RECENT DISASTERS IN INDONESIA 2010
Flood and Landslide Wasior Papua

Flooding is occur on 3-4 October 2010

95 people died, 76 people were still missing, 1061 people sustained heavy injuries

Wasior is now in the rehabilitation phase
ERUPTION is begin on 22’nd October caused many causality, today ERUPTION intensity is decrease and safety area is move from 20 km from the top of mountain to 10 – 15 km. Soon after Merapi back to safe activity, The rehabilitation phase will begin. Merapi is welth for the surrounding area
Mentawai is one of the best surfing area in the world. We should reconstruct the area with significant improvement in the early warning and mitigation for earthquake and tsunami.

Tsunami is occurred in 25 October, 445 people died, 58 people were still missing, 173 people sustained heavy injuries, 325 people sustained light injuries and 15,353 successfully evacuated.
## CONTRIBUTORS OF RS DATA FOR EMERGENCY RESPONSE

<table>
<thead>
<tr>
<th>No</th>
<th>Institution/Organization</th>
<th>RS Data/Information</th>
<th>Area (Wasior Papua, Mentawai Islands, Merapi Volcano)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CRISP</td>
<td>Quickbird</td>
<td></td>
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<tr>
<td>2</td>
<td>Sentinel Asia</td>
<td>ALOS – AVNIR, PALSAR, Formosat</td>
<td>Wasior Papua, Mentawai Islands, Merapi Volcano</td>
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<tr>
<td>3</td>
<td>JAXA-ALOS Pilot Project Phase-2</td>
<td>PALSAR Polarimetric</td>
<td>Wasior Papua, Mentawai Islands, Merapi Volcano</td>
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<tr>
<td>4</td>
<td>IDC (Int. Disaster Charter) and UNSPIDER</td>
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<td>Indorse to Sentinel Asia, DLR, and PDC</td>
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<tr>
<td>5</td>
<td>DLR</td>
<td>ALOS AVNIR</td>
<td></td>
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</tr>
<tr>
<td>6</td>
<td>PDC (Pacific Disaster Center)</td>
<td>DG World View</td>
<td></td>
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</tbody>
</table>
## EMERGENCY RESPONSE USERS

<table>
<thead>
<tr>
<th>No</th>
<th>Institutions</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BNPB (National Disaster Management Agency)</td>
<td>All Data/Information</td>
</tr>
<tr>
<td>2</td>
<td>President Office (UKP4)</td>
<td>All Data/Information</td>
</tr>
<tr>
<td>3</td>
<td>West Sumatra Local Government</td>
<td>Mentawai Data/Information</td>
</tr>
<tr>
<td>4</td>
<td>BIN (National Intelligent Agency)</td>
<td>All Data/Information</td>
</tr>
<tr>
<td>5</td>
<td>UN-OCHA Office in Jakarta</td>
<td>All Data/Information</td>
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<tr>
<td>6</td>
<td>BG (Geological Agency)</td>
<td>All Data/Information</td>
</tr>
<tr>
<td>7</td>
<td>KKP (Ministry of Marine and Fishery)</td>
<td>Mentawai Data/Information</td>
</tr>
<tr>
<td>8</td>
<td>KPU-TR (Ministry of Public Works, DG Spatial Planning)</td>
<td>All Data/Information</td>
</tr>
<tr>
<td>9</td>
<td>BPS (National Statistical Agency)</td>
<td>All Data/Information</td>
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<td>10</td>
<td>TISDA BPPT (Agency for Technology Assessment and Application)</td>
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<td>11</td>
<td>UGM (Gadjah Mada University)</td>
<td>All Data/Information</td>
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<tr>
<td>12</td>
<td>CRS-ITB (Bandung Institute of Technology)</td>
<td>All Data/Information</td>
</tr>
</tbody>
</table>
BANJIR BANDANG DI WASIOR
KABUPATEN TELUK WON-DAMA – PROVINSI PAPUA
(03 – 04 OKTOBER 2010)

ALOS AVNIR
10/08/2009

FORMOSAT
13/10/2010

SPOT-2 (09/07/2009)

SPOT-4 (12/10/2010)

INSET IMAGE

QMorph DATA
3 Oktober 2010

Legenda

Cairan (5-10 mm/hari)
Sedang (23-50 mm/hari)
Lebat (50 - 100 mm/hari)
Lebat (50 - 100 mm/hari)

KETERANGAN

Fenomena data ALOS AVNIR, FORMOSAT, dan SPOT terlihat adanya erosi dan erosi lingkungan khususnya di daerah perairan. Data ini digunakan dalam penelitian pengembangan daerah perairan yang luas dari 100 m dari kubu terbesar.

Sumber Data:

ALOS AVNIR (Inpho) dari DFPPITU (https://www.dfpptu.go.id)
FORMOSAT (Inpho) dari DFPPITU (https://www.dfpptu.go.id)
SPOT (Inpho) dari DFPPITU (https://www.dfpptu.go.id)

PERSETUHAN

Fenomena data ALOS AVNIR, FORMOSAT, dan SPOT terlihat adanya erosi dan erosi lingkungan khususnya di daerah perairan. Data ini digunakan dalam penelitian pengembangan daerah perairan yang luas dari 100 m dari kubu terbesar.

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SPOT (Inpho) dari DFPPITU (https://www.dfpptu.go.id)
Thank’s

- We thank our college from APRSAF members, jaxa, CRISP, Sentinel Asia, DLR Germany, IDC/UNSPIDER, and Pacific Disaster Center for supporting near real time satellite images.

- The Satellite images has been send to responsible agency for disaster relief activity in the disaster areas.
LAPAN’s Role on Wall-to-Wall Land Cover Change Analysis to Support Indonesia’s National Carbon Accounting System (INCAS)

Orbita Roswintiarti
Director of Remote Sensing Data Center
Indonesian National Institute of Aeronautics and Space (LAPAN)
Background

- The UNFCCC COP-15 in Copenhagen acknowledged the importance of **reducing emissions from deforestation and forest degradation**, and the role of **conservation, sustainable management of forests and enhancement of forest carbon stocks (REDD+)** in developing countries.

- Guidance on methodology:
  - To **use the most recent IPCC guidance and guidelines**, as appropriate, **as a basis for estimating** forest-related greenhouse gas (GHG) emissions and removals, forest carbon stocks and forest area changes;
Background (Cont.)

- Guidance on methodology (cont.):
  - To establish, according to national circumstances and capabilities, robust and transparent national forest monitoring systems and, if appropriate, sub-national systems as part of national monitoring systems that:
    - Use a combination of **remote sensing** and **ground-based forest carbon inventory approaches** for estimating, as appropriate, anthropogenic forest-related and forest area changes;
    - Provide **estimates that are transparent, consistent, as far as possible accurate**, and that reduce uncertainties, taking into account national capabilities and capacities;
UNFCCC and IPCC Guidelines

Six broad categories of land use:
- Forest land
- Cropland
- Grassland
- Wetland
- Settlements
- Other land

Forest definition:
- a minimum land area of 0.05-1 hectare; with
- tree crown cover more than 10-30%; and
- tree height of 2-5m at maturity.
Forest Carbon Pools

Five carbon pools as identified by Intergovernmental Panel on Climate Change (IPCC)

Living biomass:
1. Above-ground biomass
2. Below-ground biomass

Dead organic matter:
3. Litter
4. Dead wood

Soils:
5. Soil organic matter
Role of Satellite Remote Sensing

Remote sensing plays an important role in monitoring and quantification carbon sequestration activities, such as:

- Providing the **area** and **extent** of various land cover classes.
- Providing the **amount of above-ground biomass** present in those classes.
- Providing the **annual change in area in each of the classes** (due to e.g., growth and decomposition; fire or wind throw; forest to cropland or cropland to forest).
- Helping obtain **ancillary information** that may be useful to parameterize models by means of direct relationships between different biophysical parameters and spectral reflectance.
Indonesia’s National Carbon Accounting System (INCAS)

The Indonesia-Australia Forest Carbon Partnership (IAFCP) is assisting Indonesia to establish INCAS (2009-2013).

INCAS will provide a comprehensive and credible account of Indonesia’s land based emissions profile and sinks capacity.

INCAS will be a highly integrated system that will compile information from Indonesia’s forestry and agricultural sectors to provide a robust emissions profile.

INCAS will support Indonesia’s reporting requirements under the UNFCCC and a post-2012 climate change agreement. It will also support entry to carbon markets.
LAPAN’s Roles in Wall-to-wall Land Cover Change of INCAS

- Develop capacity to undertake a wall-to-wall historical assessment of land cover change from 1999 to 2008 (IPCC reviewed method)
- Support research into the development of new methods that can be used to undertake wall-to-wall historical assessments of land cover change.
- Support research and develop capacity to undertake future land cover change analysis.
- Develop methods for detecting forest degradation.
- Support development of globally accepted remote sensing methods, interoperability, via the GEO FCT, etc.
Land Cover Change Processing Stream

- Scene Selection
  - Ortho-rectification and Terrain-illumination correction
  - Cloud Masking and Mosaicing
  - Thresholding to map forest extent
  - Multi-temporal processing to monitor change

- Quality Assurance

- Attribution for Purpose

- Processing of Other Products
Methods

Methods are adopted from:

- the Australia’s NCAS developed by Australian Commonwealth Scientific and Research Organization (CSIRO).
- the Geographic Information Science Centre of Excellence, South Dakota State University (SDSU) - USA.
Landsat Data Utilization

- ~ 225 Landsat images cover Indonesia.
- Up to 5 images (usually 2-3) selected to provide maximum cloud-free area.

High resolution imagery (aerial photos, Ikonos, Quickbird) will be required for ground-truthing and validation.
Landsat Data Sources

Sources of Landsat data:

- GISTDA
- USGS
- Geoscience Australia (GA)
- LAPAN archives with assistance from GA
Summary

- Landsat data play a significant role in supporting the national and international concerns, such as carbon accounting, climate change, etc.
- This project strongly supported by Geoscience Australia, GISDA Thailand and USGS USA.
- LAPAN would keep collaboration with above agencies to achieve this goal.
SPACE WEATHER RESEARCH PROGRAM IN INDONESIA
by Sri Kaloka

CENTER FOR APPLICATION OF SPACE SCIENCE
NATIONAL INSTITUTE OF AERONAUTICS AND SPACE (LAPAN)
KEY FACTORS OF SPACE WEATHER PROGRAM

- OBSERVATIONS
- RESEARCH
- FORECAST
- MODELING
- DISSEMINATION
- EDUCATION
SOLAR ACTIVITY RESEARCH

- LONG AND SHORT TERM SOLAR ACTIVITY PREDICTION AND THE IDENTIFICATION OF THE NATURE AND MECHANISMS OF FLARES (FLARE PREDICTION), CME

- MODEL AND THE PREDICTION OF THE IMPACT OF SOLAR ACTIVITY TO THE EARTH (SUN-EARTH CONNECTION), INCLUDING THE IMPACT ON IONOSPHERE, GEOMAGNETIC FIELD
TELESCOPES

CELESTRON 8 INCH FOR SUNSPOT SKETCH

Refractor CELESTRON NEXSTAR 8 INCH for solar observation

Reflector NGT 18 inch for night observation

Refractor VIXEN 10,5 CM and Coronado Ca K

OBSERVATION OBJECTS:
• SUNSPOT
• FLARE
• PROMINENCE ---> Hα filter
• CHROMOSPHERE ---> Ca filter
SOLAR RADIO SPECTROGRAPH - SN 4000
RADIO SPECTRUM: 18 MHz – 1.8 GHz
OPERATING NOW: 56 MHz – 1.8 GHz
A new powerful radar has been established at Bukittinggi, West Sumatra, Indonesia.
Equatorial Atmosphere Radar (EAR)  
Completed in March 2001

Location:  
Koto Tabang, Palupuh District,  
Agam, West Sumatra, Indonesia  
(0.2°S, 100.32°E)

Joint Research between LAPAN,  
Indonesia and Research Institute for Sustainable Humanosphere (RISH) Kyoto University, Japan

Antenna (diameter 110 m)  
560 Yagi-arrays
LOKASI JARINGAN PERALATAN
PENGAMATAN MATAHARI, DINAMIKA ANTARIKSA DAN ATMOSFER

KOTOTABANG:
EAR, RASS, MWR, Airglow, Ceilometer, AWS, ORG, Ionosonda, TEC meter Magnetometer

PONTIANAK:
NPR, TEC meter, Magnetometer, AWS, Ionosonde, radiasi uv, ozon

MANADO:
Ionosonda, AWS, TEC meter

BIAK:
Ionosonda, Magnetometer, Lidar, Ozon

TANJUNGSARI:
Teleskop, Ionosonda, Radio Spektrograf, TEC meter, AWS, Airglow Monitor

PAMEUNGPEUK:
Ionosonda, Meteo, MF radar, AWS

WATUKOSEK:
BREWER Spectr, Ozon, Meteo, Telescope Matahari, radiasi uv

KUPANG:
Ionosonda, AWS, Magnetometer,
INFORMATION AND SERVICES

SITUS WEB: bdg.lapan.go.id

- SOLAR ACTIVITY (SUNSPOT, FLARE, CME)
- IONOSPHERIC PARAMETERS (FoF2, HF2, TEC modelling etc)
- GEOMAGNETIC ACTIVITY (Pi, Pc)
- RADIO FREQUENCY COMMUNICATION PREDICTION (QUARTERLY)
- SPACE WEATHER SCIENCE

Public Outreach: Space Weather Seminar, Public Speaking, Bulletin (Quarterly), Open House,
Ground Station and Data Processing Facilities

1. Pare-pare, South Sulawesi (SPOT-4, MODIS)
2. Biak Island, Papua (NOAA-Fengyun)
3. Pekayon, Jakarta (MTSAT, NOAA, Fengyun, MODIS)
4. Rumpin, Bogor (MODIS, LAPAN-TUBSAT)
Ground Station at Parepare, South Sulawesi

Data:
- **SPOT-2, SPOT-4**
- **Terra/Aqua MODIS**
LAPAN TUBSAT

Payload
1. PAL Video Camera ground resolution 5m, swath 3.5 km
2. and PAL video camera ground resolution 200m, swath 81 km
3. Polar Orbit, 630 km

Satellite is still operational. New video images could be browse in

http://www.lapantubsat.org/
Ground Station at Rumpin, Bogor

Data:
Microsat LAPAN-TUBSAT and Terra/Aqua MODIS
Future Microsatellite Program

- LAPAN will launch two Microsatellites
  a. Amateur Radio Microsatellite
  b. LAPAN A2
- Both satellite use LAPAN-TUBSAT configuration
- Both satellite is planned to operate in near equatorial low earth orbit
- Tentative schedule is 2011
Amateur Radio Satellite

Satellite Description

Primary Mission:
1. Disaster mitigation by amateur radio communication.
2. Earth observation (3-band multi-spectral remote sensing) for disaster mitigation efforts, land use, natural resource and environment monitoring.

Orbit:
Near Equatorial LEO, at between 6 to 8 degree inclination and orbit altitude 650 km. Launch on second quarter 2011 (same as LAPAN-A2 satellite launch).

Payload:
Indonesian Amateur Radio Organization (ORARI) communication payloads:
2. Amateur radio analog voice communication relay.
3. 3-band MSS
LAPAN-A2 Satellite

**Payload:**

Video camera  Kappa PAL color for 80 km swath width ground coverage.

True color RGB digital camera for high resolution satellite earth observation.
Ground resolution: 5,96 m
Ground coverage: 12,2 x 12,2 km.

Automatic Identification System (AIS) for maritime navigation and shipping traffic monitoring.

**Orbit:**

Near Equatorial Low Earth Orbit (LEO), at between 6 to 8 degree inclination and altitude 650 km. Planned launch as auxiliary payload on Antrix/ISRO PSLV mission for Astrosat launch on second quarter of 2011
Perkiraan liputan optimum satelit dengan inklinasi orbit katulistiwa atau dekat katulistiwa untuk wilayah Indonesia.
ALOS Application & Verification Project in Indonesia

Agus Hidayat

Pusat Pengembangan Pemanfaatan dan Teknologi Penginderaan Jauh
Kedeputian Penginderaan Jauh
Lembaga Penerbangan dan Antariksa Nasional (LAPAN)
ALOS DATA DISTRIBUTION FOR EACH WORKING GROUP MEMBERS

10 JUNE 2010:
ALOS Data Distribution from LAPAN to each Working Group Chairman at LAPAN, Pekayon Jakarta

NUMBER OF DATA:
WG 1: 61 data, WG 2: 50 data, WG 3: 50 data, WG 4: 50 data

SEPTEMBER 2010:
ALOS Data Distribution from LAPAN to KESDM for monitoring Sinabung Volcano

NUMBER OF DATA:
WG 3: 4 data

SEPTEMBER 2010:
ALOS Data Distribution from LAPAN to KLH for oil spill detection for Timor sea

NUMBER OF DATA:
WG 2: 4 data

NOVEMBER 2010:
ALOS Data Distribution from LAPAN to WG 3 for monitoring Merapi Volcano

NUMBER OF DATA:
WG 3: 5 data
WORKING GROUP TECHNICAL MEETING

24 JUNE 2010 : WG 1 Technical Meeting at CRS ITB, Bandung

Participants: LAPAN, ITB, BPPT, BAKOSURTANAL, UI, PU, UNDIP, KEMTAN

Results:
1. Data distribution
2. Plan for data (primer and secondary) exchange among members,
3. Technical discussion on radar,
4. Meeting every 3 months
5. Training requirement.
18 JUNE 2010: WG 2 Technical Meeting at BAKOSURTANAL, Bogor

Participants: LAPAN, BAKOSURTANAL, BAKORKAMLA, DKP, KEMTAN, PU

Results:
1. Data distribution
2. Data and technical exchange among members
3. Need base map the geometric correction
4. Meeting every 2 months

18 JUNE 2010: WG 3 Technical Meeting at KESDM, Bandung

Participants: KESDM, LAPAN, BPPT, UGM

Results:
1. Data distribution to all members
2. Data and technical exchange among members
3. Work distribution to all members
4. WG 3 will focus on Lokon and Soputan Vulcano in first year.
ALOS DATA TRAINING COURSE, STEP 2
LAPAN- Jakarta, August 2010 ; 36 participants
Thank You
## EMERGENCY RESPONSE OF RECENT DISASTERS IN INDONESIA 2010

<table>
<thead>
<tr>
<th>Date</th>
<th>Disaster</th>
<th>Location</th>
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<tbody>
<tr>
<td>3-4 October</td>
<td>Flush Flood</td>
<td>Wasior, Papua</td>
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<tr>
<td>25 October</td>
<td>Tsunami</td>
<td>Mentawai Islands</td>
</tr>
<tr>
<td>~ 22 October - 6 November</td>
<td>Merapi Volcano Eruption</td>
<td>Yogyakarta, Central Java</td>
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