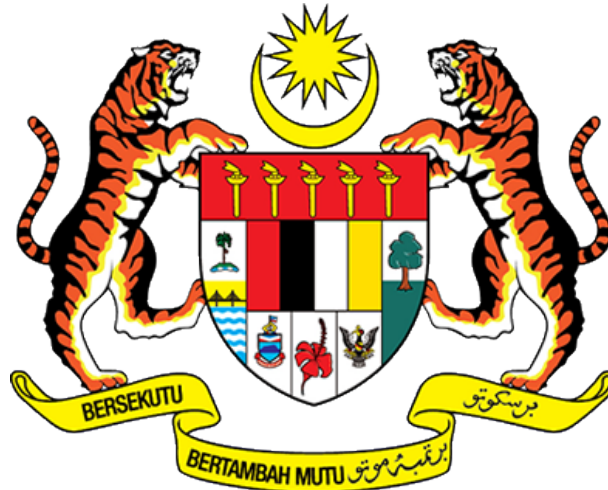


MALAYSIA COUNTRY REPORT



MALAYSIAN METEOROLOGICAL DEPARTMENT
MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION

(ABD. MALIK BIN TUSSIN)

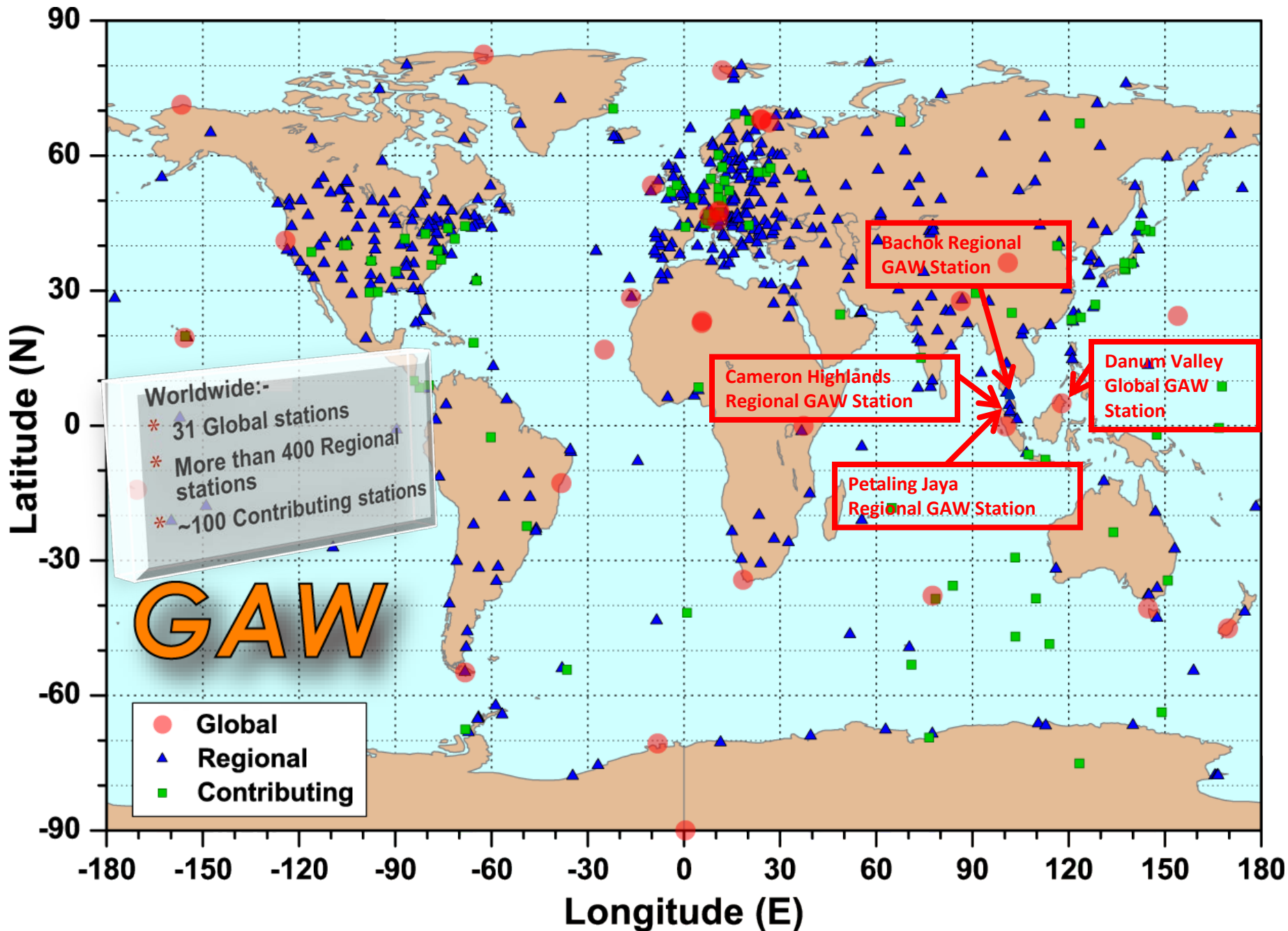
The Ninth GEOSS Asia-Pacific Symposium
11-13 January 2017
Tokyo, Japan

The report covers topics on:

- i. Global Atmosphere Watch (GAW) Monitoring Network
(Malaysian Meteorological Department)
- ii. Space Technology and Earth Observation Utilization in Malaysia
(Malaysian National Space Centre)
- iii. Applications of Earth Observation Data in Malaysia
(Malaysian Remote Sensing Agency)

i. Global Atmosphere Watch (GAW) Monitoring Network

- To support the GAW Programme of World Meteorological Organization (WMO)
- Malaysian Meteorological Department (MetMalaysia) has since 1989 established GAW stations to carry out systematic monitoring of atmospheric constituents in response to acquire a high quality data to study and understand the regional issues on trans-boundary haze, acid deposition, climate variability, climate change and stratospheric O₃ depletion.
- MetMalaysia operates four GAW stations:
 - i. one **Global** Station at Danum Valley (Nov 2003)
 - ii. three **Regional** Stations at Cameron Highlands, Petaling Jaya and Bachok (Jun 2016)



GAW Measurement Network

GAW Stations in Malaysia – site classification

URBAN



COASTAL



GAW LEMBAH DANUM

REMOTE



GAW BAGHOK

**GAW CAMERON
HIGHLANDS**

RURAL



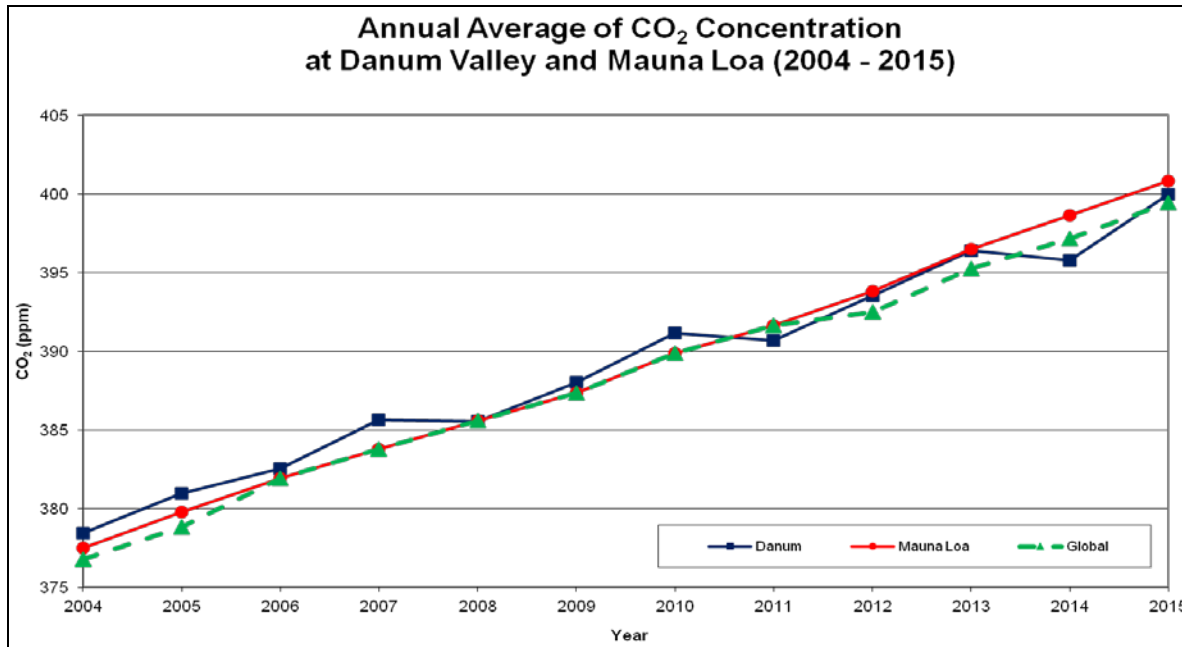
GAW PETALING JAYA

The Monitoring Activities at GAW stations in Malaysia

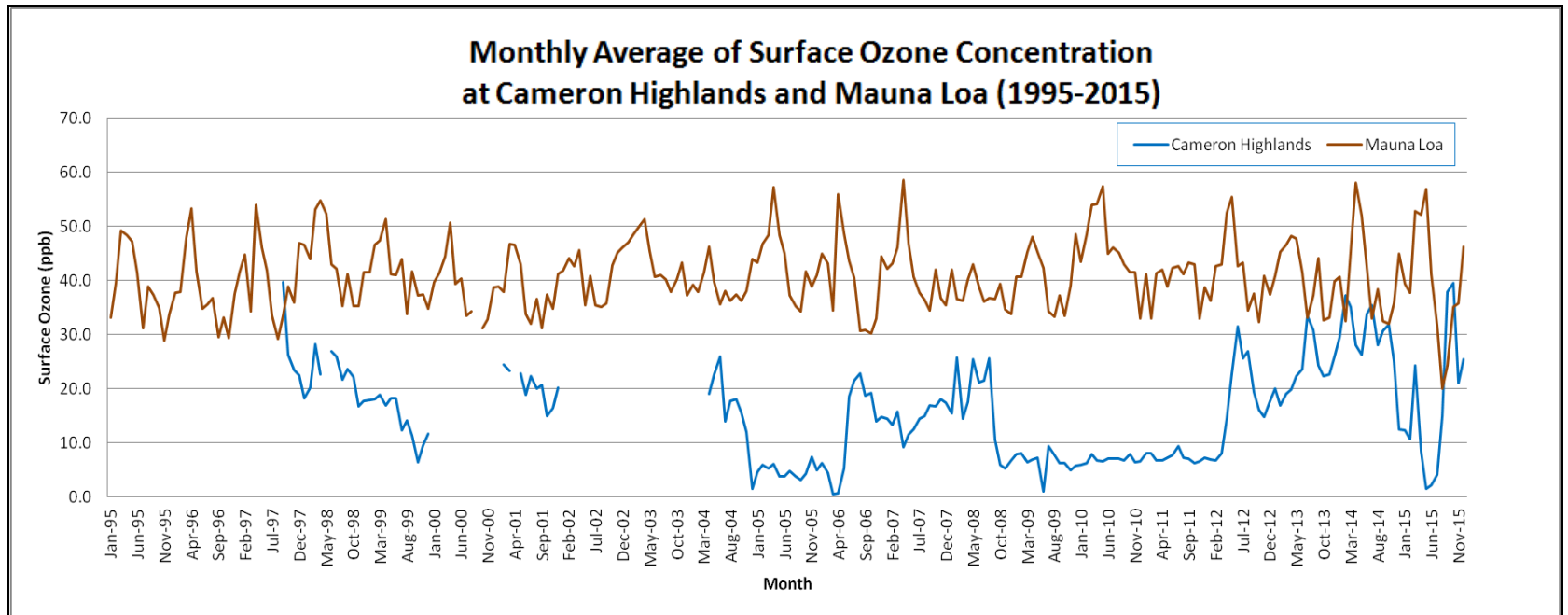
NO.	GAW FOCAL AREAS	TYPE OF INSTRUMENT	Danum Valley	Cameron Highlands	Petaling Jaya	Bachok
1.	Aerosol <ul style="list-style-type: none"> Aerosol Load Back Scattering Coefficient Absorption Coefficient Aerosol Optical Depth PM-10 & PM-2.5 Concentration 	<ul style="list-style-type: none"> High Volume Air Sampler (TSP & PM-10) & Tapered Element Oscillating Microbalance (TEOM) Nephelometer Multi Angle Absorption Photometer (MAAP) Precision Filter Radiometer (PFR) Environmental Dust Monitor (EDM) 	<ul style="list-style-type: none"> √ √ √ √ 	<ul style="list-style-type: none"> √ 	<ul style="list-style-type: none"> √ 	<ul style="list-style-type: none"> √ *
2.	Greenhouse Gases <ul style="list-style-type: none"> Carbon Dioxide (CO₂) Methane (CH₄) Nitrous Oxide (N₂O) Sulphur Hexafluoride (SF₆) 	<ul style="list-style-type: none"> Flask Sampling & CO₂ Analyzer Flask Sampling & CH₄ Analyzer Flask Sampling & N₂O Analyzer Flask Sampling 	<ul style="list-style-type: none"> √ √ √ √ 			<ul style="list-style-type: none"> √ * √ * √ *
3.	Reactive Gases <ul style="list-style-type: none"> Carbon Monoxide (CO) Nitrogen Oxides (NO_x) Sulphur Dioxide (SO₂) 	<ul style="list-style-type: none"> CO Analyzer & Flask Sampling NO_x Analyzer SO₂ Analyzer 	<ul style="list-style-type: none"> √ 	<ul style="list-style-type: none"> √ √ √ 		<ul style="list-style-type: none"> √ * √ * √ *
4.	Ozone <ul style="list-style-type: none"> Surface Ozone (O₃) Total Column Ozone 	<ul style="list-style-type: none"> O₃ Analyzer Brewer Spectrophotometer 	<ul style="list-style-type: none"> √ 	<ul style="list-style-type: none"> √ 	<ul style="list-style-type: none"> √ 	<ul style="list-style-type: none"> √ *
5.	UV Radiation	<ul style="list-style-type: none"> Brewer Spectrophotometer 			<ul style="list-style-type: none"> √ 	
6.	Precipitation Chemistry	<ul style="list-style-type: none"> Ecotech Wet Only Rainwater Sampler Acid Precipitation Sampler (APS) 	<ul style="list-style-type: none"> √ 	<ul style="list-style-type: none"> √ √ 	<ul style="list-style-type: none"> √ √ 	<ul style="list-style-type: none"> √

* University of Malaya's instrument

**Annual Average of CO₂ Concentration
at Danum Valley and Mauna Loa (2004 - 2015)**

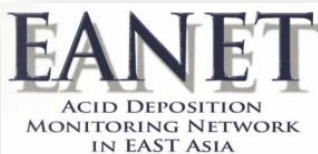
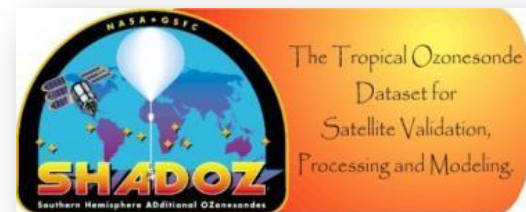


**Monthly Average of Surface Ozone Concentration
at Cameron Highlands and Mauna Loa (1995-2015)**



International Collaborations

- Monitoring of aerosols, GHGs, reactive gases, acid deposition, ozone and uv radiation
- Instrumentations and maintenance : LoFlo CO₂ Analyzer – **CSIRO**; MAAP, Nephelometer & TEOM - **TROPOS**
- Analysis of collected samples : Flask Sampling - **NIES** ; POPs - **GAPS**
- Transfer of knowledge : GAWTEC Training Course – **GAW**; EANET Individual Training - **EANET**
- Data sharing : Ozonesonde – **SHADOZ**; Aerosol Optical Depth - **AERONET**

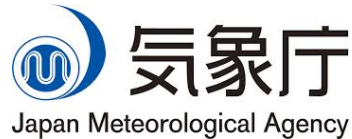


Contribution to World Data Centres

❖ World Data Centre for Greenhouse Gases

✓ Carbon Dioxide (Once a year)

✓ Surface Ozone (Once a year)



❖ World Ozone and Ultraviolet Radiation Data Centre

✓ Total Column Ozone (Once a month)

✓ Ozone Profile (Once a year)



❖ World Data Centre for Aerosols

✓ Aerosol Physical Properties (Once a year)



❖ World Radiation Centre

✓ Aerosol Optical Depth (Continuous)



❖ East Asia Acid Deposition Monitoring Network

✓ Wet & Dry Deposition (Once a year)

✓ Inland Aquatic (Once a year)



Asia Center for Air Pollution Research (ACAP)

Future Plan

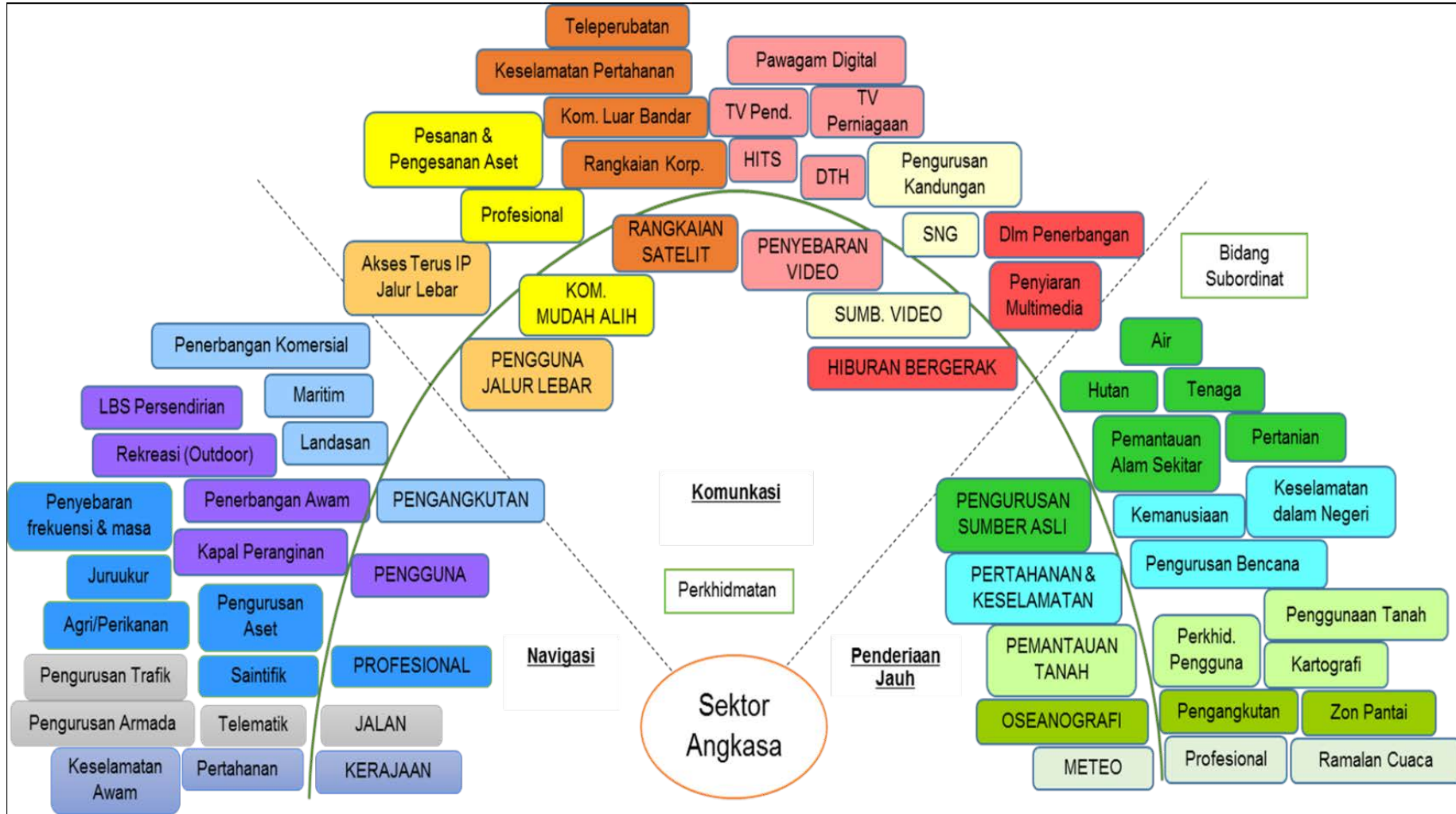
- Since the government of Malaysia acknowledges the importance of ozone monitoring, MetMalaysia was given enough allocation to acquire 6 units of total column ozone monitoring instrument under the 11th Malaysia Plan.
- With the installation of 6 units of Brewer Spectrophotometer in early 2017, Malaysia will be able to monitor near real time total column ozone as well as other parameter such as UV radiation and AOD all over the country and the distribution of these parameters can be mapped.
- Before 2020, MetMalaysia is planning to acquire 4 units of CO₂ and CH₄ Analyzer to be installed in northern and central part of Peninsular as well as in Sabah and Sarawak.

ii. Space Technology & Earth Observation Utilization in Malaysia

The Role of National Space Centre

- To develop an integrated and coordinated national capacity in the field of space science and technology
- To improve information support in various applications
- To add value to national policies related to space
- To increase and strengthen international cooperation and collaborations related to space
- To promote education and research in space science and technology

Malaysia Space Sector



THE SPACE PROGRAMMES

- Space science
- Space technology
- Ground infrastructures
- Space applications
- Space policy

RazakSAT-2

- Malaysian government expand the national earth observation satellite development program after the the launched of TiungSAT and RazakSAT-1.
- Funded by the government, RazakSAT-2 will have much higher image resolution capability. The satellite will carry an optical sensor of 1 meter for panchromatic band and 4 meters for multispectral bands to be launched on sun-synchronous orbit.
- Applications will cover urbanization, agriculture, landuse, forestry, mapping, biodiversity, environment monitoring and disaster management.

Sentinel Asia - Member of Joint Project Team (JPT) in Sentinel Asia which is a space-based disaster management support system in the Asia-Pacific region

The screenshot displays the Sentinel Asia website interface. At the top, the browser address bar shows the URL <https://sentinel.tksj.jaxa.jp/sentinel2/topControl.jsp>. The website header features the Sentinel Asia logo and a navigation menu with items: HOME, Announce, About Sentinel Asia, JPT Member, FAQ, Contact US, Links, and Site Policy. A user login section is visible with fields for UserID (containing 'gues9999') and password, and a 'login' button.

The main content area is divided into several sections:

- WEB GIS**: A vertical sidebar menu with items: Emergency Observation, Wildfire Monitoring, Flood Monitoring, MTSAT Imagery, Capacity Building, and Library.
- Welcome To Sentinel Asia Web Site**: A text block stating: "Sentinel Asia is a voluntary basis initiative led by the APRSAF (Asia-Pacific Regional Space Agency Forum) to support disaster management activity in the Asia-Pacific region by applying the WEB-GIS technology and space based technology, such as earth observation satellites data."
- Emergency Observation**: A list of recent events, each with a globe icon:
 - 25/Apr/2015 Earthquake in Nepal
 - 14/Mar/2015 Tropical cyclone in Vanuatu
 - 27/Feb/2015 Others in Vietnam
 - 09/Feb/2015 Flood in Indonesia
 - 21/Dec/2014 Flood in Malaysia
 - 12/Dec/2014 Landslide in Indonesia
 - 06/Dec/2014 Typhoon in Philippines
 - 29/Oct/2014 Landslide in Sri Lanka
 - 12/Oct/2014 Flood in India
 - 27/Sep/2014 Volcano eruption in JapanA "more..." button is located below the list.
- Current Topics**: A list of news items:
 - 31/Mar/2015 Sentinel Asia participated in the WCDRR which was held in Sendai, Japan, from 14 to 18 March, 2015. [link...](#)
 - 13/Mar/2015 The central server of JAXA become the new environment and reopened. [link...](#)A "more..." button is located below the list.
- Images**: Three satellite-related images are displayed on the right side of the main content area.

The footer of the website features a row of partner organization logos, including JAXA, ICIMOD, CSIRO, KARI, AIT (Asian Institute of Technology), and others. The copyright notice at the bottom right reads: "©Copyright 2009 Japan Aerospace Exploration Agency. All Rights Reserved." The Windows taskbar at the very bottom shows the system clock as 11:28 AM on 27/4/2015.

Sentinel Asia Step-3: Objectives & Main Activities

Objectives:

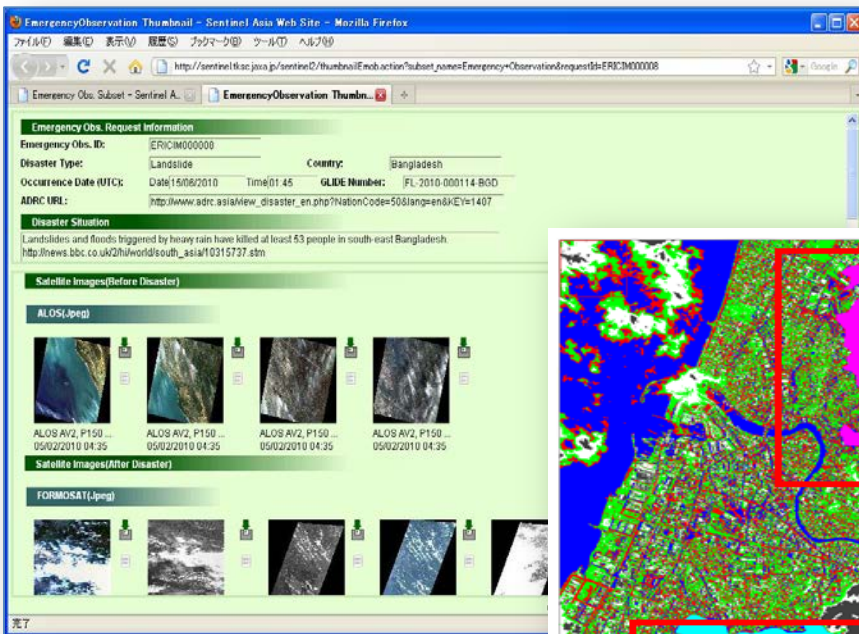
- Improve safety in society by Information and Communication Technology (ICT) and space technologies
- Improve the speed and accuracy of disaster preparedness and early warning
- Minimize the number of victims and social/economic losses

Main Activities:

- Emergency observation by earth observation satellites upon requests in case of major disasters
- 4 Working groups activities focusing on specific disasters such as wildfire, flood, glacial lake outburst flood (GLOF), and tsunami
- Capacity building and human resources development for more effective disaster management

Sentinel Asia Step-3: Participation

- A Cooperate Arrangement between ANGKASA–JAXA was signed on **August 2011**.
- **WINDS 51M-VSAT** as a ground terminal for Sentinel Asia operations. The terminal has been successfully installed on November 2012 and begin its operation on December 2012.
- **ANGKASA is a Data Analysis Node (DAN)** member which implement the analyses of satellite data provided by DPN, make value add product and disclose the result through the Sentinel Asia System within the domestic legislation of each DAN permits



- In-house Image Processing for Disaster Management
- ERDAS IMAGING
- ENVI
- ArcGIS

GCP Tool: (Input: indon_ikonos.img) (Reference: capture.img)

Point #	Point ID	Color	X Input	Y Input	Color	X Ref.	Y Ref.	Type	X Residual	Y Residual	RMS Error	Contrib.	Match
1	GCP #1		124.851	1.510		230.815	-140.648	Control	-0.001	-0.004	0.004	0.800	
2	GCP #2		124.856	1.481		271.825	-189.804	Control	0.000	0.001	0.001	0.263	
3	GCP #3		124.837	1.476		165.491	-190.332	Control	0.002	0.008	0.009	1.523	
4	GCP #4		124.836	1.466		171.714	-230.546	Control	-0.001	-0.005	0.006	0.955	0.234
5	GCP #5							Control					

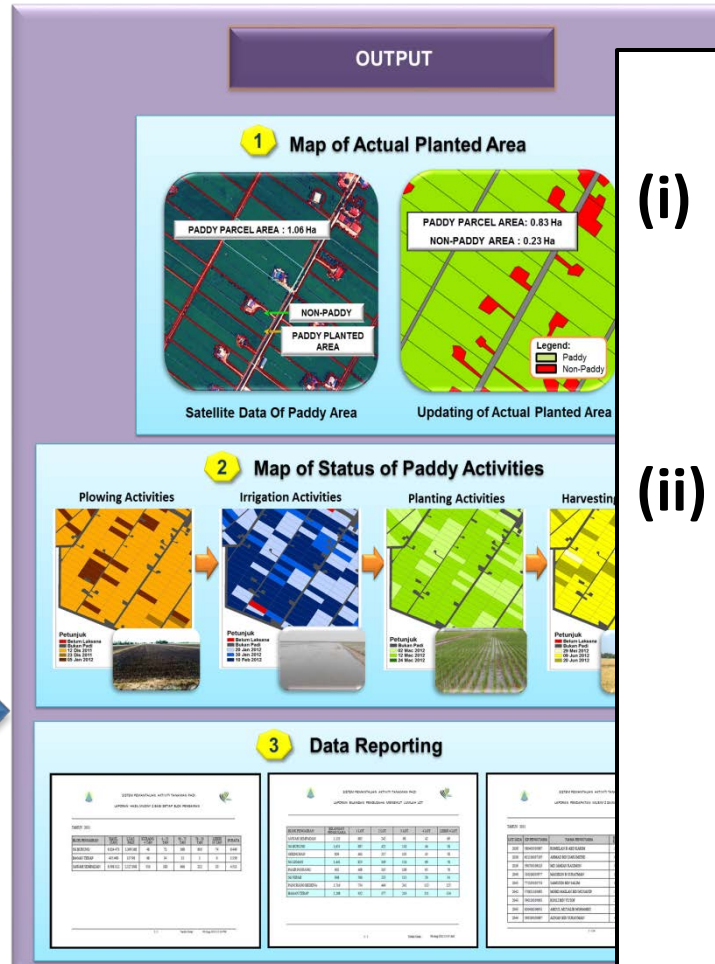
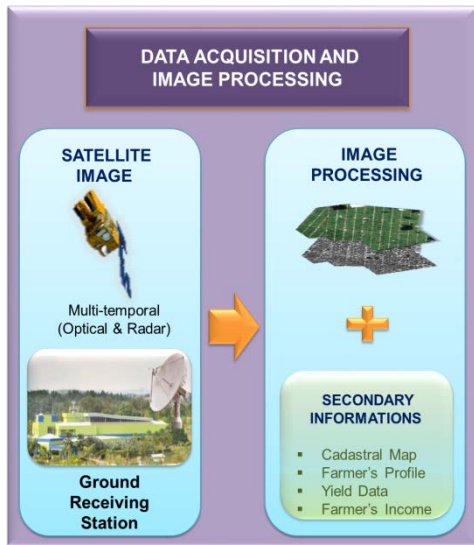
iii. Applications of Earth Observation Data in Malaysia

The Role of Malaysian Remote Sensing Agency

- To develop applications of remote sensing and related technologies for use in operational agencies for more effective management of agriculture production, natural resources, environment, disaster, security and land development of the country
- To optimise the use of remote sensing and related technologies for sustainable development of the country
- To provide total solution in remote sensing and related technologies applications, and centrally acquire and distribute remote sensing satellite images for the requirement of the country

AGRICULTURE (SDG#2)

Paddy Cultivation Management System Using Remote Sensing and GIS



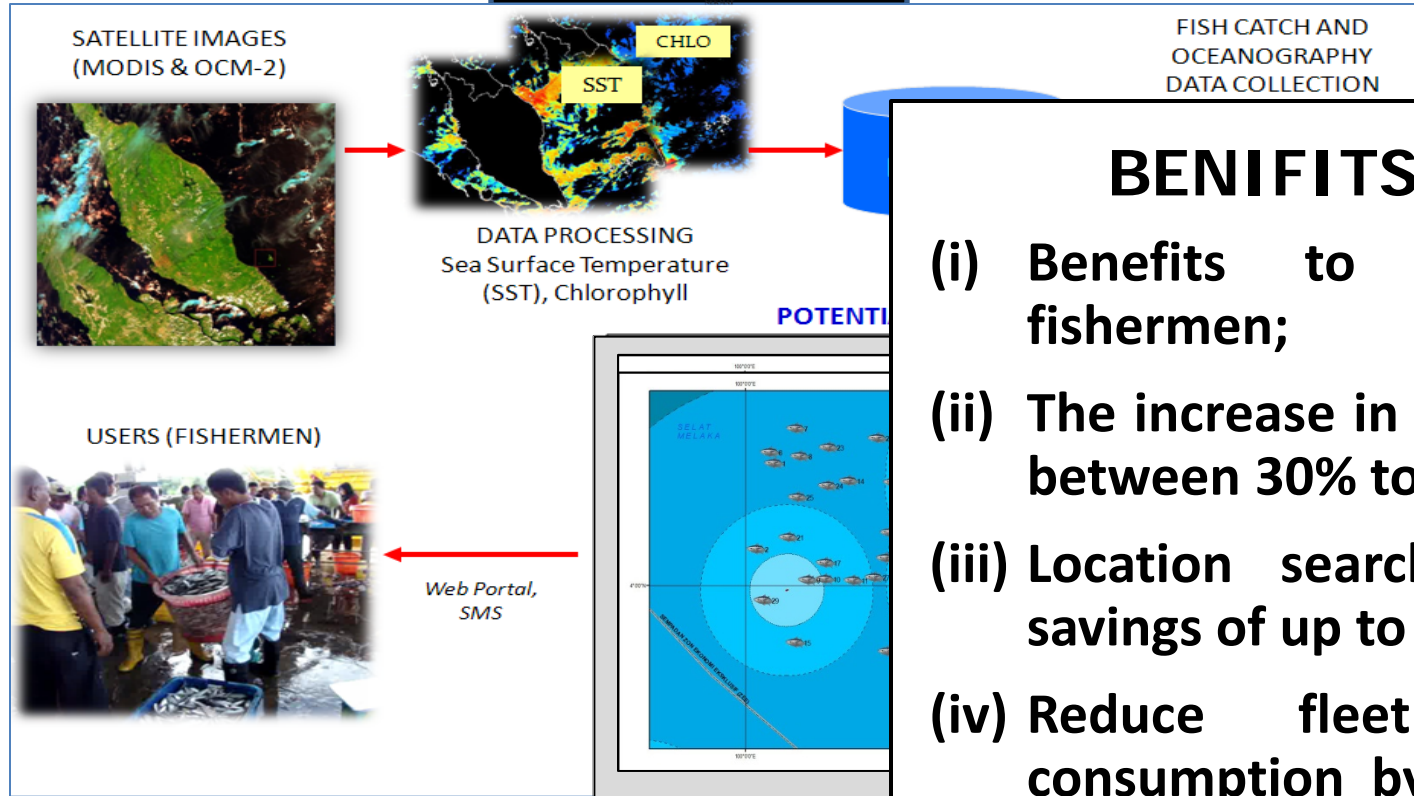
BENIFITS

- (i) Improve the efficiency of rice crop management; and
- (ii) To faster estimation of post harvest yield for logistics planning, including the planning of country's rice import.



FISHERIES (SDG#14)

Fishing Site Identification (FSI)



BENEFITS

- (i) Benefits to 35,000 fishermen;
- (ii) The increase in catches between 30% to 50%;
- (iii) Location search time savings of up to 30%;
- (iv) Reduce fleet fuel consumption by up to 30%; and
- (v) More efficient enforcement in national waters.



Date, Zone State Catches

Locations of PFZ

Electronic dissemination of information

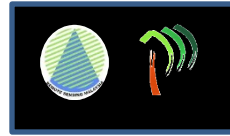
SMS: Type **RSENSING IKAN [NO VESEL]** and SMS to **15888**



<http://ikan.remotesensing.gov.my:3000>

NATURAL RESOURCES DAN ENVIRONMENTAL (SDG#15)

Forest Monitoring System



Achieving a balanced of the natural resources taking into account the importance of physical development with preservation and sustainability of forest and the environment

Thank you

