

Outline

1. Introduce to RSC;
2. Organization Chart;
3. The status of Space Technology Application for DRR & Sentinel Asia activities;
4. Expected /Discussion and
5. Future work plan of RSC 2014-2020.

Introduce to RSC

- **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 Space Technology Applications, focusing on the RS and GIS at the national level.

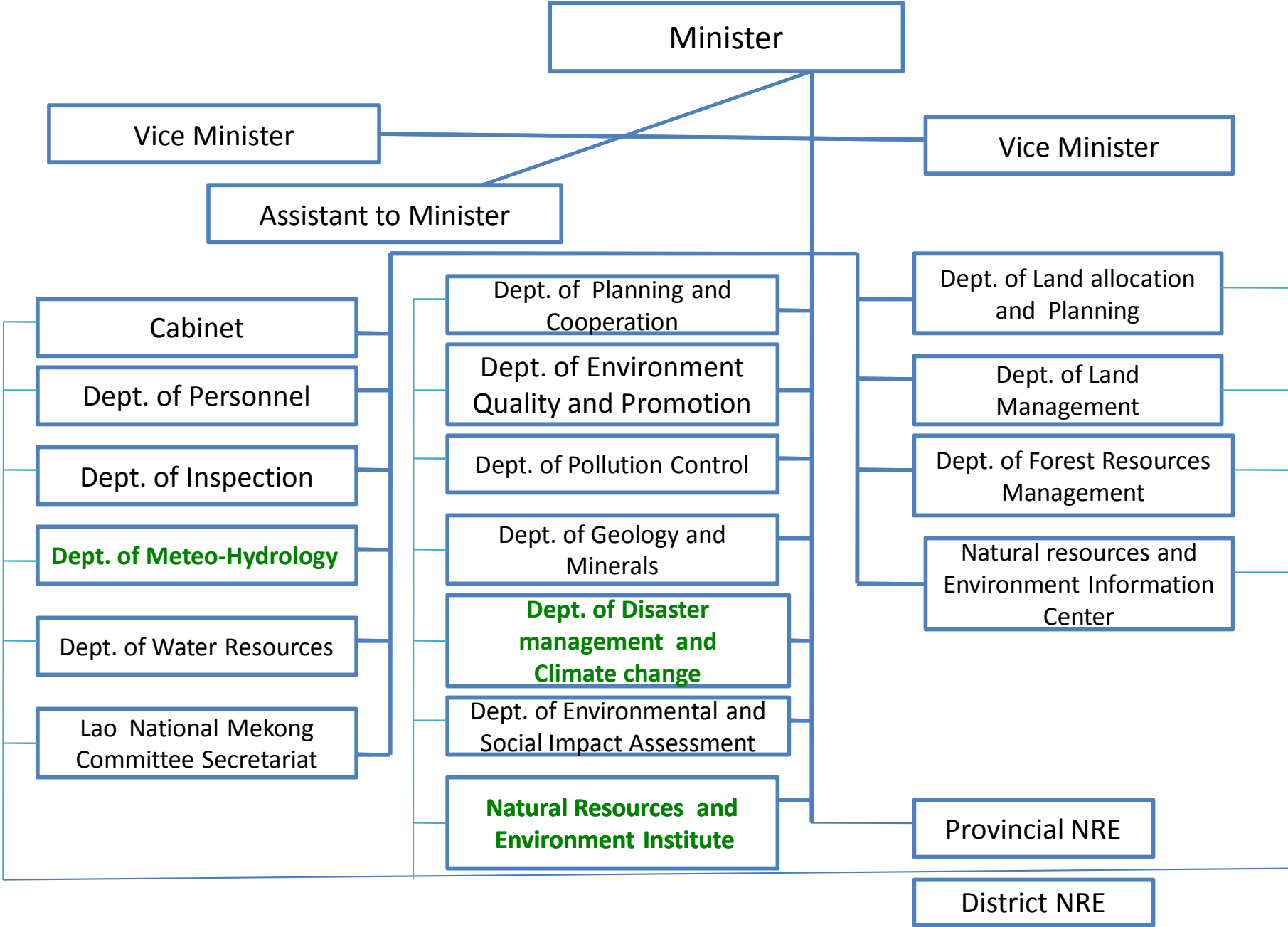
Introduce to RSC

- It has been steadily recognized that the RS and GIS System are among the important tools to support the realization of the national sustainable development, specifically in the effective environment management, appropriate disaster management as well as in ensuring sustained use of natural resources.

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



Type of disaster in Laos

▪ Natural Disaster:

- **Flood** (river flood and flash flood)
- **Drought**
- **Local Storm ,**
- **Hail**
- **Tropical Cyclone,**
Southwest Monsoon,
- **Landslide**
- **Earthquake**

❖ Man-made

- **UXO**
- **Fire**

The main hazards in Lao PDR are flood and drought Both are dependent on the amount of rainfall.

Disaster Statistics from 1999-2015

No	Year	Types of Damage	Damage Cost/(USD)	Place of Damage
1	1999	Flood	7,450,000	Central
2	2000	Flood	12,500,000	Central and southern
3	2001	Flash flood	8,000,000	Central and southern
4	2002	Large flood, flash flood and landslide	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	Flash flood and landslide	218,304,000	Central and southern
8	2006	Flood and strong wind	3,207,968	Northern, central and southern
9	2007	Flood and drought	997,960	Central
10	2008	Large flood	485,902,186	Northern and Central
11	2009	Flash flood and Typhoon	58 million	Southern
12	2011	Flood / Tropical storms <u>Haima</u> , (June) and <u>Nok-Ten</u> , (August)	12 million, (<u>Xayaboury</u> province) or 174 million in Laos	Northern, Central and southern
13	2013	Large flood	280 million	Southern
14	2015	Winter storm		<u>Hatxayphong</u> district, Vientiane capital city (18/02/2015)
15	2015	Flood		<u>Bolikhamxay</u> province, 2-6 August 2015

The status of Space Technology Application for DRR & Sentinel Asia activities



Sentinel Asia in Lao PDR

Emergency Request:

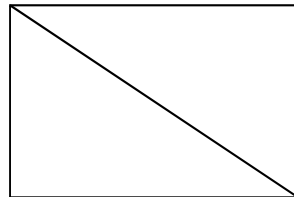
1. The observation request User Name (UN) and Password (PW), by Sentinel Asia website and submit EOR completed form as well as request to the ADRC/JAXA;
2. Sharing information between line agency and research node such as AIT, JAXA, ADRC, etc;
3. Report to the Ministry of Natural Resources and Environment-MoNRE.

Monitor and Access the area of flood/real time/before / after; drought; forest fire

SA Emergency Request Form

Lat: 18° 24"

Long: 103° 40'




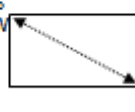
Lat: 18° 23"

Long: 103° 42'

Flood in Saravanh Province, Lao PDR, 2013.

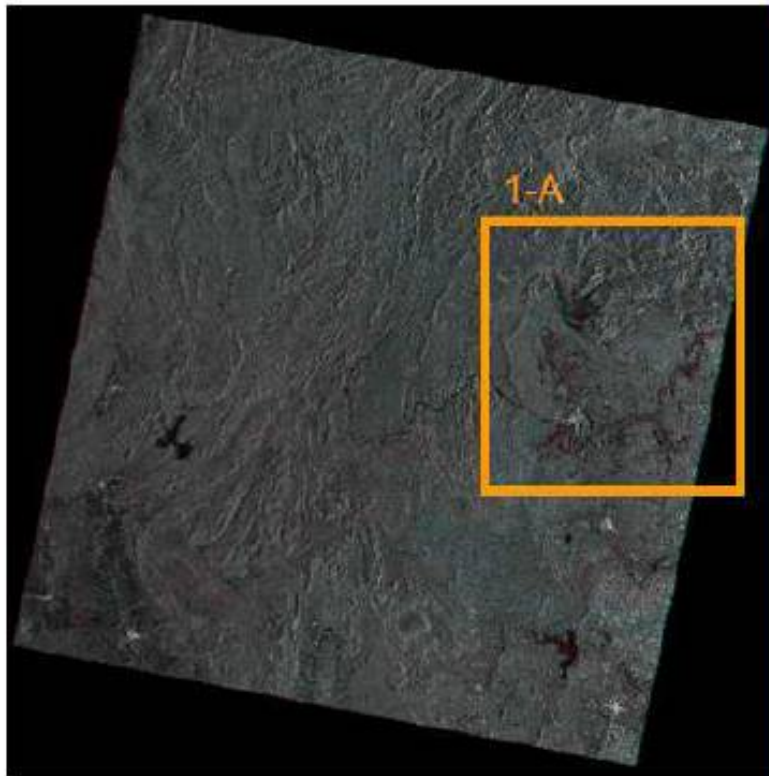
The heavy rain in Saravan province during 18-24 September, 2013 caused flood in to three district such as Vapi district, Khongsedone district and Saravan district around Xedone basin area.

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

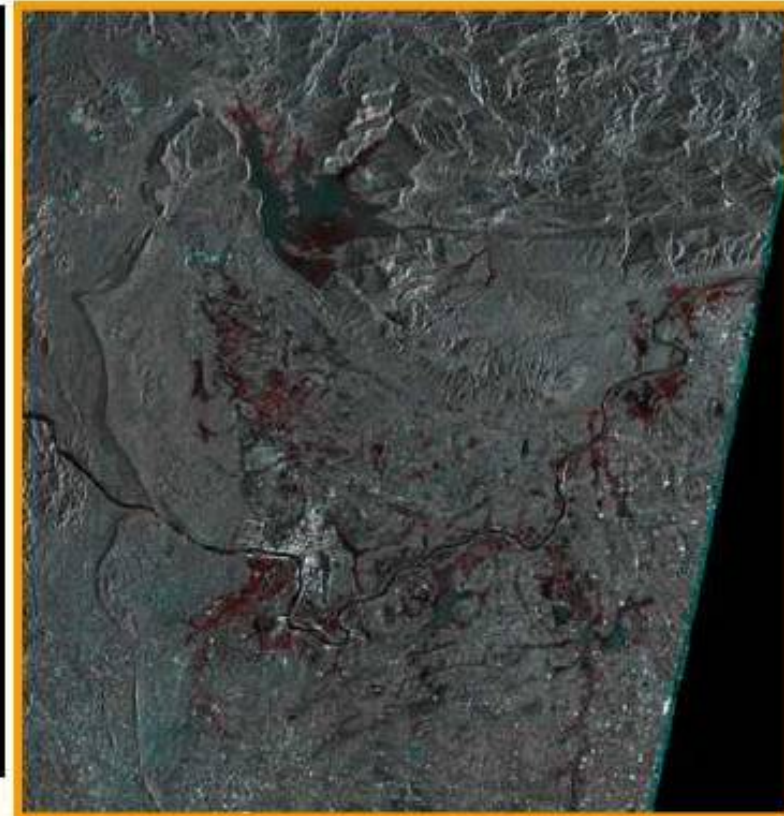
SENTINEL ASIA EMERGENCY REQUEST FORM	
Call ID (To be filled by ADRC):	
Date and time of the call	
Date (dd/mm/yyyy, UTC)	
Time (UTC)	
Local time zone	
Name of the organization and caller	
Name	
Organization	Ministry of Natural Resources and Environment <input type="checkbox"/> ADRC member <input checked="" type="checkbox"/> JPT member
Phone	
Cellular Phone	
Fax	
E-mail	
Emergency type	
<input type="checkbox"/> Flood <input type="checkbox"/> Landslide <input type="checkbox"/> Storm <input type="checkbox"/> Fires <input type="checkbox"/> Volcano <input type="checkbox"/> Earthquake <input type="checkbox"/> Ice hazard <input type="checkbox"/> Industrial danger <input type="checkbox"/> Other :	
Approximate date and time of occurrence	
Date (dd/mm/yyyy, UTC)	
Time (UTC)	
Local time zone	
Area details	
Area Name / Country	
Coordinates of center point	
<input type="checkbox"/> Circular zone	 Latitude : ° ' " N/S Longitude : ° ' " E/W Radius : km
Coordinates of corners	
<input type="checkbox"/> Rectangular zone	Lat.: ° ' " N/S Lon.: ° ' " E/W  Lat.: ° ' " N/S Lon.: ° ' " E/W
Comments or special instructions	

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 Refresh Home Search Favorites Mail Print Copy Paste

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


Web Search Bookmarks Settings Local Groups Messenger Mail MySpace News

Sentinel-Asia Project - Disaster ... Add Tab

Sentinel Asia Project
Disaster Management Support System

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

Satellite Image



Map Data

- DCW (Vmap01)
- 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 8.478s E

Copyright © JAXA, NGA

Add Other Information Output to PDF

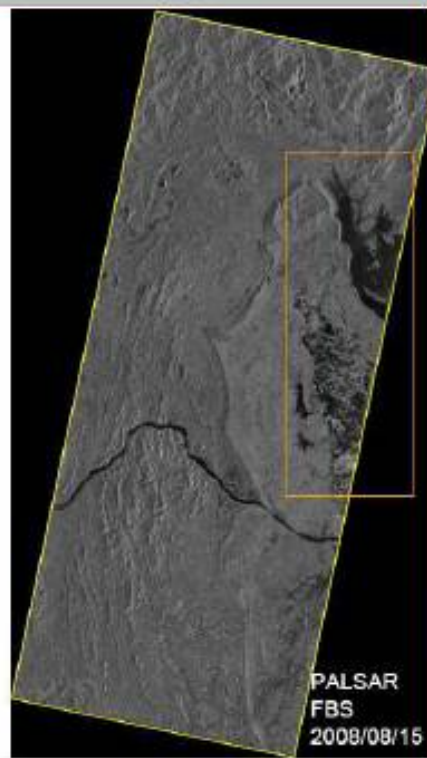
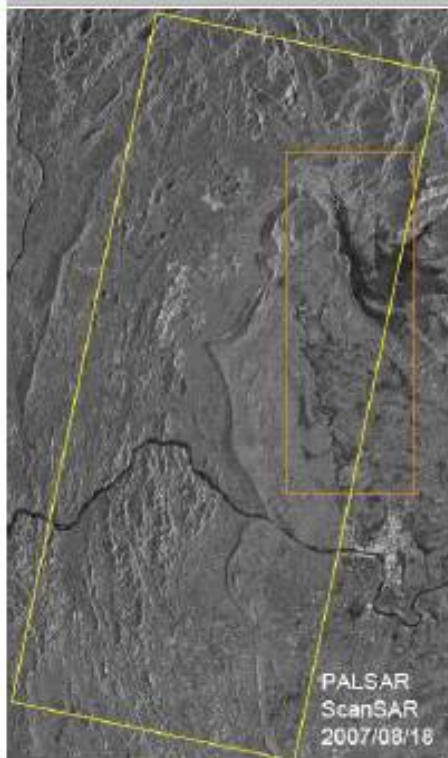
[Download this image from HTTP site] [screen display] [Close]

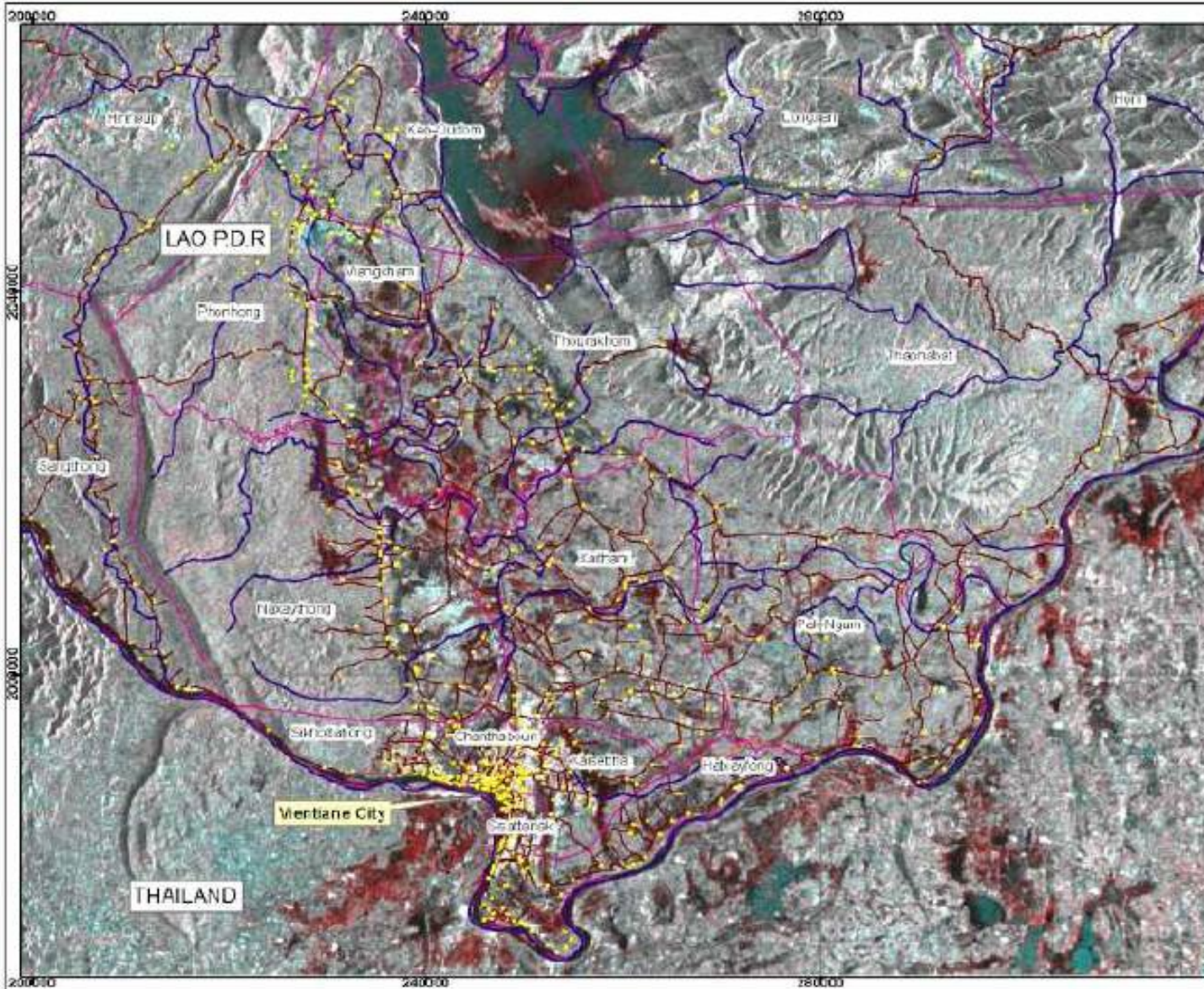
RSC/JAXA/ADRC: Field survey on flood area in Vientiane Capital City and Vientiane Province



Nov 13, 2008

Field survey :
ADRC/JAXA/RSC





Flood in Laos

Legend

- Village
- River
- Road
- District Boundary

Satellite: ALOS
 Sensor: PALSAR ScanSAR
 © JAXA, METI

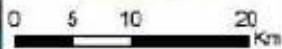
RGB Color Composite Image
 R:G:B=2007/08/18 : 2008/08
 /20 : 2008/08/20

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



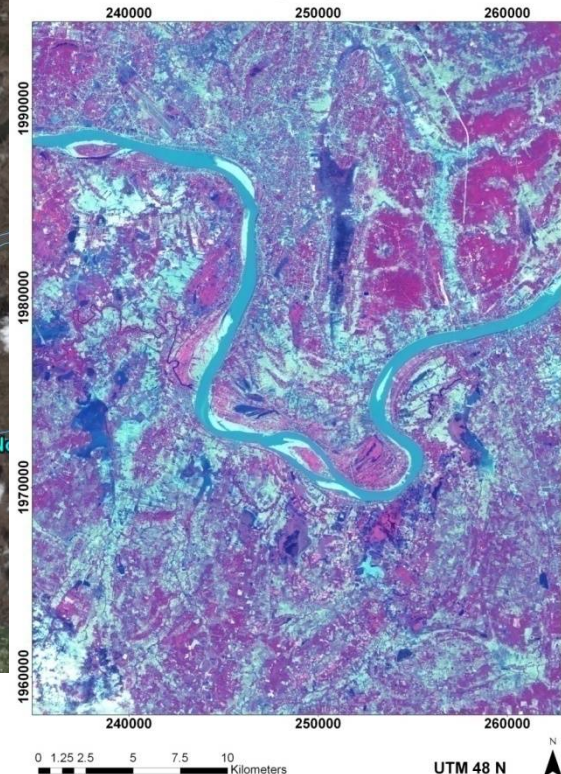
Lao PDR/GIC-AIT: Flood Hazard Mapping using ALOS/ PALSAR, 2009.



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



Mekong River

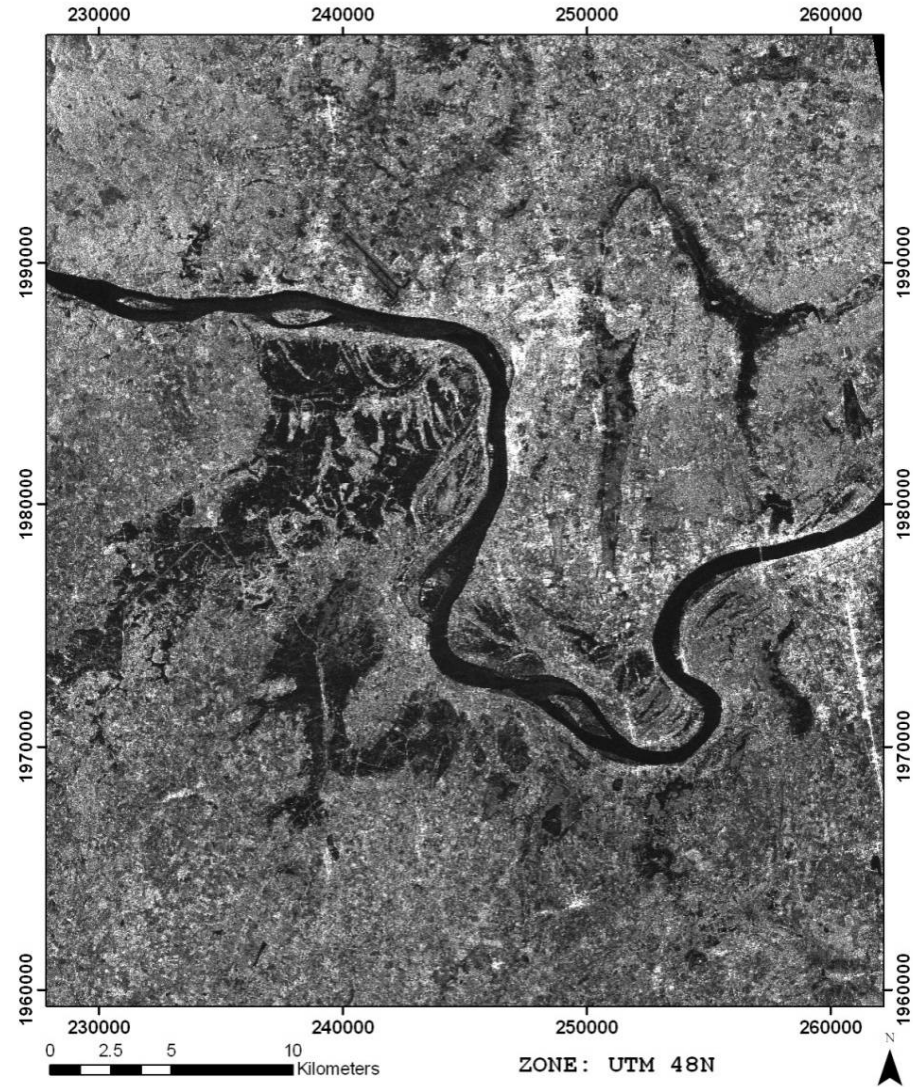


Hatsayphon District, Vientiane
11-15 August 2008

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.



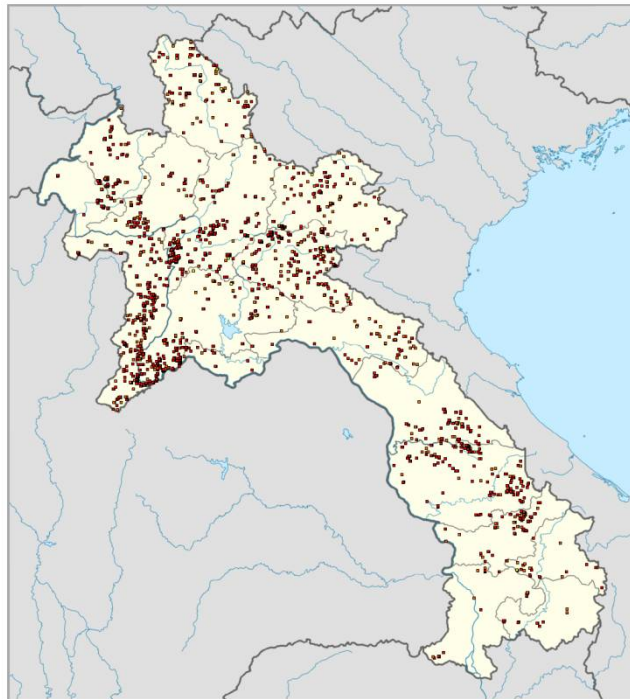
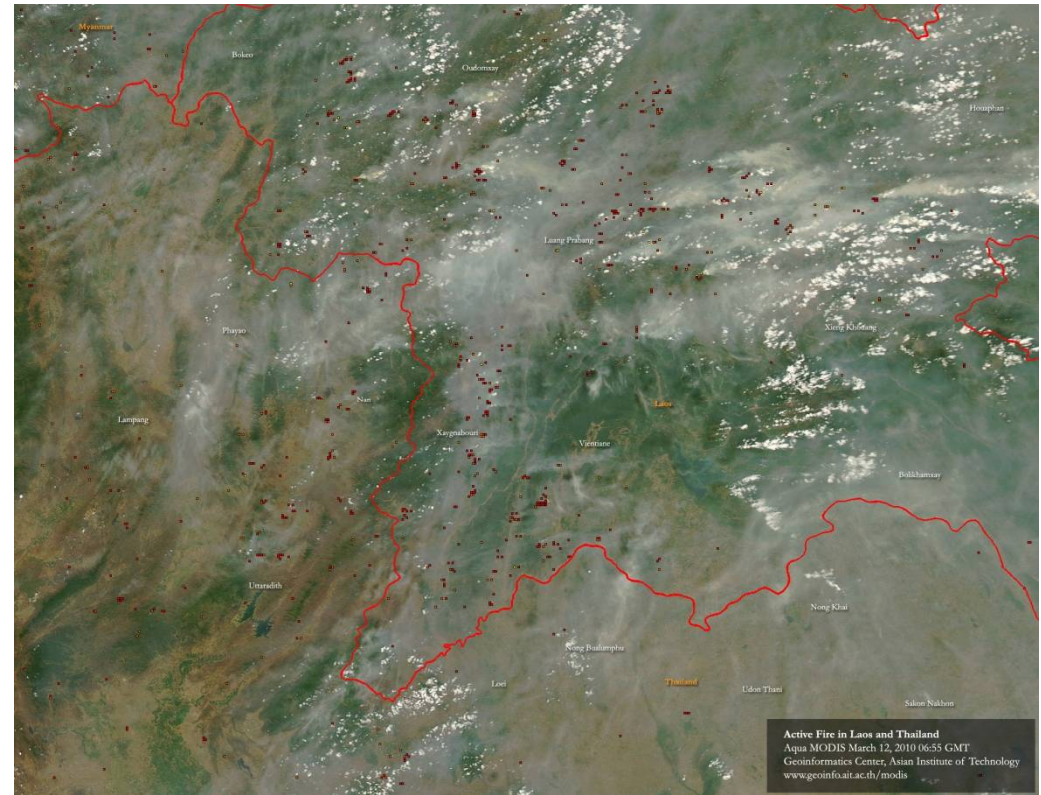
City of Samakkheesay
Attapu province

07 June 2010



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 generated and transferred by the regional system.

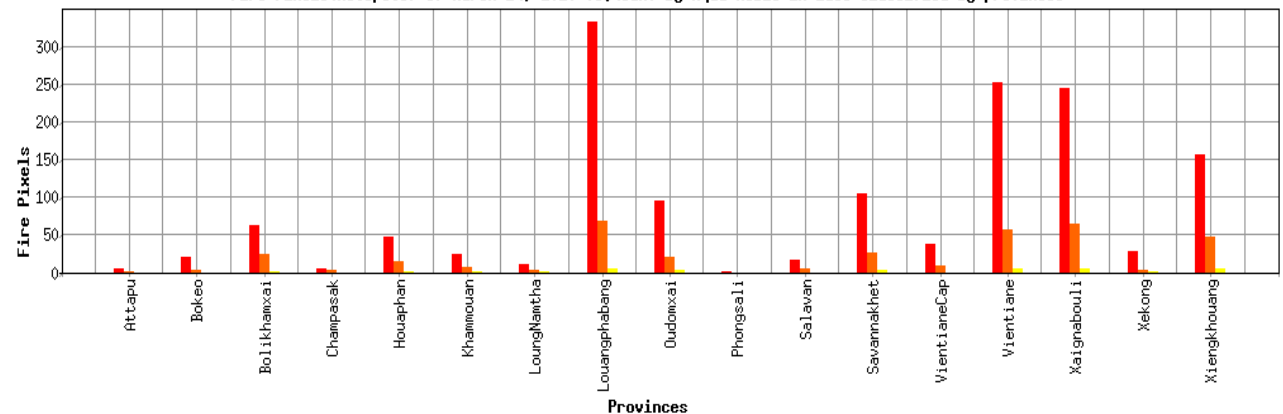


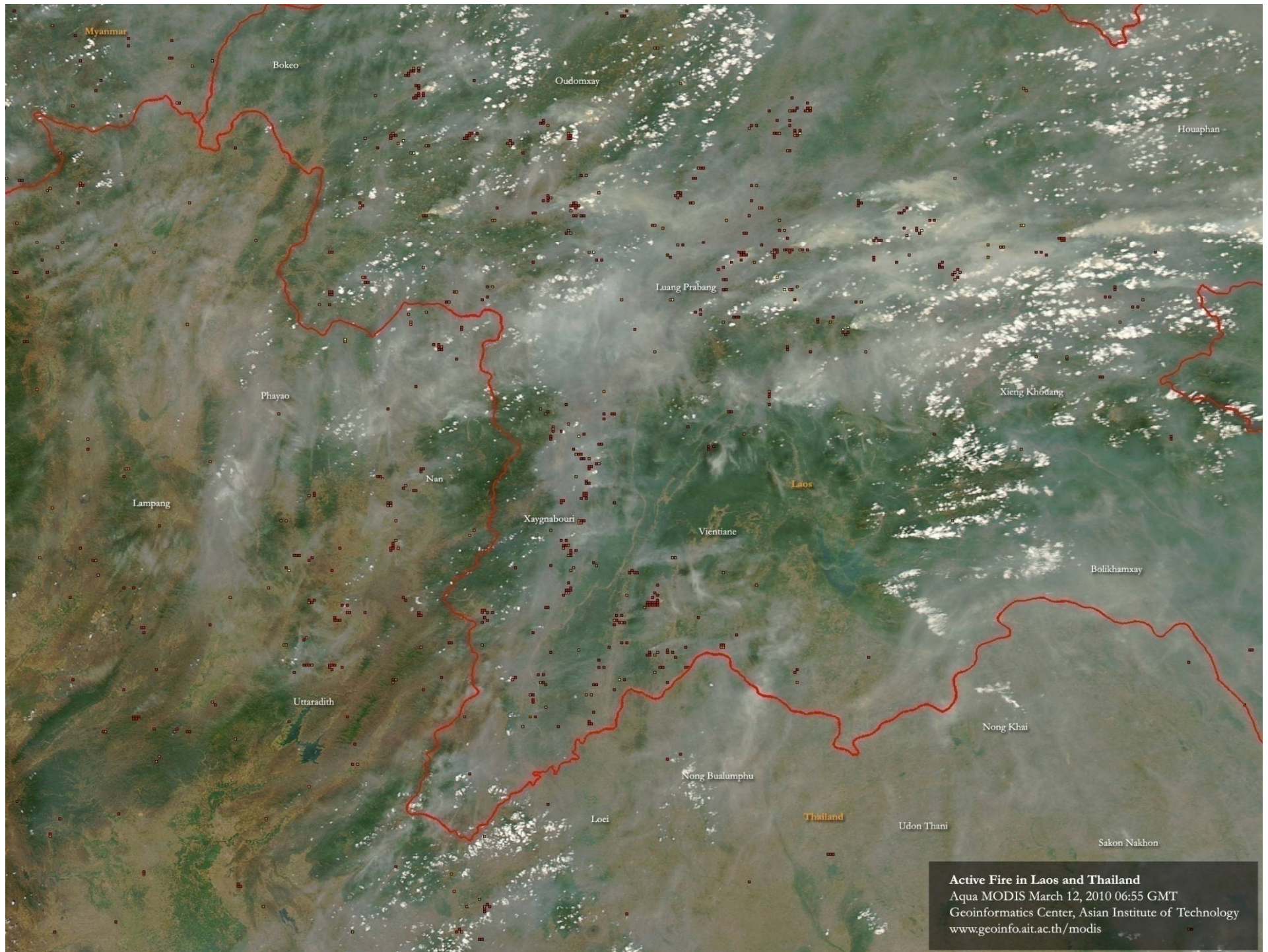
http://www.geoinfo.ait.ac.th/mod14/index_lao0.php

(Shut down now)

Wildfire Information, 14 March 2010

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





Active Fire in Laos and Thailand
Aqua MODIS March 12, 2010 06:55 GMT
Geoinformatics Center, Asian Institute of Technology
www.geoinfo.ait.ac.th/modis

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

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 located in the village of Ban Thong, District of Mondul Kiri, Cambodia. It is a rural area with a population of approximately 1,500 people. The area is characterized by a mix of agricultural land, forests, and some built-up areas. The flood hazard mapping was conducted using ALOS/PALSAR data, which provides a unique perspective on the terrain and water bodies. The results show that the flood hazard is primarily concentrated in the low-lying areas, particularly in the areas near the river and the coastal plain.

Data Used
The data used in this study were: ALOS/PALSAR SAR Data (2009-2010), DEM Data (1:50,000 scale), Topographic Data (1:50,000 scale), and Hydrologic Data (1:50,000 scale). The ALOS/PALSAR data was processed using the SAR to DEM conversion technique, which allows for the extraction of terrain information from SAR data. The DEM data was used to calculate the flood hazard index, which is a measure of the potential for flooding. The topographic data was used to identify the flood-prone areas, and the hydrologic data was used to determine the flood flow paths.

Results
The results of the flood hazard mapping show that the flood hazard is primarily concentrated in the low-lying areas, particularly in the areas near the river and the coastal plain. The flood hazard index is highest in these areas, indicating a high potential for flooding. The results also show that the flood hazard is significantly reduced in the areas with higher elevations and steeper slopes. This information is valuable for flood risk assessment and disaster preparedness planning.

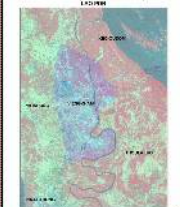
Flood Hazard mapping Using Iicc-Ras



Data Requirement
The data requirements for Iicc-Ras include: Hydrologic Data (flow rate, water surface elevation, etc.), Topographic Data (DEM, etc.), and Geospatial Data (land use, etc.). The hydrologic data is essential for determining the flow characteristics of the river, while the topographic data is used to define the channel geometry and the surrounding terrain. The geospatial data is used to identify the flood-prone areas and to calculate the flood hazard index.

Results
The results of the Iicc-Ras simulation show that the flood hazard is primarily concentrated in the low-lying areas, particularly in the areas near the river and the coastal plain. The flood hazard index is highest in these areas, indicating a high potential for flooding. The results also show that the flood hazard is significantly reduced in the areas with higher elevations and steeper slopes. This information is valuable for flood risk assessment and disaster preparedness planning.

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



Study Area
The study area is located in the Viengkham District, LaoPDR. It is a rural area with a population of approximately 1,500 people. The area is characterized by a mix of agricultural land, forests, and some built-up areas. The flood hazard mapping was conducted using ALOS/PALSAR data, which provides a unique perspective on the terrain and water bodies. The results show that the flood hazard is primarily concentrated in the low-lying areas, particularly in the areas near the river and the coastal plain.

Data Used
The data used in this study were: ALOS/PALSAR SAR Data (2009-2010), DEM Data (1:50,000 scale), Topographic Data (1:50,000 scale), and Hydrologic Data (1:50,000 scale). The ALOS/PALSAR data was processed using the SAR to DEM conversion technique, which allows for the extraction of terrain information from SAR data. The DEM data was used to calculate the flood hazard index, which is a measure of the potential for flooding. The topographic data was used to identify the flood-prone areas, and the hydrologic data was used to determine the flood flow paths.

Results
The results of the flood hazard mapping show that the flood hazard is primarily concentrated in the low-lying areas, particularly in the areas near the river and the coastal plain. The flood hazard index is highest in these areas, indicating a high potential for flooding. The results also show that the flood hazard is significantly reduced in the areas with higher elevations and steeper slopes. This information is valuable for flood risk assessment and disaster preparedness planning.


Field Visit and Discussion.

Range of BS per Landuse type

Land Use Type	BS Range
Forest	100 - 150
Wetland	150 - 200
Water	200 - 250
Barren	250 - 300
Urban	300 - 350
Road	350 - 400
Open Field	400 - 450
Plantation	450 - 500
Other	500 - 550

Discussion
The field visit revealed that the flood hazard is primarily concentrated in the low-lying areas, particularly in the areas near the river and the coastal plain. The flood hazard index is highest in these areas, indicating a high potential for flooding. The results also show that the flood hazard is significantly reduced in the areas with higher elevations and steeper slopes. This information is valuable for flood risk assessment and disaster preparedness planning.

Field Visit and Analysis



Results
The field visit analysis shows that the flood hazard is primarily concentrated in the low-lying areas, particularly in the areas near the river and the coastal plain. The flood hazard index is highest in these areas, indicating a high potential for flooding. The results also show that the flood hazard is significantly reduced in the areas with higher elevations and steeper slopes. This information is valuable for flood risk assessment and disaster preparedness planning.

Discussion

Conclusion
The study concludes that the flood hazard is primarily concentrated in the low-lying areas, particularly in the areas near the river and the coastal plain. The flood hazard index is highest in these areas, indicating a high potential for flooding. The results also show that the flood hazard is significantly reduced in the areas with higher elevations and steeper slopes. This information is valuable for flood risk assessment and disaster preparedness planning.

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.

Suggestions

1. Promote and development of the use of RS&GIS in to the natural resources management, environment quality monitoring and disaster risk reduction;
2. National policy and regulation of the application of space technology (especially Remote Sensing technology)
3. Enhancement of National staffs capacity building.
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.

RSC/NREI/MONRE: Future Work Plan 2014-2020 On Natural Resources and Disaster Monitoring using the Space Data.

- 1. Emergency Request by using ER form;**
- 2. Flood Risk Mapping Bolikhamxay province, Lao PDR;**
- 3. Drought Risk Mapping using Remote Sensing and GIS in Savannakhet Province, Lao PDR.**
- 4. Research/Training/: (RS/GIS/GPS), on soil erosion in Saravan province and Luangnumtha province.**
- 5. Fire Monitoring in Lao PDR.**
- 6. RSC, NREI, MoNRE would like to continue support Sentinel Asia STEP3 and promotion related to the utilization on space for disaster reduction.**



Flood depth 1.5 metre



Flood in Bolikhamxay

2-6 August 2015

Vientiane times newspaper :

-Hadkhay village in Thaphabath district, Borikhamxay province, has shut down its activities after the road into the village was flooded when the Mang River overflowed.

-More than 1,400 families and 4,200 hectares of rice fields have been affected by flooding in the districts of Thaphabath, Borikhan, Pakxan and Pakkading.





Thank you very much
For your kind attention !