



AIT
ASIAN INSTITUTE OF TECHNOLOGY



Digital Image Processing System for Near Real-Time Global Environmental Monitoring

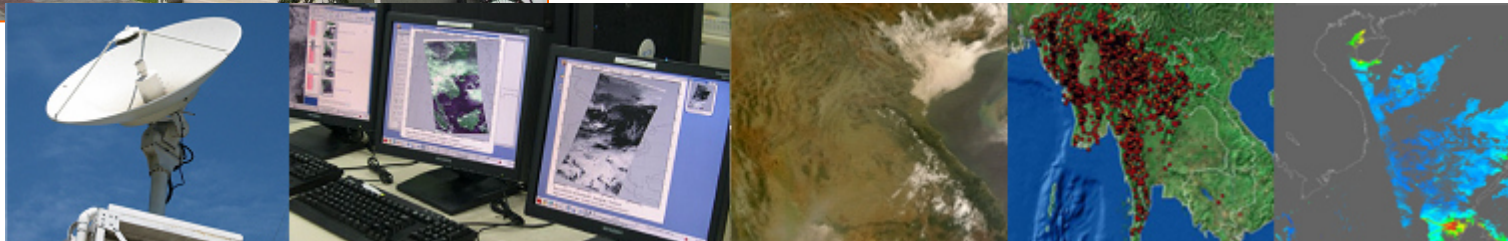


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Asian Institute of Technology

Affiliated Faculty
Remote Sensing & GIS Field of Study
Asian Institute of Technology

vivarad@ait.ac.th, vivarad@gmail.com

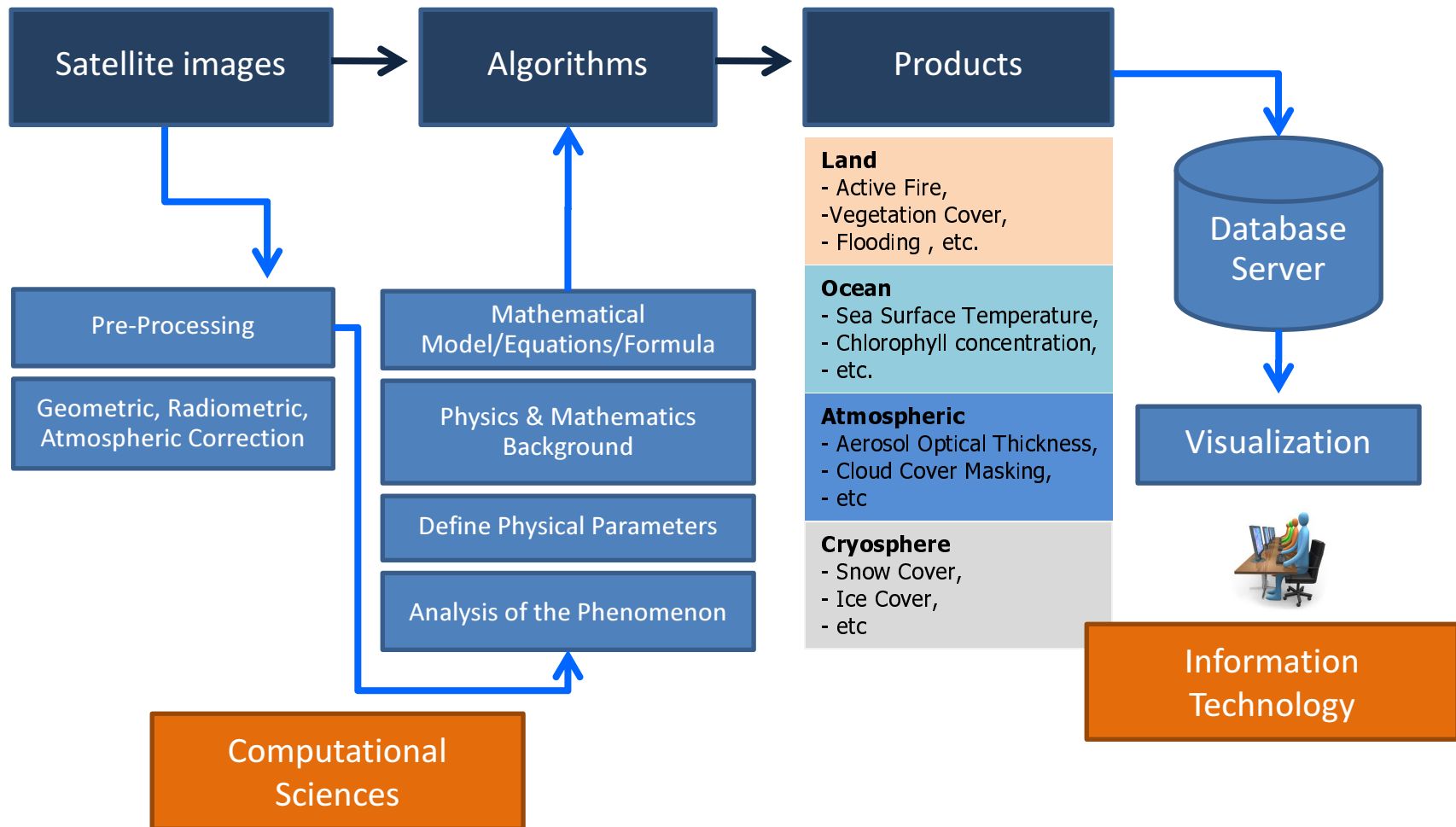
www.vivarad.info



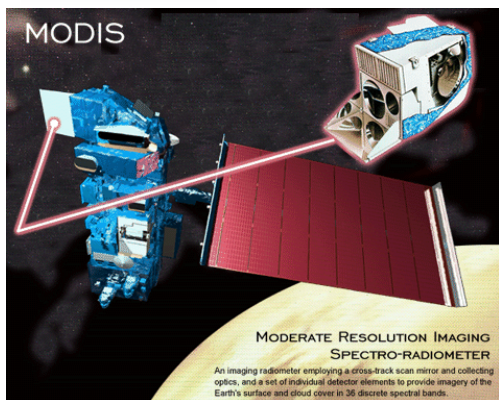
Geoinformatics Center (GIC)
School of Engineering & Technology (SET)
Asian Institute of Technology (AIT)
Bangkok, Thailand
October 2012

<http://www.geoinfo.ait.ac.th/>

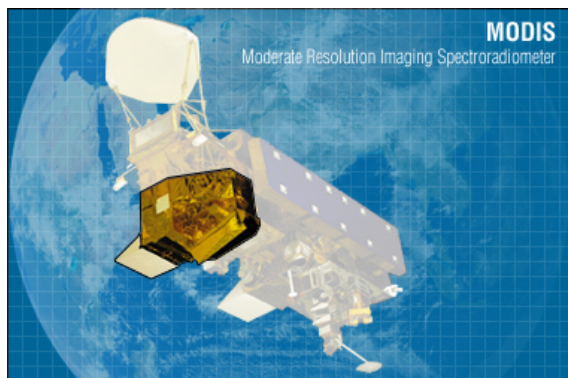
Digital Image Processing in Data Processing Systems of Satellite Image for Global Environmental Monitoring



MODIS – Earth Observation System (EOS) Flagship for Global/Regional Environment and Disaster Monitoring since 1999



Terra (EOS-AM1) – Dec 1999 until present



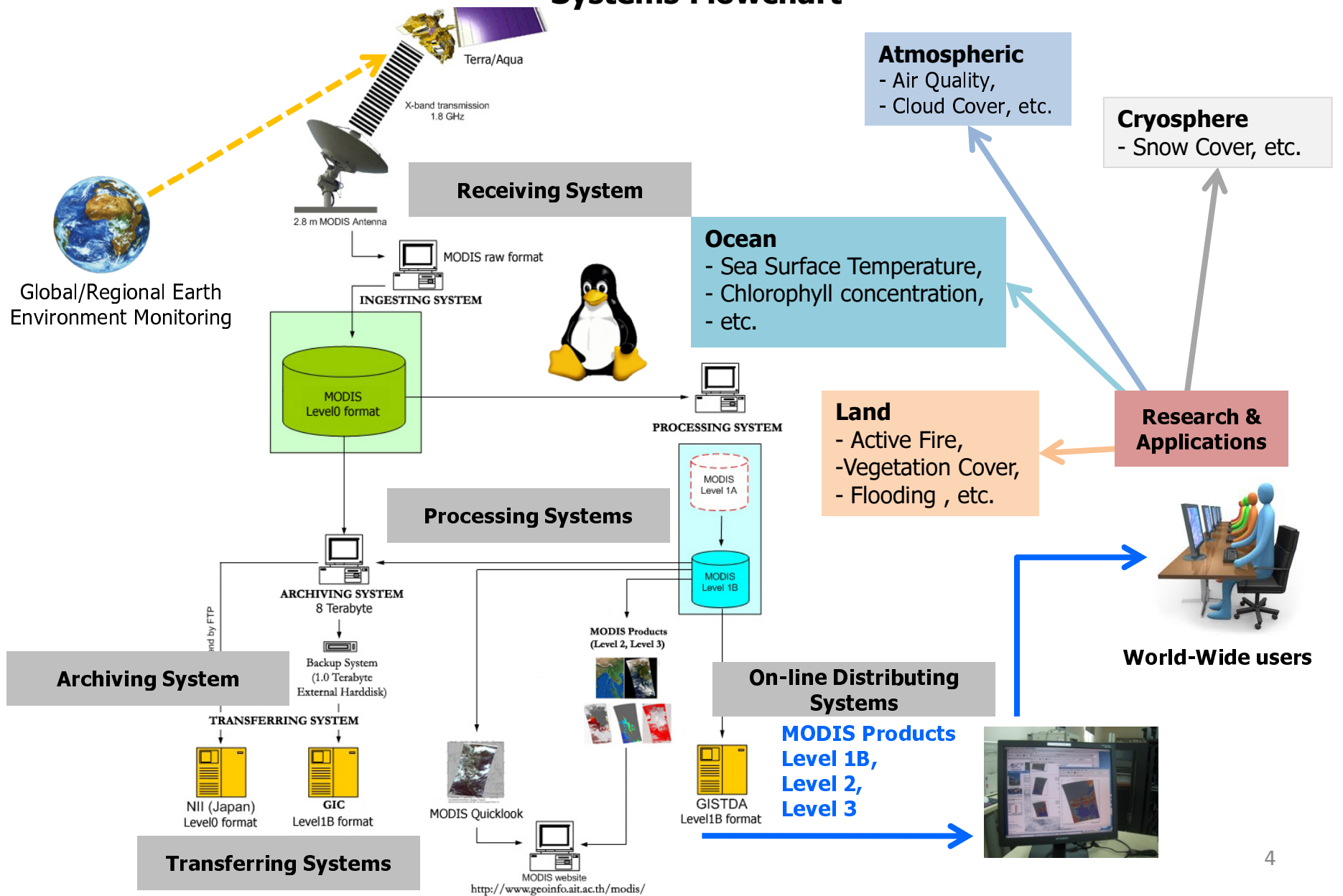
Aqua (EOS-PM1) - May 2002 until present

<http://modis.gsfc.nasa.gov/>

<http://terra.nasa.gov/>

<http://aqua.nasa.gov/>

GIC/AIT Near Real time Automatic MODIS Receiving, Processing, Archiving, Transferring and Distributing Systems Flowchart



Terra/Aqua MODIS Receiving, Archiving and Processing Systems in Geoinformatics Center (GIC), AIT

- Operational since May 2001 – present
- More than 20,000 Scenes for Terra/Aqua(day and night)
- Covering 19 countries (South and Southeast Asia)
- Products include:
 - Land, Ocean, Atmosphere and Cryosphere disciplines
- Most products are Standard NASA Products
- Mostly use NASA ATBD (Algorithm Theoretical Basic Documents) for data processing
- Operating System : Linux (only!)

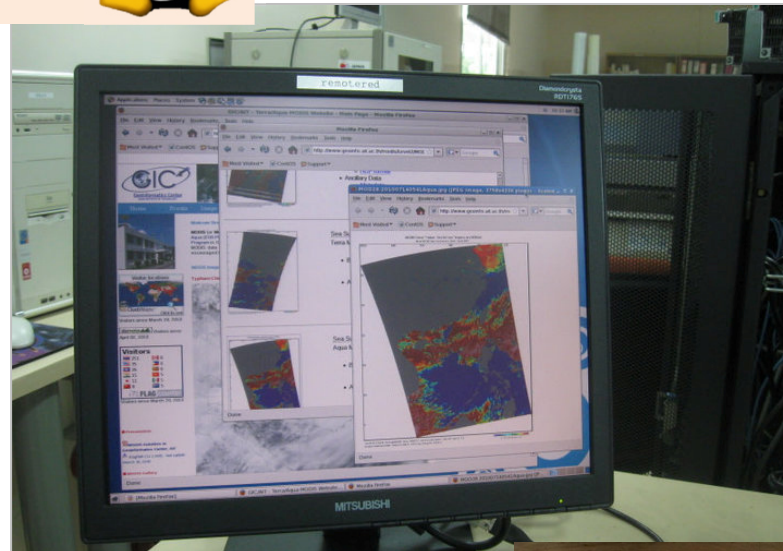


Concept of Processing System:

- Automatic
- Near Real-time
- Daily (6-8 image scenes/day)
- Online Product Access for 24 hours
- Easy-to-use Data format Products



Receiving System



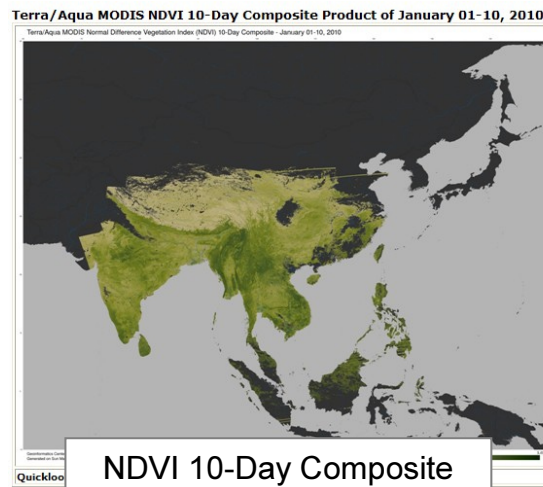
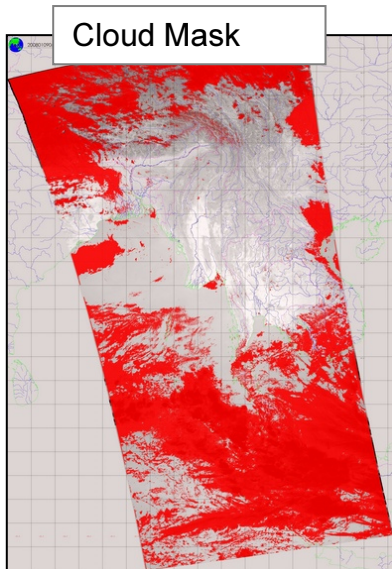
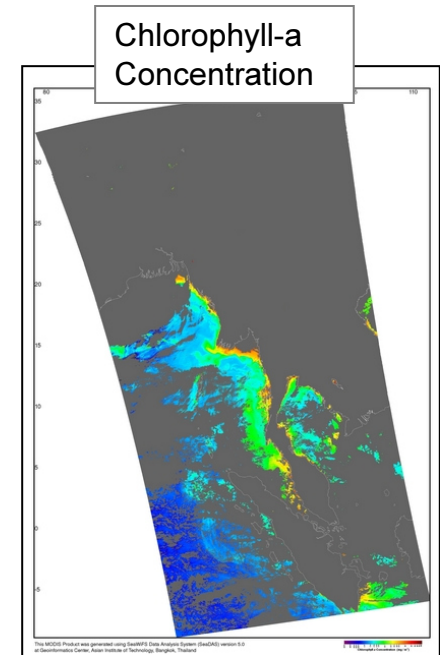
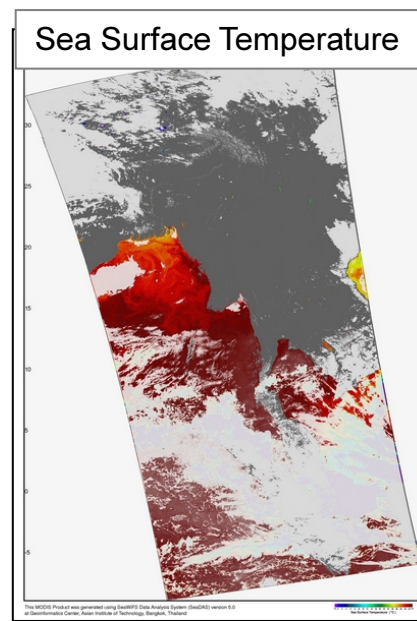
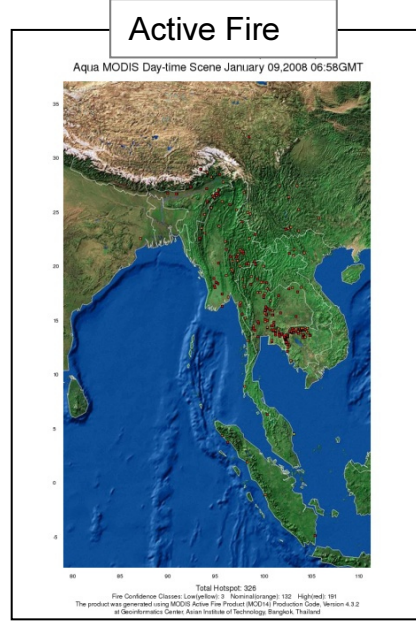
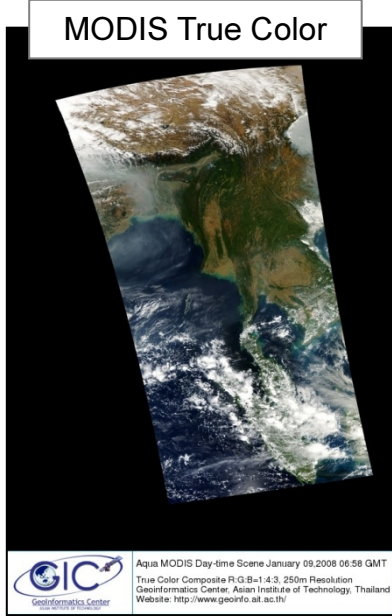
Automatic Near Real-Time Processing Systems



Backup Storage:

- External USB Hard disks (2.0 TB)
- DLT Tapes (40 Gigabytes)

MODIS Products available in Geoinformatics Center, AIT

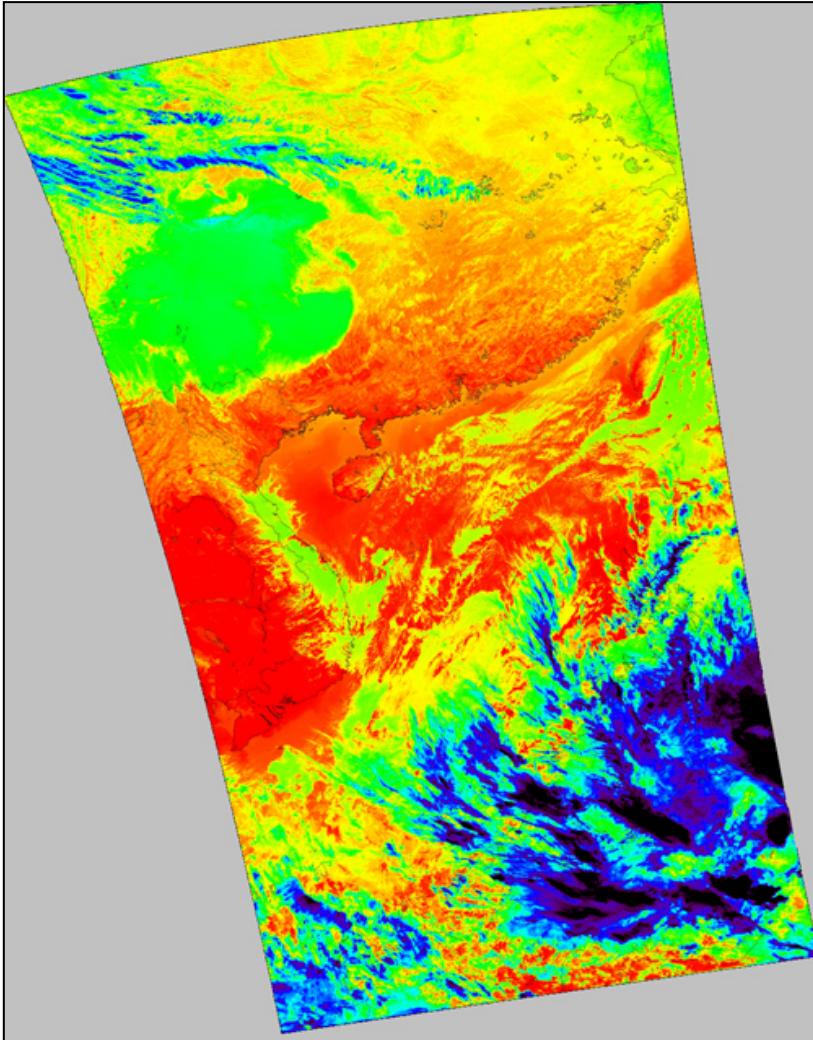


Last update : Sun Mar 7 10:53:05 ICT 2010 (Bangkok Time)

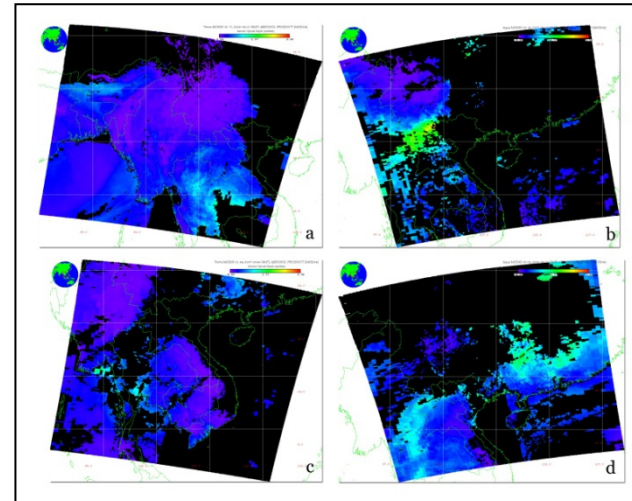
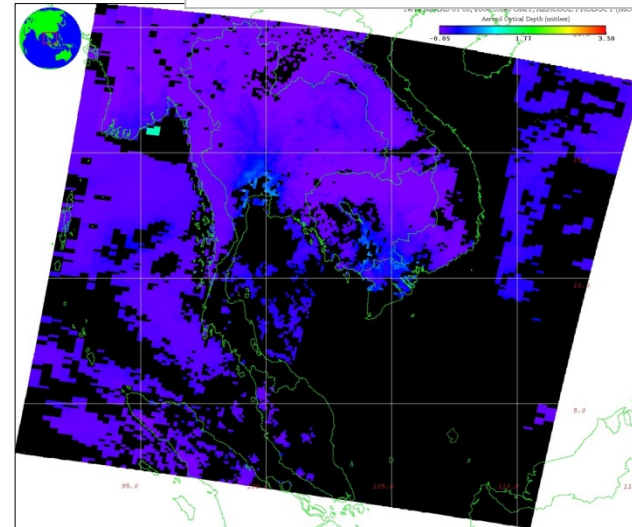
1. MODIS True Color 250m resolution
2. Active Fire and Thermal Anomalies (MOD14)
3. Cloud Masking (MOD35)
4. Ocean Color Products :
 - 3.1 Sea Surface Temperature (MOD28)
 - 3.2 Chlorophyll-a Concentration (MOD21)
5. NDVI 10-Day Composite

MODIS Products under development in Geoinformatics Center, AIT

1. Land Surface Temperature (MOD11)
2. Surface Reflectance (MOD09)
3. Aerosol Optical Thickness (MOD04)
4. Burning Area



Land Surface Temperature (MOD11)

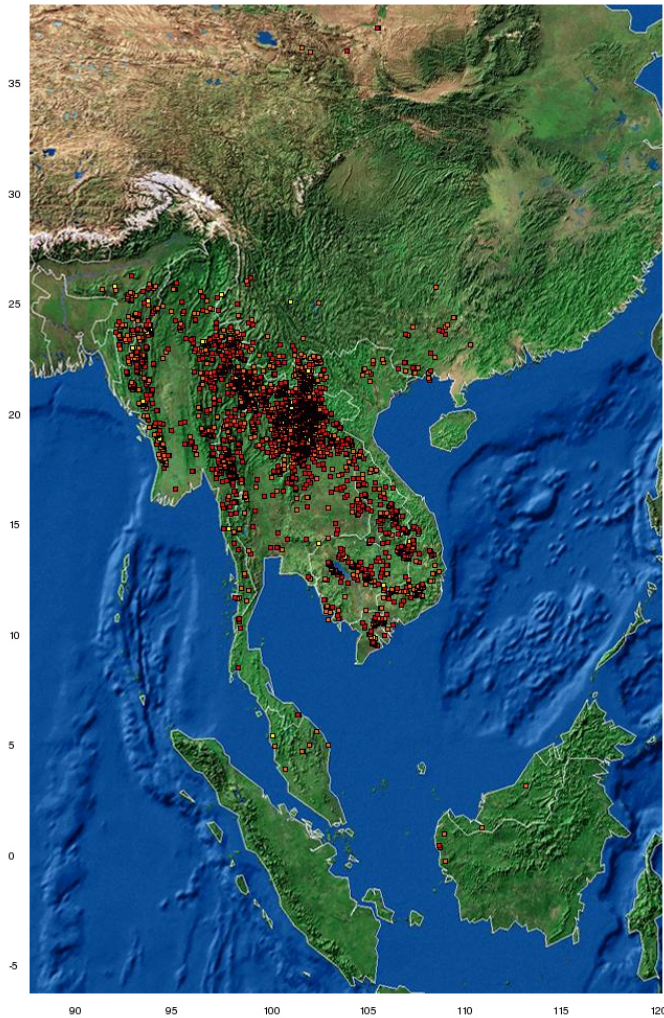


Aerosol Optical Thickness (MOD04)

Application of MODIS Active Fires and Aerosol Products for Biomass Burning and Air Quality Monitoring in SE Asia

MODIS Fire Product(MOD14)

Aqua MODIS Day-time Scene March 25,2010 06:24GMT

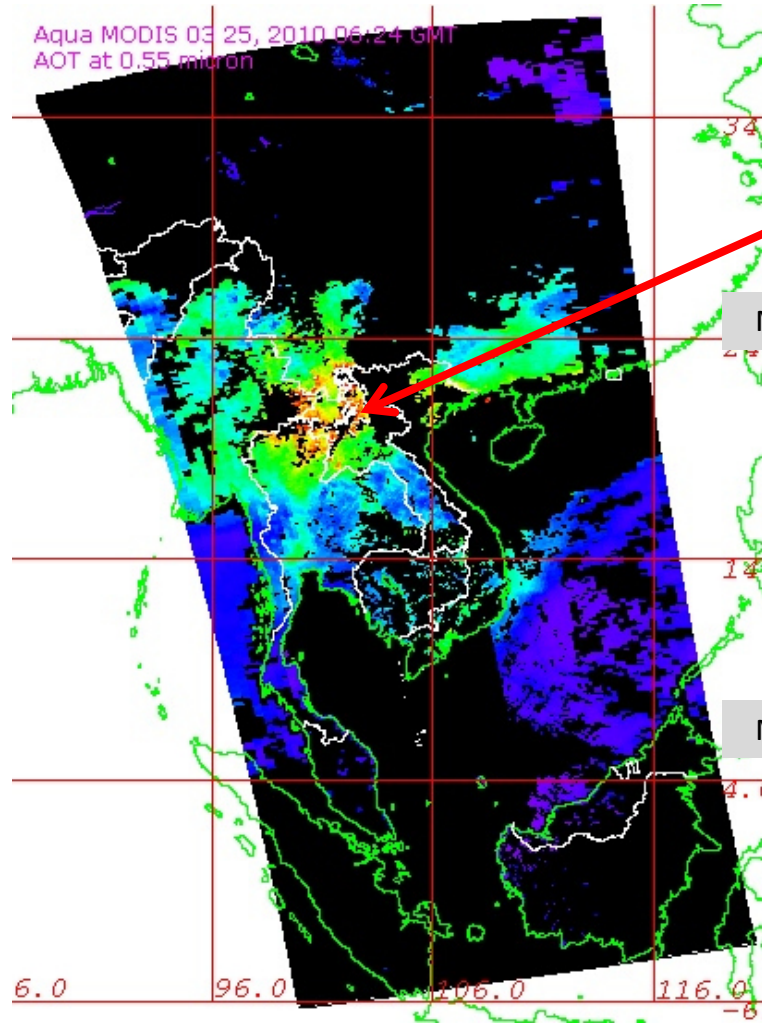


Total Hotspot: 5160

Fire Confidence Classes: Low(yellow): 93 Nominal(orange): 1320 High(red): 3747

The product was generated using MODIS Active Fire Product (MOD14) Production Code, Version 4.3.2 at Geoinformatics Center, Asian Institute of Technology, Bangkok, Thailand

Aerosol Optical Thickness (MOD04)



Aqua MODIS March 25, 2010 06:24 GMT

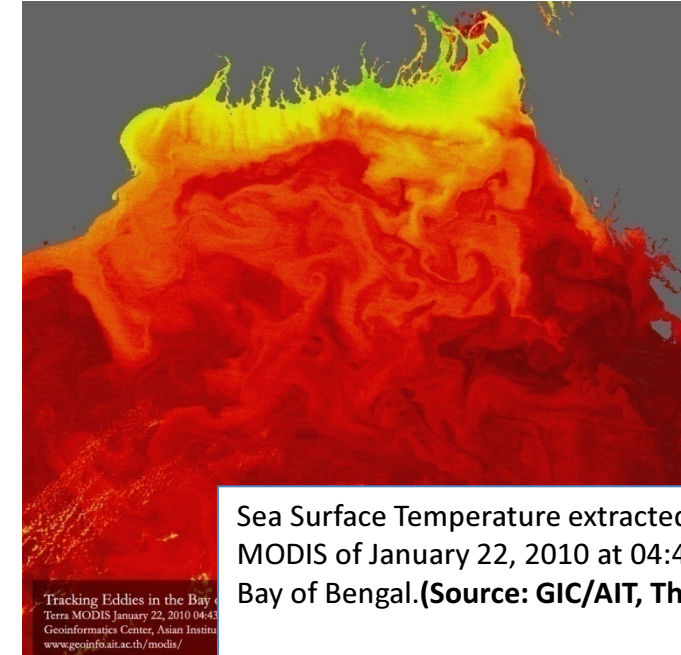
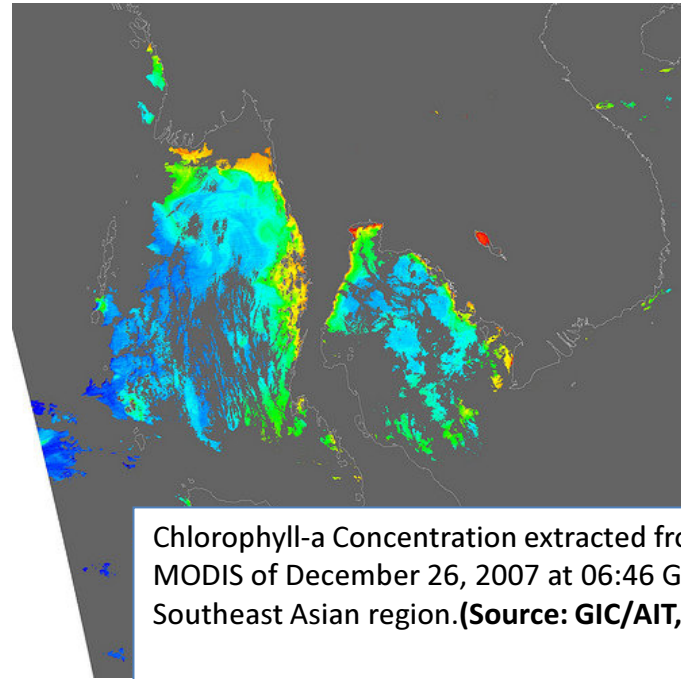
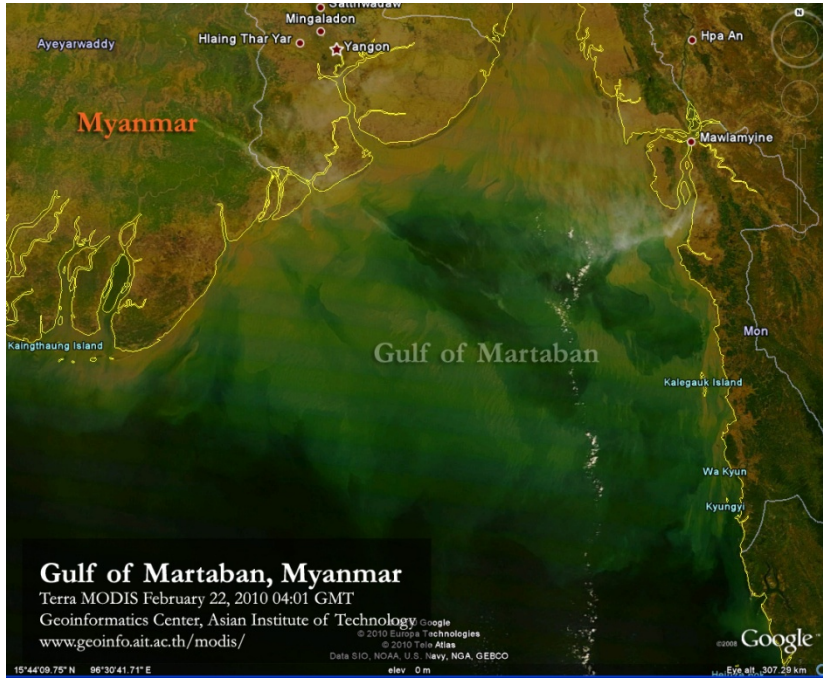


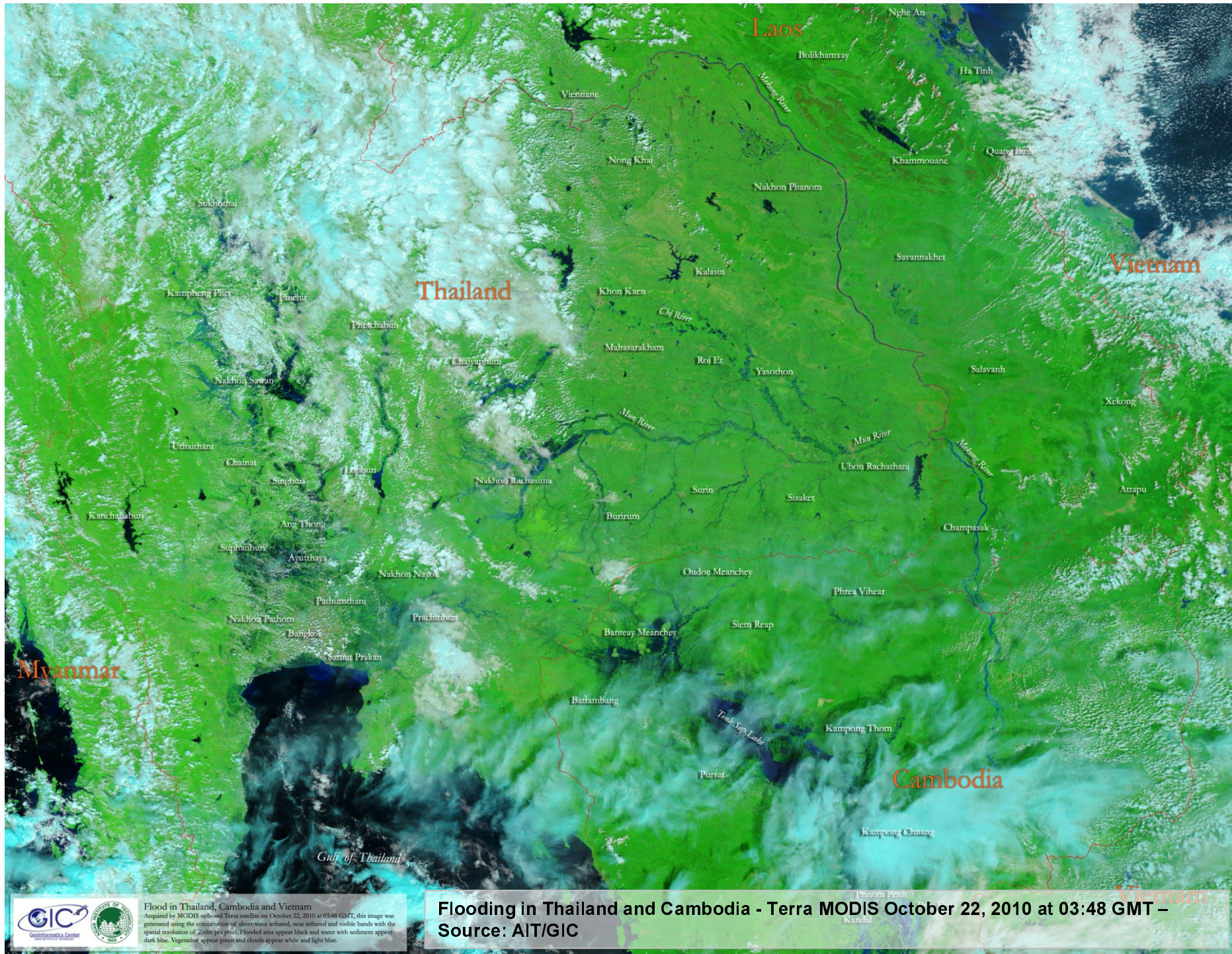
March 25, 2010, Luang Prabang



March 26, 2010, Luang Prabang

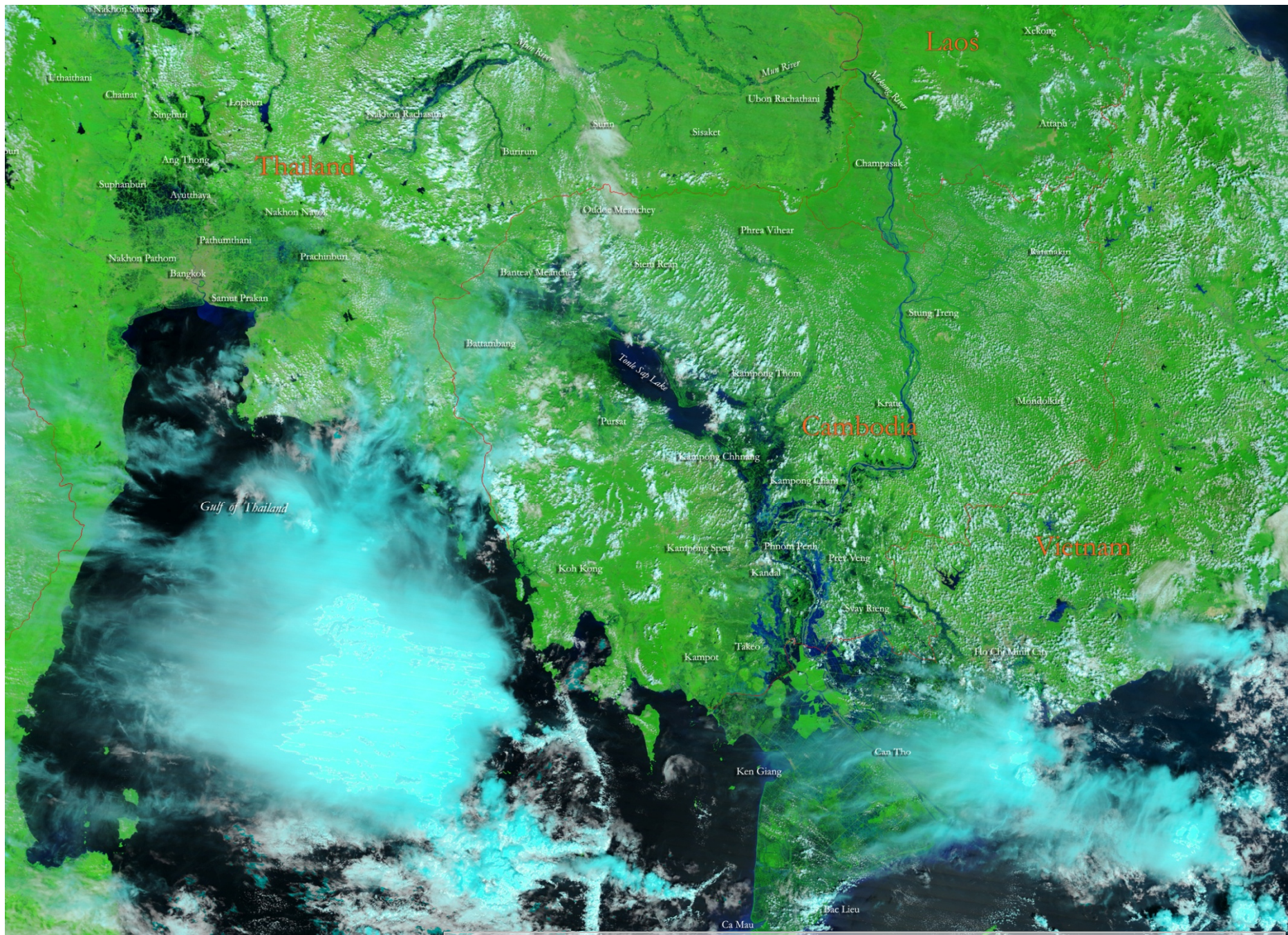
Monitoring of Ocean Color using MODIS imagery





Flood in Thailand, Cambodia and Vietnam
 Acquired by MODIS onboard Terra satellite on October 22, 2010 at 03:48 GMT, this image was generated using the combination of short wave infrared, near infrared and visible bands with the spatial resolution of 250m per pixel. Flooded area appear black and water with sediment appear dark blue. Vegetation appear green and clouds appears white and light blue.

Flooding in Thailand and Cambodia - Terra MODIS October 22, 2010 at 03:48 GMT – Source: AIT/GIC



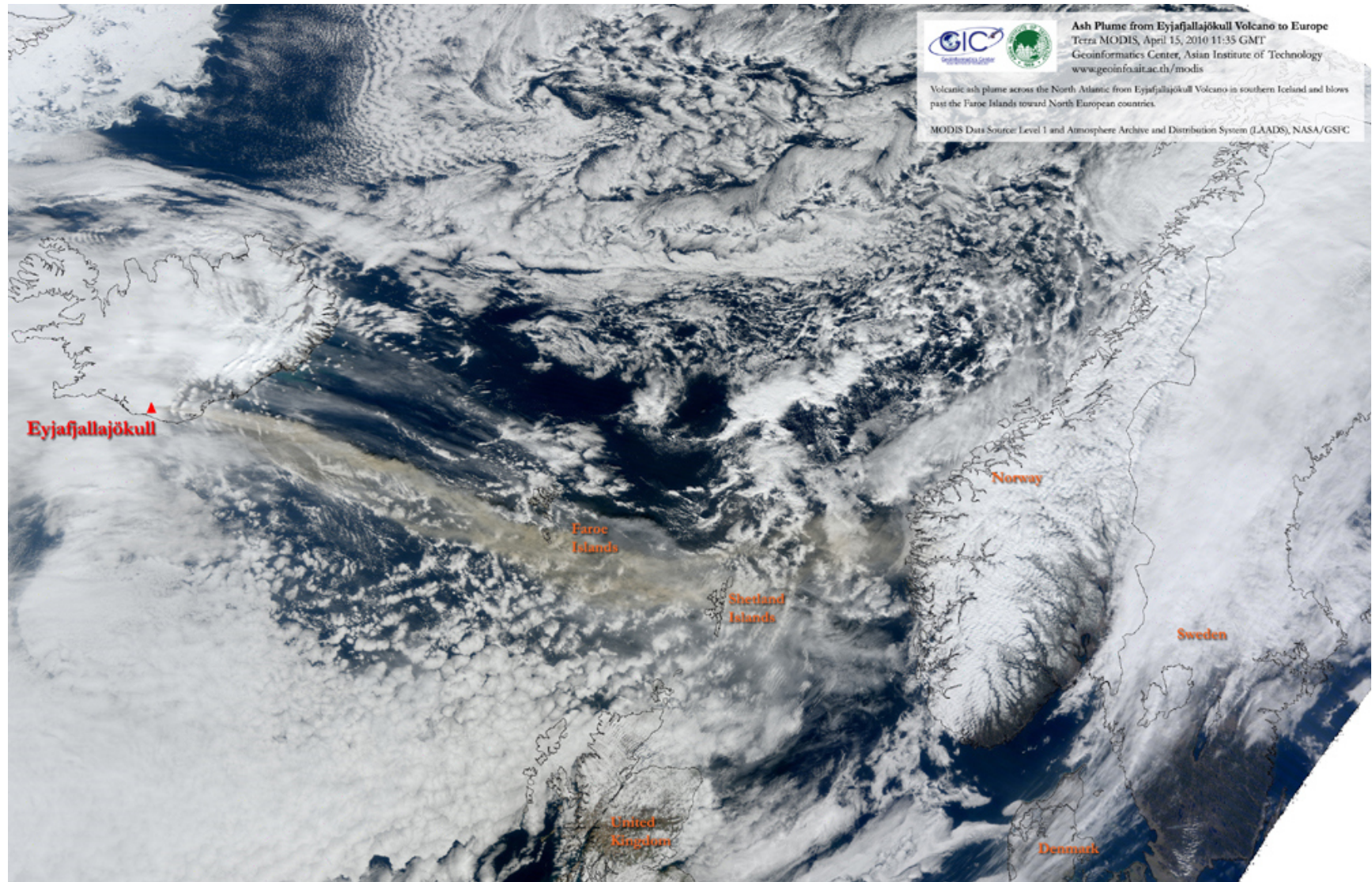


Flood in Thailand, Cambodia and Vietnam
 Acquired by MODIS onboard Terra satellite on October 24, 2010 at 03:36 GMT, this image was generated using the combination of short wave infrared, near infrared and visible bands with the spatial resolution of 250m per pixel. Flooded areas appear black and water with sediment appear dark blue. Vegetation appears green and clouds appear white and light blue.
<http://www.geoinfo.ait.ac.th/modis>

Flooding in Thailand, Cambodia and Vietnam - Terra MODIS on October 24, 2010 03:36 GMT – Source: AIT/GIC

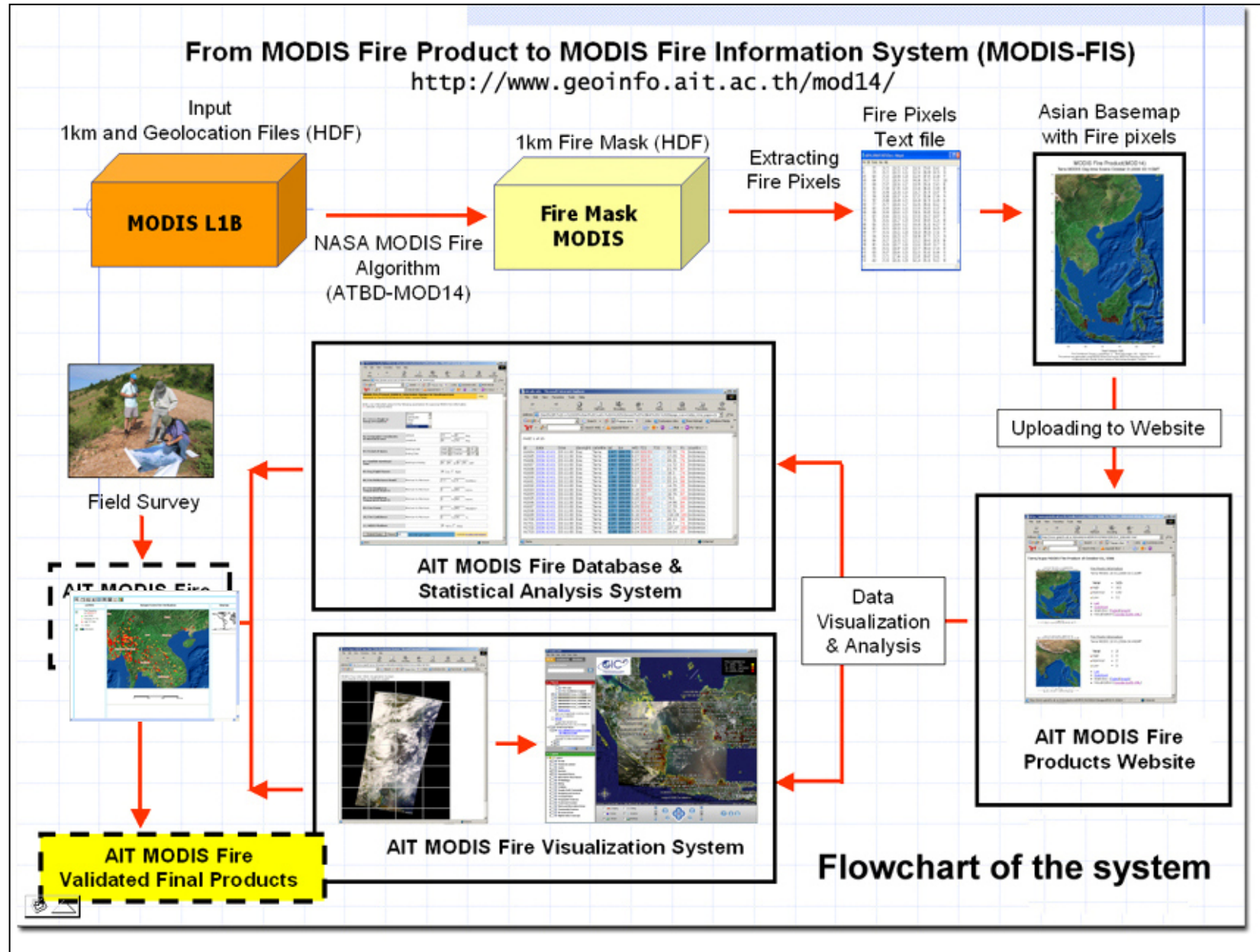
Monitoring of Volcano Eruption using MODIS imagery

Ash Plume from Eyjafjallajökull Volcano to Europe



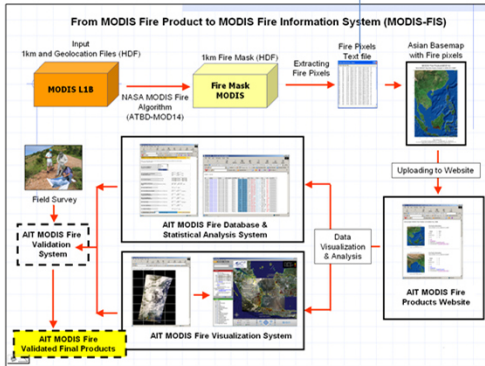
Eyjafjallajökull Volcano seen by Terra MODIS April 15, 2010 11:35 GMT (Source: GIC/AIT, Thailand)

Near Real-Time Automatic MODIS Fire Information System



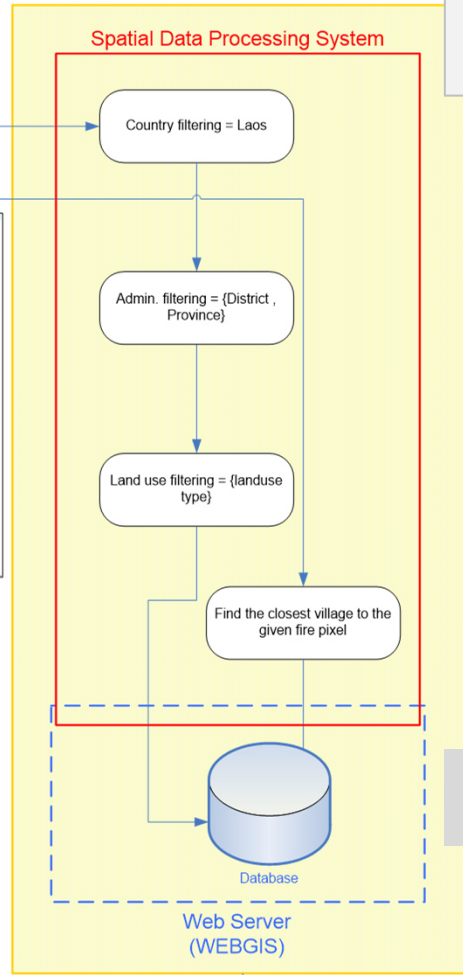
System for Monitoring in Regional Level

[Objective 1] 1. DEMONSTRATION



Existing MODIS Fire Information System

[Objective 2] 2. DEVELOPMENT



MODIS Active Fire Monitoring System in National Level - Laos

Flowchart of the Development



Developed & opened to public

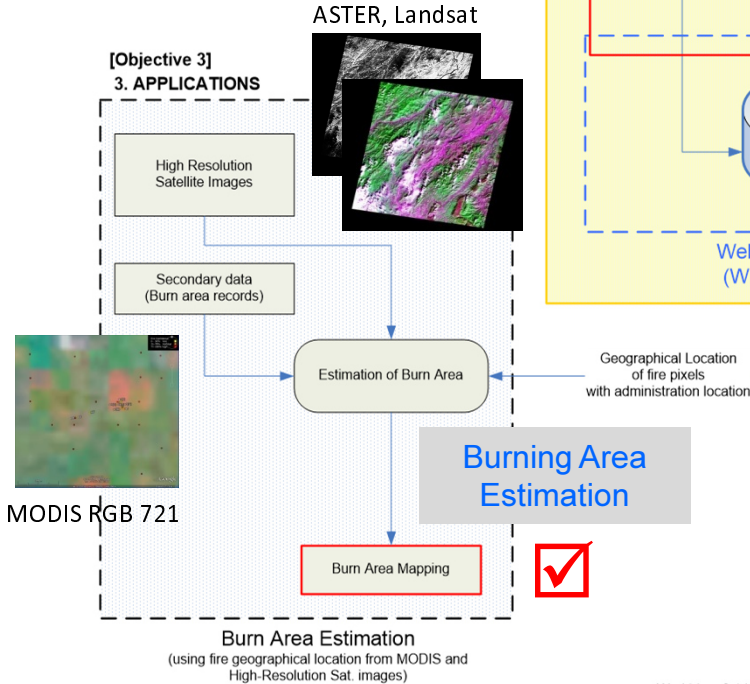


Under development

System for Monitoring in Country Level



[Objective 3] 3. APPLICATIONS



Extended System for Laos

Terra ASTER specifications

Instrument	VNIR	SWIR	TIR
Bands	1-3	4-9	10-14
Spatial Resolution	15m	30m	90m
Swath Width	60km	60km	60km
Cross Track Pointing	$\pm 318\text{km} (\pm 24 \text{ deg}) \pm 116\text{km} (\pm 8.55 \text{ deg}) \pm 116\text{km} (\pm 8.55 \text{ deg})$		
Quantisation (bits)	8	8	12

Global Environmental Research using MODIS – MODIS Products – MODIS Fire Product (MOD14)

User data query for MODIS Fire Information - Windows Internet Explorer

http://www.geoinfo.ait.ac.th/mod14/mod14_db/search_db_mod14b.php

File Edit View Favorites Tools Help

Links Customize Links Free Hotmail My Yahoo! Windows Windows Marketplace Windows Media Yahoo! Yahoo! Bookmarks

Geoinformatics Center - ... User data query for ... http://www.geoinfo.ait... http://www.geoinfo.ait...

MODIS Fire Product (MOD14) Information System for Southeast Asia [Instructions](#)

Released on Tue Jul 25 09:56:53 ICT 2006 - Update: Oct 28,2006 12:23:42 ICT

Notes: Data is available since July 27, 2006 until present. The data before this period will be added soon.

Enter your interested values to the following parameters for querying MODIS Fire Information.
(*) denotes required fields.

01. Select a Single or Group of Countries*

Cambodia
China
India
Indonesia
Laos

02. Geographic Coordinates of interested area

Latitude -10 to 60 deg.
Longitude 60 to 150 deg.

03. Period of Query

Starting Date 2007 March 11
Ending Date 2007 March 11

04. Satellite Overhead Time

Starting to Ending 06 00 to 06 59 GMT

05. Day/Night Passes

Day Night

06. Fire Reflectance Band2

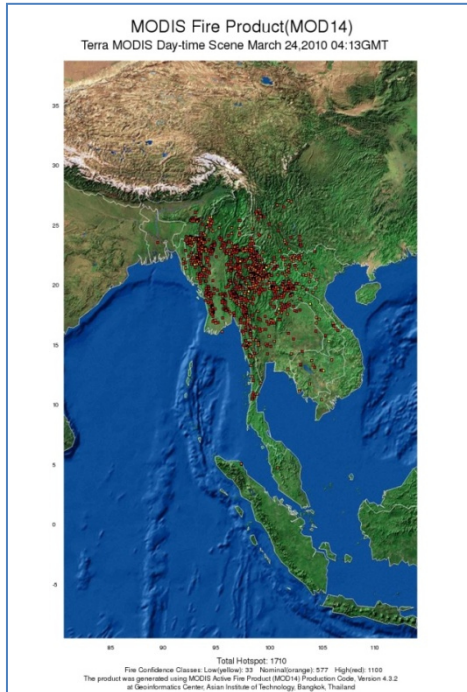
Minimum to Maximum -1.0 to 1.0 (Unitless)

07. Fire Brightness Temperature Band 21

Minimum to Maximum 273 to 400 Kelvin

Internet 100%

MODIS Fire Information System (Regional Level)



User data query for MODIS Fire Information - Windows Internet Explorer

http://www.geoinfo.ait.ac.th/mod14/mod14_db/search_db_mod14.php

MODIS Fire Product (MOD14) Information System for Southeast Asia

Released on Tue Jul 25 09:56:53 ICT 2006 - Update: Oct 28, 2006 12:23:42 ICT

Notes: Data is available since July 27, 2006 until present. The data before this period will be added soon.

Enter your interested values to the following parameters for querying MODIS Fire Information.
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01. Select a Single or Group of Countries*

- Cambodia
- China
- India
- Indonesia
- Laos

02. Geographic Coordinates of interested area

Latitude: -10 to 60 deg.
Longitude: 60 to 150 deg.

03. Period of Query

Starting Date: 2007 March 11
Ending Date: 2007 March 11

04. Satellite Overhead Time

Starting to Ending: 06 00 to 06 59 GMT

05. Day/Night Passes

Day Night

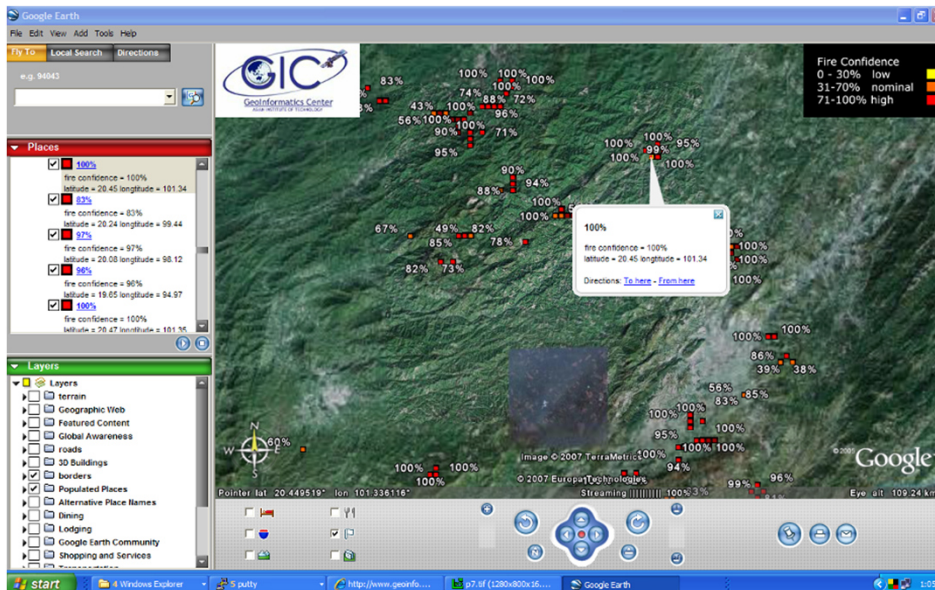
06. Fire Reflectance Band2

Minimum to Maximum: -1.0 to 1.0 (Unitless)

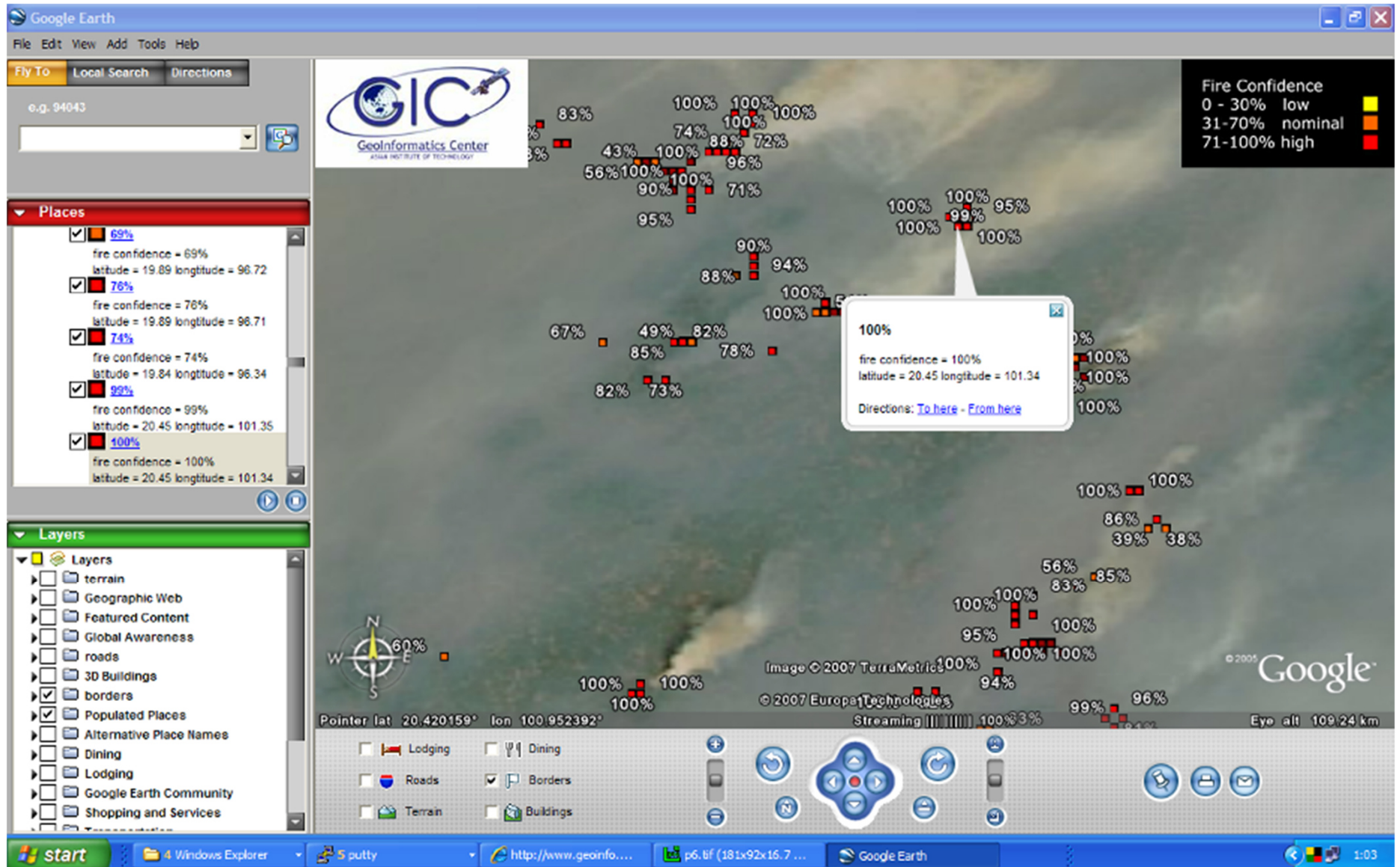
07. Fire Brightness Temperature Band 21

Minimum to Maximum: 273 to 400 Kelvin

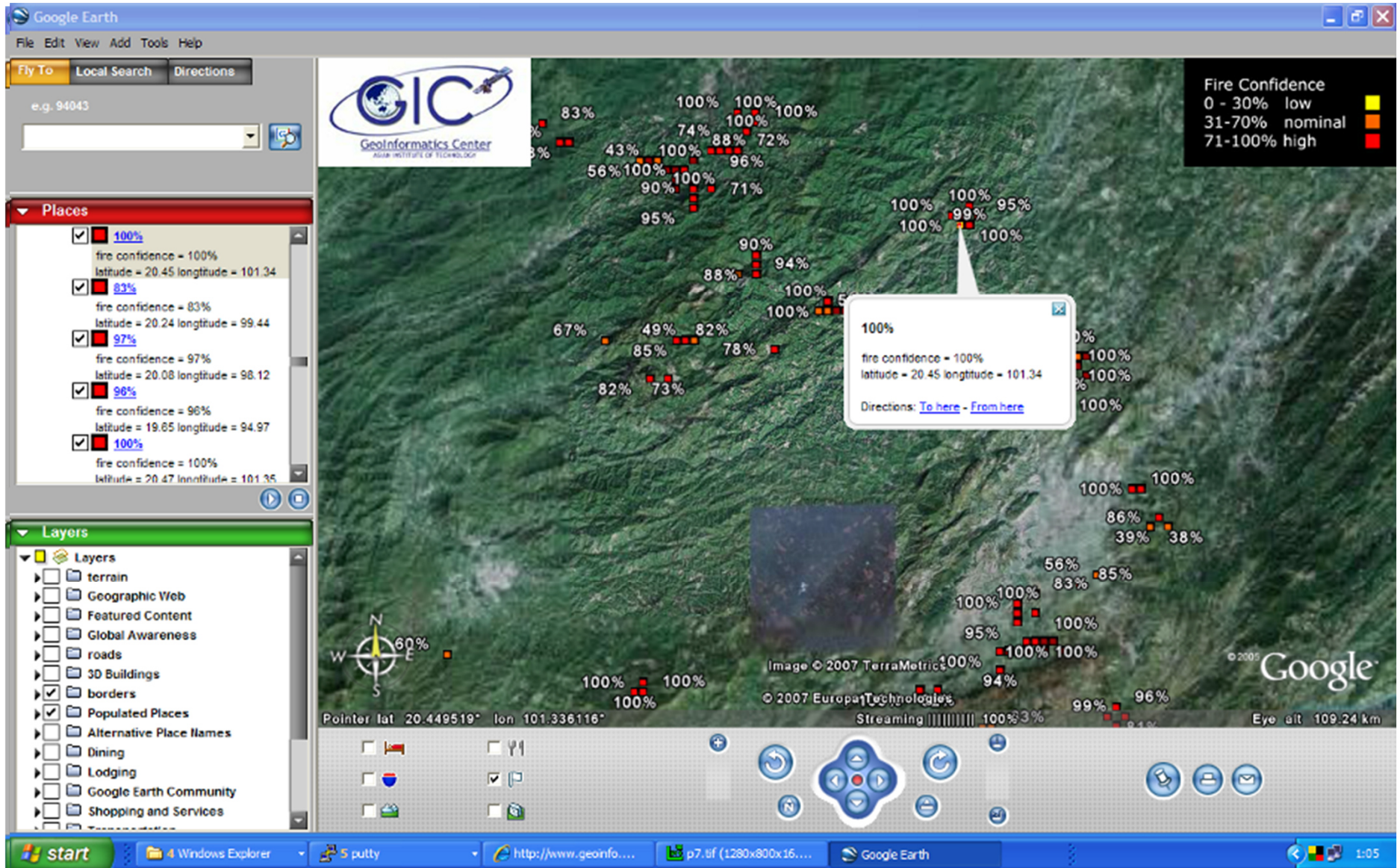
www.geoinfo.ait.ac.th/mod14/



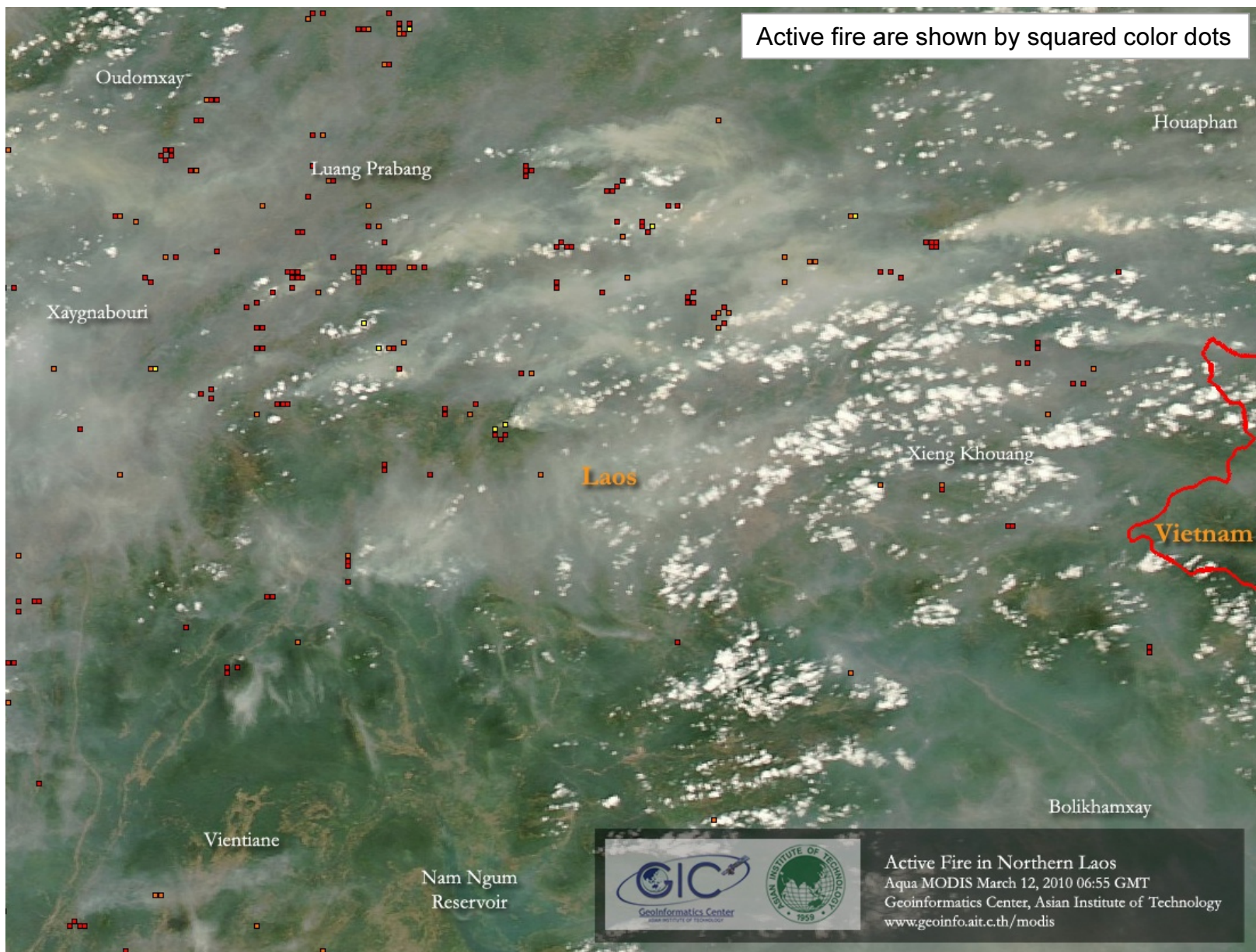
Visualization of Active fire using Google Earth and MODIS TCC250m



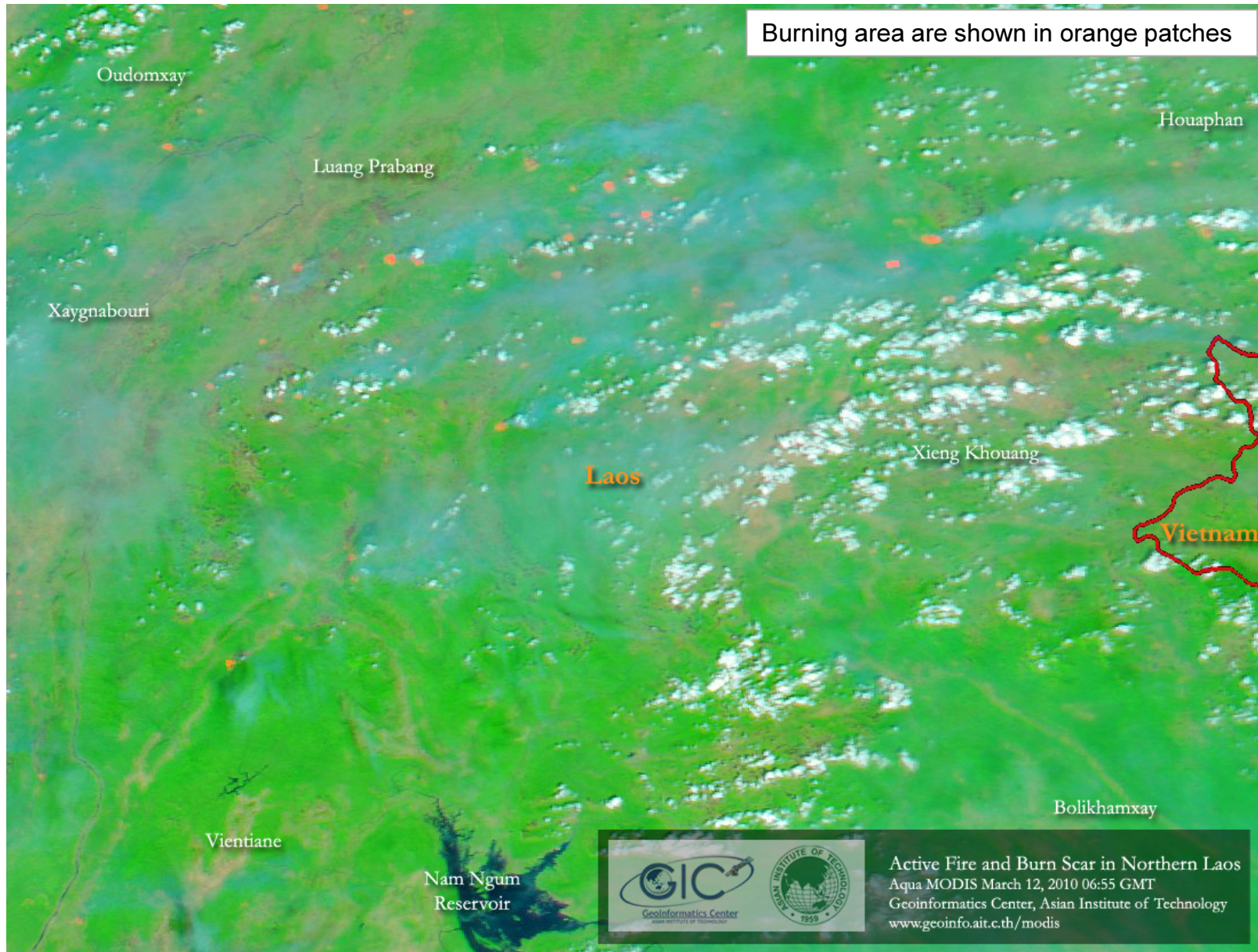
Visualization of Active fire using Google Earth and MODIS TCC250m

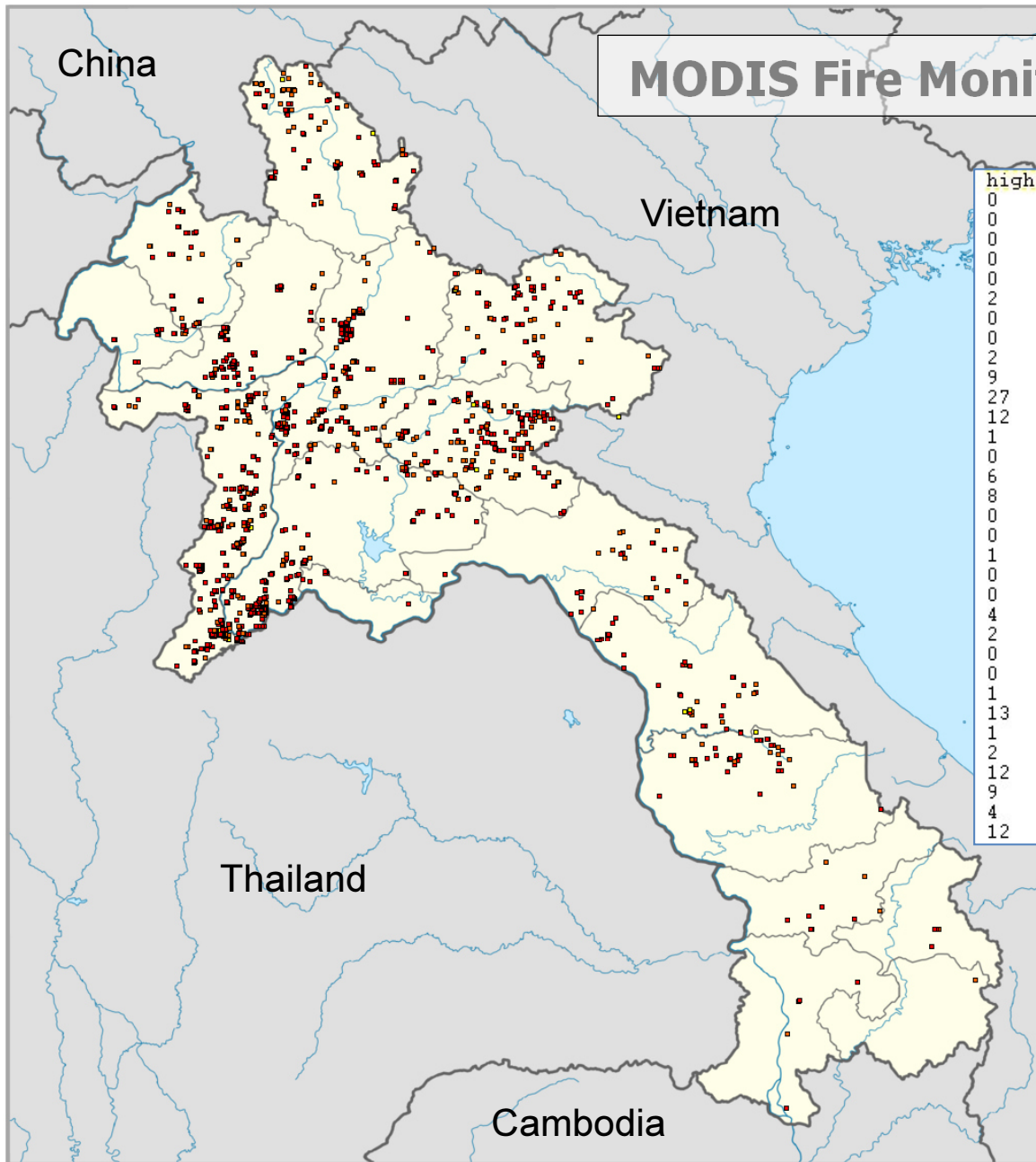


MODIS Burning Area Monitoring System in Regional Level South and Southeast Asia



MODIS Burning Area Monitoring System in Regional Level South and Southeast Asia





MODIS Fire Monitoring System for Laos

high	nom	low	dist	prov
0	1	0	Sanxai	Attapu
0	0	0	Samakhixai	Attapu
0	0	0	Kaiseththa	Attapu
0	0	0	Phouvong	Attapu
0	0	0	Sanamxai	Attapu
2	0	0	Houayxay	Bokeo
0	0	0	Meung	Bokeo
0	0	0	Tonpheung	Bokeo
2	0	0	Paktha	Bokeo
9	3	0	Pha-Oudom	Bokeo
27	20	1	Bolikhamxai	Bolikhamxai
12	14	1	Viengthong	Bolikhamxai
1	0	0	Thaphabat	Bolikhamxai
0	0	0	Pakxan	Bolikhamxai
6	1	0	Pakkading	Bolikhamxai
8	5	0	Khamkheut	Bolikhamxai
0	0	0	Xanasomboun	Champasak
0	0	0	BachiangCh	Champasak
1	0	0	Fakxong	Champasak
0	0	0	Phonethong	Champasak
0	0	0	Pakxe	Champasak
4	1	0	Champasak	Champasak
2	1	0	Pathoumphone	Champasak
0	0	0	Soukhouma	Champasak
0	0	0	Mounlapamok	Champasak
1	0	0	Khong	Champasak
13	4	0	Et	Houaphan
1	3	0	Kiengkho	Houaphan
2	0	0	Sopbao	Houaphan
12	14	1	Viengthong	Bolikhamxai
9	10	0	Xamnua	Houaphan
4	1	0	Viengxai	Houaphan
12	3	0	Houamuang	Houaphan



MODIS Fire and Thermal Anomalies (MOD14) Product for Laos
 This product shows the distribution of fire pixels in Laos, detected by MODIS on board of Aqua on March 05, 2010 06:49GMT;
 total of 1372 pixels, classified to confidence classes as: Low(yellow): 20, Nominal(orange): 358 and High(red): 994
 Production Date : March 07, 2010 18:53:02 ICT by Geoinformatics Center, Asian Institute of Technology, Bangkok, Thailand.
 Website: <http://www.geoinfo.ait.ac.th/modis/> E-mail: geoinfo@ait.ac.th

MODIS Fire Product (MOD14) Information System for Laos

Released on Tue Jul 25 09:56:53 ICT 2006 - Update: Tue Jan 1 16:33:37 ICT 2008

[Instructions](#)

Notes: Data is available since July 27, 2006 until present. The data before this period will be added soon.

Enter your interested values to the following parameters for querying MODIS Fire Information.

(*) denotes required fields.

01. Select a Single or Group of Provinces *

Attapu
Bokeo
Bolikhambxai
Champasak
Houaphan

02. Period of Query

Starting Date: 2006 January 01
Ending Date: 2010 January 01

03. Satellite Overhead Time

Starting to Ending: 02 00 to 20

04. Day/Night Passes

Day Night

05. Fire Reflectance Band2

Minimum to Maximum: -1.0 to 1.0

06. Fire Brightness Temperature Band 21

Minimum to Maximum: 273 to 400

07. Fire Brightness Temperature Band 31

Minimum to Maximum: 273 to 400

08. Fire Power

Minimum to Maximum: 0 to 400

09. Fire Confidence

Minimum to Maximum: 0 to 100

10. MODIS Platform

Terra Aqua

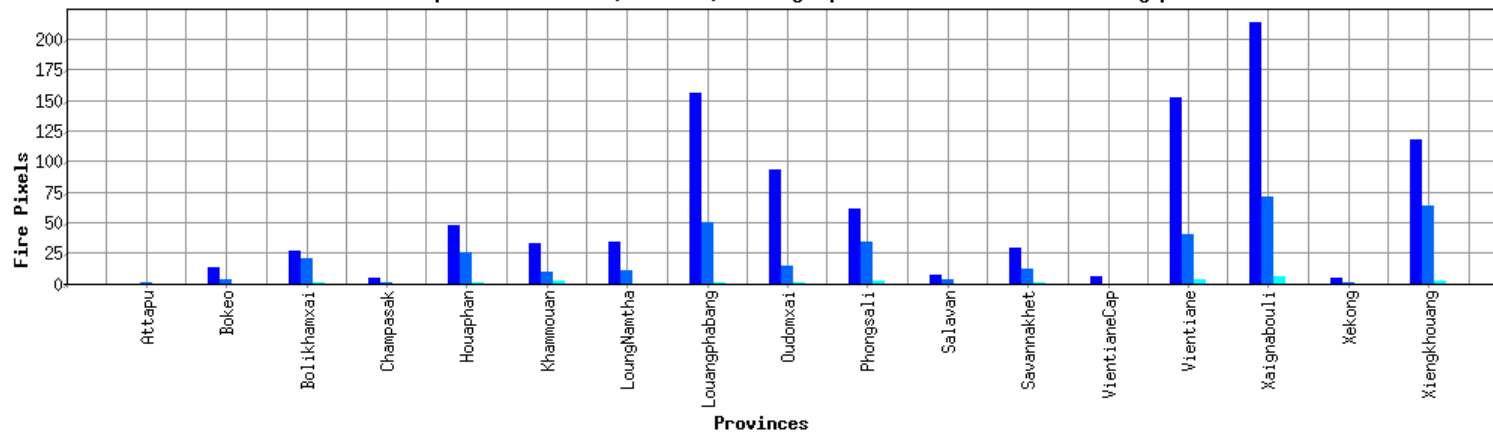
Submit Query Reset Display 20 records per page Conta

MODIS Fire Monitoring System for Laos

RESULT PAGE 792 of 826

id	date	time	daynight	satellite	lat	lon	ref2	T21	T31	Fp	Fc	district	province	country
23589	2010-03-07	06:37:00	Day	Aqua	20.24	104.28	0.27	327.34	299.05	25.38	89	Xamnua	Houaphan	Laos
23590	2010-03-07	06:37:00	Day	Aqua	20.18	103.81	0.27	356.11	303.24	77.4	100	Houamuang	Houaphan	Laos
23591	2010-03-07	06:37:00	Day	Aqua	20.19	103.81	0.27	345.81	301.1	54.2	100	Houamuang	Houaphan	Laos
23592	2010-03-07	06:37:00	Day	Aqua	20.19	103.8	0.27	365.02	305.19	102.14	100	Houamuang	Houaphan	Laos
23593	2010-03-07	06:37:00	Day	Aqua	20.19	103.79	0.29	350.17	305.34	64.01	100	Houamuang	Houaphan	Laos
23594	2010-03-07	06:37:00	Day	Aqua	20.15	103.46	0.25	316.36	303.33	10.57	71	Viengthong	Bolikhambxai	Laos
23595	2010-03-07	06:37:00	Day	Aqua	20.03	102.58	0.24	320.18	301.68	14.68	80	Pakxeng	Louangphabang	Laos
23596	2010-03-07	06:37:00	Day	Aqua	19.87	101.48	0.23	319.36	305.05	13.5	79	Houn	Oudomxai	Laos
23597	2010-03-07	06:37:00	Day	Aqua	19.76	100.73	0.21	314.01	302.67	5.16	27	Xianghon	Xaignabouli	Laos
23598	2010-03-07	06:37:00	Day	Aqua	20.27	104.34	0.24	313.8	296.69	11.16	66	Viengxai	Houaphan	Laos
23599	2010-03-07	06:37:00	Day	Aqua	20.22	103.92	0.26	312.2	300.49	7.21	52	Houamuang	Houaphan	Laos
23600	2010-03-07	06:37:00	Day	Aqua	20.22	103.91	0.27	310.77	299.52	6.27	33	Houamuang	Houaphan	Laos
23601	2010-03-07	06:37:00	Day	Aqua	20.07	102.86	0.26	334.89	300.75	36.42	96	Pakxeng	Louangphabang	Laos
23602	2010-03-07	06:37:00	Day	Aqua	20.07	102.85	0.26	332.08	300.91	32.24	94	Pakxeng	Louangphabang	Laos
23603	2010-03-07	06:37:00	Day	Aqua	19.77	100.73	0.18	322.01	303.85	14.23	83	Xianghon	Xaignabouli	Laos
23604	2010-03-07	06:37:00	Day	Aqua	20.04	102.53	0.2	328.69	300.78	25.43	90	Pakxeng	Louangphabang	Laos
23605	2010-03-07	06:37:00	Day	Aqua	20.04	102.52	0.21	377.61	304.13	145.67	100	Pakxeng	Louangphabang	Laos
23606	2010-03-07	06:37:00	Day	Aqua	20.03	102.45	0.2	316.09	304.11	7.29	72	Pakxeng	Louangphabang	Laos
23607	2010-03-07	06:37:00	Day	Aqua	19.93	101.74	0.19	326.63	305.22	19.81	88	Chomphet	Louangphabang	Laos
23608	2010-03-07	06:37:00	Day	Aqua	19.92	101.73	0.2	322.09	304.31	13.56	83	Chomphet	Louangphabang	Laos

Fire Pixels(Hotspots) of March 05, 2010 06:49GMT by Aqua MODIS in Laos classified by provinces



MODIS Fire Product (MOD14) Information System for Laos

[Instructions](#)

Released on Tue Jul 25 09:56:53 ICT 2006 - Update: Tue Jan 1 16:33:37 ICT 2008

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Enter your interested values to the following parameters for querying MODIS Fire Information.

(*) denotes required fields.

01. Select a Single or Group of Provinces *	Attapu Bokeo Bolikhamxai Champasak Houaphan
02. Period of Query	Starting Date: 2006 January 01 Ending Date: 2010 January 01
03. Satellite Overhead Time	Starting to Ending: 02 00 to 20 59 GMT
04. Day/Night Passes	<input checked="" type="checkbox"/> Day <input type="checkbox"/> Night
05. Fire Reflectance Band2	Minimum to Maximum: -1.0 to 1.0 (Unitless)
06. Fire Brightness Temperature Band 21	Minimum to Maximum: 273 to 400 Kelvin
07. Fire Brightness Temperature Band 31	Minimum to Maximum: 273 to 400 Kelvin
08. Fire Power	Minimum to Maximum: 0 to 400 Watt/m ²
09. Fire Confidence	Minimum to Maximum: 0 to 100 %
10. MODIS Platform	<input checked="" type="checkbox"/> Terra <input type="checkbox"/> Aqua

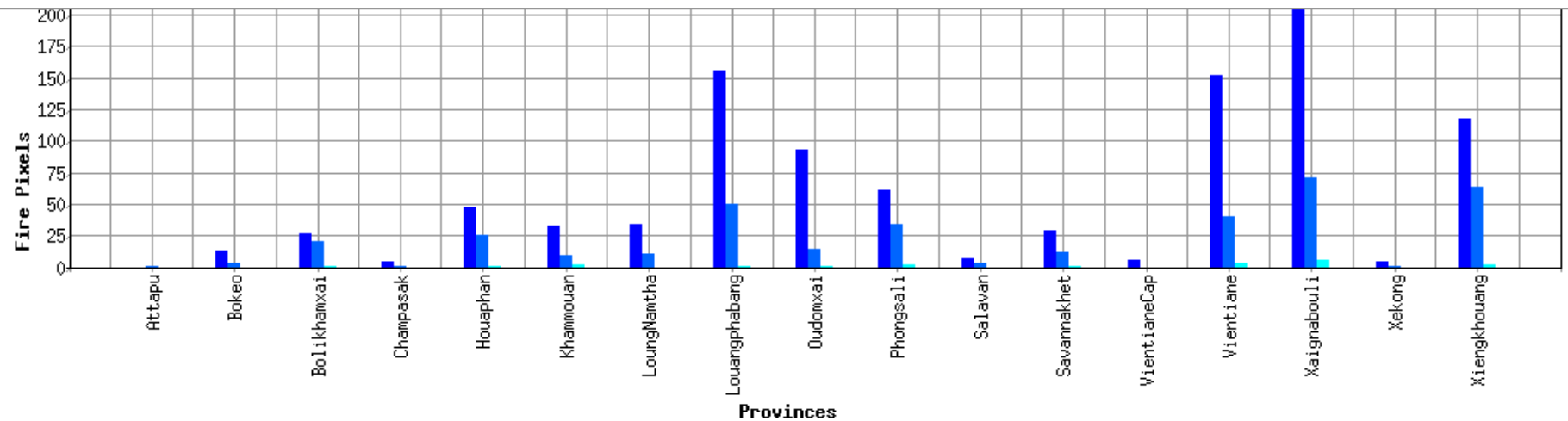
Submit Query

Reset

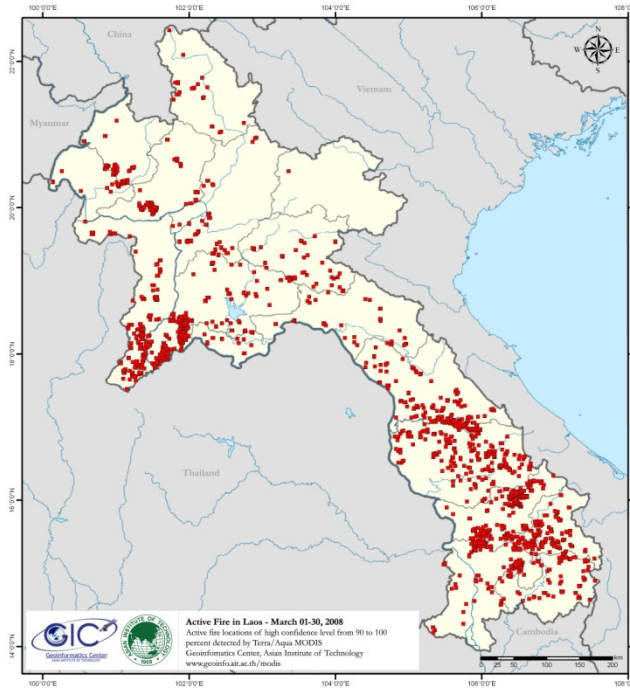
Display 20 records per page

Contact [System Developer](#)

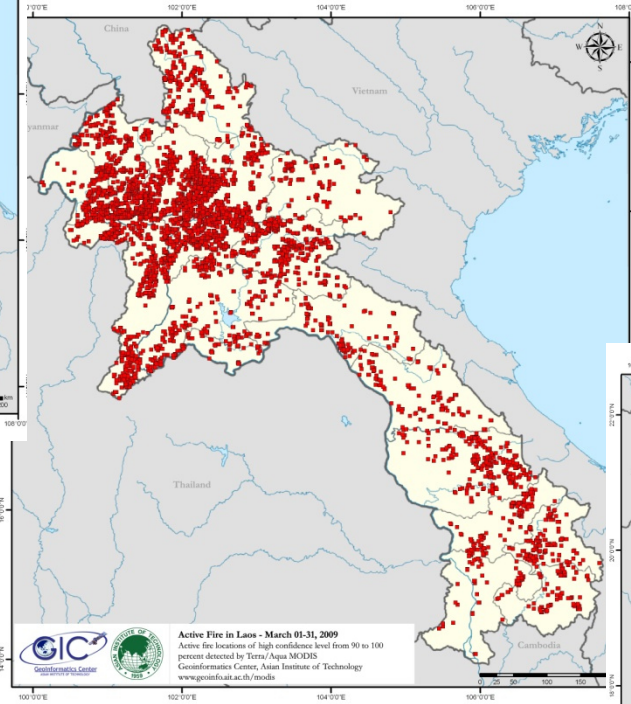
id	date	time	daynight	satellite	lat	lon	ref2	T21	T31	Fp	Fc	district	province	country
23589	2010-03-07	06:37:00	Day	Aqua	20.24	104.28	0.27	327.34	299.05	25.38	89	Xamnua	Houaphan	Laos
23590	2010-03-07	06:37:00	Day	Aqua	20.18	103.81	0.27	356.11	303.24	77.4	100	Houamuang	Houaphan	Laos
23591	2010-03-07	06:37:00	Day	Aqua	20.19	103.81	0.27	345.81	301.1	54.2	100	Houamuang	Houaphan	Laos
23592	2010-03-07	06:37:00	Day	Aqua	20.19	103.8	0.27	365.02	305.19	102.14	100	Houamuang	Houaphan	Laos
23593	2010-03-07	06:37:00	Day	Aqua	20.19	103.79	0.29	350.17	305.34	64.01	100	Houamuang	Houaphan	Laos
23594	2010-03-07	06:37:00	Day	Aqua	20.15	103.46	0.25	316.36	303.33	10.57	71	Viengthong	Bolikhambxai	Laos
23595	2010-03-07	06:37:00	Day	Aqua	20.03	102.58	0.24	320.18	301.68	14.68	80	Pakxeng	Louangphabang	Laos
23596	2010-03-07	06:37:00	Day	Aqua	19.87	101.48	0.23	319.36	305.05	13.5	79	Houn	Oudomxai	Laos
23597	2010-03-07	06:37:00	Day	Aqua	19.76	100.73	0.21	314.01	302.67	5.16	27	Xianghon	Xaignabouli	Laos
23598	2010-03-07	06:37:00	Day	Aqua	20.27	104.34	0.24	313.8	296.69	11.16	66	Viengxai	Houaphan	Laos
23599	2010-03-07	06:37:00	Day	Aqua	20.22	103.92	0.26	312.2	300.49	7.21	52	Houamuang	Houaphan	Laos
23600	2010-03-07	06:37:00	Day	Aqua	20.22	103.91	0.27	310.77	299.52	6.27	33	Houamuang	Houaphan	Laos
23601	2010-03-07	06:37:00	Day	Aqua	20.07	102.86	0.26	334.89	300.75	36.42	96	Pakxeng	Louangphabang	Laos
23602	2010-03-07	06:37:00	Day	Aqua	20.07	102.85	0.26	332.08	300.91	32.24	94	Pakxeng	Louangphabang	Laos
23603	2010-03-07	06:37:00	Day	Aqua	19.77	100.73	0.18	322.01	303.85	14.23	83	Xianghon	Xaignabouli	Laos
23604	2010-03-07	06:37:00	Day	Aqua	20.04	102.53	0.2	328.69	300.78	25.43	90	Pakxeng	Louangphabang	Laos
23605	2010-03-07	06:37:00	Day	Aqua	20.04	102.52	0.21	377.61	304.13	145.67	100	Pakxeng	Louangphabang	Laos
23606	2010-03-07	06:37:00	Day	Aqua	20.03	102.45	0.2	316.09	304.11	7.29	72	Pakxeng	Louangphabang	Laos
23607	2010-03-07	06:37:00	Day	Aqua	19.93	101.74	0.19	326.63	305.22	19.81	88	Chomphet	Louangphabang	Laos
23608	2010-03-07	06:37:00	Day	Aqua	19.92	101.73	0.2	322.09	304.31	13.56	83	Chomphet	Louangphabang	Laos



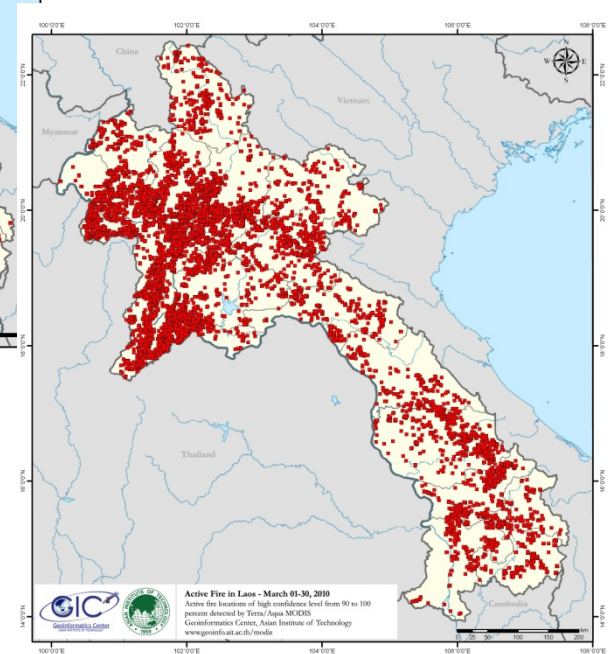
Locations of Active Fire Detected by MODIS in Laos for March 2008, 2009 and 2010 (fire confidence 90-100%)



March 01-31, 2008



March 01-31, 2009



March 01-31, 2010

MODIS Fire Product (MOD14) Information System for Laos
Release on Tue Jul 21 16:59:53 ICT 2009. Contact: Tue Jan 14 16:59:57 ICT 2008

Enter your interested values for the following parameters for querying MODIS Fire Information.
(*) denotes required fields.

01. Select a Single or Group of Provinces
 Allprovinces
 Bouliakhumai
 Champasak
 Houaphan

02. Period of Query
 Starting Date: 2008 January 01
 Ending Date: 2010 January 01

03. Satellite Overhead Time
 Starting to Ending: 02:00 to 20:00 (GMT)

04. Day/Night Passes
 Day Night

05. Fire Reflectance Band
 Minimum to Maximum: 12 to 12 (Default)

06. Fire Brightness Temperature
 Minimum to Maximum: 273 to 320 (Default)

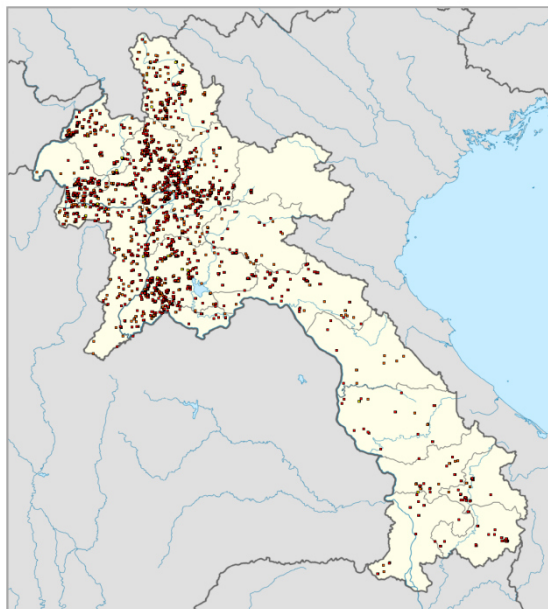
07. Fire Brightness Temperature
 Minimum to Maximum: 273 to 320 (Default)



08. Fire Power
 Minimum to Maximum: 0 to 1000

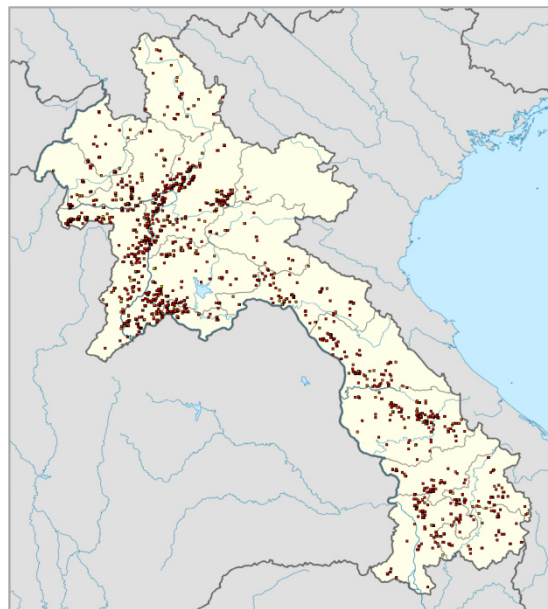
09. Fire Confidence
 Minimum to Maximum: 90 to 100



Submit Query Filtered Results

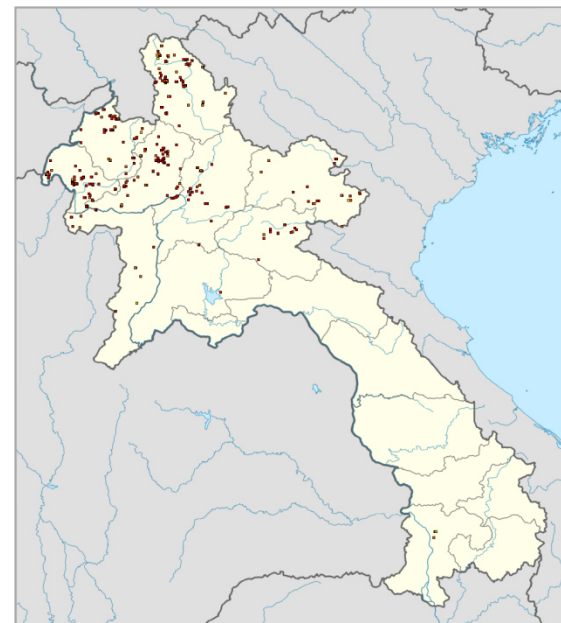
ID	date	time	Satellite	lat	lon	hft	T21	T31	Po	Pc	district	province	country	
23549	2010-03-07	06:37:00	Day	Aqua	20.24	104.26	0.27	227.34	299.05	25.38	09	Khammouang	Laos	
23550	2010-03-07	06:37:00	Day	Aqua	20.38	103.81	0.27	256.11	303.24	77.4	100	Houamuang	Laos	
23551	2010-03-07	06:37:00	Day	Aqua	20.83	103.85	0.27	245.81	301.1	54.2	100	Houamuang	Laos	
23552	2010-03-07	06:37:00	Day	Aqua	20.38	103.8	0.27	265.02	305.19	102.14	100	Houamuang	Laos	
23553	2010-03-07	06:37:00	Day	Aqua	20.38	103.78	0.29	266.17	305.1	64.91	100	Houamuang	Laos	
23554	2010-03-07	06:37:00	Day	Aqua	20.18	103.66	0.25	216.96	302.11	129.97	71	Viangkhong	Bouliakhumai	Laos
23555	2010-03-07	06:37:00	Day	Aqua	20.97	102.58	0.24	320.18	301.68	34.68	80	Pakxeng	Louanghabang	Laos
23556	2010-03-07	06:37:00	Day	Aqua	18.83	103.66	0.23	210.56	305.05	13.5	79	Heuan	Oudoumxi	Laos
23557	2010-03-07	06:37:00	Day	Aqua	18.76	106.73	0.21	314.01	302.67	5.16	27	Kiangkhong	Xaignabouli	Laos
23558	2010-03-07	06:37:00	Day	Aqua	20.27	104.34	0.24	313.8	306.05	11.16	66	Viangxay	Houaphan	Laos
23559	2010-03-07	06:37:00	Day	Aqua	20.23	103.92	0.26	312.2	306.05	7.21	52	Houamuang	Houaphan	Laos
23600	2010-03-07	06:37:00	Day	Aqua	20.22	103.93	0.27	310.77	299.1	6.27	33	Houamuang	Houaphan	Laos
23601	2010-03-07	06:37:00	Day	Aqua	20.03	102.86	0.26	324.89	300.71	28.42	96	Pakxeng	Louanghabang	Laos
23602	2010-03-07	06:37:00	Day	Aqua	20.07	102.85	0.26	332.08	300.81	32.24	94	Pakxeng	Louanghabang	Laos
23603	2010-03-07	06:37:00	Day	Aqua	19.77	100.73	0.18	322.01	303.01	14.23	83	Kiangkhong	Xaignabouli	Laos
23604	2010-03-07	06:37:00	Day	Aqua	20.94	102.93	0.2	328.69	300.7	25.43	90	Pakxeng	Louanghabang	Laos
23605	2010-03-07	06:37:00	Day	Aqua	20.94	102.92	0.21	377.61	304.13	145.67	100	Pakxeng	Louanghabang	Laos
23606	2010-03-07	06:37:00	Day	Aqua	20.03	102.45	0.2	318.09	304.11	7.29	72	Pakxeng	Louanghabang	Laos
23607	2010-03-07	06:37:00	Day	Aqua	19.08	104.74	0.19	326.43	302.22	19.81	68	Chomphet	Louanghabang	Laos
23608	2010-03-07	06:37:00	Day	Aqua	18.92	104.73	0.2	322.09	304.11	13.56	83	Chomphet	Louanghabang	Laos







MODIS Fire and Thermal Anomalies (MOD14) Product for Laos
 This product shows the distribution of fire pixels in Laos, detected by MODIS on board of Aqua on March 25, 2010 06:24GMT; total of 2092 pixels, classified to confidence classes as: Low(yellow): 41, Normal(orange): 460 and High(red): 1592.
 Production Date: March 25, 2010 03:25:44 ICT by Geoinformatics Center, Asian Institute of Technology, Bangkok, Thailand.
 Website: <http://www.geoinfo.aist.ac.th/modis/> E-mail: geoinfo@ait.ac.th







MODIS Fire and Thermal Anomalies (MOD14) Product for Laos
 This product shows the distribution of fire pixels in Laos, detected by MODIS on board of Aqua on March 16, 2010 09:31GMT; total of 1717 pixels, classified to confidence classes as: Low(yellow): 16, Normal(orange): 332 and High(red): 1367.
 Production Date: March 17, 2010 02:28:59 ICT by Geoinformatics Center, Asian Institute of Technology, Bangkok, Thailand.
 Website: <http://www.geoinfo.aist.ac.th/modis/> E-mail: geoinfo@ait.ac.th





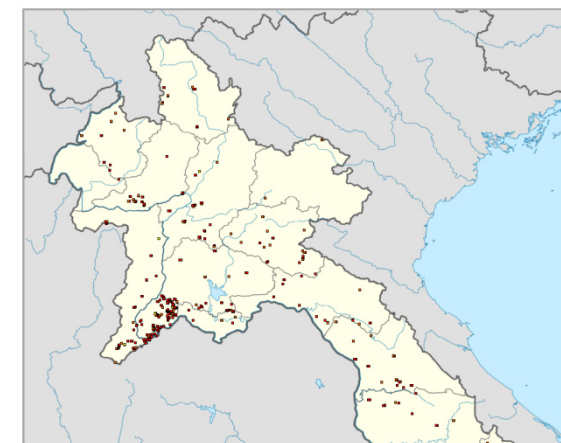


MODIS Fire and Thermal Anomalies (MOD14) Product for Laos
 This product shows the distribution of fire pixels in Laos, detected by MODIS on board of Aqua on April 07, 2010 06:55GMT; total of 941 pixels, classified to confidence classes as: Low(yellow): 6, Normal(orange): 86 and High(red): 245.
 Production Date: March 18, 2010 15:34:04 ICT by Geoinformatics Center, Asian Institute of Technology, Bangkok, Thailand.
 Website: <http://www.geoinfo.aist.ac.th/modis/> E-mail: geoinfo@ait.ac.th





MODIS Fire and Thermal Anomalies (MOD14) Product for Laos
 This product shows the distribution of fire pixels in Laos, detected by MODIS on board of Aqua on March 30, 2007 05:55GMT; total of 978 pixels, classified to confidence classes as: Low(yellow): 27, Normal(orange): 267 and High(red): 678.
 Production Date: April 06, 2010 12:39:29 ICT by Geoinformatics Center, Asian Institute of Technology, Bangkok, Thailand.
 Website: <http://www.geoinfo.aist.ac.th/modis/> E-mail: geoinfo@ait.ac.th

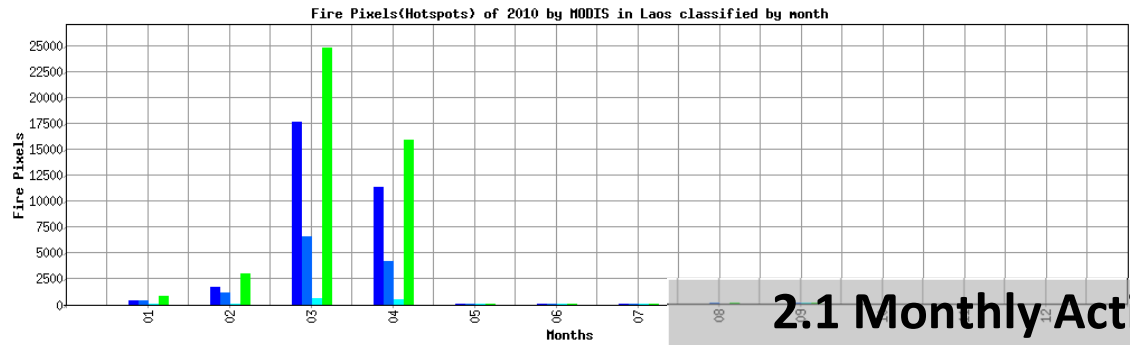
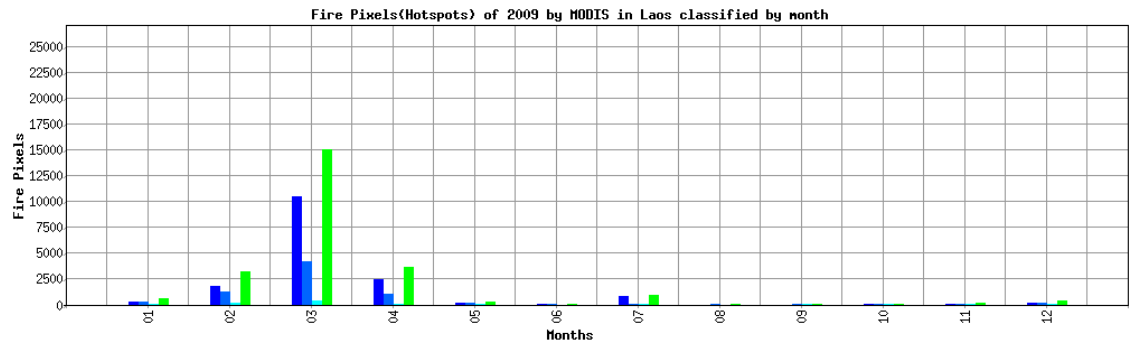
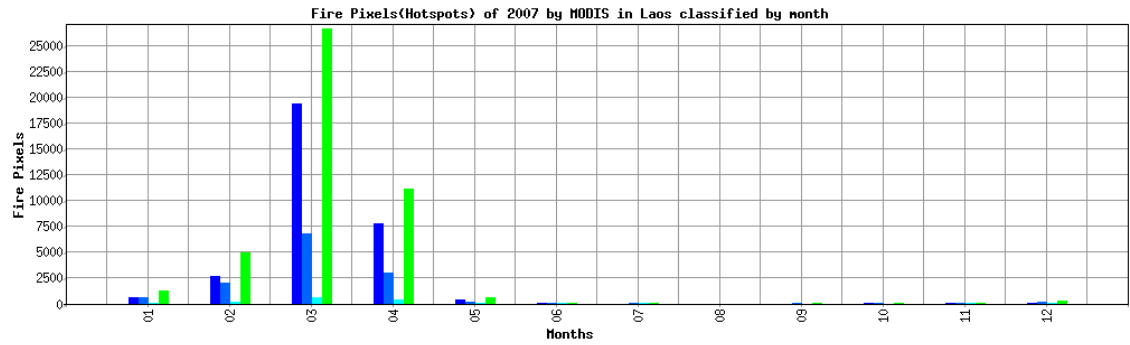
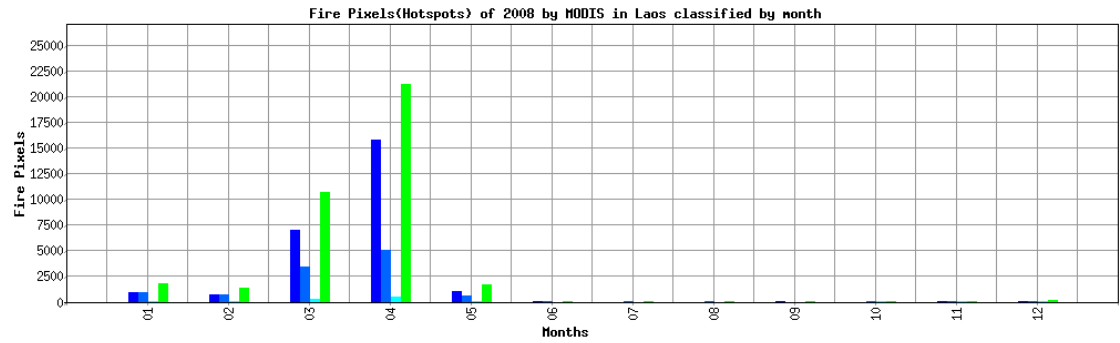




MODIS Fire and Thermal Anomalies (MOD14) Product for Laos
 This product shows the distribution of fire pixels in Laos, detected by MODIS on board of Aqua on March 19, 2010 21:33:50 ICT by Geoinformatics Center, Asian Institute of Technology, Bangkok, Thailand.
 Production Date: March 19, 2010 21:33:50 ICT by Geoinformatics Center, Asian Institute of Technology, Bangkok, Thailand.
 Website: <http://www.geoinfo.aist.ac.th/modis/> E-mail: geoinfo@ait.ac.th

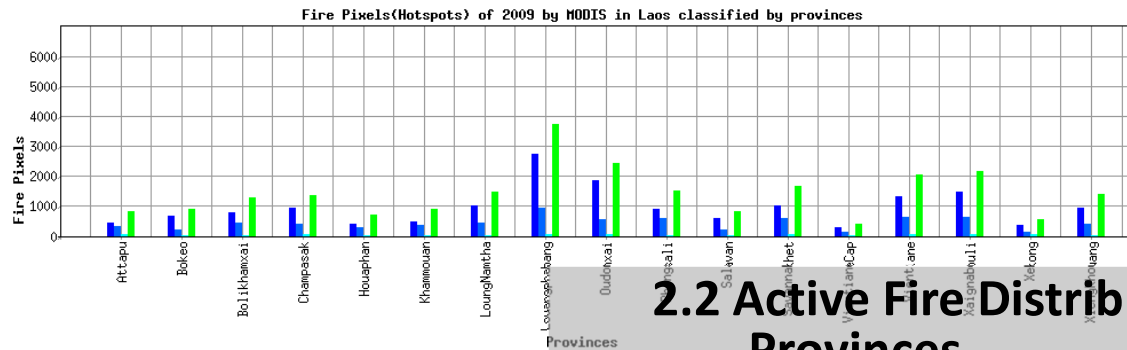
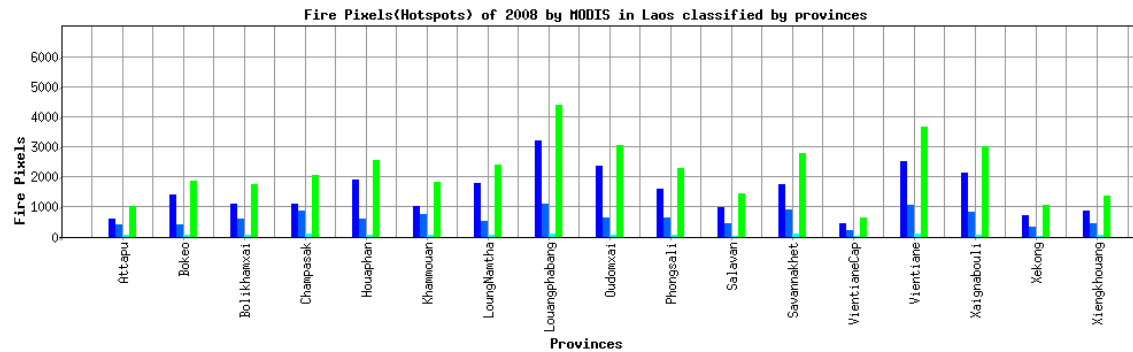
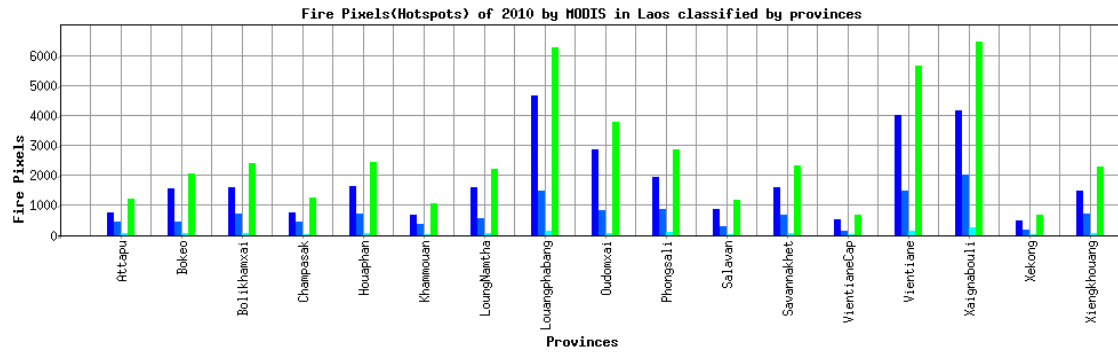
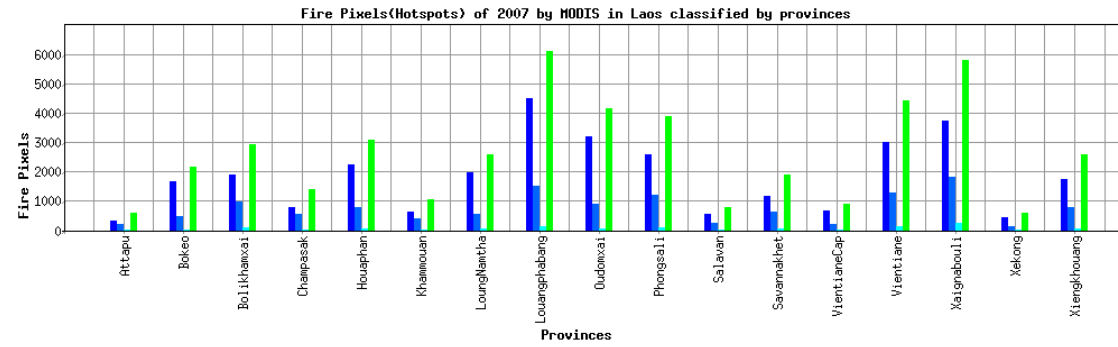


GMS Country	Starting observation date	Ending observation date	Total active fire locations
Cambodia	2006-07-29	2010-09-13	96,883
Laos	2006-09-02	2010-09-10	137,081
Myanmar	2006-07-30	2010-09-07	299,084
Thailand	2006-07-29	2010-09-07	116,647
Vietnam	2006-07-27	2010-09-13	60,590

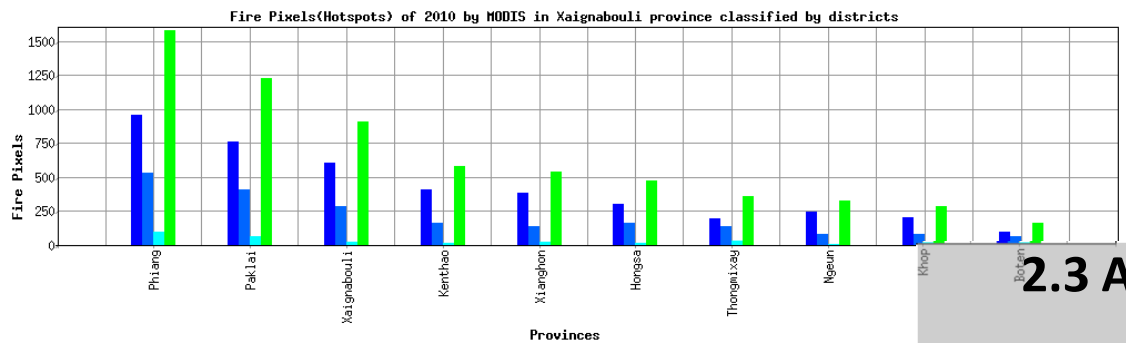
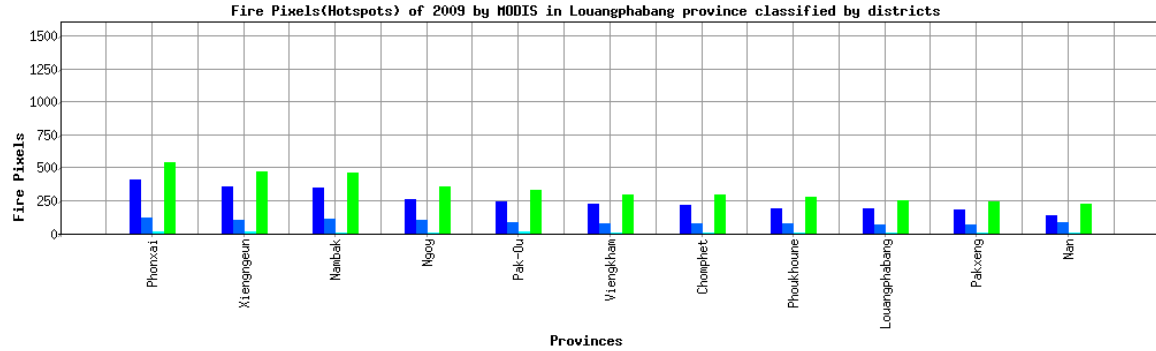
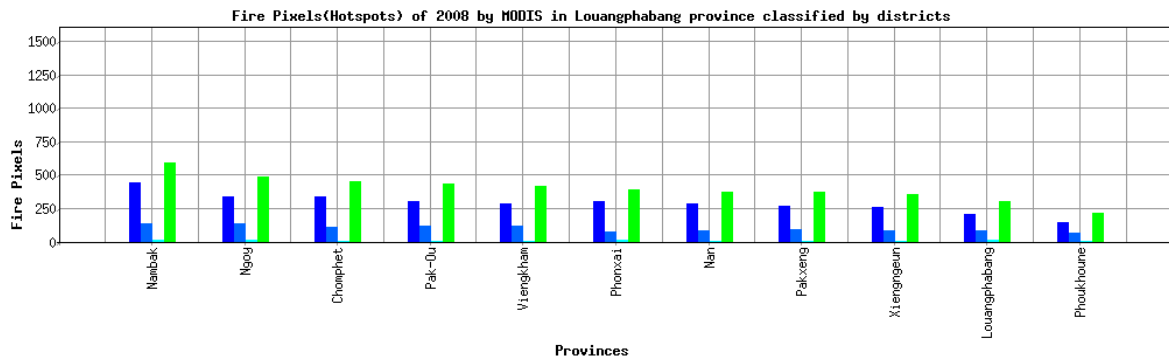
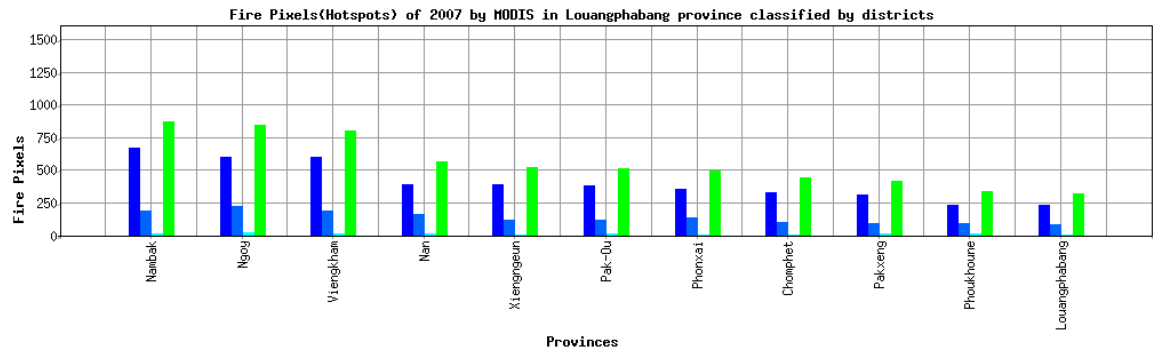
Table 1 Active fire detected by MODIS in the GMS region



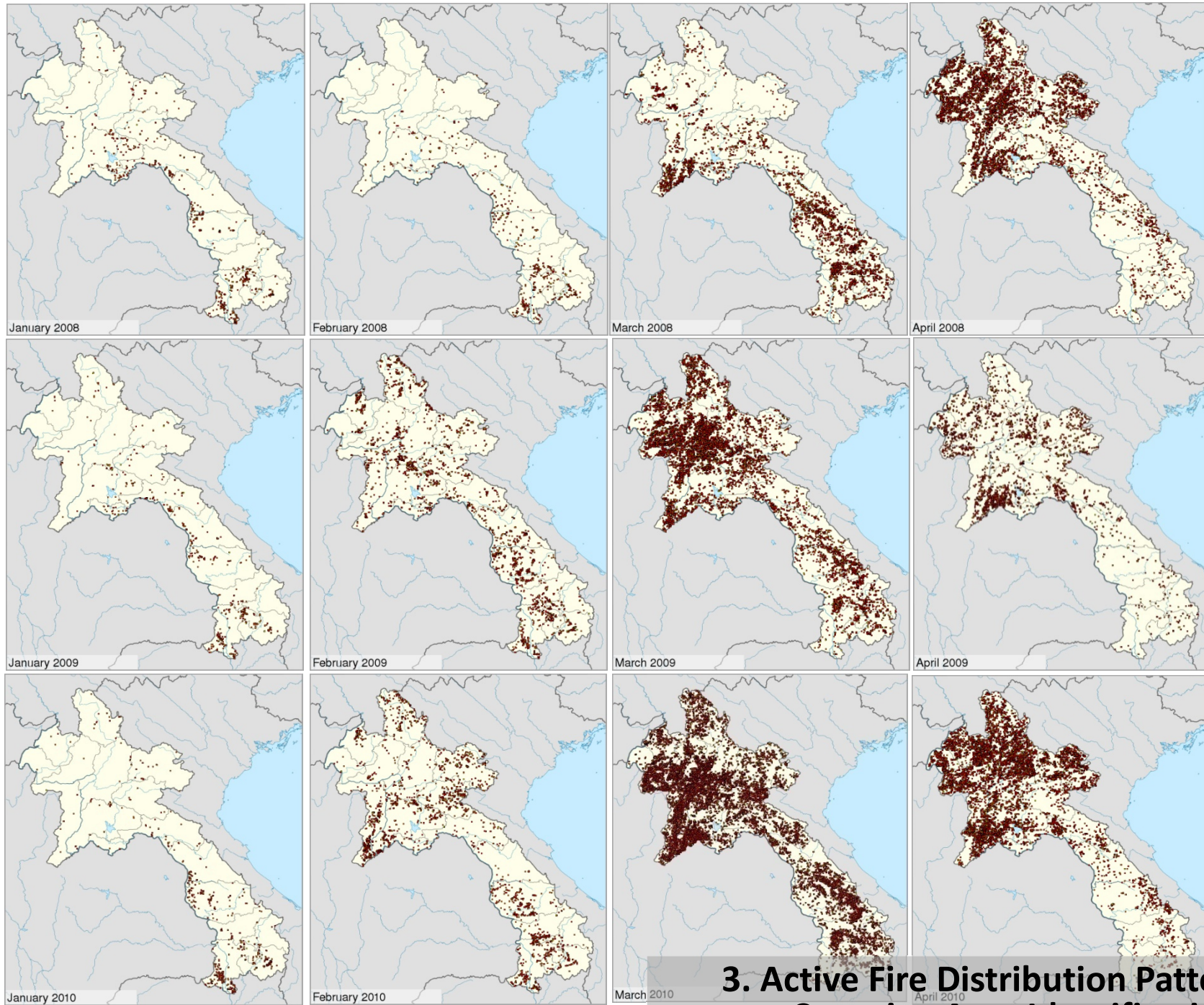
2.1 Monthly Active Fire Distribution



2.2 Active Fire Distribution by Provinces

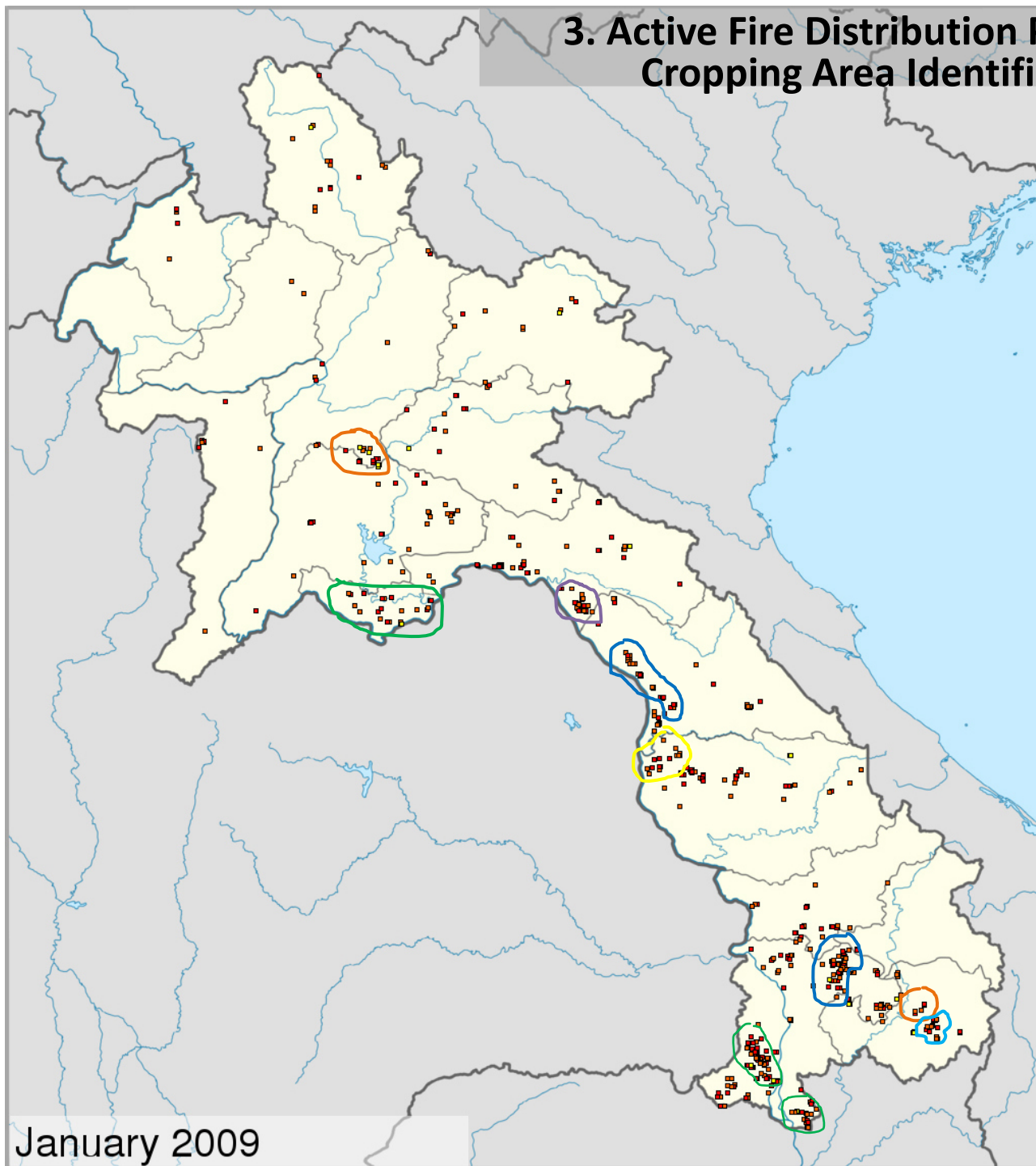


2.3 Active Fire Distribution by District



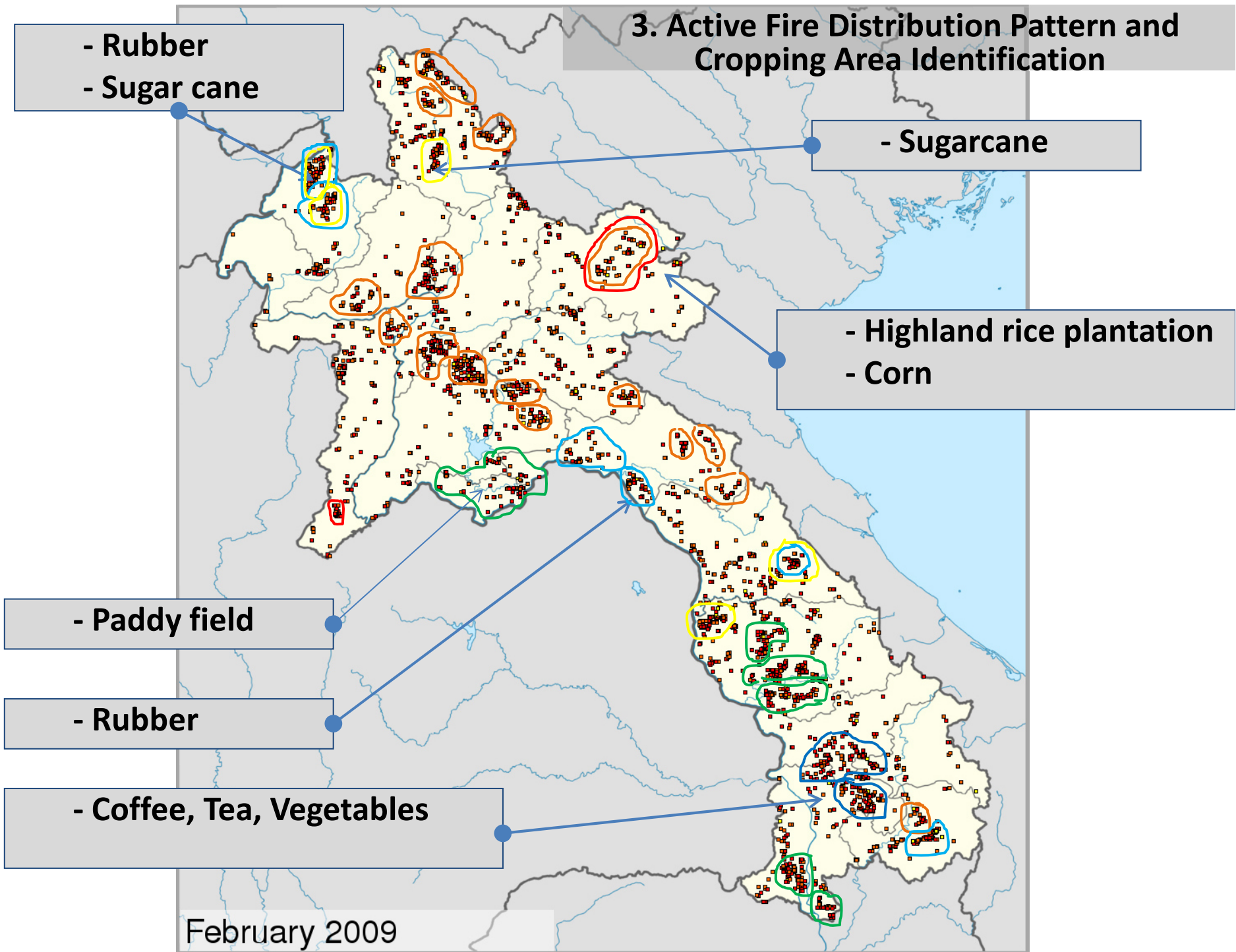
3. Active Fire Distribution Pattern and Cropping Area Identification

3. Active Fire Distribution Pattern and Cropping Area Identification

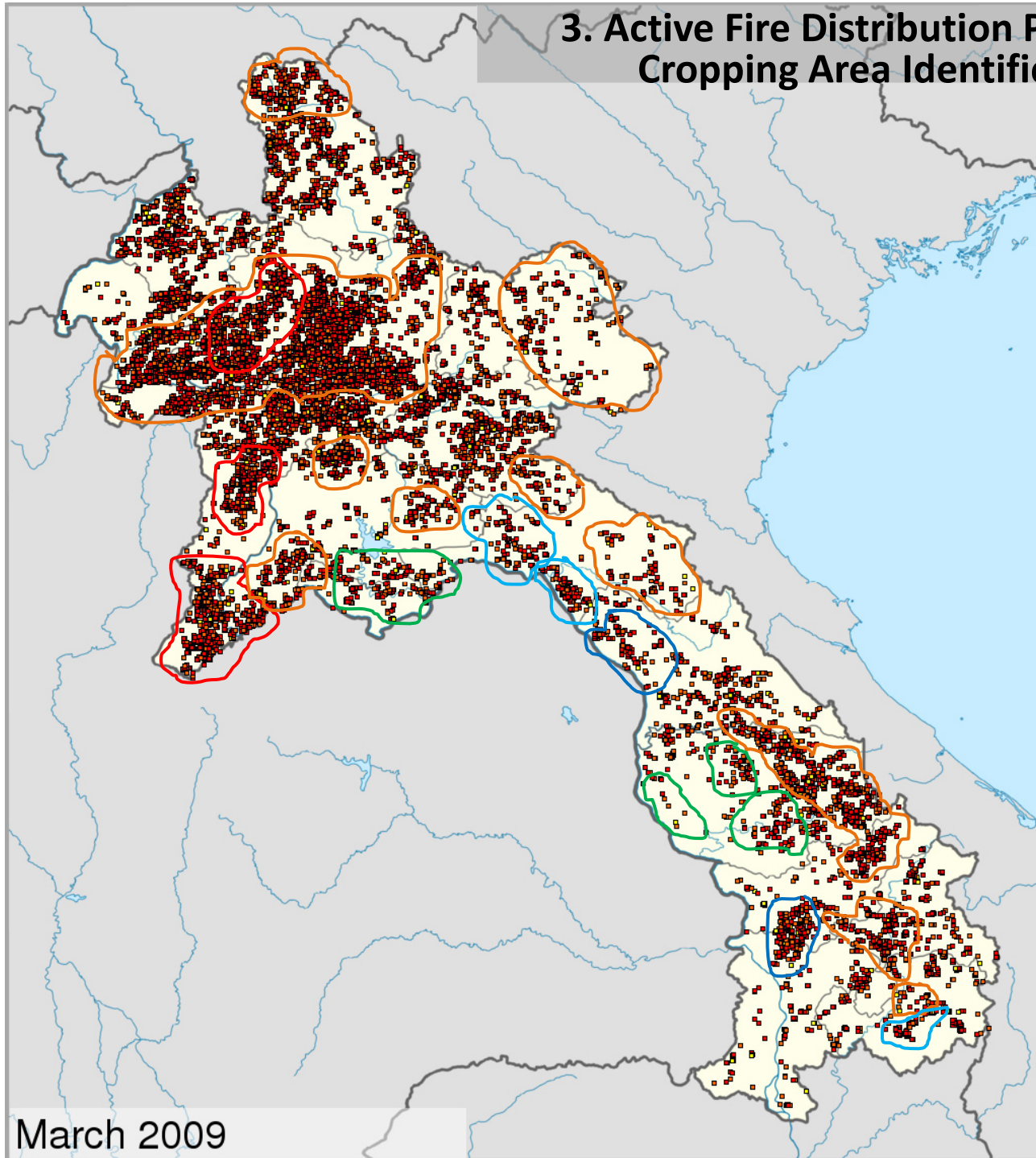


January 2009

3. Active Fire Distribution Pattern and Cropping Area Identification



3. Active Fire Distribution Pattern and Cropping Area Identification



March 2009

MODIS Imagery and Products for Land, Ocean and Atmospheric Near Real Time Monitoring in South and Southeast Asian Region available in Geoinformatics Center, Asian Institute of Technology

1. MODIS Imagery:

Land cover, Ocean Color and Smoke/Haze in True Color 250m Resolution

www.geoinfo.ait.ac.th/modis/tcc250/TCC250_2010.html

Active Fire and Thermal Anomaly

www.geoinfo.ait.ac.th/mod14/pic_mod14.php

Flood

www.geoinfo.ait.ac.th/modis/modis_flood/

Tropical Typhoons and Cyclones

www.geoinfo.ait.ac.th/modis/modis_typhoon/

2. MODIS Products

MOD14: Active Fire and Thermal Anomalies Near Real-time Monitoring System

•Regional Level (South and Southeast Asia)

- www.geoinfo.ait.ac.th/mod14/

•Country Level (Laos)

- www.geoinfo.ait.ac.th/mod14/index_lao0.php

MOD28: Sea Surface Temperature (SST)

www.geoinfo.ait.ac.th/modis/Level2/MOD28/MOD28.2010.html

MOD21: Chlorophyll a Pigment Concentration

www.geoinfo.ait.ac.th/modis/Level2/MOD21/MOD21.2010.html

MOD35: Cloud Masking

www.geoinfo.ait.ac.th/modis/Level2/MOD35/MOD35.2010.html

MODIS Cloud-Free 10-Day NDVI Composite Products

www.geoinfo.ait.ac.th/modis/Level3/MOD_NDVI_COMP/index.php



