




JAXA/Earth Observation Program for Water Resource Management

Chu Ishida

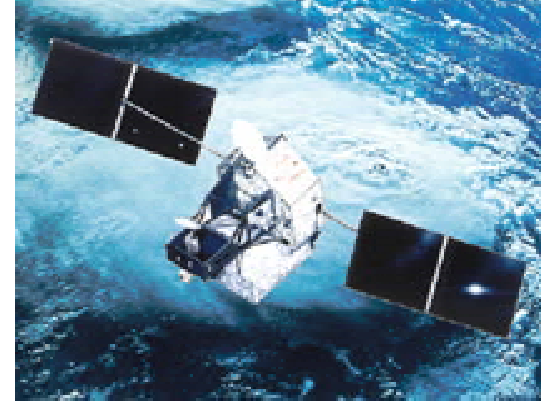
Japan Aerospace Exploration Agency (JAXA)



2nd Asian Water Cycle Symposium
Tokyo
January 9-10, 2007

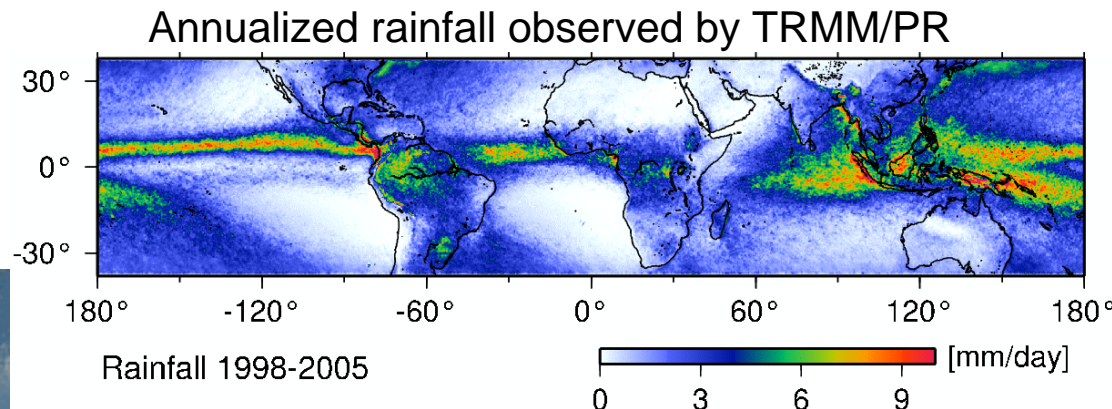
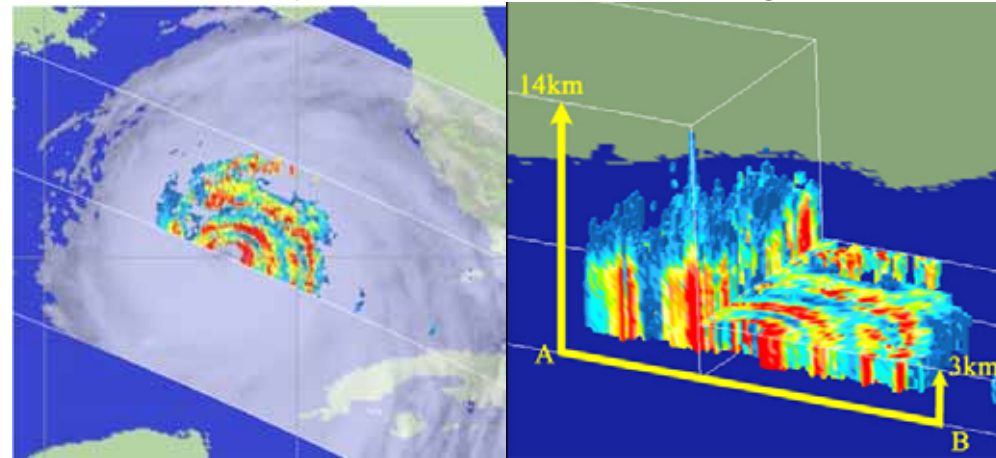


Tropical Rainfall Measuring Mission (TRMM)



Hurricane KATRINA approaching South US, observed by TRMM at 0323Z 28 Aug. 2005.

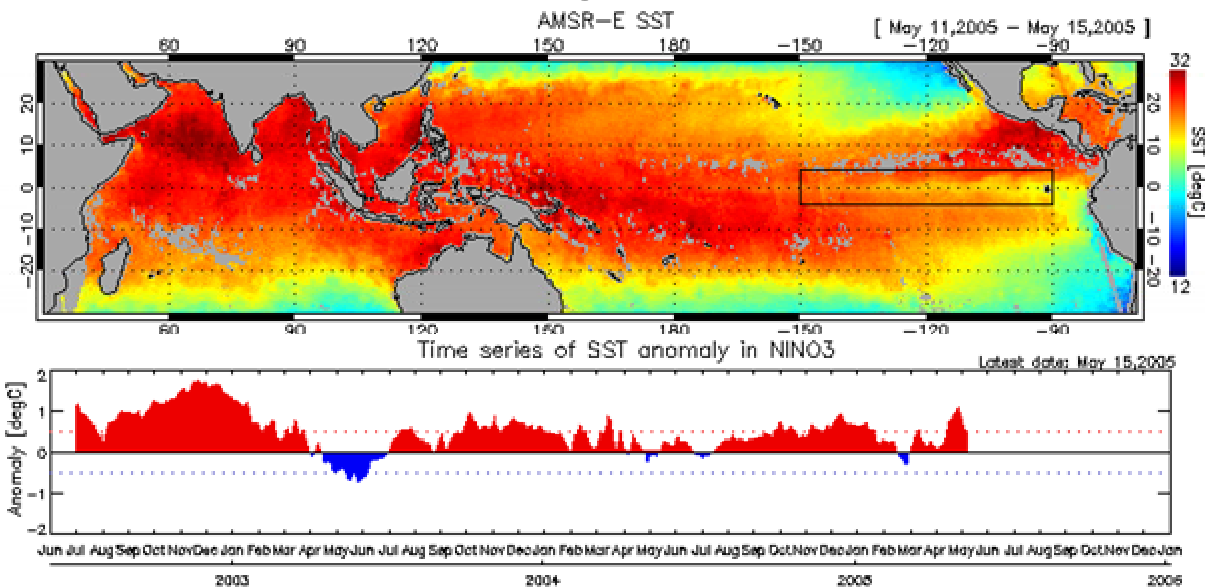
- Japan-U.S. joint mission, flying since Nov. 1997
- World's **first and only space-borne precipitation radar (PR)** with microwave radiometer and visible-infrared sensor
- Three-dimensional observation of rainfall by PR





Advanced Microwave Scanning Radiometer for EOS (AMSR-E)

- Observing various geophysical parameters related to global water and energy cycle.
- Accomplished the scheduled three-year mission and initiating long-term climate monitoring.



El Nino monitoring by AMSR-E.

AMSR-E sea surface temperature (SST).

Time series of SST anomaly (AMSR-E minus climate SST) in the box area of upper figure.

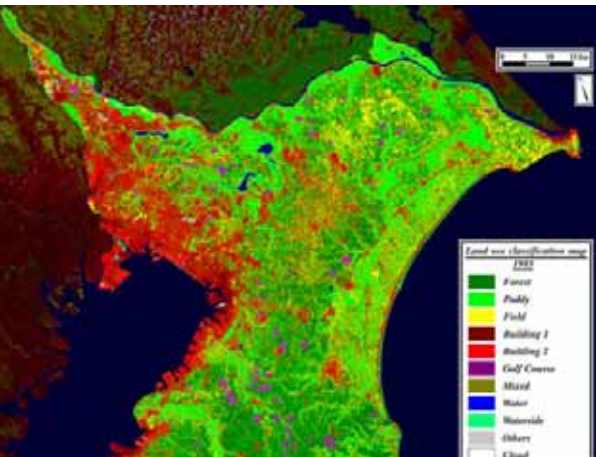
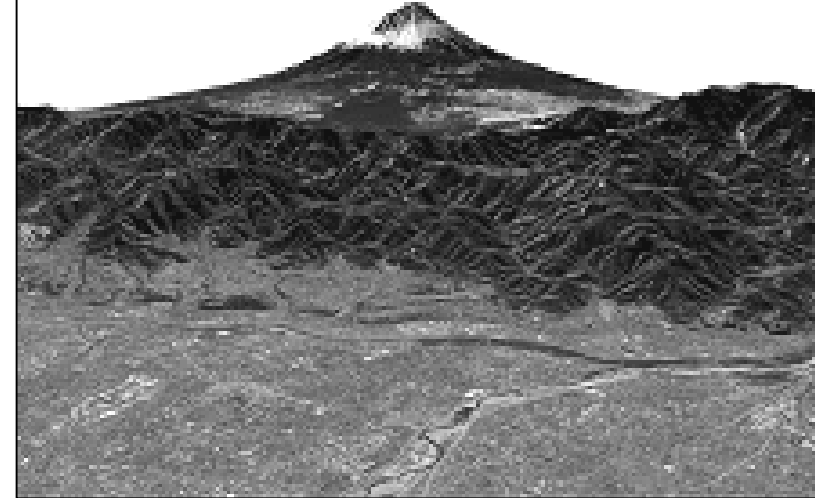


Advanced Land Observing Satellite (ALOS)

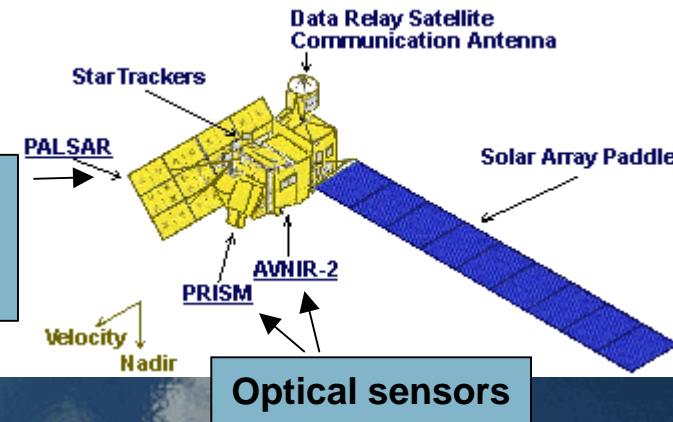
- Launch: 24 January, 2006.
- Objectives:
 - Cartography
 - Regional observation
 - Disaster monitoring
 - Resource surveying



Mt. Fuji observed by PRISM

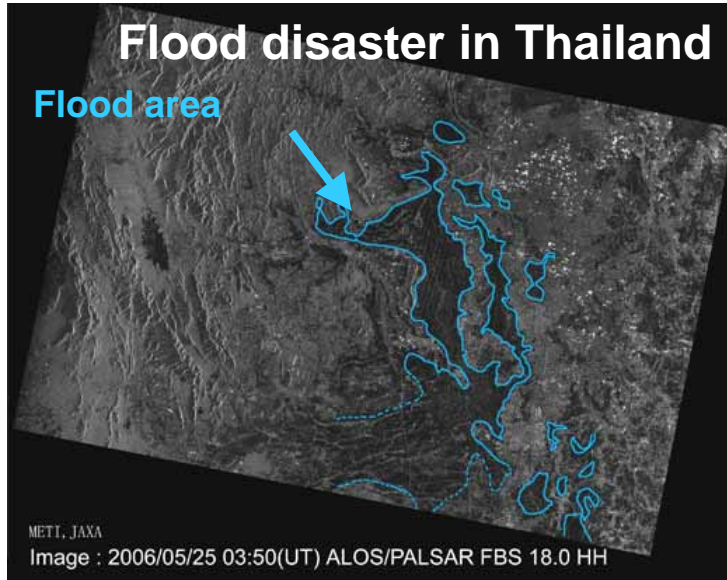


PALSAR(L-band SAR)
Cloud-free
Day-night observation

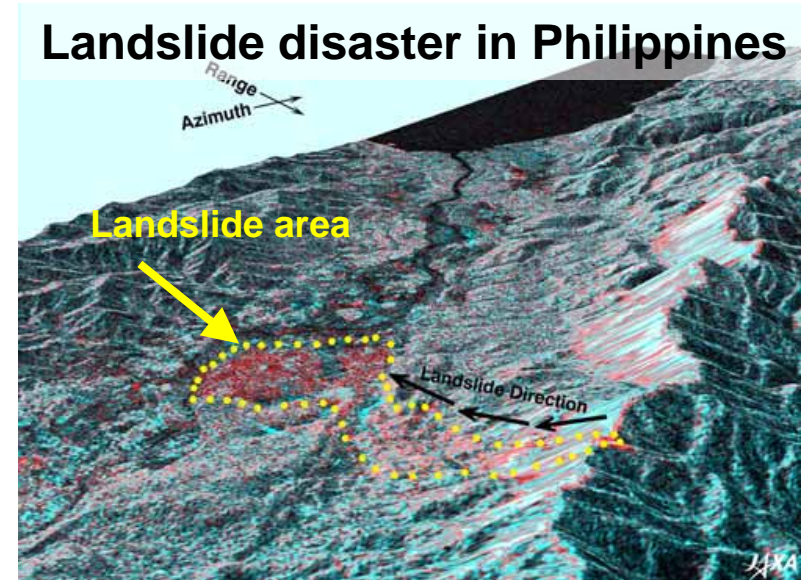




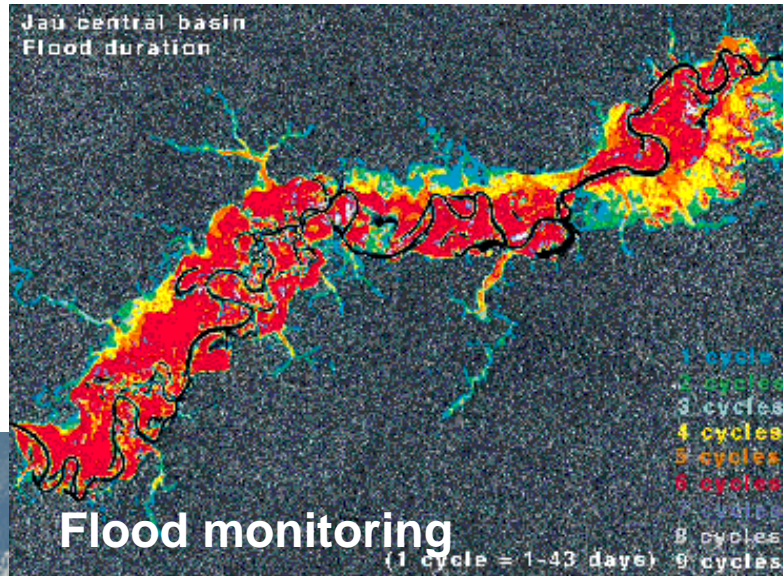
Observation from space plays significant role for disaster management



Northern Thailand, observed by ALOS/PALSAR



Leyte Island, Philippines, observed by ALOS/PALSAR



Jau River, Amazon, Brazil, observed by JERS-1/SAR





Future mission: Global Precipitation Measurement (GPM)

Core Satellite

Dual-frequency Precipitation Radar and microwave radiometer

- Observation of rainfall with more accurate and higher resolution
- Adjustment of data from constellation satellites

JAXA (Japan)

Dual-frequency Precipitation Radar
NASA(US)
Satellite bus, microwave radiometer

(launch in 2013)

Constellation Satellites

Each carrying microwave radiometers, provided by international partners

- More frequent Observation

International Partners :

NOAA(US), NASA(US), **JAXA (Japan)**, CNES/ISRO(France/India) and others

(launch around 2013)



Global Observation every 3 hours

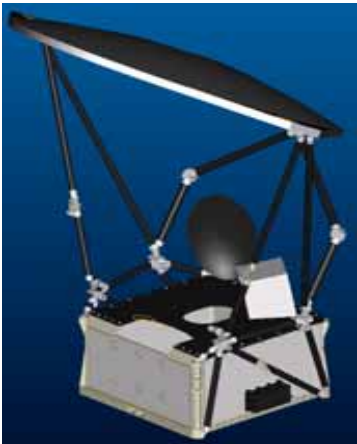
- Improve the accuracy of both long-term and short-term weather forecasts
- Improve water resource management in river control and irrigation systems for agriculture



Future mission: Global Change Observation Mission (GCOM)

- Establish and demonstrate global and long-term Earth observation system for understanding climate variability and water-energy cycle.
- 2 satellites (**GCOM-W and C**) series of 3 generations with 1-year overlap will result in over 13 years homogeneous and steady observation. (**W: water and C: climate**)
- GCOM-W will focus on variability of **global water-energy cycle** and **extend successful AMSR-E observation** to contribute to world water relevant issues.

GCOM-W & -C characteristics (TBD)		
	GCOM-W	GCOM-C
Design		
Orbit (TBD)	<ul style="list-style-type: none"> ■ Sun-synchronous ■ Altitude: 699.6km ■ Inclination: 98.19deg ■ Asc. local time: 13:30 	<ul style="list-style-type: none"> ■ Sun-synchronous ■ Altitude: 798km ■ Inclination: 99.36deg ■ Dsc. local time: 10:30
Instruments	<ul style="list-style-type: none"> ■ AMSR follow-on Microwave imager 	<ul style="list-style-type: none"> ■ SGLI ■ Near-UV ~ TIR imager
Launch Date	JFY 2010	JFY 2011
Mission Life	5 years (×3 satellites; total 13 years)	
Launch Vehicle	H-IIA	



AMSR follow-on of GCOM-W satellites





Scientific and societal significance of water-related satellite data

For example, global rain map may apply to ;

- Climate change assessment
 - Monitor variations in rainfall and rain areas associated with climate changes and global warming
- Improvement in weather forecasts
 - Data assimilation in numerical prediction systems
- Flood prediction
- Water resource management
 - River, dam, agricultural water, etc.
- Other applications
 - Agriculture, etc.





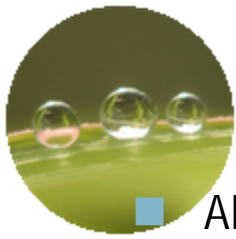
JAXA's Capacity Building Program

- JAXA conducted education and training program on RS and GIS in cooperation with AIT with total 914 participants for 1995-2004.
- Training through mini-project started since 2004 to address real-world issues in various fields, such as flood and landslide. Training provided at AIT and local offices. 10 mini-projects are ongoing for 2006-2007.
- Caravan training with AIT experts visiting Asian countries.



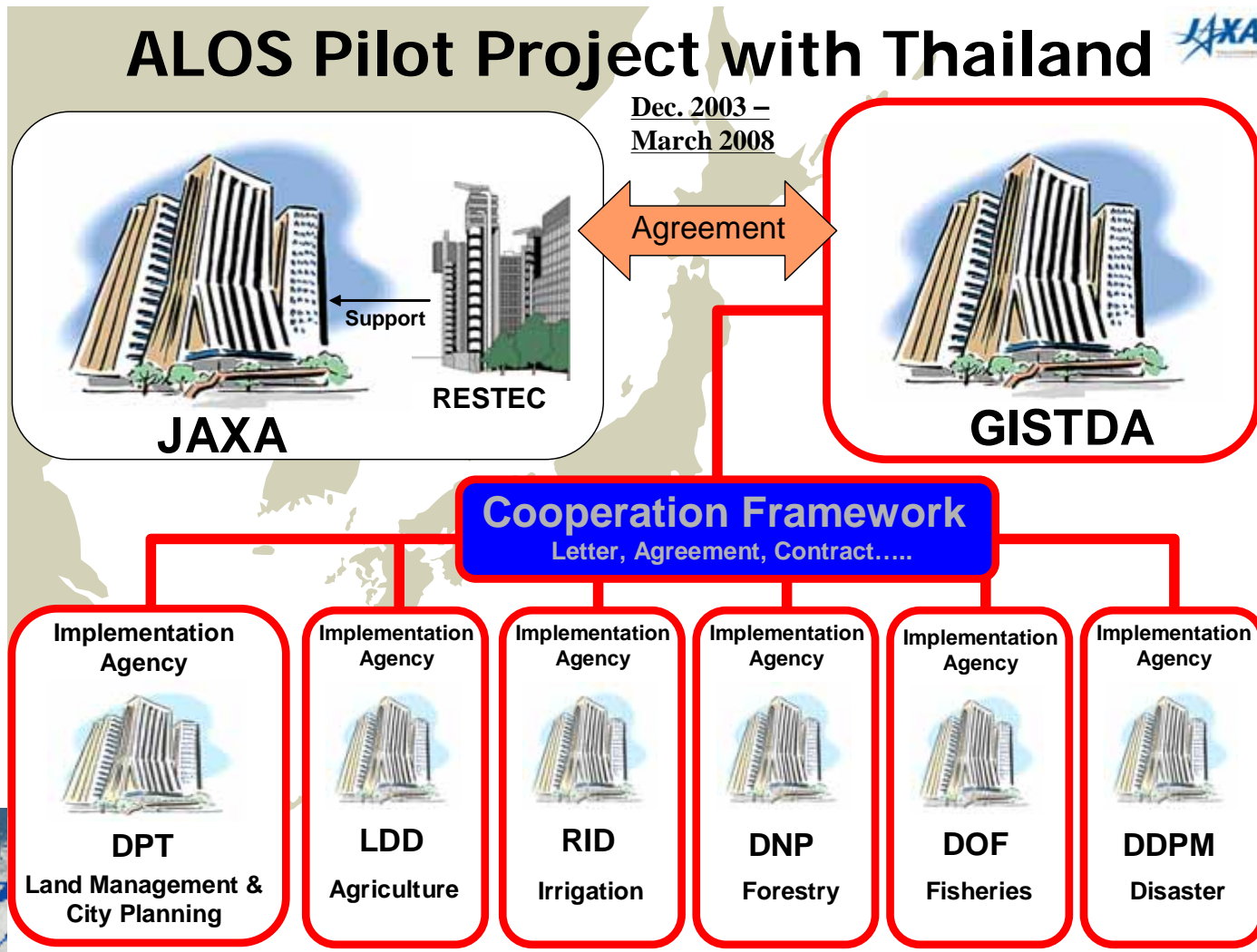
AIT training in the field





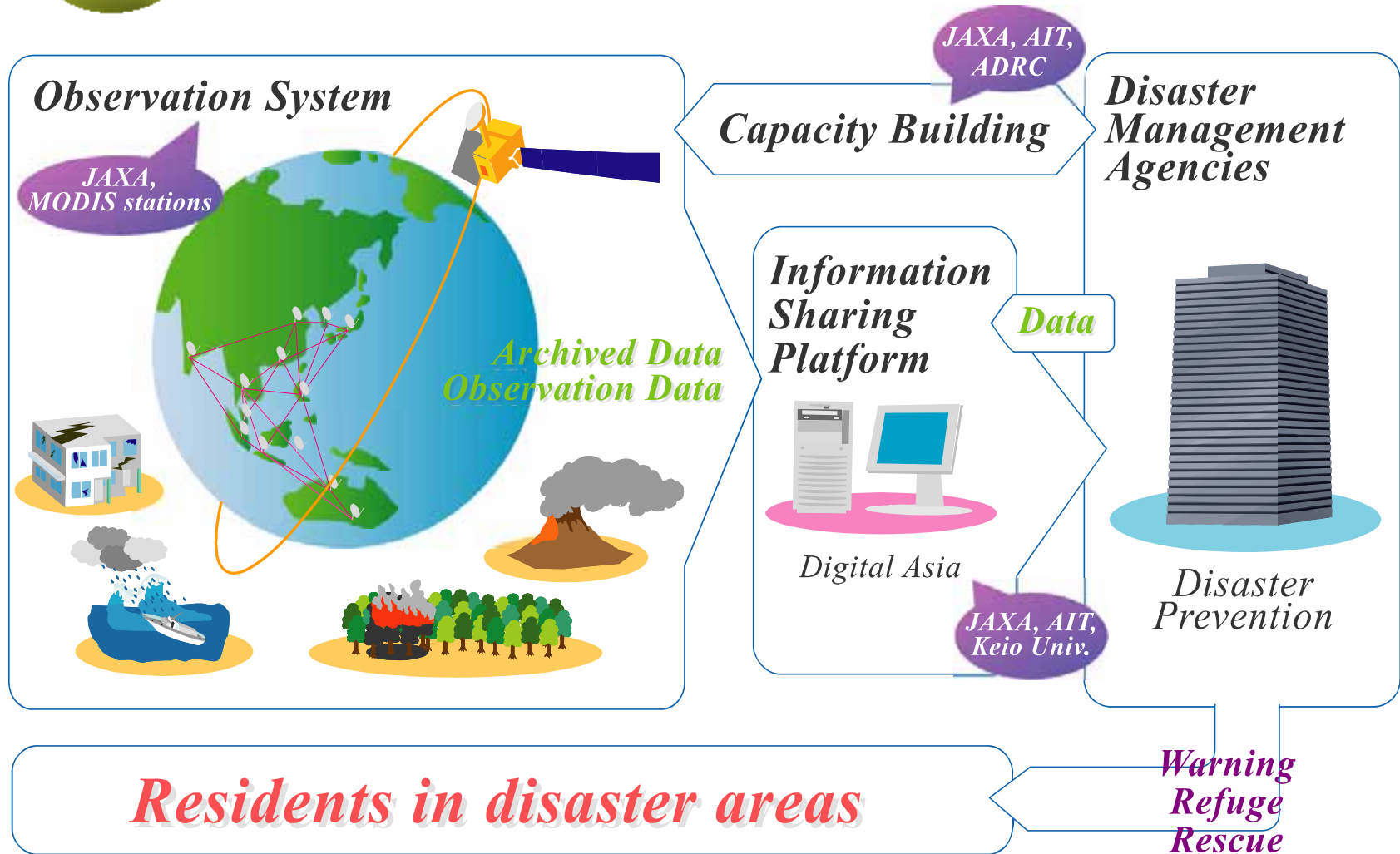
ALOS Pilot Projects

- ALOS Pilot Projects have been conducted in cooperation with GISTDA and LAPAN.
- Ministries and governmental agencies participate in the pilot project to demonstrate ALOS data applications.





Sentinel-Asia Project under the framework of APRSAF: Asia Pacific Region Space Agency Forum





Sentinel Asia Project under the framework of APRSAF (cont'd)

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

ファイル 編集 表示 お気に入り ツール ヘルプ

アドレス http://21017290247/adrc/MyMap/adrc/index.jsp


Sentinel Asia Project
Disaster Management Support System

Home
Search Photo
Search Satellite Images
Search Observation Requests
Request New Observation
User Management

Observation Date: 2008-05-16 00:00:00
Sensor: *
Product: ***
Comments: ALDS Image around Mt. Merapi Volcano on May 16, 2008.

Satellite Image Details

Satellite Image



Legend:

- Elevation
 - Elevation Contour
 - Spot Elevation
- Transportation
 - Airport Facilities F
 - Transportation Da
 - Miscellaneous Trar
 - Railroads
 - Roads
 - Railroad Yard Poin
 - Trail and Tracks
 - Transportation Str
 - Transportation Str
- Utilities
 - Util Data Quality L
 - Pipe lines
 - Power Transmissi
 - Utility Point Featu
- Vegetation
 - Croplands
 - Grasslands
 - Marshes/Swamps
 - Trees

Lat: 7d 33m 31.244s S, Lon: 110d 26m 22.266s E

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インターネット



Conclusion

- The satellite observation is very effective to obtain global water cycle information.
- Satellite information is significant for scientific issues, such as extreme rainfall events and variation of water cycle related to global change.
- End-to-end system linking data providers and users are being constructed in cooperation with IFNet/GFAS, ICHARM, etc., toward future operational systems.
- JAXA is conducting capacity building program in cooperation with AIT, GISTDA and LAPAN
- Sentinel Asia project is being promoted under the framework of APRSAF



Thank you for your attention.

