2-6. Collection and Distribution of Information About Emergency Aid in Countries Where Disasters Have Occurred

2-6-1. Transmitting Images of Disaster-Stricken Areas and Providing Lessons in Image Analysis Techniques

(1) Sentinel Asia

Sentinel Asia is a program that was proposed by the Asia-Pacific Regional Space Agency Forum (APRSAF) for the provision of satellite images and disaster information by analytical result to countries in the Asia-Pacific region.

The first of a three-step process to achieve an online disaster prevention information sharing system was launched in October 2006, and was completed in December 2007. In the second step, a new satellite communication system for expansion is to be developed from January 2008 until 2012. And the third step, the establishment of a disaster management support system, is scheduled to start in 2013.

(2) Emergency Observation

From April 2008 to March 2009, 22 emergency observation requests were received and 20 emergency observations were performed. Table 2-7-1 provides details of the emergency observations performed during this period. When emergency requests are received, ADRC's emergency request administrator decides whether the request is appropriate and whether the observation will be performed.

Figure 2-7-4 is good example of how Sentinel Asia was used to perform emergency observations during a disaster in southeast Nepal in August 2008. This image was processed by the Nepal's Survey Department based on color image data provided by Sentinel Asia. The Ministry of Water Resources of Nepal sent a testimonial to the Sentinel Asia secretariat regarding the utility of the data received from Sentinel Asia.

Country	Area	Type	Date	Implementation of the observation
Maynmar	Southern area	Cyclone	2008/5/2	Yes
China	Sichuan	Earthquake	2008/5/12	Yes
Indonesia	Central JAWA	Heavy rain	2008/6/4	Yes
Japan	Iwate and Miyagi	Earthquake	2008/6/14	Yes
Philippines	Iloilo city	Typhoon	2008/6/21	Yes
Japan	Iwate	Earthquake	2008/7/24	Yes
Lao PDR	Vientiane	Flood	2008/8/12	Yes
Nepal	Sunsari	Flood	2008/8/18	Yes
Thailand	Nan	Flood	2008/9/8	Yes
Nepal	West Dangari, Mahendranagar	Flood	2008/9/20	Yes
Vietnam	Northen area	Typhoon	2008/9/24	No
Pakistan	Quetta	Earthquake	2008/10/29	Yes
Vietnam	Hanoi city	Flood	2008/11/4	Yes
Thailand	Surat thani, nakhon si Thammarat	Flood	2008/11/24	Yes
Thailand	Surat thani, nakhon si Thammarat	Flood	2008/12/18	Yes
Indonesia	Papua state	Earthquake	2009/1/4	Yes
Philippines	misamis oriental	Flood	2009/1/22	Yes
Austoralia	Victria	Forest fire	2009/2/7	Yes
Austoralia	New South Wales, Queensland	Flood	2009/1 early in Janualy (requested at 2/19)	Yes
Philippines	Dumaguete, Negros Oriental	Flood	2009/2/7 (requested at 3/9)	No
Austoralia	Queensland, Brisbane	Typhoon	2009/3/11	Yes
Indonesia	Jakarta	Flood	2008/3/27	Yes

Table 2-6-1 Emergency Observations

Figure 2-6-1-4 Koshi River Flood Map

(3) Follow-up Survey

Starting this year, follow-up surveys are being conducted in countries that have requested emergency observations. Surveys this year were conducted in Lao PDR, Nepal, and Vietnam, and the results show that the requesting agencies, especially local offices, lack the necessary skills for processing satellite image data for disaster reduction. We must provide examples of how satellite image data can be used, and teach relevant agencies how to process those images for disaster reduction purposes. We also learned that the staff of local government agencies are less adept than national government officials at utilizing satellite image data. It is therefore very important to implement capacity-building measures for local government officials.

(4) Seminar and International Conference on Sentinel Asia

This year, ADRC dispatched staff to Thailand (September 2008) and Lao PDR (February 2009) to conduct seminars on the operation of Sentinel Asia. During those seminars, participants learned about the activities of ADRC and received training in the issuance of Emergency Observation Request.

ADRC also sent a representative to attend a conference organized by the Asia-Pacific Regional Space Agency Forum (APRSAF) in Hanoi, Vietnam in September 2008. At this conference, ADRC presented the results of a field survey about the Wenchuan Earthquake in China in 2008, and the results of the follow-up surveys conducted on the use of Sentinel Asia.

2-6-2. Contributions of Satellite Images

Various types of natural disasters, including earthquakes, tsunamis, floods, and landslides occur in Asia every year. It is therefore necessary to get the latest information on natural disasters to promote recovery in the affected areas. However, it is often difficult to survey devastated areas in the immediate aftermath of a disaster. Thus, satellite images can be very useful tools in strengthening disaster prevention efforts. Since satellite images taken before natural disasters occur are stored in a database, these can be compared against satellite images taken after a natural disaster strikes. Providing natural disaster information using a hazard map based on satellite images is also an effective means of promoting disaster prevention.

This suggests that satellite image technologies should be used more widely to create hazard maps and to facilitate the analysis of images by government officials, disaster specialists, and other relevant parties. However, challenges exist in terms of training operators and maintaining the infrastructure for sending data and creating GIS data.

*GIS (Geography Information System):
Map data is also compiled and made available in the form of digital maps for ready use on computers, and these maps serve as information base for the Geographic Information System (GIS)[Intended meaning was unclear. This is a guess. Please confirm intended meaning.]. Digital maps are becoming increasingly indispensable components of the information infrastructure of our IT society.
（source: http://www.gsi.go.jp/ENGLISH/index.html）

To solve the these problems, ADRC will provide information on disaster mitigation based on satellite images to promote the recovery of the affected area. In addition, ADRC will analyze these satellite images and create hazard maps for those who are not experts in this field.

Figure 2-6-2-1 shows satellite images taken before and after an earthquake in northern Sumatra, Indonesia. The image on the left was taken before the earthquake while the image on the right was taken after the quake. Figure 2-6-2-2 shows the differences between the images in Figure 2-6-2-1, allowing users to easily see the affected area. However it is difficult to identify the names of the affected areas, the population of the region, the latest infrastructure information, and other details.

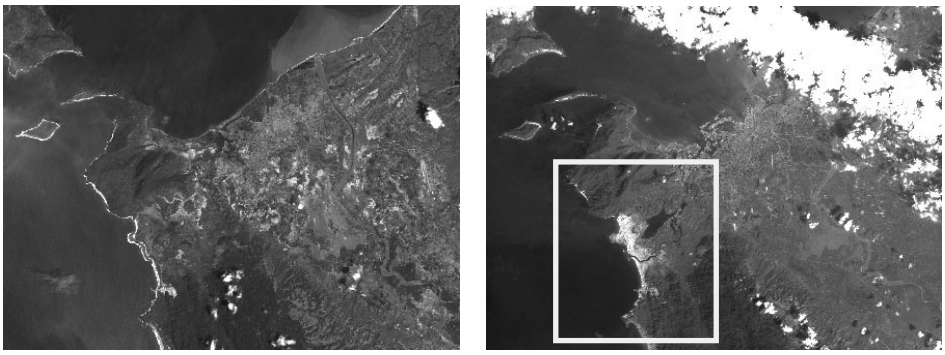

Fig. 2-6-2-1 Satellite image
(Northern part of Sumatra, Indonesia)

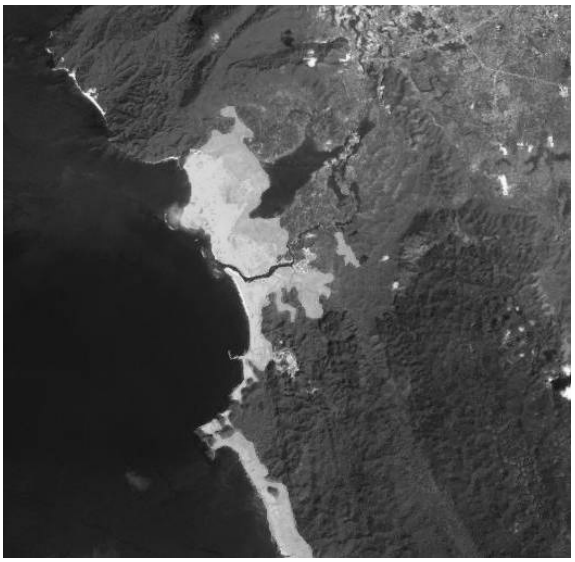

Fig. 2-6-2-2 Affected area

One way to obtain these types of details is to overlay the image with GIS data. The image below is a sample map showing the results of a flood in the Kosi Basin, in the southeast part of Nepal. This flood occurred on August 18, 2007. The area affected by this flood is described at the bottom of the picture. Inundation points along the Kosi River are indicated by triangles. This map provides information on flood trigger points and indicates the best places to conduct surveys. Immediate action is of the utmost importance. Thus, ADRC distributes maps like this as soon as possible after a natural disaster strikes.

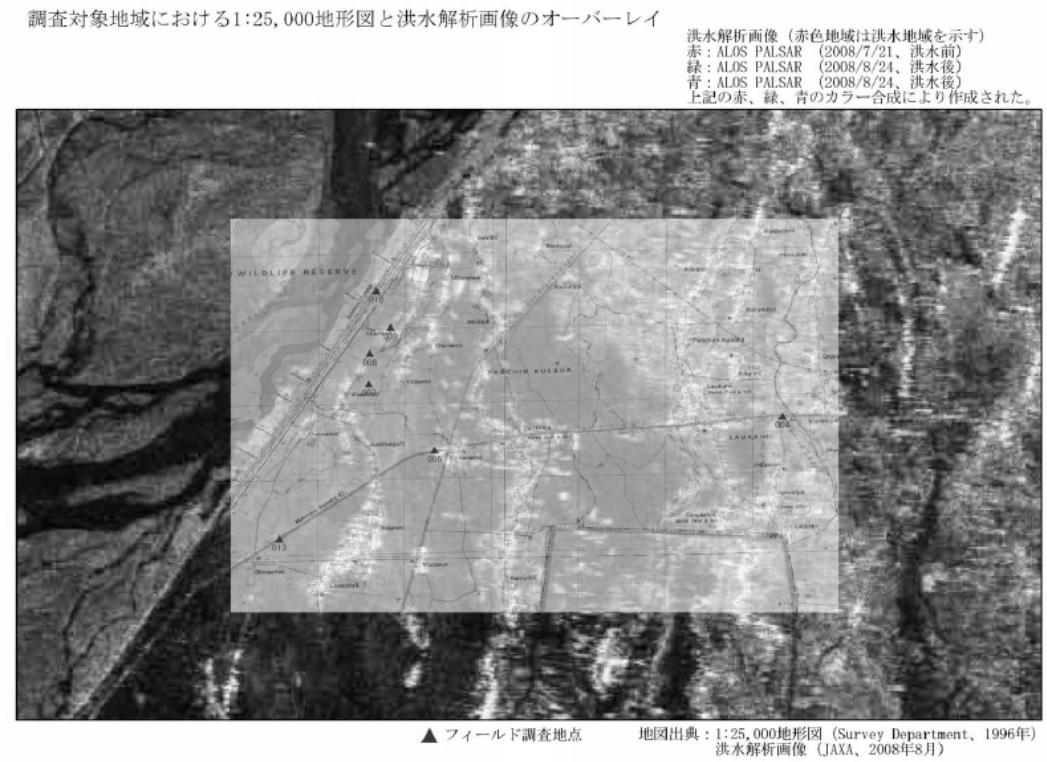

Fig 2-6-2-3 Sample of Satellite Image with Map Overlay

However there are still some problems yet to be solved. One is the need for human resource development. The number of ADRC staff who can perform satellite image processing should be increased. Another is the map content. Information distributed by ADRC does not necessarily meet the needs of users. User feedback is important to enabling ADRC to create better maps, and to provide the information that will be the most useful for disaster mitigation efforts.