



Sentinel Asia Success Story and Capacity Building Activities



November 2014

Rio Tanabe

Disaster Management Support Systems Office

Japan Aerospace Exploration Agency

Contents

- 1. Sentinel Asia Success Story*
- 2. Sentinel Asia Emergency Observation
Success Story*
- 3. Sentinel Asia System Training*

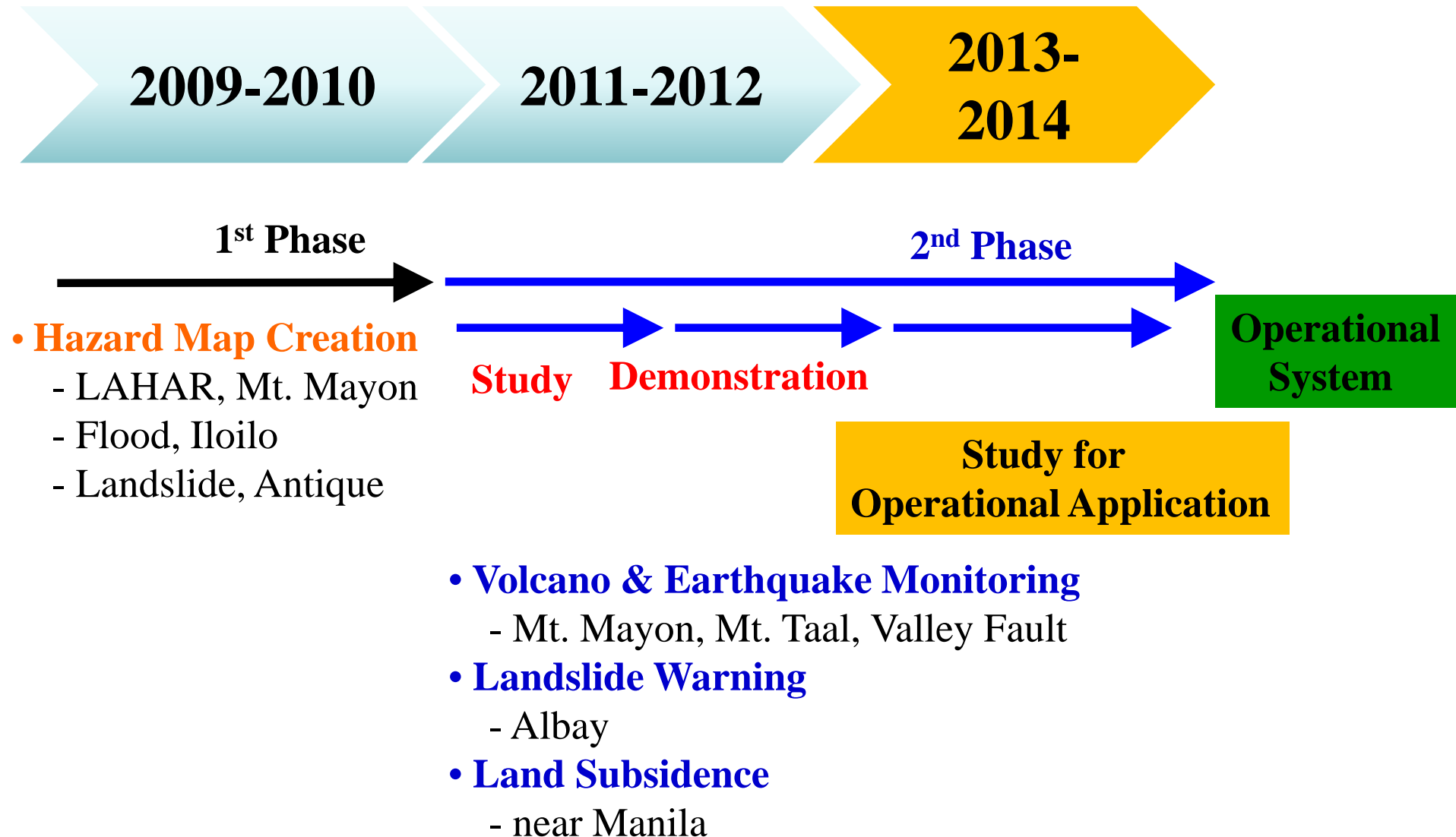
1. Sentinel Asia Success Story

Sentinel Asia Success Story

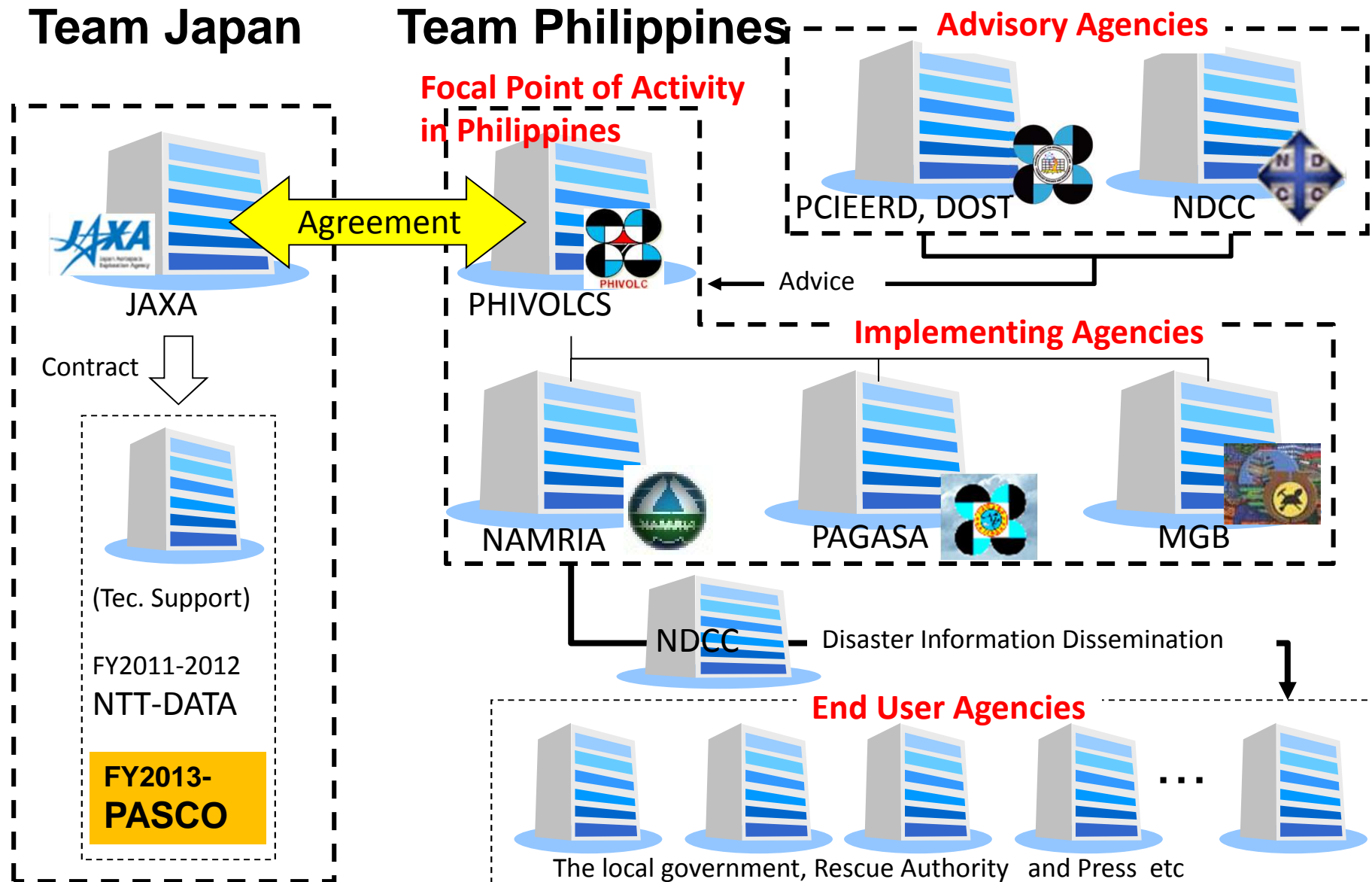
- Regional cooperation to promote utilization of Sentinel Asia by end-users in each country
 - Local awareness and knowledge transfer through capacity building
 - Human resources and human network development
-
- Success Story in the Philippines from 2009
 - EO (Emergency Observation) Success Story by Mini-Project in Sri Lanka, Philippines, Bangladesh, and Myanmar from 2013
 - In 2014, Indonesia & Vietnam are included for target countries EO Success Story Mini-Project.

*Sentinel Asia Success Story
in the Philippines (PHSS)*

Schedule & Activities

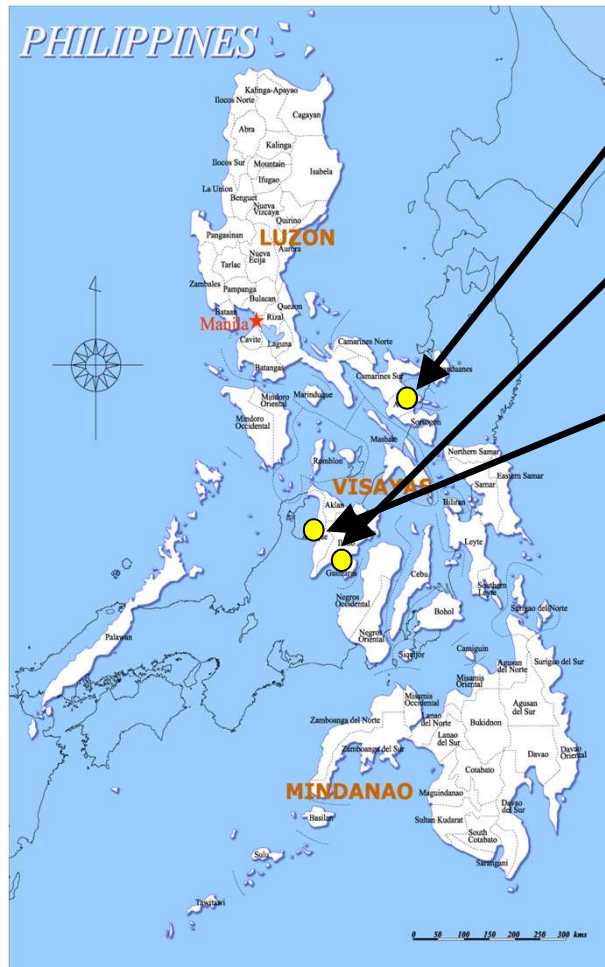


Framework of Sentinel Asia Success Story in the Philippines



Success Story in the Philippines (1st Phase: 2009-2010)

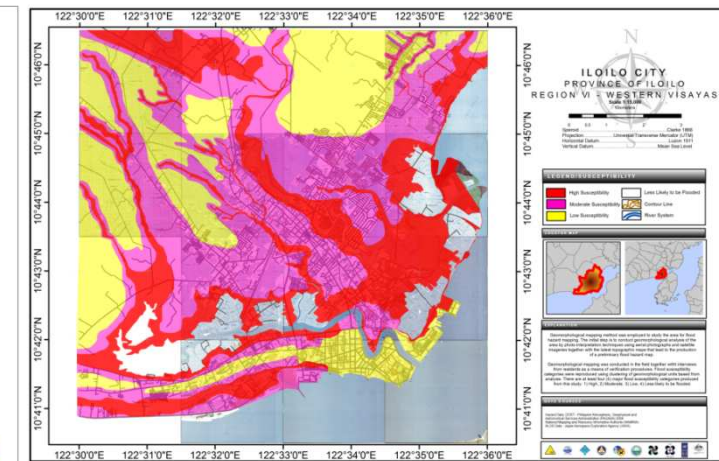
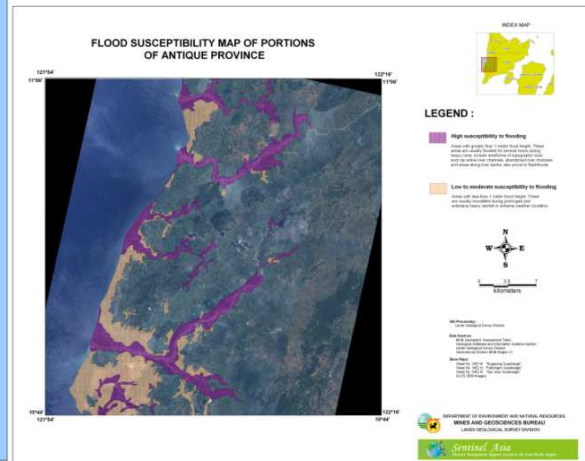
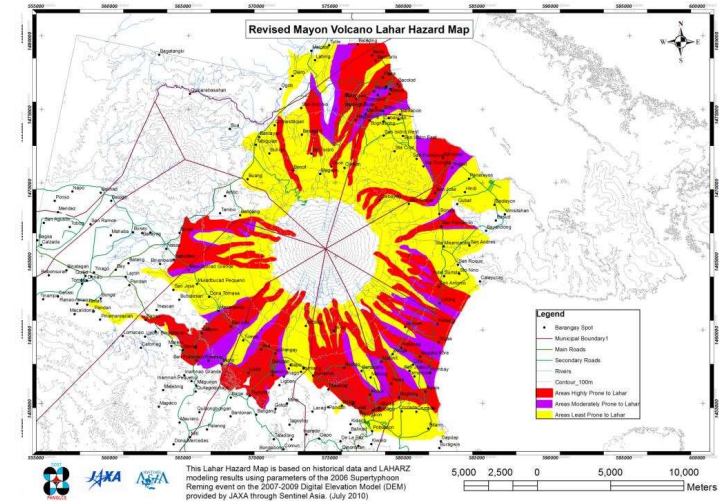
Hazard maps (**Flood**, **Lahar** and **Landslide**) of 3 study areas (**Antique**, **Iloilo** and **Mt. Mayon**) were created by using **ALOS Pansharpen Image** and **DSM**.



**Lahar - Mt. Mayon
(PHIVOLCS)**

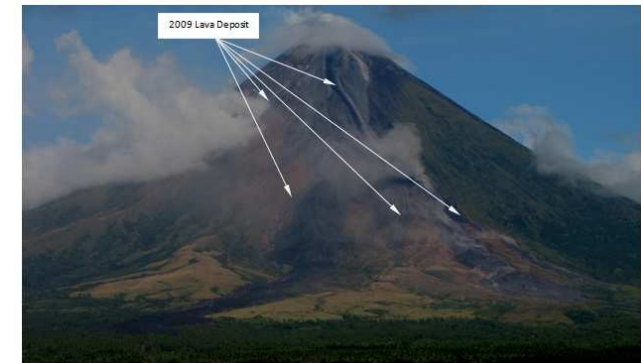
**Flood - Iloilo City
(PAGASA)**

**Landslide - Antique
(MGB)**

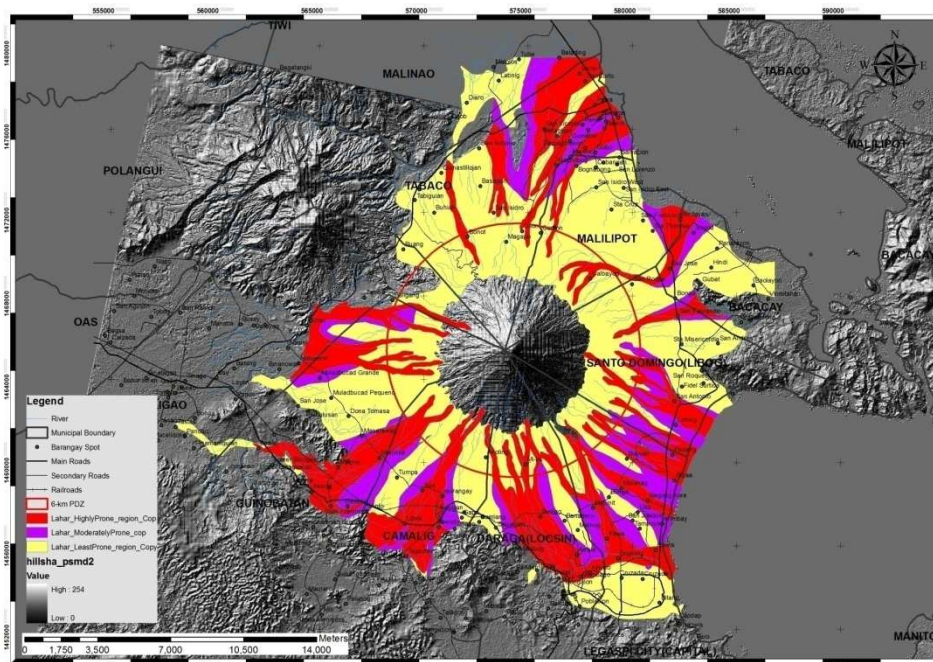


Eruption of Mayon Volcano in the Philippines in December 2009

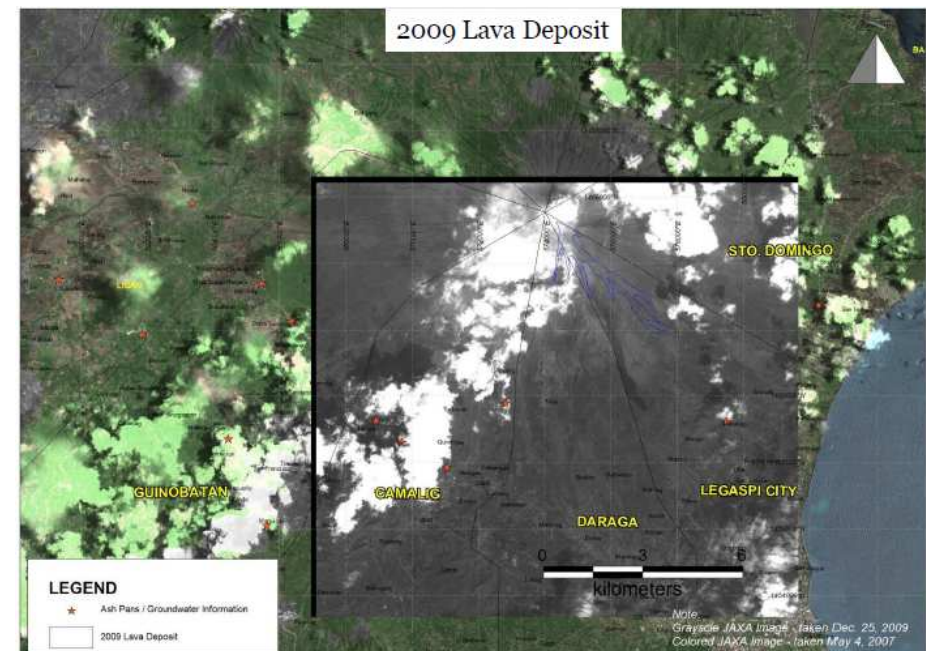
Philippine Institute of Volcanology and Seismology (PHIVOLCS) made lava deposit map by the eruption using ALOS imagery and others, **which was used to understand the situation and make decision for evacuation** by National Disaster Coordinating Council (NDCC).



Mayon Volcano on 30 December 2009



lava flow hazard map made by PHIVOLCS using ALOS DSM



lava deposit map made by PHIVOLCS using emergency observation imagery with ALOS/AVNIR-2 on 25 Dec. 2009

Success Story in the Philippines (2nd Phase: 2011 onwards)

Application of **GSMaP** for **Landslide Warning**, and **Interferometry** for monitoring of **Land Subsidence** and **Earthquake/Volcanic Eruption** have been studied.



Volcano & Earthquake Monitoring

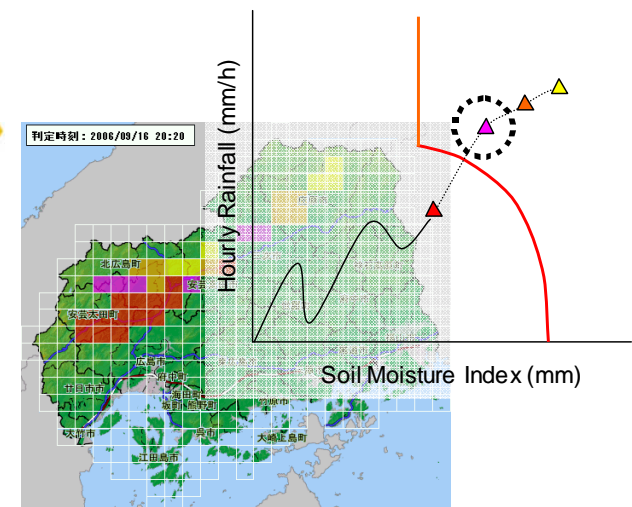
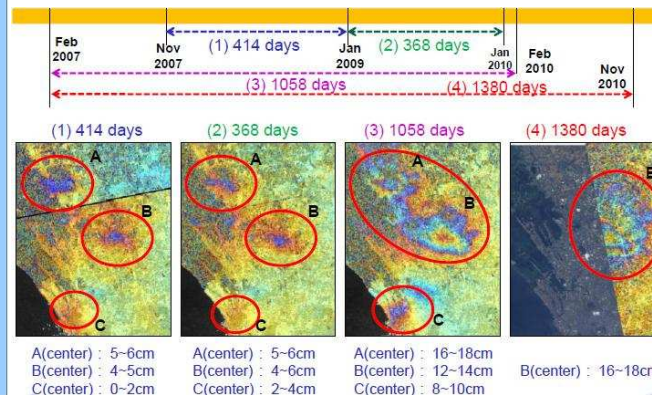
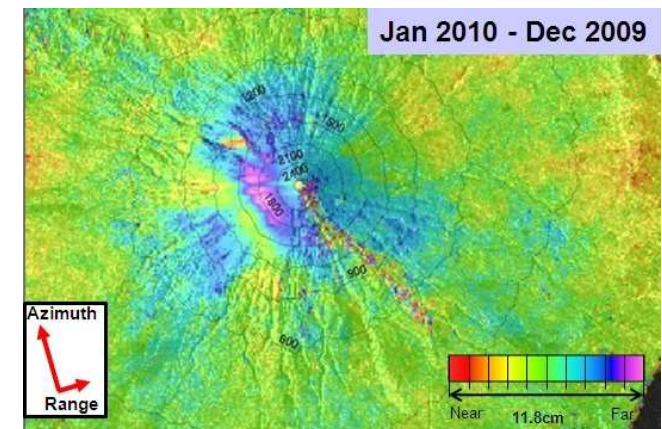
- Mt. Mayon, Mt. Taal & Valley Fault

Landslide Warning

- Albay

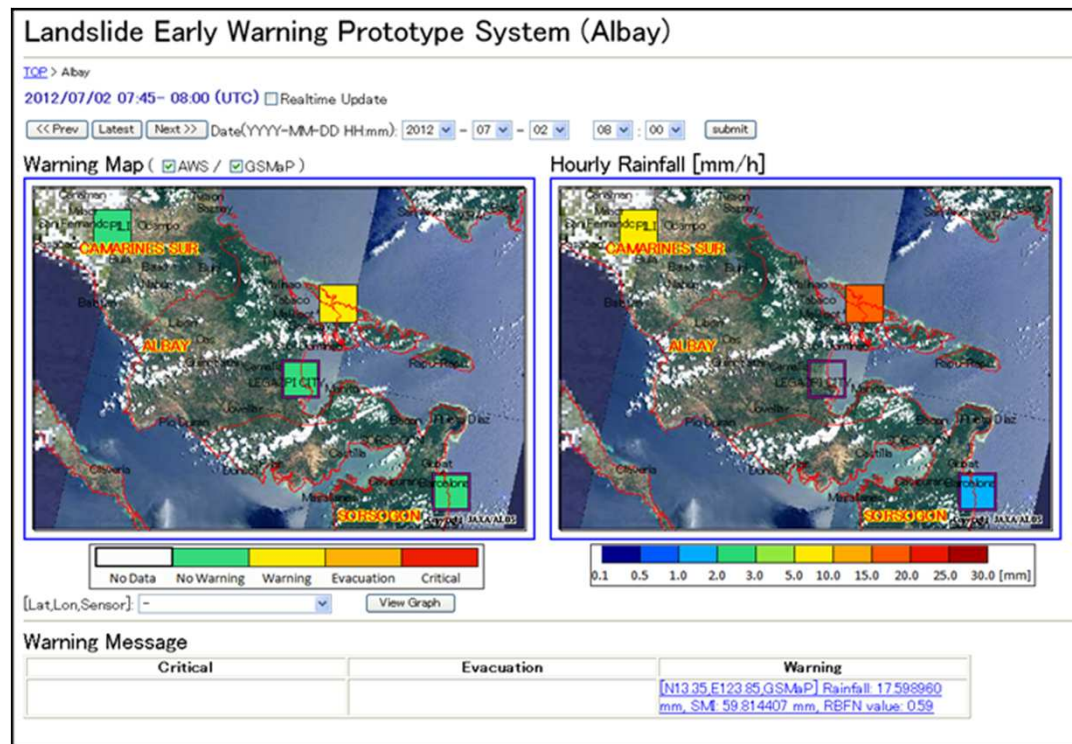
Land Subsidence

- near Manila

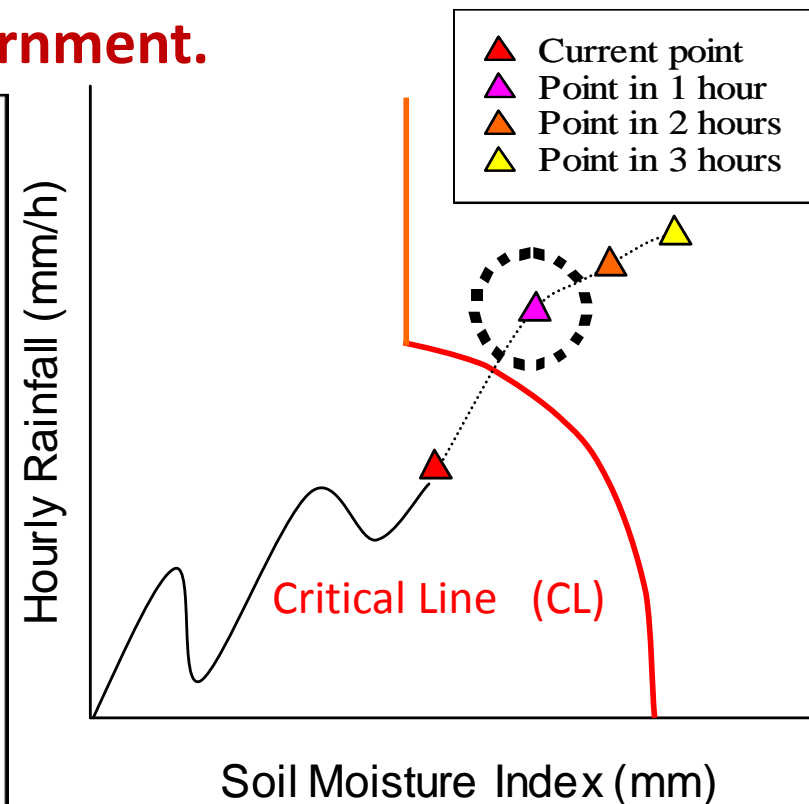


Landslide Forecasting using Critical Line

Early warning for **debris flows and slope failures (short-term events)** is issued based on current (& predicted) rainfall situation and **non-linear CL**. Hourly point of **rainfall vs SWI** is traced on CL, and if it exceeds CL early warning is issued. **This method is applied to early warning by Japanese prefectural government.**



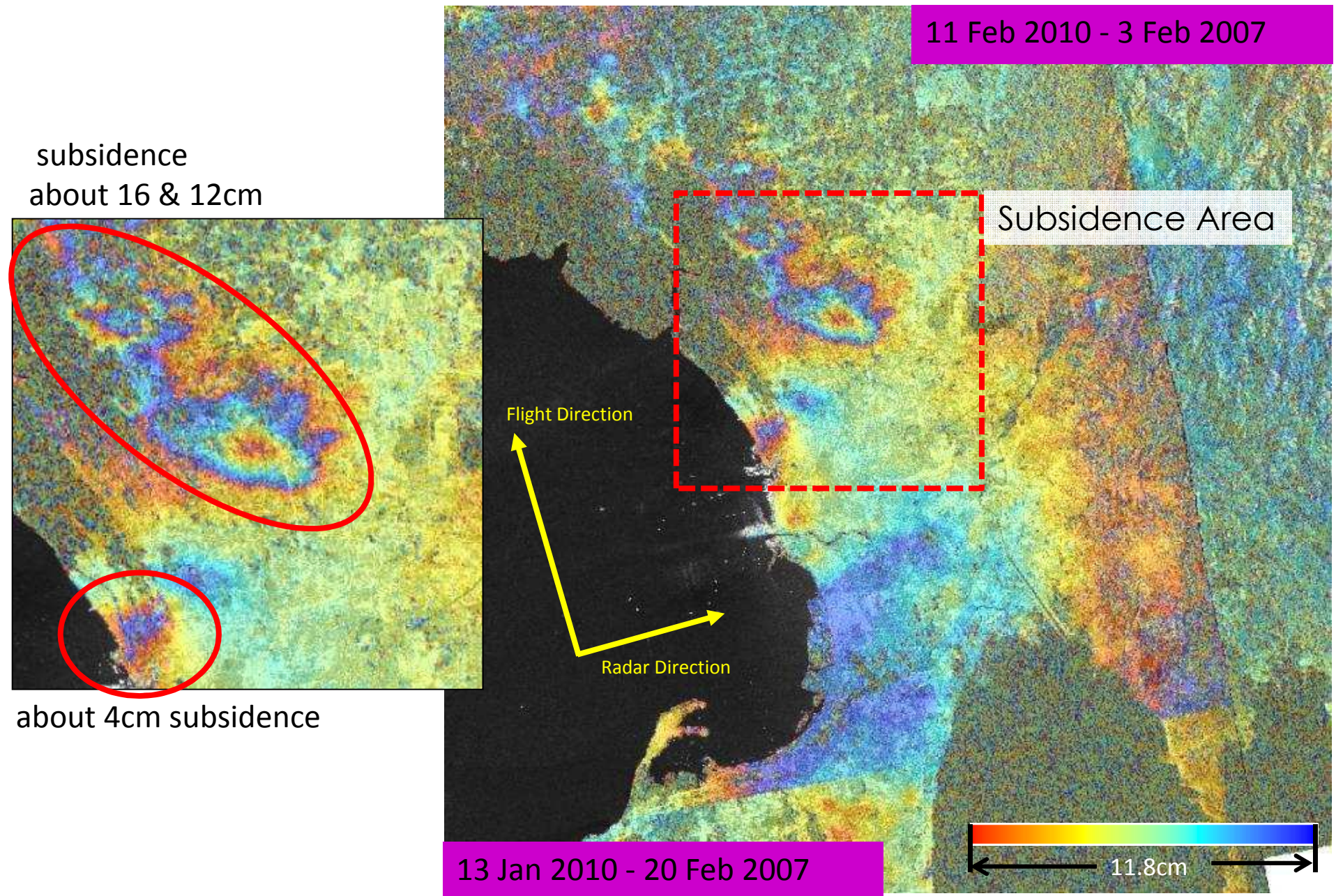
Landslide Early Warning Prototype System in Albay



Y-axis: **hourly rainfall** (mm/h)

X-axis: **soil moisture index (SMI)** (mm)

Land Subsidence near Manila (3 years, 2007-2010)



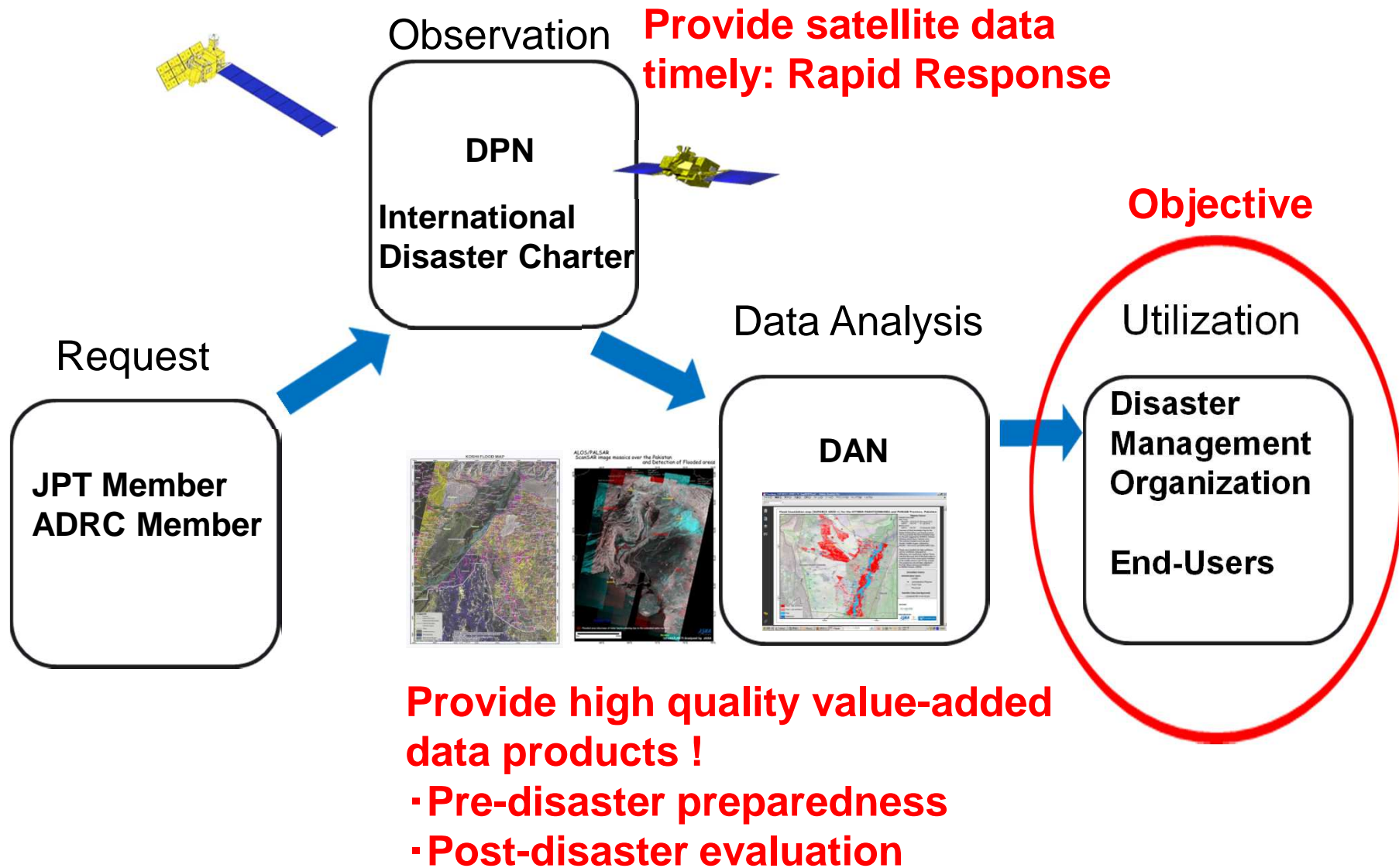
Technical Training

| Summary from 2009-2011 | Trainings | No. of Participants |
|------------------------|---|---------------------|
| 2009 | Remote Sensing | 9 ++ |
| 2009 | Multi-spectral and Radar Image Processing | 22 |
| 2010 | InSAR Processing | 35 |
| 2010 | Satellite-based Rainfall Precipitation | 34 |
| 2011 | Differential Interferrometry | 27 |
| 2011 | Landslide Modelling and Warning Using Satellite-based Rainfall Data | 28 |



*3. Sentinel Asia Emergency Observation Success
Story by JAXA/ AIT Mini-Project*

Emergency Observation Flow and Objective



Approach by JAXA/AIT Mini-Project

To organize group to make high quality value-added data products for end-users

- Pre-disaster preparedness
 - sharing existing maps, hazard map, risk map, ground GIS data, etc. among group members
 - making new maps using Open Street Map
- Post-disaster evaluation

In FY 2014: Indonesina, Sri Lanka, Philippines, Bangladesh, Myanmar, and Vietnam are target countries

**JAXA's Present RS
Capacity Building Activities
for Asia-Pacific Region
Multi-lateral Cooperation**

**JAXA-Sponsored
Mini-Projects
in cooperation with
GIC-AIT**

20-Year History of JAXA's RS Capacity Building Activities in cooperation with GIC-AIT

1. *For last 20 years starting from April 1995, JAXA has been entrusting a responsibility to the Geo-Informatics Center, Asian Institute of Technology (GIC-AIT) in Bangkok, Thailand, to support JAXA in order to provide the Asia-Pacific nations with various types of RS/GIS trainings.*
2. *The contents of the trainings at GIC were sometimes changed by the needs of the times, and for last 6 years from 2007 to 2012, JAXA & GIC concentrated on the Mini-Projects, a **problem-solving type of training by seeking themes from the public**.*
3. *In JFY2013, JAXA, however, stopped seeking the Mini-Project themes from the public in order to use the Mini-Projects more closely with the APRSAF-initiatives such as “Sentinel Asia” and “SAFE” for supporting them more strongly.*

External Appearance of GIC-AIT



Outline of JAXA's RS Capacity Building Activities in cooperation with GIC-AIT



1. Number of Participants of JAXA-Sponsored Trainings at GIC (JFY1995 ~ 2013) :

Approximately 1,000 from 29 countries of the Asia-Pacific region

2. Number of GIC Staff:

Usually 15 Asian personnel including lecturers and administrative staff

76 JAXA-Sponsored Mini-Projects in Total for 8 Years (JFY2005 - 2012)

For eight years from the JFY2005 to 2012, JAXA invited approximately 160 people from a cumulative total of 140 organizations of the following 18 Asian countries to the JAXA-sponsored nine-week Mini-Project training done at GIC-AIT, including a week-long local data collection, to help those participants solve their problems relating to RS/GIS at their work:

Southeast Asia : 8 countries



Cambodia



Indonesia



Lao PDR



Malaysia



Myanmar



Philippines



Thailand



Vietnam

South Asia : 5 countries



Bangladesh



Bhutan



Nepal



Pakistan



Sri Lanka

Central Asia : 3 countries



Kyrgyzstan



Tajikistan



Uzbekistan

East Asia : 2 countries



China



Mongolia

Research Fields covered by JAXA-Sponsored Mini-Projects at GIC-AIT (JFY2005-2012)



| No. | Research Fields | No. | Research Fields |
|-----------|-------------------------|-----------|----------------------------|
| 1 | Flood/Cyclone | 11 | Urbanization |
| 2 | Forest Fire | 12 | Medicine |
| 3 | Landslide | 13 | Ground Biomass |
| 4 | Drought | 14 | Soil Erosion |
| 5 | Wild-life Conservation | 15 | Hazard Mapping |
| 6 | Sea Level Rise | 16 | DEM |
| 7 | Coastal Zone Management | 17 | Land Use/Land Cover Change |
| 8 | Earthquake | 18 | Glacier Lake Outburst |
| 9 | Tsunami | 19 | Shiting Cultivation |
| 10 | Volcano/Lahar | 20 | ETC. |

GIC-AIT's Past & Present Staff



Dr. Lal, Director of GIC (in the middle of the top line) and his staff working for GIC.

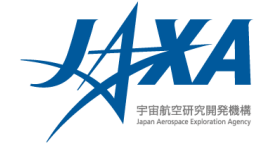


Dr. Nagai, the former Vice Director of GIC (on the extreme right of the top) was dispatched to AIT by JAXA from April 2010 to March 2014.

Scenes from Past Mini-Project Classroom Lectures at GIC-AIT



Past Mini-Project Participants with a JAXA Researcher



**With a
JAXA
researcher
as one of
the
lecturers
for the
past Mini-
Projects.**

Scenes from Past Mini-Project Field Work



Mini-Project Implementation Method Changed from JFY2013



- *JAXA has been providing opportunities to the Asian people to develop their knowledge and techniques in applications of RS and GIS in their national needs for almost last 20 years through some actual problem-solving type of and publicly theme-seeking type of training projects such as the JAXA-sponsored “Mini-Projects” and “Oceanic Mini-Projects.”*



- *The number of applicants for the Mini-Projects had, however, been increasing year by year over our capacity due to the strong demands to JAXA’s advanced RS technology from many different Asian countries.*
- *Consequently, JAXA has decided to provide more opportunities from the JFY2013 to a bigger number of RS data uses in Asia by dispatching Japanese lecturers to some countries for organizing workshops and trainings locally so that JAXA will also be able to spread the information on “Sentinel Asia” and “SAFE” at the same time.*

What are the JFY2013 JAXA-Sponsored Mini-Projects?

(1) The JAXA-Sponsored Mini-Projects are a problem-solving type of training based on particular themes which Asian government offices presently need to resolve.

(2) For the JFY2013 (April-March), JAXA has selected 3 particular themes (Flood/Volcano/Agriculture) and 5 targeted countries (The Philippines/Sri Lanka/Bangladesh/Myanmar/Cambodia.)

(3) JAXA has entrusted a responsibility to the Geo-Informatics Center, Asian Institute of Technology (GIC-AIT) as same as before, in order to support JAXA to carry out the JFY2013 Mini-Projects.

(4) JAXA & GIC have selected one agency from each participating nation as its' co-host organization according to the theme.

(5) The JAXA-Sponsored Mini-Projects are made of 3 different phases from First to Third, and JAXA, GIC & the co-host agencies negotiate on the contents of the Mini-Projects' 3 phases.

(6) The First Phase, which consists of 1-day workshop and 4-day training at each country, will be completed for 3 months from Sept to Nov 2013.

New Mini-Project Implementation Method started in JFY2013 - Case of JFY2013 -



First Phase (1 Week at Each Participating Country)

(1-Day WS & 4-Day Training including On-Sight Data Collection by inviting Approx.30 National-Level Government Personnel)

<For Sentinel Asia> (Theme: Flood, Volcano)

- (1) 23-27 Sept2013 @Sri Lanka (Flood)
- (2) 14-18 Oct 2013 @The Philippines (Flood & Volcano)
- (3) 27-31 Oct 2013 @Bangladesh (Flood)
- (4) 18-22 Nov 2013 @Myanmar (Flood)

<For SAFE> (Theme: Agriculture)

- (1) 07-11 Oct 2013 @Cambodia(Agriculture)
- (2) 28Oct-01Nov2013 @Bangladesh (Agriculture)
- (3) 19-23 Nov 2013 @Myanmar (Agriculture)



Second Phase (3 Weeks at GIC-AIT by inviting 18 People in Total from the Leading Agencies of Each Participating Country)

- (1) Processing & Analysis of both Satellite & On-Sight Data
- (2) Report Making



Third Phase (1 Week at Each of 5 Participating Countries)

- (1) Sharing Mini-Project Results with Approx.30 National-Level Government Personnel at Workshops and Symposiums.
- (2) A detailed schedule at each country will shortly be determined.



Schedules & Venues of JFY2013 JAXA-Sponsored Mini-Projects (Phase-I)



- (1) Sri Lanka: 23-27 Sep 2013 (for S.A.)@Survey Department, Colombo
- (2) Cambodia: 07-11 Oct 2013 (for SAFE)@Department of Planning and Statistics, Phnom Penh
- (3) Philippines: 14 - 18 Oct 2013 (for S.A. & SAFE)@PHIVOLCS, Manila
- (4) Bangladesh: 28 Oct – 01 Nov 2013 (for SAFE)@SPARSSO, Dhaka
- (5) Bangladesh: 10 -14 Nov 2013 (for S.A.)@Agriculture Research Institute, Gazipur (located near Dhaka)
- (6) Myanmar: 18-22 Nov 2013 (for SAFE)@Nay PYi Taw
- (7) Myanmar: 19-23 Nov, 2013 (for S.A.)@Nay PYi Taw

Note) S.A.means “Sentinel Asia” (APRSAF Initiative)

Note) SAFE means “Space Applications for Environment” (APRSAF Initiative)

3. Sentinel Asia System Training

Sentinel Asia System Training Series

A good human network is the foundation of the project



The 8th Sentinel Asia System Operation Training by JAXA, hosted by AIT in February 2012



The 9th Sentinel Asia System Operation Training by JAXA, hosted by BPPT in October 2012

JICA DM Training Supported by Sentinel Asia

Title: "Capacity Development for Immediate Access and Effective Utilization of Satellite Information for Disaster Management"

Venue: Jakarta, Indonesia

Organizer: JICA

Contents: How to use Sentinel Asia system, SAR data use, Flood mapping, etc

Duration: 5 days

Participants: DM related officials from ASEAN member countries

<1st Training: Aug 2013, 2nd Training: Aug 2014, 3rd Training: Aug 2015>



JICA DM Training supported by Sentinel Asia, hosted by AHA Center in August 2014



Japan Aerospace Exploration Agency
Satellite Applications and Promotion Center
Sentinel Asia Project Office
E-mail : z-sentinel.asia@jaxa.jp

