduction.

Thank you very much



For your kind attention!