** October 2021 News from Sentinel Asia Project Office **

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Topics:

1. [News] Emergency Observation of Disasters
2. [Interview] Dr. Raj Kumar, Outstanding Scientist, Director, National Remote Sensing Centre (NRSC), Indian Space Research Organisation (ISRO)
3. [Event] Sentinel Asia Webinar
4. How to Send an Emergency Observation Request
5. Using the Sentinel Asia Operation System, OPTEMIS

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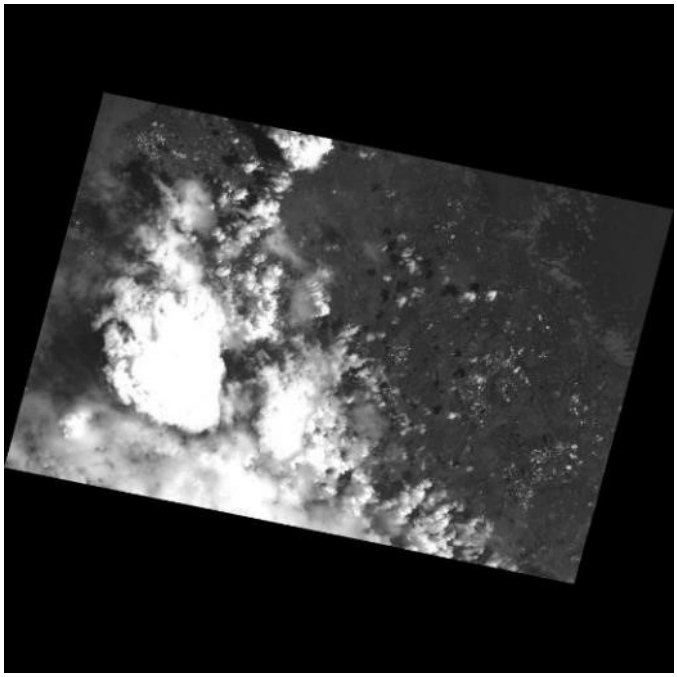
1. [News] Emergency Observation of Disasters (as of 28 October, 2021)

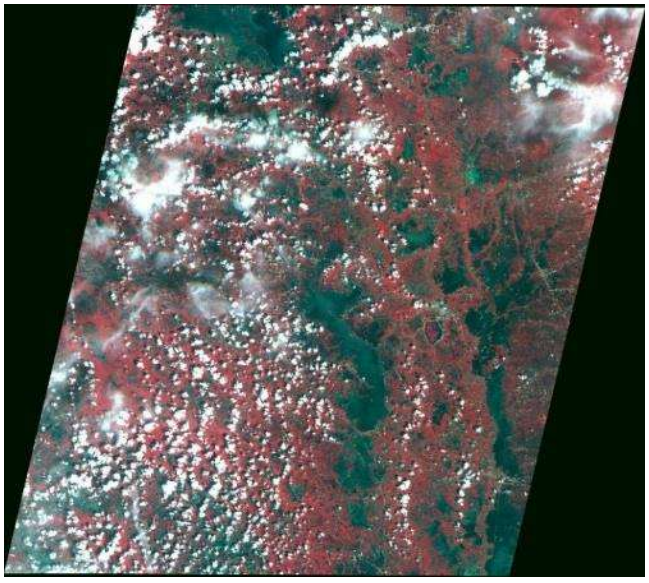
(1) Tropical Storm Dianmu Flood in Thailand (GLIDE Number: FL-2021-000147-THA)

Tropical storm Dianmu caused flood in 32 provinces in Thailand. According to the Bangkok Post, as of 5 October, eight people died and one remains missing. (https://www.bangkokpost.com/thailand/general/2192803/storm-dianmu-floods-linger-in-18-provinces)

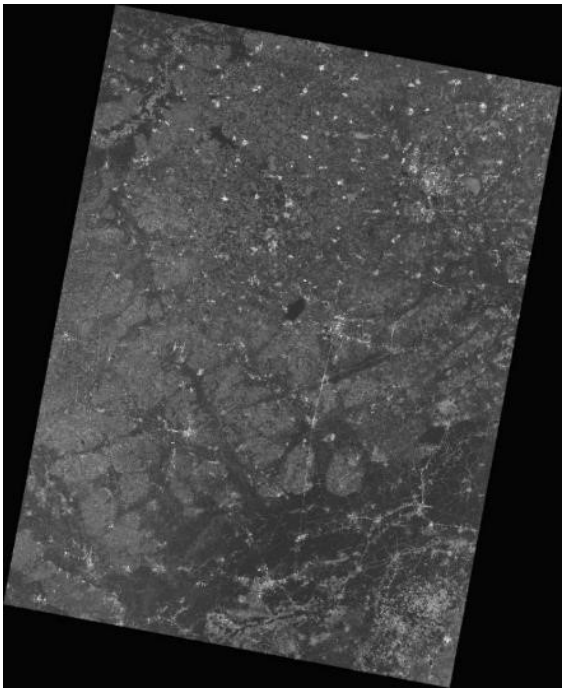
The Geo-Informatics and Space Technology Development Agency (GISTDA) made an EOR to Sentinel Asia on 29 September. Among DPNs, the Indian Space Research Organisation (ISRO), the Japan Aerospace Exploration Agency (JAXA) and the National Applied Research Laboratories (NARL) provided data. Among DANs, the Asian Institute of Technology (AIT) provided its VAPs. Information on the latest response by Sentinel Asia is available at the following link:
https://sentinel-asia.org/EO/2021/article20211001TH.html



Satellite image (THEOS1) provided by GISTDA

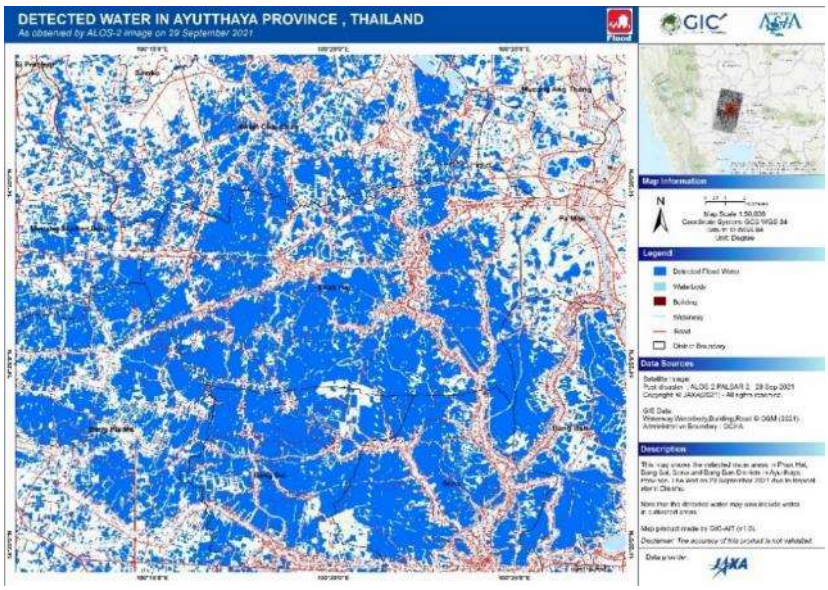


Satellite image (Resourcesat-2) provided by ISRO



Satellite image (ALOS-2) provided by JAXA

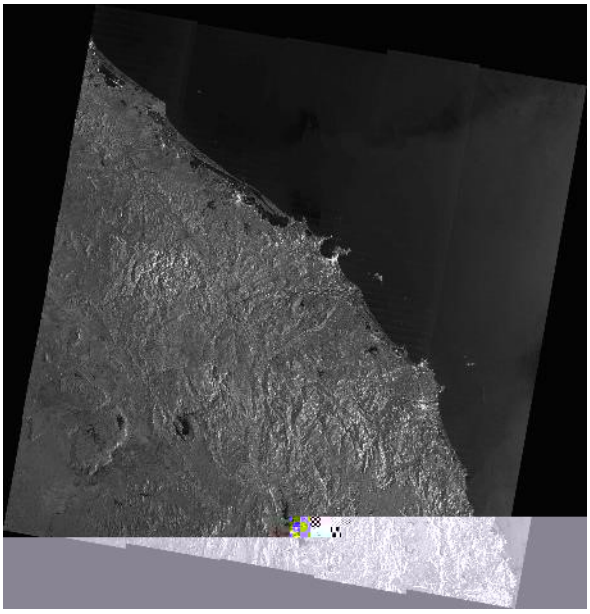
Satellite image (FORMOSAT-4) provided by NARL



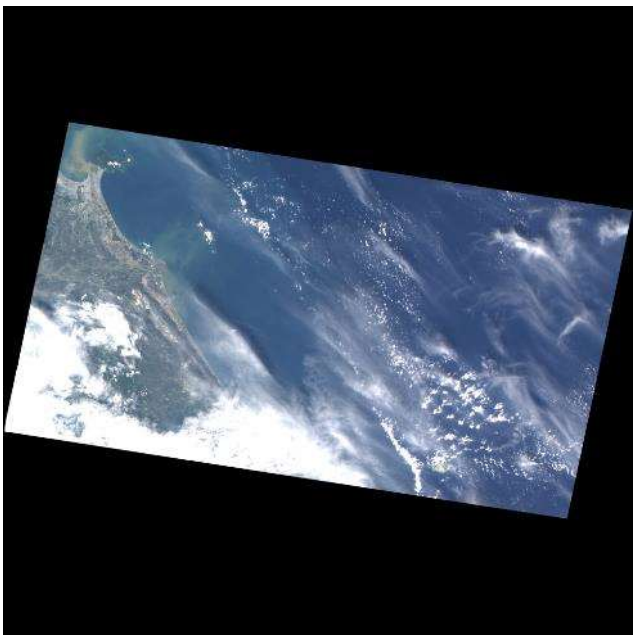
Value-Added Product by AIT

(2) Flood, Landslides and Storm in Vietnam (GLIDE Number: FL-2021-000158-PHL)
Heavy rain was expected in northern and central Vietnam. Tuoi Tre News reported the risk of flashfloods and landslides.
(https://tuoitrenews.vn/news/society/20211006/tropical-depression-to-bring-downpours-to-central-vietnam/63434.html)

The Ministry of Natural Resources and Environment (MONRE) made an EOR to Sentinel Asia on 7 October. Among DPNs, JAXA and GISTDA provided data. Information on the latest response by Sentinel Asia is available at the following link:
https://sentinel-asia.org/EO/2021/article20211006VN.html



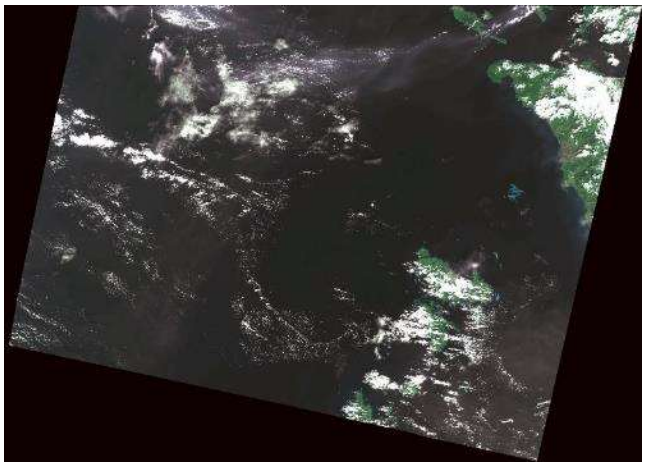
Satellite image (ALOS-2) provided by JAXA



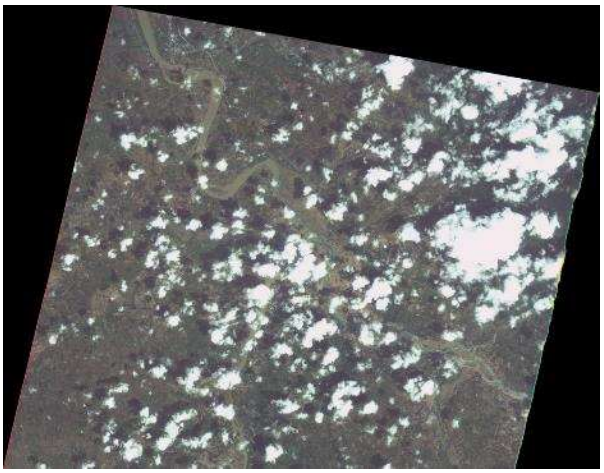
Satellite image (THEOS1) provided by GISTDA

(3) Flood and Landslides in the Philippines (GLIDE Number: FL-2021-000158-PHL)
Tropical storm Maring (Kompasu) made landfall in the vicinity of Fuga Island, the Philippines, on 11 October and crossed the Philippine Area of Responsibility (PAR). According to CNN, the National Disaster Risk Reduction and Management Council announced that the death toll was at least 23 as of 17 October.
(https://www.cnnphilippines.com/news/2021/10/16/Maring-death-toll-October-16.html)

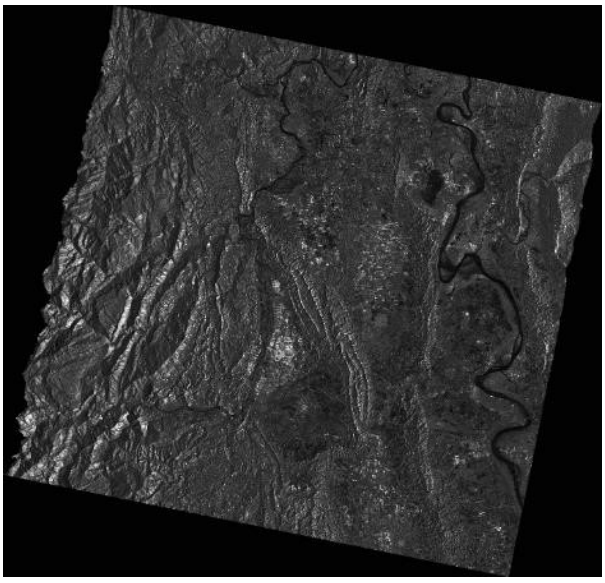
The Manila Observatory (MO) made an EOR to Sentinel Asia on 13 October. Among DPNs, JAXA, GISTDA, ISRO and NARL provided data. Information on the latest response by Sentinel Asia is available at the following link:
https://sentinel-asia.org/EO/2021/article20211012PH.html



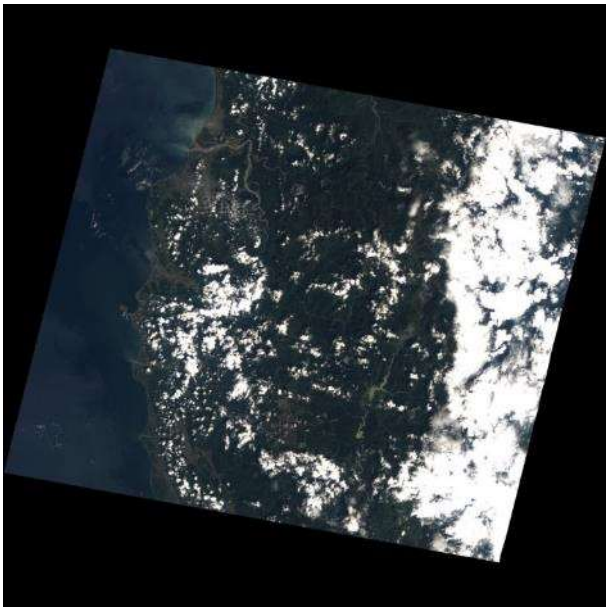
Satellite image (Resourcesat-2) provided by ISRO



Satellite image (FORMOSAT-5) provided by NARL



Satellite image (ALOS-2) provided by JAXA

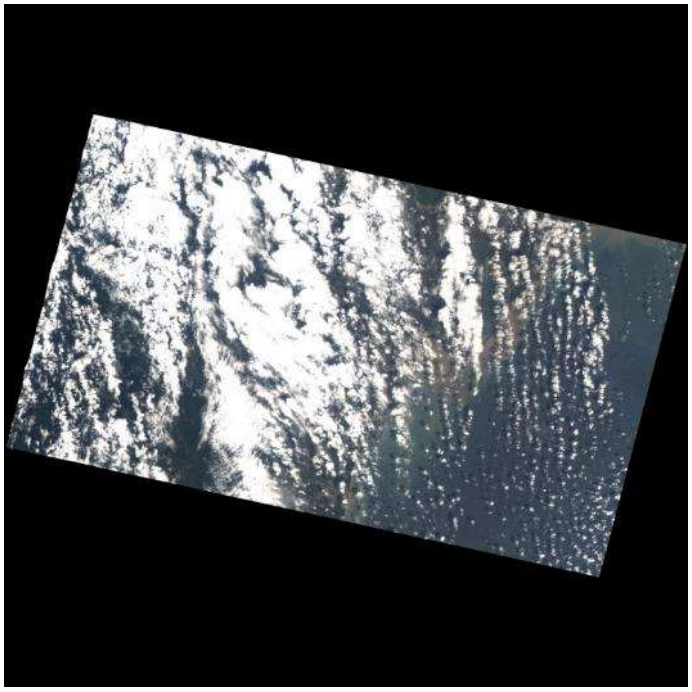


Satellite image (THEOS1) provided by GISTDA

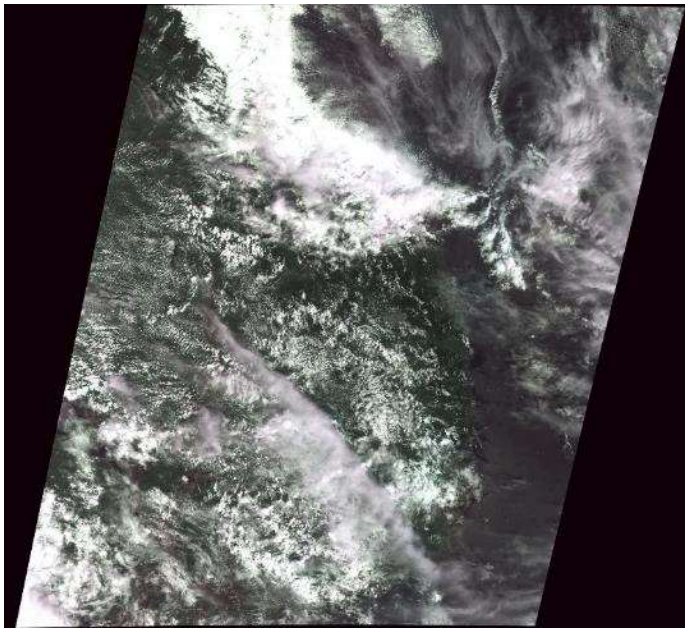
(4) Typhoon Kompasu in Vietnam (GLIDE Number: FL-2021-000158-PHL)

After passing over the Philippines, Typhoon Kompasu (Maring) approached Vietnam. According to the AHA Centre, the National Disaster Management Authority (VNDMA) reported that 2,144 houses were damaged and 2,669 ha of rice fields, 1,042 ha of other crops and 3,044 livestock were lost.
(https://ahacentre.org/wp-content/uploads/2021/10/FlashUpdate_03_20Oct2021-TC-KOMPASU-PHLVNMTHL.pdf)

MONRE made an EOR to Sentinel Asia on 10 October in anticipation of the disaster. Among DPNs, GISTDA and ISRO provided data. In addition, NARL planned to provide its data. Information on the latest response by Sentinel Asia is available at the following link:
https://sentinel-asia.org/EO/2021/article20211012PH.html



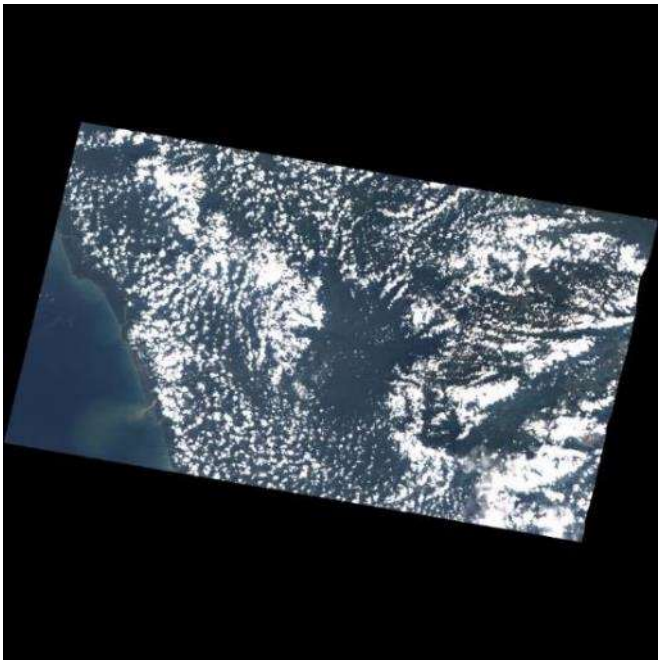
Satellite image (THEOS1) provided by GISTDA



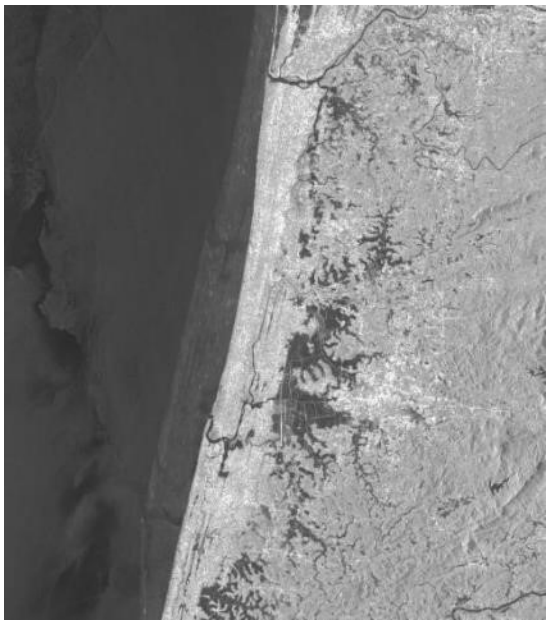
Satellite image (Resourcesat-2) provided by ISRO

(5) Flood, Landslides and Storm in India (GLIDE Number: FL-2021-000161-IND)
Heavy rain over Kerala state in India caused landslides and floods. CNN reported that at least 27 people were killed.
(https://edition.cnn.com/2021/10/18/india/kerala-rains-flooding-intl-hnk/index.html)

ISRO made an EOR to Sentinel Asia on 17 October. Among DPNs, GISTDA and JAXA provided data. In addition, NARL planned to provide its data. Information on the latest response by Sentinel Asia is available at the following link:
https://sentinel-asia.org/EO/2021/article20211016IN.html



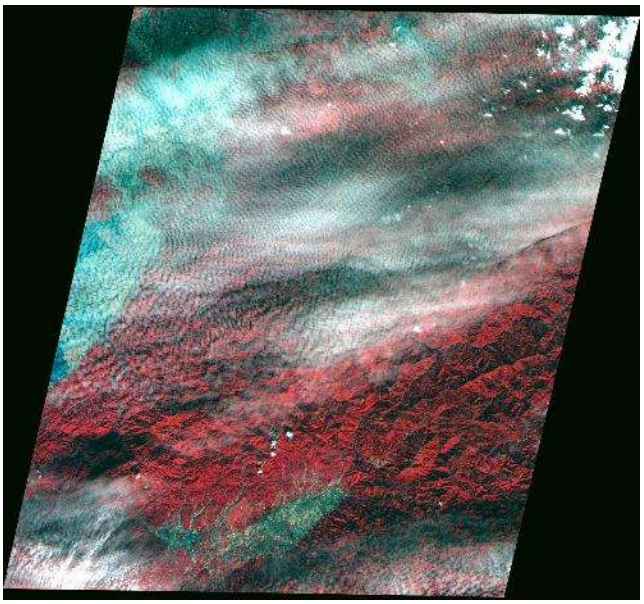
Satellite image (THEOS1) provided by GISTDA



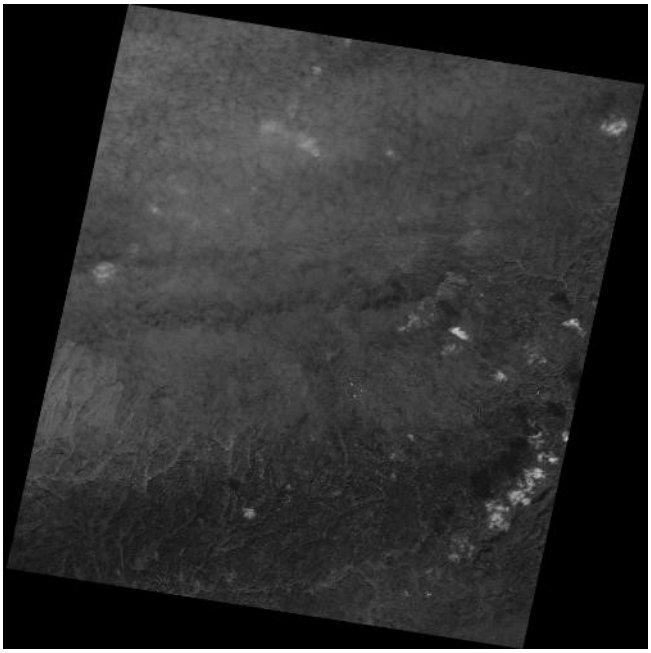
Satellite image (ALOS-2) provided by JAXA

(6) Volcanic eruption in Japan (GLIDE Number: VO-2021-000163-JPN)
A volcanic eruption was observed at Mt. Aso in southwestern Japan on 20 October. Kyodo News reported that Mt. Aso's volcanic alert level was raised to 3 on a scale of 5, with people urged not to approach the mountain.
(https://english.kyodonews.net/news/2021/10/fcaf30350266-urgent-mt-aso-in-southwest-japan-erupts-alert-level-raised.html)

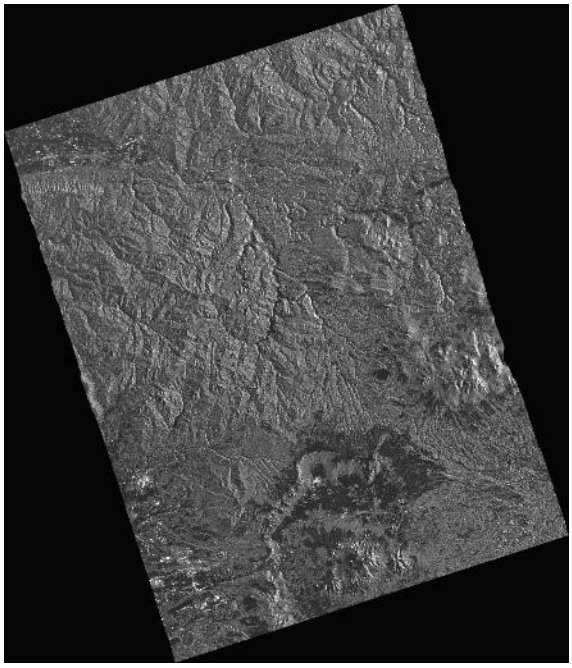
Asian Disaster Reduction Center (ADRC) made an EOR to Sentinel Asia on 20 October. Among DPNs, ISRO, GISTDA and JAXA provided data. In addition, MBRSC and NARL planned to provide their data.. Information on the latest response by Sentinel Asia is available at the following link:
https://sentinel-asia.org/EO/2021/article20211020JP.html



Satellite image (Resourcesat-2) provided by ISRO



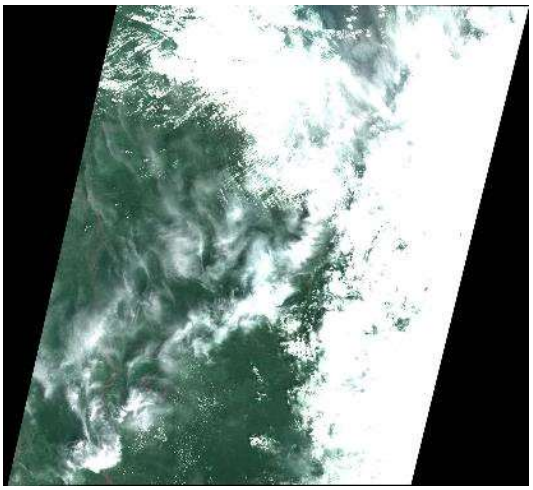
Satellite image (THEOS1) provided by GISTDA



Satellite image (ALOS-2) provided by JAXA

(7) Flood and Landslides in Vietnam (GLIDE Number: FL-2021-000166-VNM)
From 22 to 25 October, heavy rainfall was recorded in Vietnam, causing widespread floods. VNExpress reported that 11,000 houses were submerged, one person was killed and three others were missing.
(https://e.vnexpress.net/news/news/record-rainfall-deluges-central-vietnam-province-4376382.html)

MONRE made an EOR to Sentinel Asia on 25 October. Among DPNs, ISRO provided data. In addition, GISTDA planned to provide its data. Information on the latest response by Sentinel Asia is available at the following link:
https://sentinel-asia.org/EO/2021/article20211020JP.html



Satellite image (Resourcesat-2) provided by ISRO

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2. [Interview] Dr. Raj Kumar, Outstanding Scientist, Director, National Remote Sensing Centre (NRSC), Indian Space Research Organisation (ISRO)

Dr. Raj Kumar
Outstanding Scientist
Director, National Remote Sensing Centre (NRSC)
Indian Space Research Organisation (ISRO)

The National Remote Sensing Centre (NRSC) of the Indian Space Research Organisation (ISRO) has been one of the leading supporters of the Sentinel Asia community so far and is strengthening its support to Sentinel Asia. The centre provides satellite observation for Emergency Observation Requests (EORs) from members of Sentinel Asia and contributes to the operation of Sentinel Asia. The Sentinel Asia secretariat interviewed Dr. Raj Kumar, Outstanding Scientist and Director, NRSC, to introduce the centre's activities regarding Sentinel Asia.

Dr. Raj Kumar currently leads a team of scientists and engineers from various disciplines, with a mandate of establishing ground stations, generation of data products, dissemination to users, development of techniques for remote sensing applications including disaster management support, geospatial services for good governance and capacity building for professionals, faculty and students. His research is mainly focused on effective utilization of space technology, especially microwave remote sensing, for studies of ocean, atmosphere and climate to benefit society. He also leads the Indian Science Team for NASA-ISRO joint mission (NISAR) as Project Scientist.

Sentinel Asia Secretariat
ISRO is a major space agency and its brilliant achievements in recent years are well known. At the same time, its large scale makes it difficult to understand the roles of each department. Can you tell us about the role of NRSC, an ISRO core division, in the context of disaster management?

Dr. Raj Kumar
National Remote Sensing Centre (NRSC) is one of the major centres of Indian Space Research Organisation (ISRO), Department of Space (DOS), and has a mandate of establishing ground

stations for receiving satellite data, data product generation, dissemination to users, development of techniques for remote sensing applications including disaster management support, geospatial services for good governance and capacity building for professionals, faculty and students.

ISRO has established the Decision Support Centre (DSC) at NRSC under ISRO's Disaster Management Support (DMS) Programme. It is a single-window delivery mechanism of space- and aerial-based information to accommodate various needs during all phases of disasters in India. The DSC provides space-based inputs in near real time regarding various disasters to the central and state DMS organizations in the country. These products are being used for relief and rescue operations, damage assessment and as input in disaster management by state and central DMS organisations in the field. NRSC, ISRO also provides Indian remote sensing satellite data support to various Emergency Observation Requests (EORs) received through Sentinel Asia and the International Charter regarding various disasters worldwide. We are also actively involved in capacity building programmes on "Space Technology Utilisation for Disaster Management and DRR" in the country and in Sentinel Asia region.

ISRO has established the National Database for Emergency Management (NDEM) at the behest of the Ministry of Home Affairs (MHA), India, which is a state-of-art facility. NDEM is a multi-scale geospatial database repository coupled with decision support system tools at a national level. It is a unique, homogenous database that serves the entire country with essential database elements for addressing emergency/disaster management with a structured framework and multi-institutional participation to assist disaster managers of India. NDEM disseminates all disaster-specific products via a geospatial platform named "Bhuvan" in near real time, in addition to maintaining a disaster-specific historical database.

Sentinel Asia Secretariat

The Sentinel Asia secretariat appreciates ISRO's contribution to Sentinel Asia as a Data Provider Node (DPN) for more than a decade now. Could you introduce some of NRSC's major activities in recent years relating to Sentinel Asia, including EOR response?

Dr. Raj Kumar

ISRO has been part of all of Sentinel Asia's three-step activities and has been contributing to various EORs by providing IRS-series satellite datasets since its inception. Apart from satellite datasets, NRSC/ISRO has volunteered the role of Data Analysis Node (DAN) to extend its expertise in generating value-added products and special reports for Cyclone "NARGIS" (Myanmar) – 2008, Pakistan floods – 2010, Japan Tsunami – 2011, Sri Lanka Floods – 2017 & 2018, Indonesia Tsunami – 2018.

In recent years, 2018-2021 (until August), about 67 EORs were supported with the help of 159 Indian Remote Sensing (IRS) satellite datasets in addressing various disasters in member

countries. These datasets include data from ResourceSat series, RISAT-1, Cartosat series, etc.

Sentinel Asia Secretariat

In addition to your contributions as a DPN, we appreciate your engagement as a Sentinel Asia Steering Committee (SC) member. In January 2020, ISRO hosted for the first time an SC meeting in Hyderabad. Could you tell us about your motivation or background reason for hosting this meeting and the result?

Dr. Raj Kumar

The 10th Steering Committee (SC) meeting was hosted by ISRO for the first time during 21 and 22 January, 2020, in Hyderabad in close association with the Japan Aerospace Exploration Agency (JAXA) as the Sentinel Asia Secretariat. About 17 international participants from SC member organizations participated in the meeting.

ISRO hosted this SC meeting in understanding of the requirements of Sentinel Asia member countries to gain exposure regarding the technologies utilized in addressing disaster management in respective countries and to have open-ended discussions on various aspects of disaster management. This has benefited both ISRO as well as Sentinel Asia in general in terms of the effectiveness of its approach to the Step 3 disaster risk reduction phase of Sentinel Asia. The following important actions emerged during the course of the meeting;

- Improving Sentinel Asia operations from the viewpoint of DPN and DAN.
- Strengthening user interaction within the Sentinel Asia community.
- Capacity building programmes on various disaster-specific themes were proposed after thorough discussions, and ISRO proposed to organize/contribute regarding three programmes: Drought Risk Management, Spatial Flood Early Warning, and Emergency Response Mapping and Crisis Management
- Existing Sentinel Asia working groups and related roles and responsibilities, as well as recommendations for future directions
- Strategies on the private sector's involvement in Sentinel Asia activities were discussed

Sentinel Asia Secretariat

It is a significant achievement in Sentinel Asia Step 3 that international collaboration to operate OPTEMIS developed by GISTDA with other members was realized. We would like to aim for the next level of collaboration among systems used by other members. In this regard, as you mentioned earlier, we understand that NRSC launched and operates the sophisticated "Bhuvan" platform. Could you tell us more about it and advise on possibilities for its use by Sentinel Asia members?

Dr. Raj Kumar

Bhuvan is an Indian geo-platform of ISRO. It provides a host of wide-ranging services covering visualization of multi-date, multi-platform, multi-sensor satellite data & thematic maps, query and analysis, free data & products download, near-real-time support to disaster services, mobile apps for crowdsourcing, and diverse geospatial applications, for utilization by citizens and government agencies. It serves as a Geospatial Governance platform by hosting applications of various ministries/departments of central/state governments for planning, monitoring and evaluation.

One of the important components of Bhuvan is disaster services. Disaster Management Information Support services are hosted on Bhuvan for six types of natural disasters: Flood, Cyclone, Drought, Forest Fire, Earthquake and Landslide. Information support ranging from prediction, early warning, alerts and aiding decision makers for post-disaster damage assessment, hazard zonation and rehabilitation plan. Bhuvan disseminates the information via SMS, e-mail and feeds to users. Bhuvan's rich administrative datasets and thematic datasets besides the core disaster ones comprise a single-window system and platform for users and decision makers to realize effective disaster mitigation and preparation plans.

All applications and services through Bhuvan are developed using open-source solutions and Open Geospatial Consortium (OGC) compliant and restricted to Indian territory. The Bhuvan framework can be customized and used for any disaster application as a collaborative effort with proper administrative arrangements by Sentinel Asia member countries. The geo-spatial database has to be provided by the member countries concerned. Of course, in order to induce interests and make such active participation from the part of member countries possible and fruitful, we will be pleased to raise awareness of Bhuvan, reaching out to the Sentinel Asia community by ourselves as well and we may also discuss specific plans to customize Bhuvan in close collaboration with member countries. Also, ISRO can provide technical support in strengthening the existing system developed by GISTDA.

Sentinel Asia Secretariat

On 19 and 20 July, 2021, ISRO organized and hosted a webinar called "Space Technology for Drought Risk Management" with IWMI, as a capacity building program with Sentinel Asia. Among the themes, "drought" is different from other disasters in terms of time frame (speed of progress). How should the Sentinel Asia community tackle such "slow-onset" disasters? And what can we expect ISRO's contribution to be on this issue?. Could you also advise us of your plan for future capacity building programs for Sentinel Asia, if any?

Dr. Raj Kumar

The occurrence and progression of drought are slow. It is a hydro-meteorological or environmental disaster. Drought monitoring and impact assessment is multi-disciplinary in nature

and includes meteorological, hydrological, agricultural and socio-economic indicators. Drought management requires a strong system for monitoring and timely assessment of impact. Recent advances in data-centric technologies such as remote sensing, mobiles and weather instrumentation and data analytics offer enormous opportunities for objective assessment of the drought situation leading to its effective management.

NRSC (ISRO) is an active partner in UNESCAP's regional cooperation mechanism for drought risk management. NRSC has developed automation tools for satellite data analysis in drought monitoring in Myanmar and Sri Lanka under this mechanism. Similarly, NRSC organised capacity building programmes for various countries, identified by UNESCAP. Such initiatives may also be taken up for Sentinel Asia member countries on drought risk management and monitoring. Development of automation tools for satellite data analysis in drought monitoring, organisation of customised capacity building programmes, and exchange of knowledge and methodologies are some of the activities that can be planned for Sentinel Asia.
Also, other than the "Space Technology for Drought Risk Management" webinar, as an active partner of Sentinel Asia, ISRO is planning to organize the following two capacity building training programmes:

1. Spatial Flood Early Warning by NRSC/ISRO with IWMI in October 2021
2. Emergency Response Mapping and Crisis Management by IWMI in association with ADRC, NRSC/ISRO in winter (TBC)

In addition to these, ISRO will support and be associated with any other capacity building programmes envisaged under Sentinel Asia in the near future.

Sentinel Asia Secretariat
We understand that ISRO is preparing for a NISAR project, an ISRO–NASA collaboration for a SAR satellite, which has cutting-edge sensors. Could you introduce this mission, including its possible contribution to Sentinel Asia?

Dr. Raj Kumar
ISRO and NASA JPL are jointly developing a state-of-the-art L- and S-band SweepSAR (NISAR), planned to be launched by India. The NISAR mission has been conceptualized to provide L- and S-band space-borne SAR data with high repeat cycle, high resolution and larger swath with capability of full-polarimetric and interferometric modes of operation. This science mission is expected to provide an impetus to the understanding of various processes for land, oceans and cryosphere in regional to global scales. NISAR data will address the critical issues of disaster management such as floods, forest fire, landslides, volcanoes, oil spills, earthquakes, glacier melt, etc. apart from many other applications. The data will be freely available and will be made available to Sentinel Asia users in addressing various disasters in member countries.

Sentinel Asia Secretariat

Lastly, what can you contribute to Sentinel Asia's activities in the future and what do you expect from Sentinel Asia?

Dr. Raj Kumar

ISRO has been supporting Sentinel Asia and other international commitments, by providing all the necessary Indian Remote Sensing satellite data as a DPN, based on the role ISRO has played as a DAN for specific disaster events. ISRO has organized several international meetings and symposia under Sentinel Asia, APRSAF, and the International Charter. Also, ISRO has contributed significantly to capacity building on various disaster themes for the national and international community. ISRO is firmly committed to working towards achieving the goals of Sendai Framework for Disaster Risk Reduction 2015-2030 in building a society resilient to disaster risks. ISRO ensures that it will extend similar support to Sentinel Asia member countries in the near future.

As ISRO requires satellite data from more space missions in microwave and optical regions from member countries to address disasters in India, Sentinel Asia may facilitate the provision of such data. ISRO would look forward to collaborative research on disaster risk modelling and risk reduction with expertise available among member countries on various disaster themes

<About Dr. Raj Kumar >

Dr. Raj Kumar received his master's and Ph.D. degrees in physics from Lucknow University. He has more than 100 publications in peer-reviewed journals of international repute and leading many young researchers towards their Ph.D. Dr. Raj Kumar also plays a pivotal role in propelling collaborations with international space agencies through various forums such as the Committee on Earth Observation Satellites (CEOS), the Coordination Group for Meteorological Satellites (CGMS), and the International Ocean Vector Winds Science Team (IOVWST). He currently co-leads the CEOS COAST team with the National Oceanic and Atmospheric Administration (NOAA).

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3. [Event] Sentinel Asia Webinar "Space Technology for Flood Forecast Modelling" co-organized by ISRO and IWMI was successfully held.

The webinar "Space Technology for Flood Forecast Modelling" was held on 27 and 28 October, jointly organized by ISRO and IWMI.

This webinar is a follow-on of the webinar on space-based drought risk management co-organized by ISRO and IWMI on 19 and 20 July, and featured, like its predecessor, general theories, experts' lectures and an interactive session, among others. Stakeholders, engineers and researchers participated in this webinar.

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4. How to send an Emergency Observation Request

JPT member organizations are entitled to send an Emergency Observation Request (EOR) for disasters in the Asia-Pacific region. Please refer to https://sentinel-asia.org/e-learning/Emergency_Observation_Request.html.

EOR Order Desk:
Asian Disaster Reduction Center (ADRC)
HP: http://www.adrc.asia/
E-mail: sarequest@adrc.asia
FAX: +81-78-262-5546,
TEL: +81-78-262-5540

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5. Using Sentinel Asia Operation System, OPTEMIS

Sentinel Asia launched a new operation system, OPTEMIS. Please refer to the website on how to create an account for OPTEMIS. https://sentinel-asia.org/e-learning/Emergency_Observation_Request.html

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