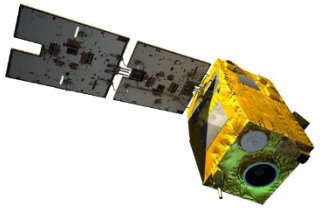
Ministry of Agriculture and Rural Development

VIETNAM DISASTER MANAGEMENT AUTHORITY

APPLICATION OF REMOTE SENSING AND SPACE TECHNOLOGY FOR DISASTER MANAGEMENT IN VIETNAM

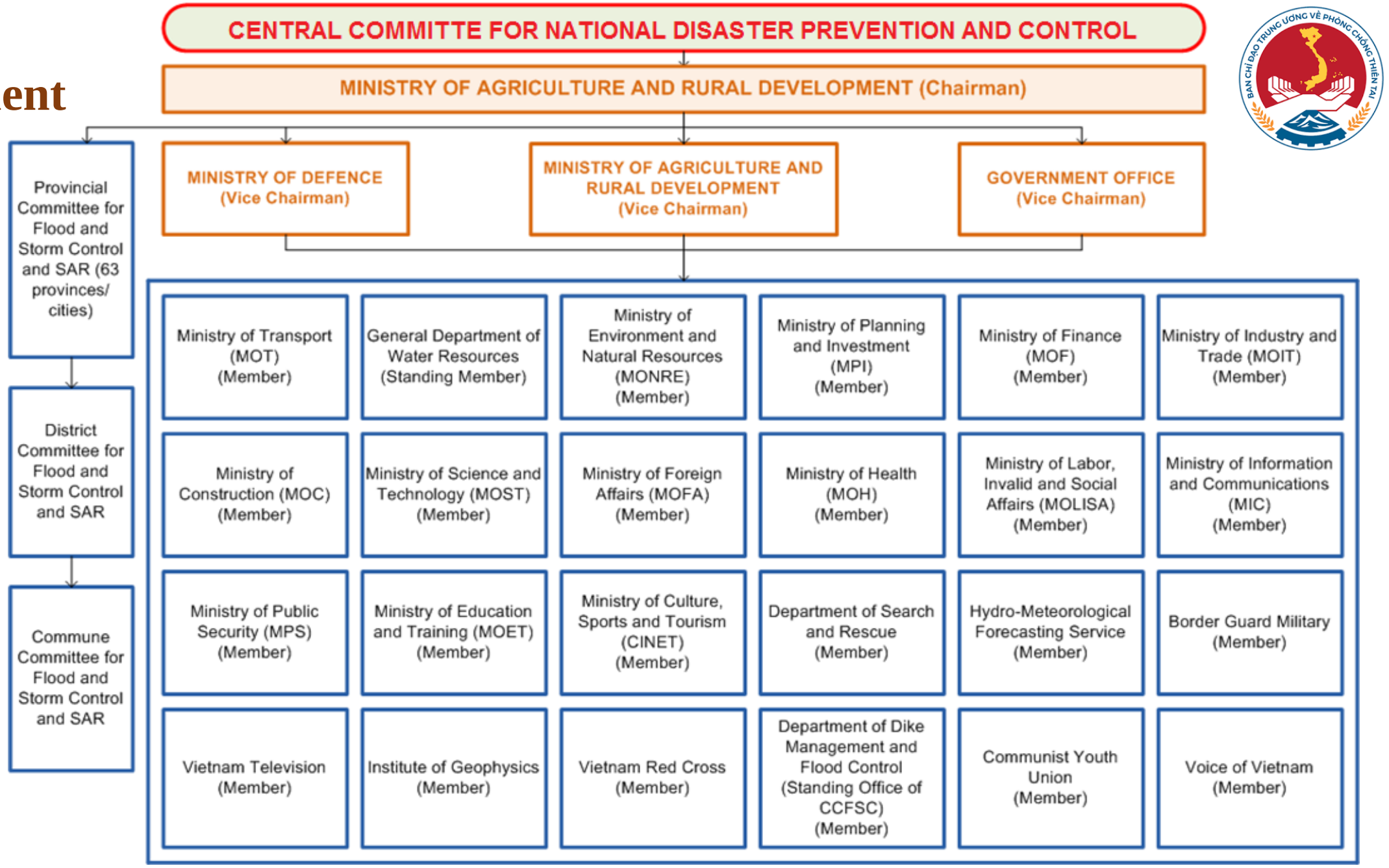


ThaiLand, Nov 2019

INTRODUCTION

- Vietnam is one of the countries most affected by natural disasters and climate change (in 2016, 20/21 type of disaster has appeared, excluding tsunami)
- Natural disasters, especially storms, floods and droughts, are increasing in intensity, frequency, causing great loss of life and damage to the economy. In the last 20 years, about 10,800 people were killed/missing by natural disasters; Average annual loss is about 20,000 billion VND (1-1.5% of GDP)
- Impacts from the adverse effects of socio-economic development:

Disaster management structure



Activities in applying space technology in Vietnam

- **UN-SPIDER** Technical Advisory Mission to Vietnam (March 2013)
- **UNSPIDER** and **GITA'** technical Advisory Group to Vietnam (September 2014)
- JAXA & Disaster Charter: **1st** Request / activation: Collected Data, products from Sentinel Asia, Disaster Charter, Vietnamese DANs, AIT, Tokyo University
- **DMPTC** Collaborated **STI (Spatial Technology Institute)** for processing, mapping, survey and report (BIG Flooding 2014, Quang Ninh province)
- **Sign MOU between JAXA, WRD, VAST** (September2015); Building Implementation plans for 3 years of MOU
- **Request activation SA for big disaster: DMPTC** Collaborated **STI** for processing, mapping, survey and report for big drought (2015-2016) in Central Highland of Viet Nam, flood event (2016- 2018) in the central area of Vietnam…
- Cooperation to organization the 10 years anniversary workshop and the 4th JPTM meeting in Hanoi (2017).
- **Request activation SA for big disaster: DMPTC** Collaborated **Remote Sensing Center (National Department of Remote Sensing), STI** for processing, mapping, survey and report disaster event (2016- 2018)

THE INNITIAL RESULT

(WRD) – (MARD) & (VAST) & (JAXA)

The Parties cooperate and make efforts on the following activities;

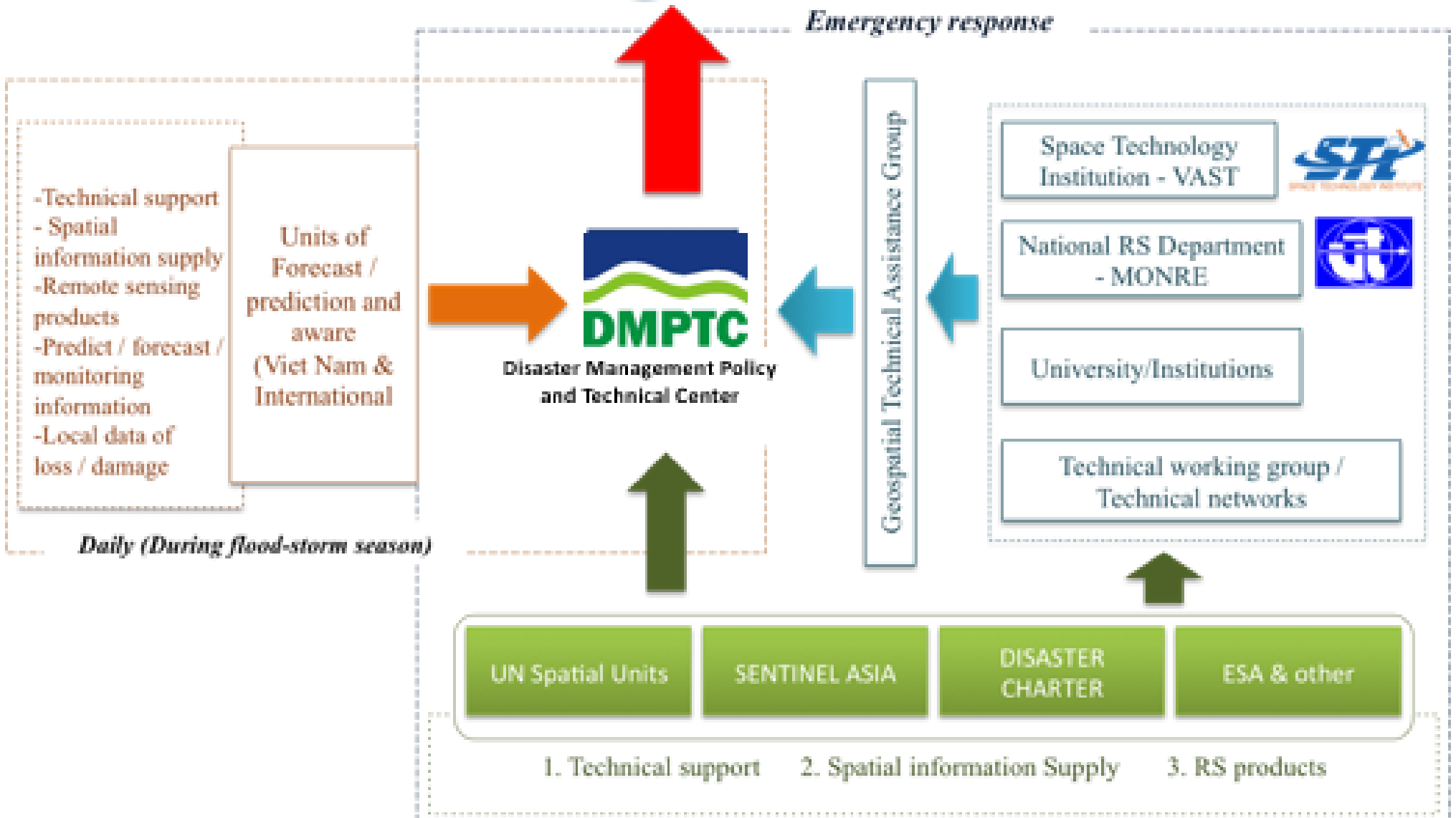
- ❑ Development of a database system by past satellite imageries of Vietnam for disaster prevention.
- ❑ Exchange of satellite data when disaster happens. *(JAXA will provide satellite data owned by JAXA, such as, including but not limited to, ALOS-2 data for WRD and/or VAST upon request of WRD and/or VAST through Sentinel Asia. VAST will provide satellite data owned by VAST, such as, including but not limited to, VNREDSat, for Sentinel Asia Step 3 Activities..)*

Memorandum of Understanding signing ceremony – Sep 2015

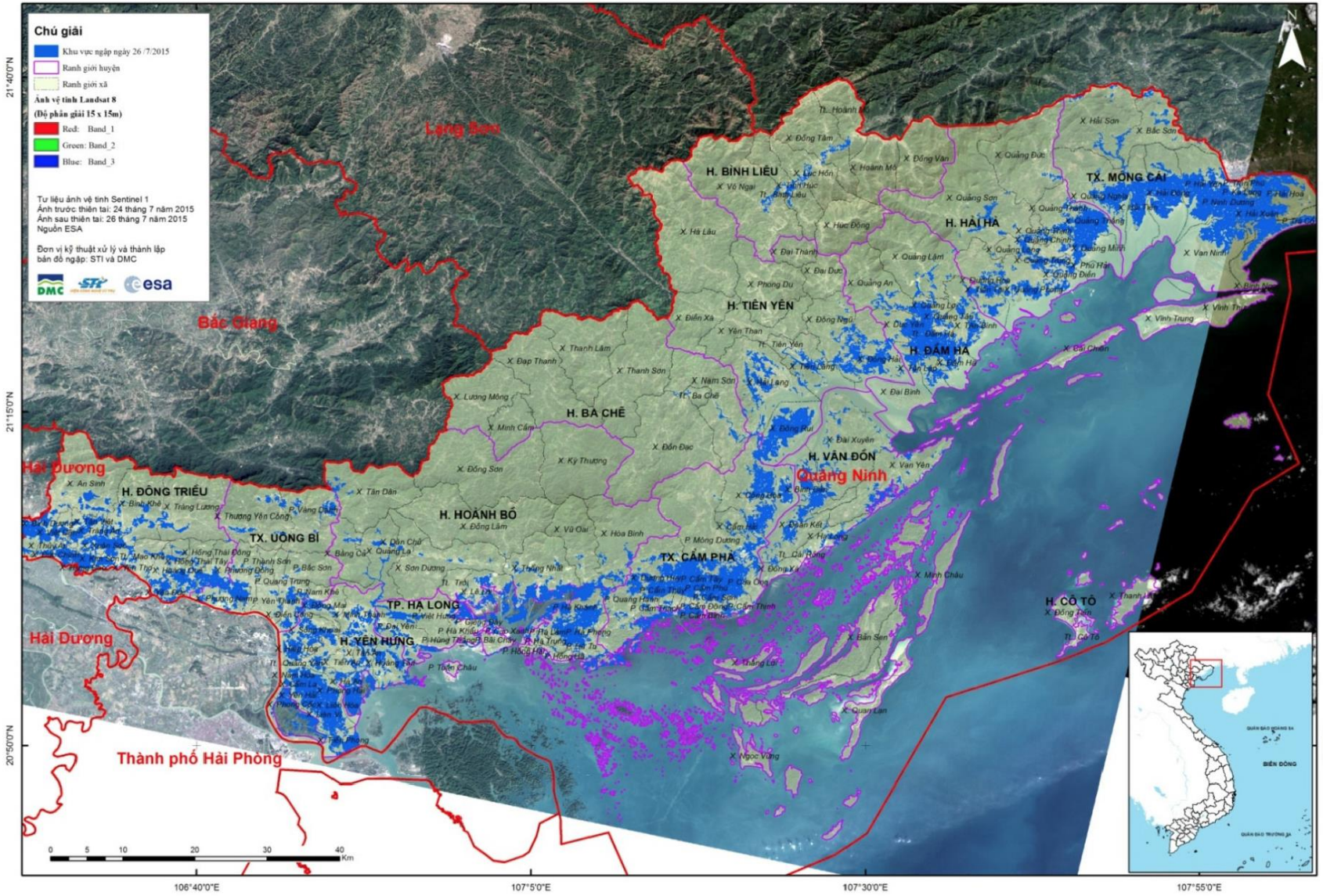
- ❑ Strengthening the capacity of application of RS and GIS technology for disaster prevention in Vietnam.
- ❑ Development of programs and projects on application of RS and GIS technologies for disaster prevention.

The structure for receipt RS and GIS to serve for disaster prevention and control

Standing Office of National Committee for Disaster prevention and Control

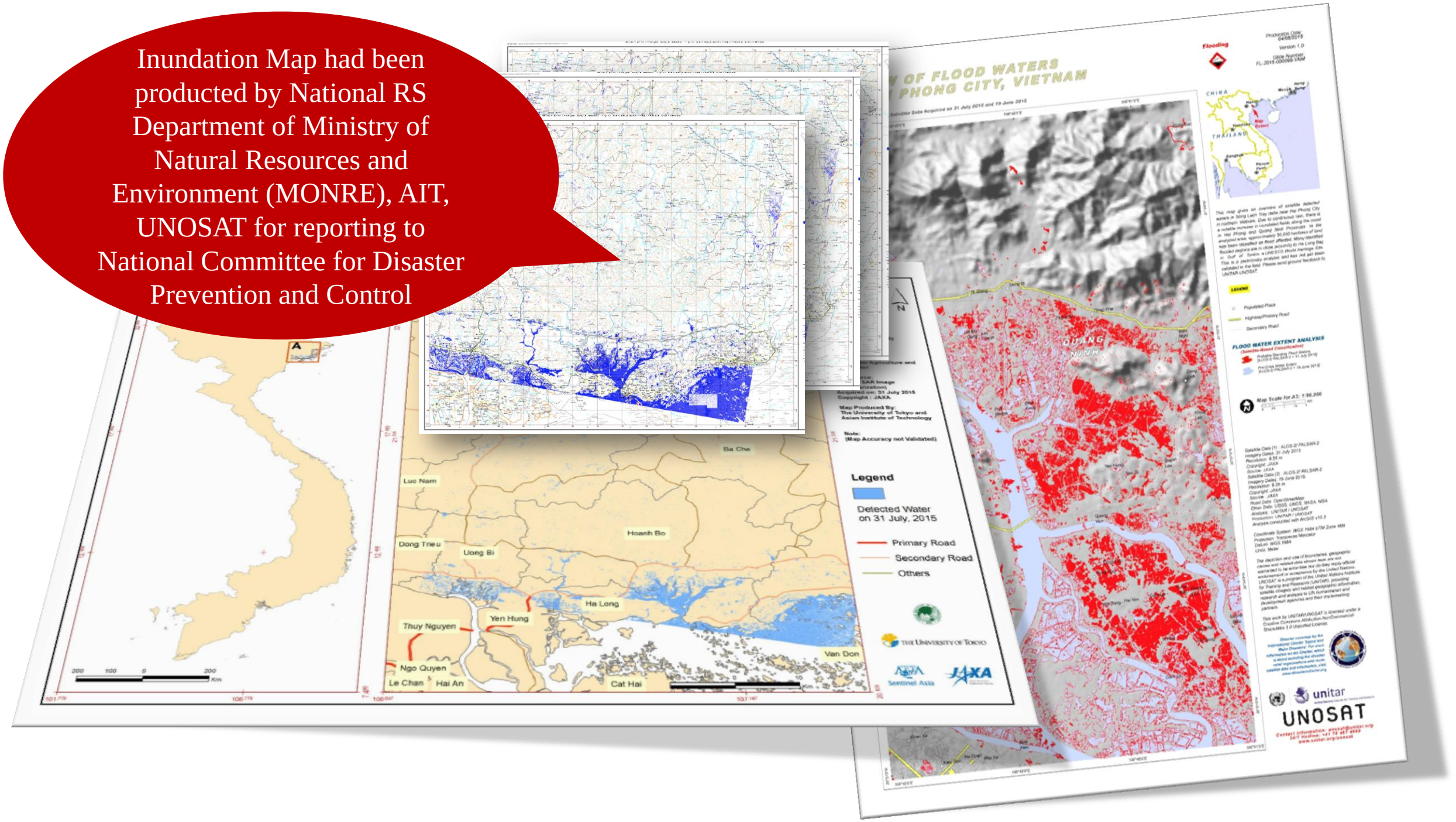


Inundation map in Quang Ninh province, 26/7/2015.



DMPTC and Spatial Technology Institution (STI) had cooperated in developing inundation map by heavy rain in Quang Ninh province (26/7/2015) using satelite image of Sentinel 1 (SAR)

Inundation Map had been producted by National RS Department of Ministry of Natural Resources and Environment (MONRE), AIT, UNOSAT for reporting to National Committee for Disaster Prevention and Control

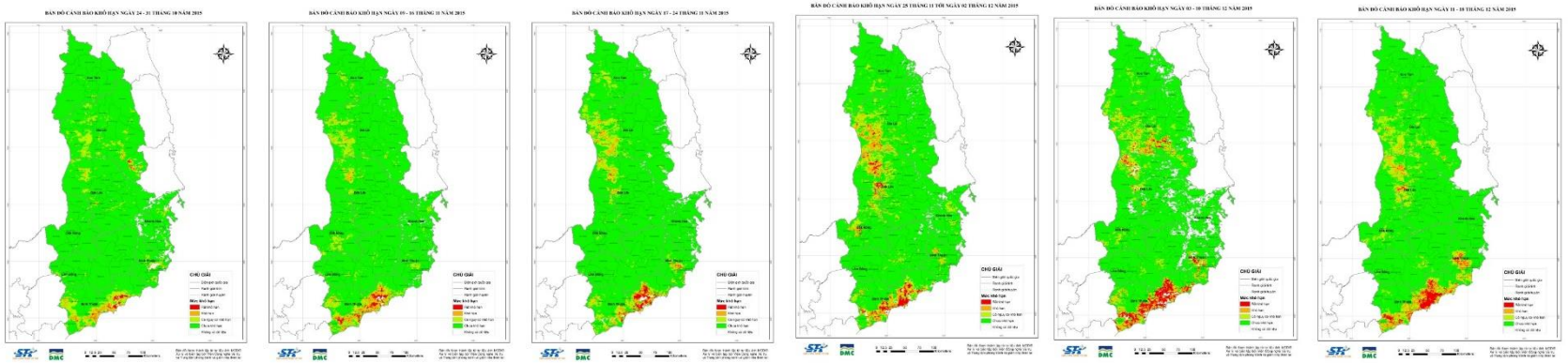


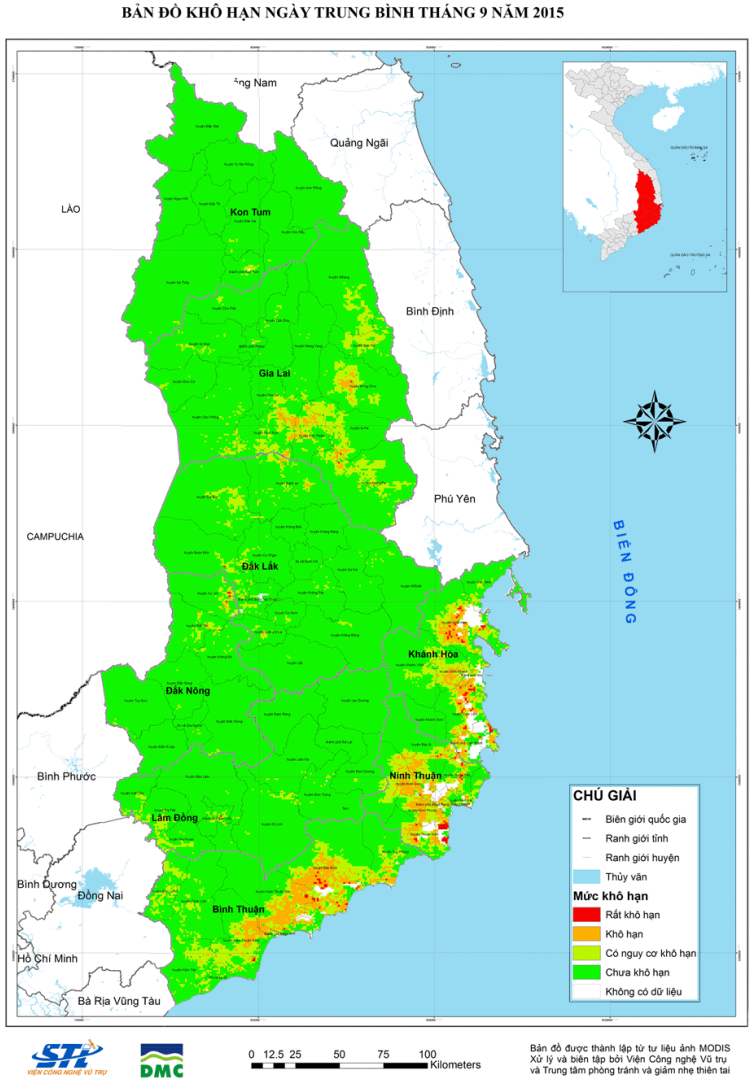
Drought map of Highland area and South Central area on 2015.

STI and DMPTC coorperation to produced the drought map for 5 provinces in Highland area and Ninh Thuan, Binh Thuan, Binh Dinh provinces.

(adapted from Mauro E. Holzman và Raúl E. Rivas, 2015)

Mức độ cảnh báo khô hạn	Ngưỡng giá trị TVDI	Thang màu cảnh báo
Rất khô hạn	0,7 – 1	
Khô hạn	0,55 – 0,7	
Có nguy cơ khô hạn	0,4 – 0,55	
Chưa khô hạn	< 0,4	

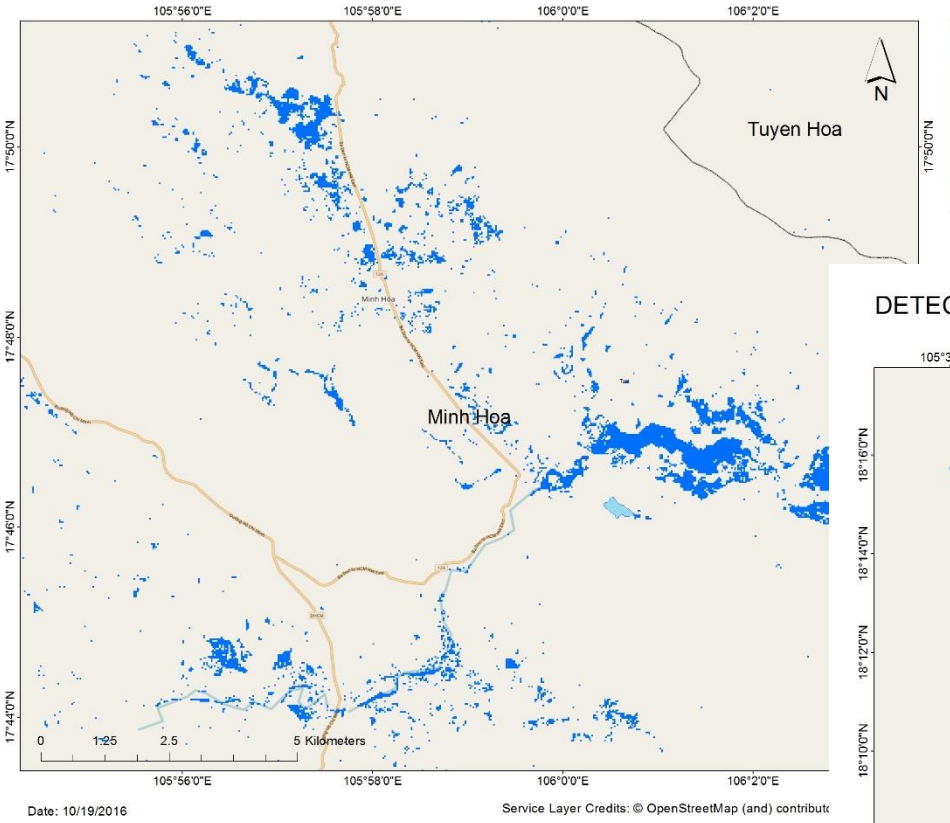




MODIS satellite

October 2016
DMPTC & STI requested Sentinel Asia
AIT processed

DETECTED WATER IN MINH HOA DISTRICT, QUAN BINH PROVINCE, VIETNAM (16 OCT 2016)

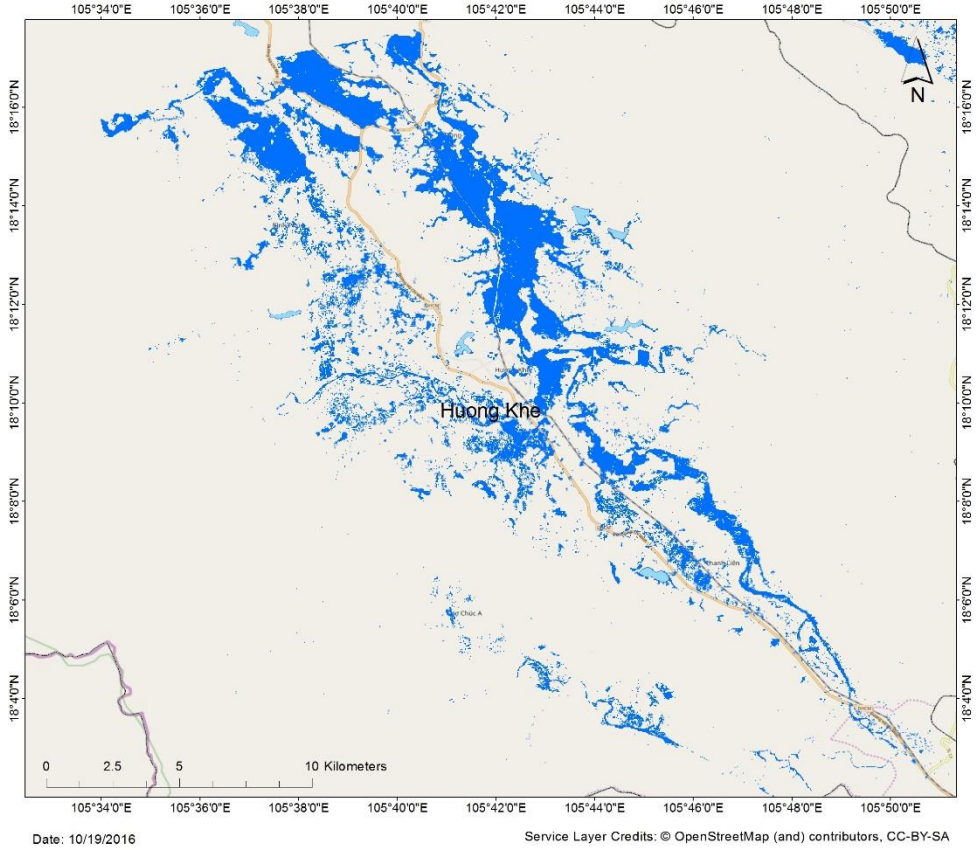


Legend

Date: 10/19/2016

Service Layer Credits: © OpenStreetMap (and) contribute

DETECTED WATER IN HUONG KHE DISTRICT, HA TINH PROVINCE, VIETNAM (16 OCT 2016)



Legend

Detected Water

MAP SCALE 1:60,000

POST-DISASTER IMAGE
Satellite/ Sensor: ALOS-2/ PALSAR-2
Date: 16 Oct 2016
© JAXA

Coordinate System: GCS_WGS_84
Datum: D_WGS_84
Unit: Degree

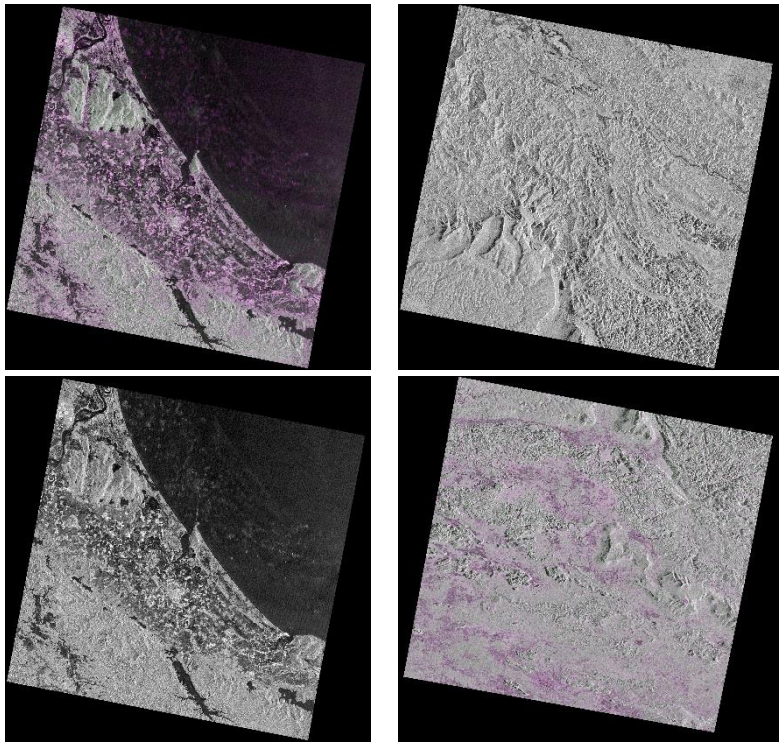
This map shows detected water area in Huong Khe district, Quan Binh province, Vietnam as observed from ALOS-2 data on 16 October 2014. Image processing using thresholding technique was applied to extract the water area.

Disclaimer: The accuracy of this product is not validated.

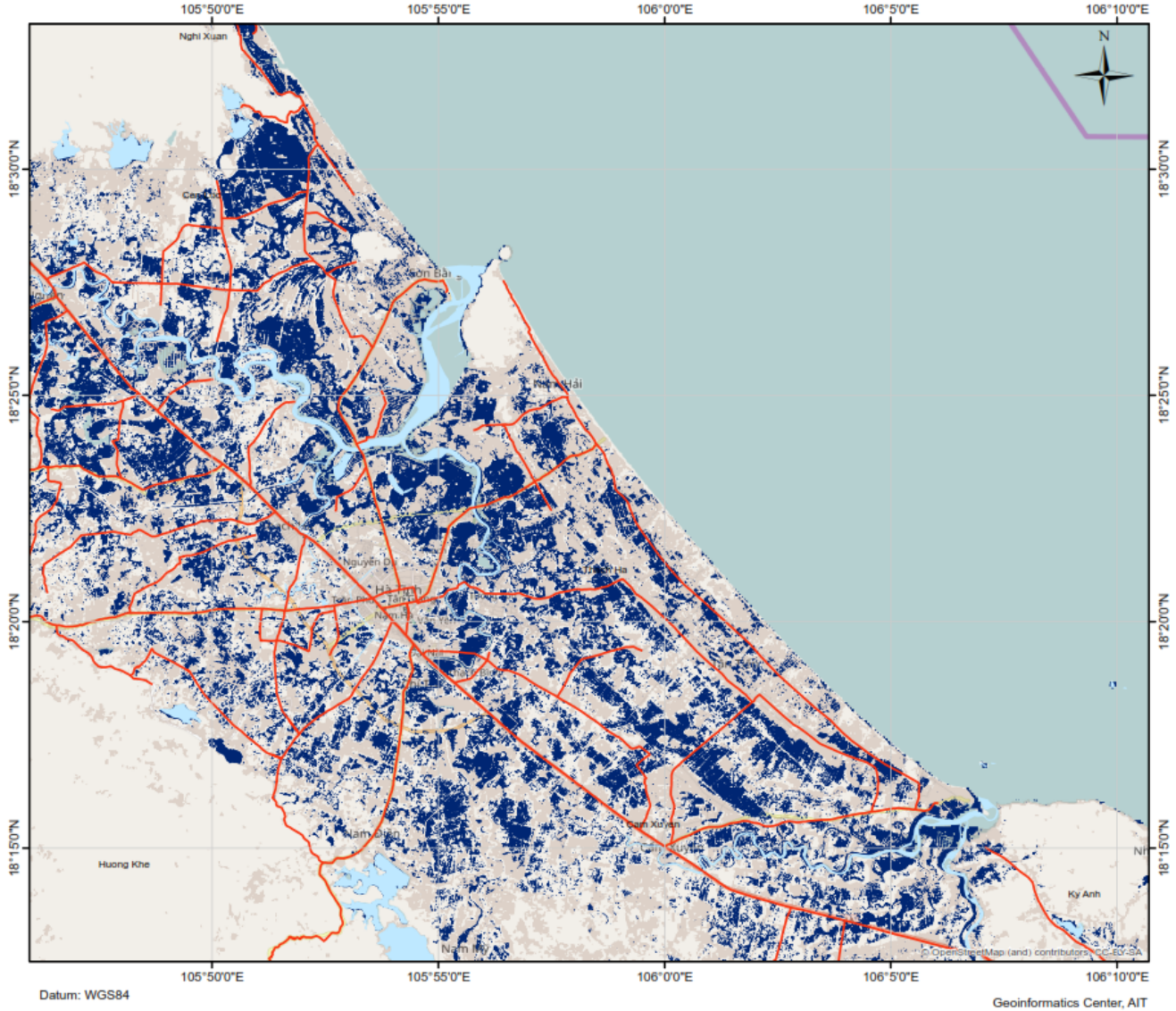
Date: 10/19/2016

Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA

November 2016
DMPTC & STI requested Sentinel Asia
AIT processed



Map 1.1 : Existing Water Detected by ALOS-2/PALSAR-2 Images observed on 04/11/16 in Central of Vietnam



Legend

- Roads
- Built-up areas / barelands
- Flooded water
- River / Lake

Data source: ALOS-2 © JAXA, LANDSAT 8 © USGS
Post image: 2016.11.4
Map scale: 1: 150,000
Note: The map is not validated

0 1.25 2.5 5 Kilometers

Description:

Serious flooding occurred in the districts of Huong Son, Huong Khe and Vu Quang, Cam Xuyen, Duc Tho (Ha Tinh province); Minh Hoa and Tuyen Hoa, Bo Trach, Quang Trach and Ba Don Town, Le Thuy (Quang Binh)

Datum: WGS84

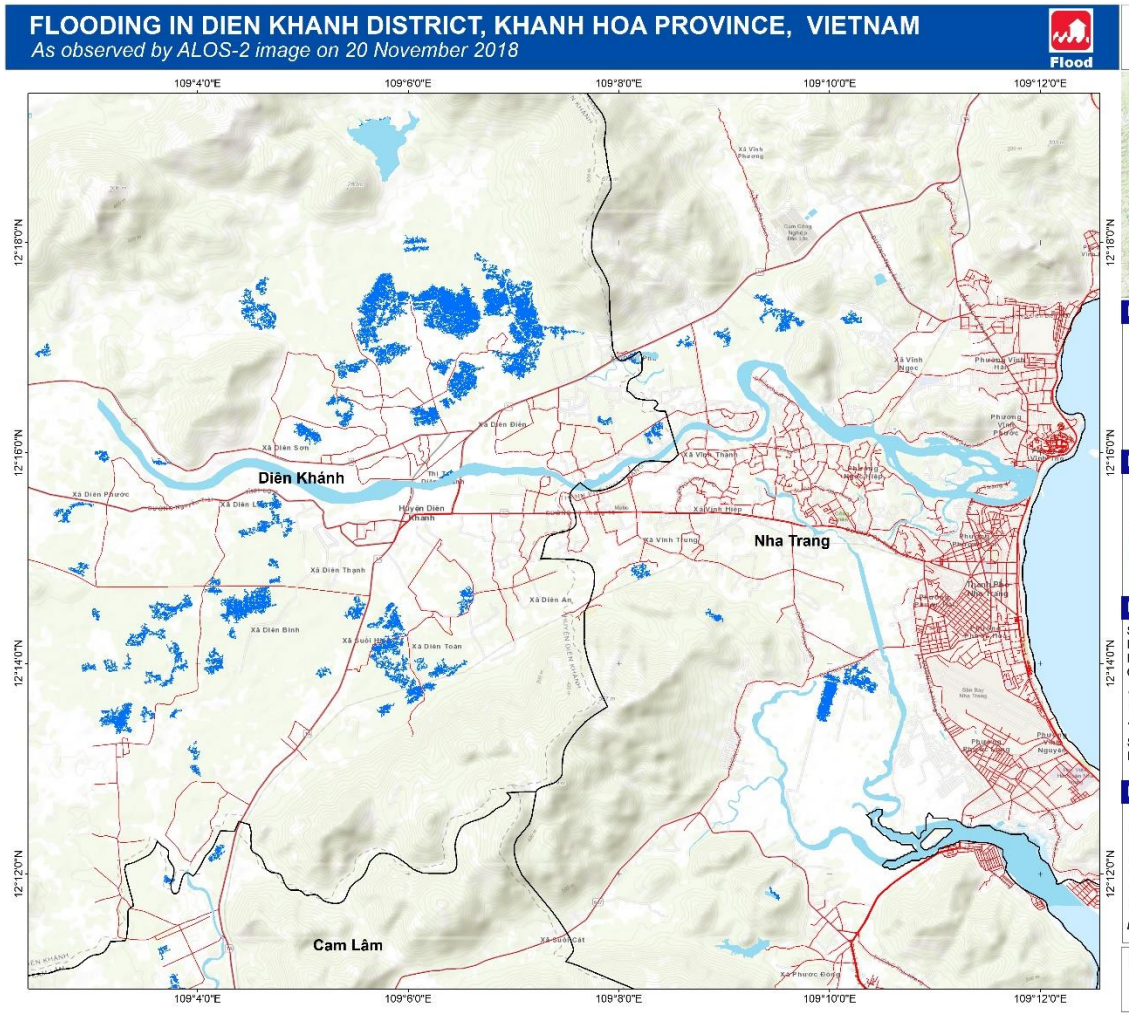
Geoinformatics Center, AIT

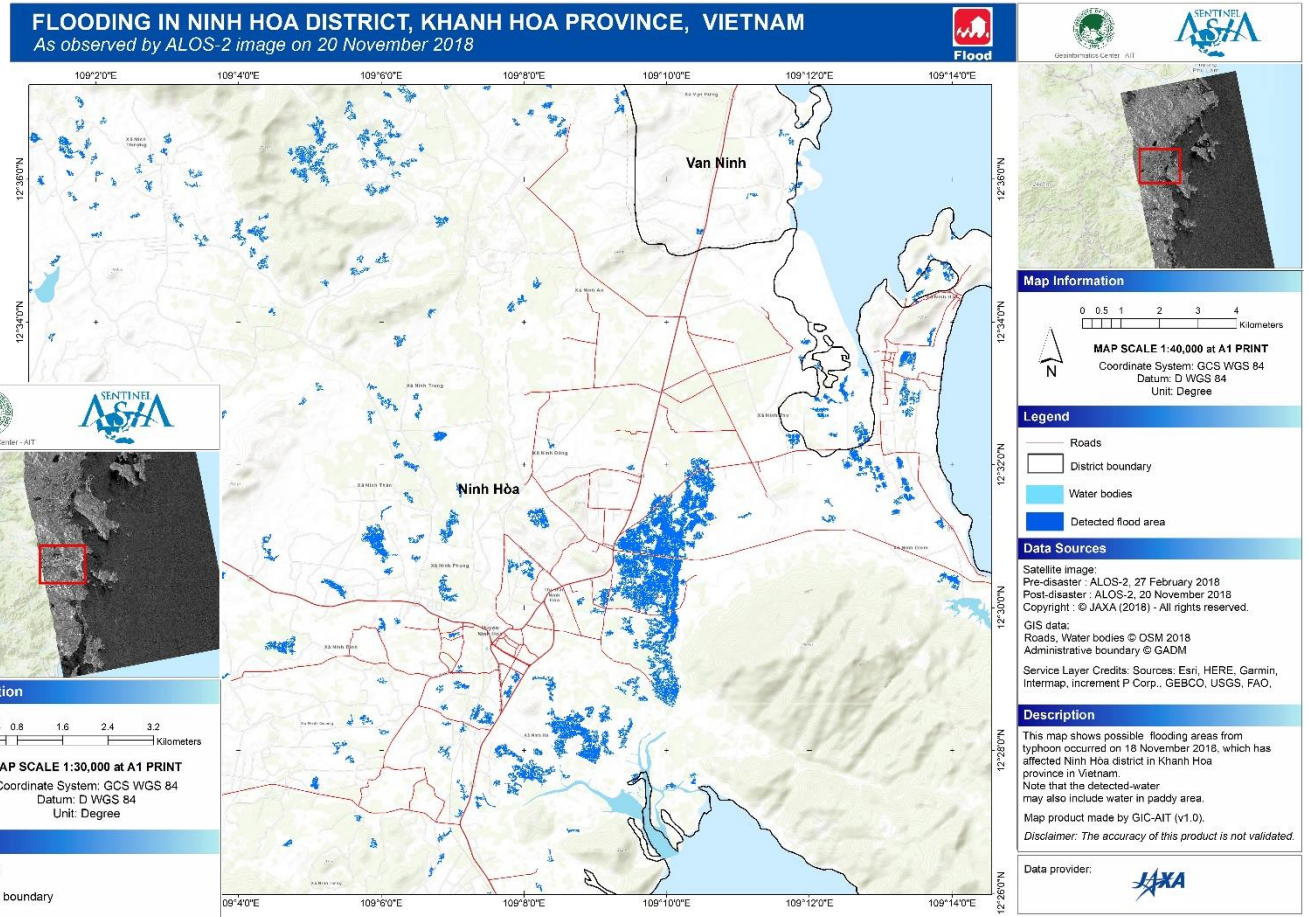
Sentinel Asia

Activated disaster in Sentinel Asia 06 event in 2018 and 02 event in 2019:

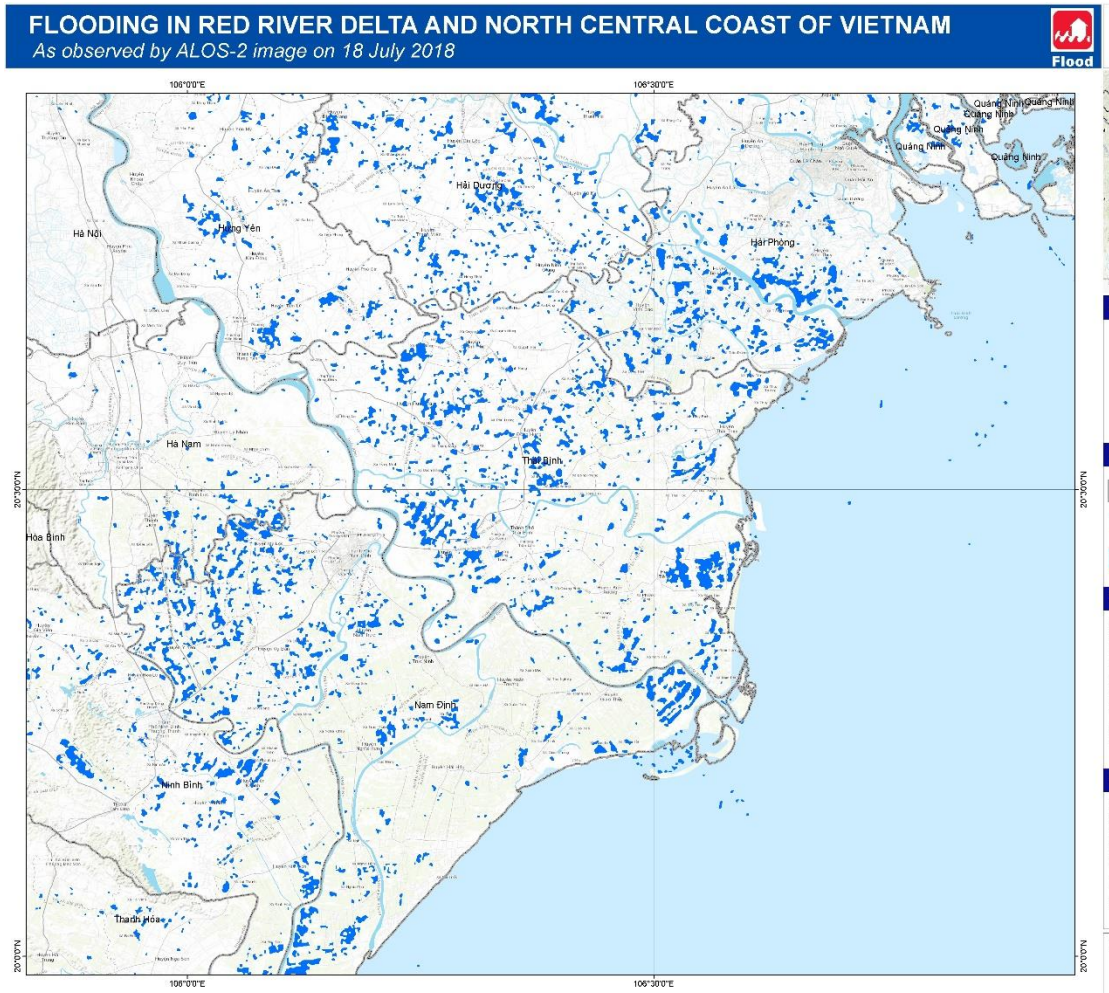
Emergency Obs. ID	Occurrence Date	Country	Disaster Type	Product	WEB-GIS	Detail	Disaster Inf.	Status
ERVNMN000057	05/Sep/2019	Vietnam	Flood			link	ADRC	Active
ERVNMN000054	24/Jun/2019	Vietnam	Flash flood			link	ADRC	Active
ERVNMN000053	24/Nov/2018	Vietnam	Typhoon			link	ADRC	Active
ERVNMN000052	18/Nov/2018	Vietnam	Typhoon			link	ADRC	Active
ERVNMN000051	17/Sep/2018	Vietnam	Typhoon			link	ADRC	Active
ERVNMN000050	27/Aug/2018	Vietnam	Flood			link	ADRC	Active
ERVNMN000049	18/Jul/2018	Vietnam	Flood			link	ADRC	Active
ERVNMN000048	23/Jun/2018	Vietnam	Flood			link	ADRC	Active

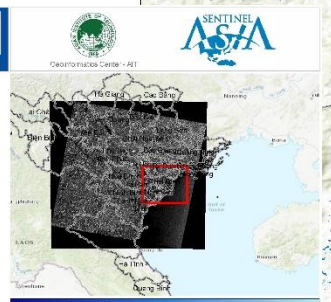
Flood in Khanh Hoa province (20/Nov/2018)





Flood in Nghe An, Thai Binh province and , Hai Phong city (18/Jul/2018)





Map Information

0 6 12 18 24
Kilometers
MAP SCALE 1:250,000 at A1 PRINT
Coordinate System: GCS WGS 84
Datum: D WGS 84
Unit: Degree

Legend

- Province Boundary
- Waterbody
- Floodwater

Data Sources

Satellite image:
Pre-disaster : ALOS-2, 20 June 2018
Post-disaster : ALOS-2, 18 July 2018
Copyright : © JAXA (2018) - All rights reserved.

GIS data:
River, Water bodies © OSM 2018
Administrative boundary © GADM

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO,

Description

This map shows possible flooding areas from heavy rain, which has affected Red River Delta and North Central Coast of Vietnam.
Note that the detected-water may also include water in paddy area.

Map product made by GIC-AIT (v1.0).

Disclaimer: The accuracy of this product is not validated.

Data provider: JAXA

Map Information

0 2 4 6 8
Kilometers
MAP SCALE 1:75,000 at A1 PRINT
Coordinate System: GCS WGS 84
Datum: D WGS 84
Unit: Degree

Legend

- Province Boundary
- District Boundary
- Waterbody
- Flood Proxy Map

Data Sources

Satellite image:
Pre-disaster : ALOS-2, 23 March 2018
Post-disaster : ALOS-2, 28 July 2018
Copyright : © JAXA (2018) - All rights reserved.

GIS data:
River, Water bodies © OSM 2018
Administrative boundary © GADM

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO,

Description

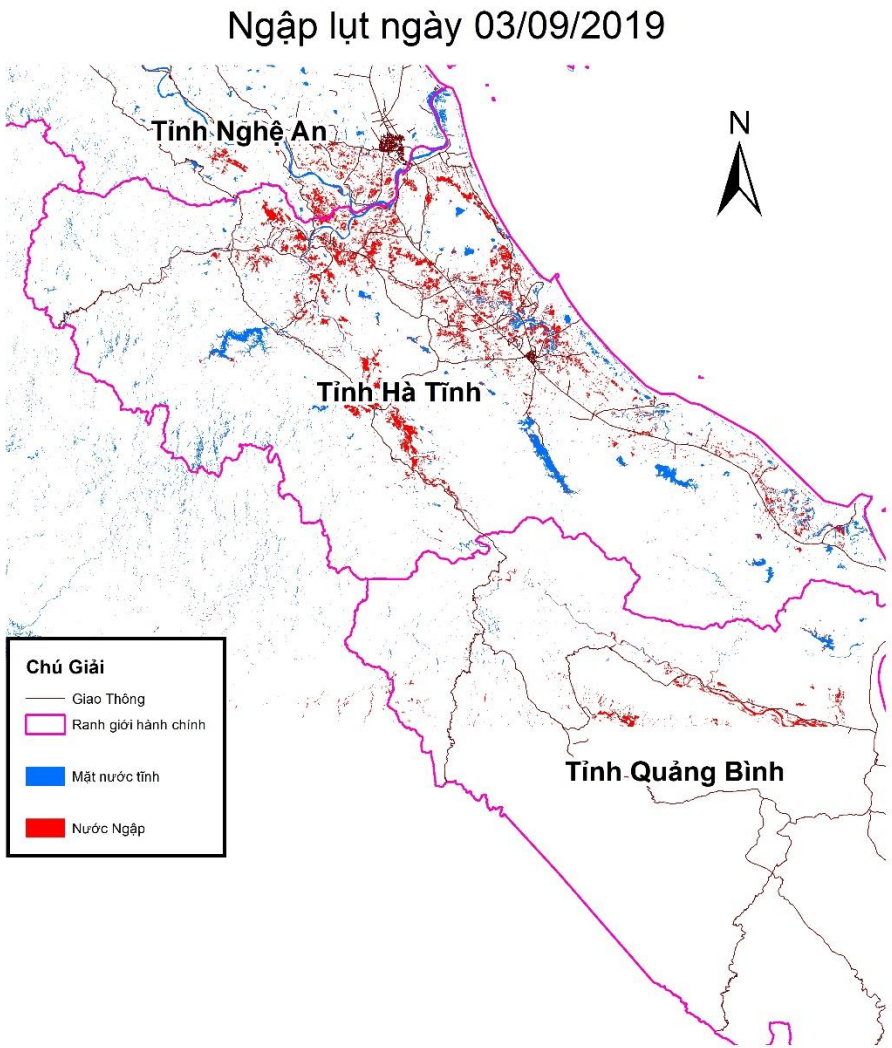
This map shows possible flooding areas from heavy rain, which has affected Huyen District and surrounding, Nghe An Province. Note that the detected-water may also include water in paddy area.

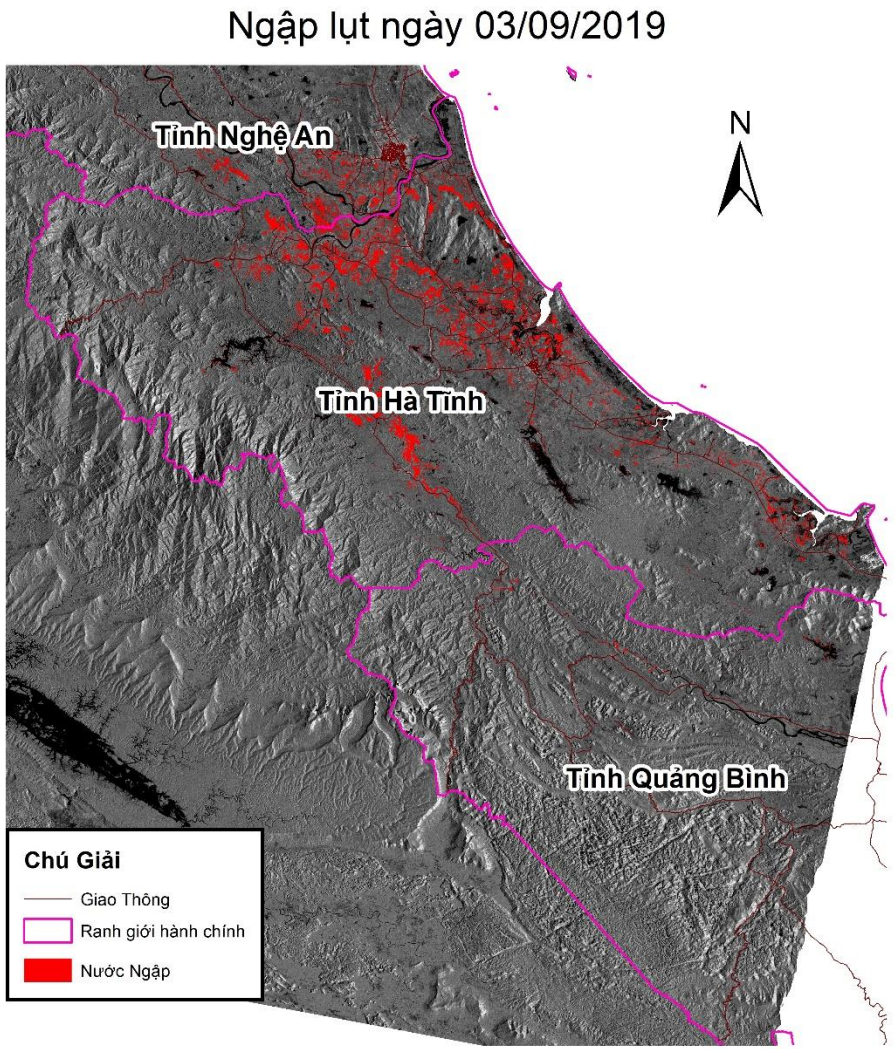
Map product made by GIC-AIT (v1.0).

Disclaimer: The accuracy of this product is not validated.

Data provider: JAXA

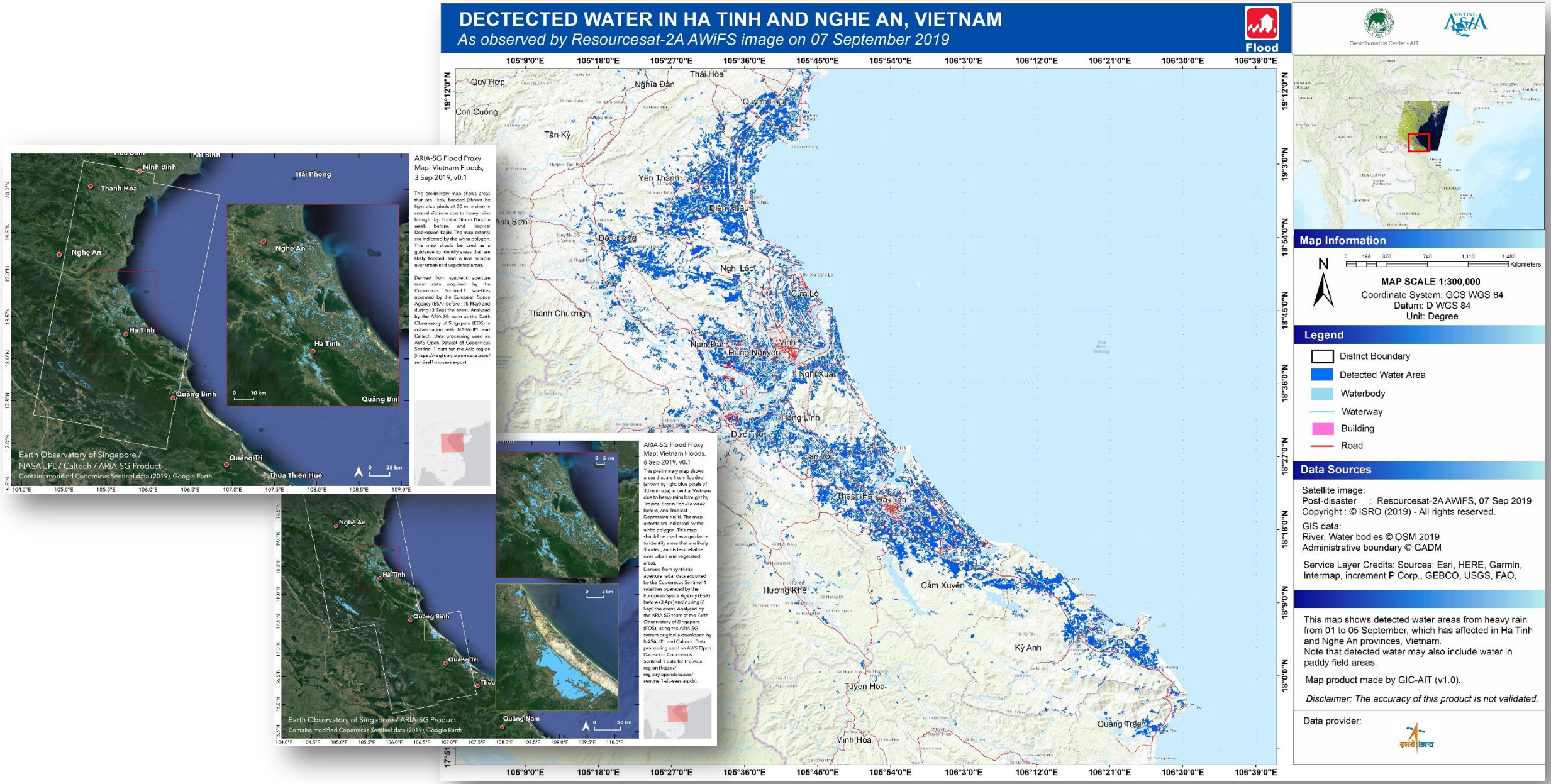
Heavy rain in Nghe An to Ha Tinh province (3/Sep/2019)



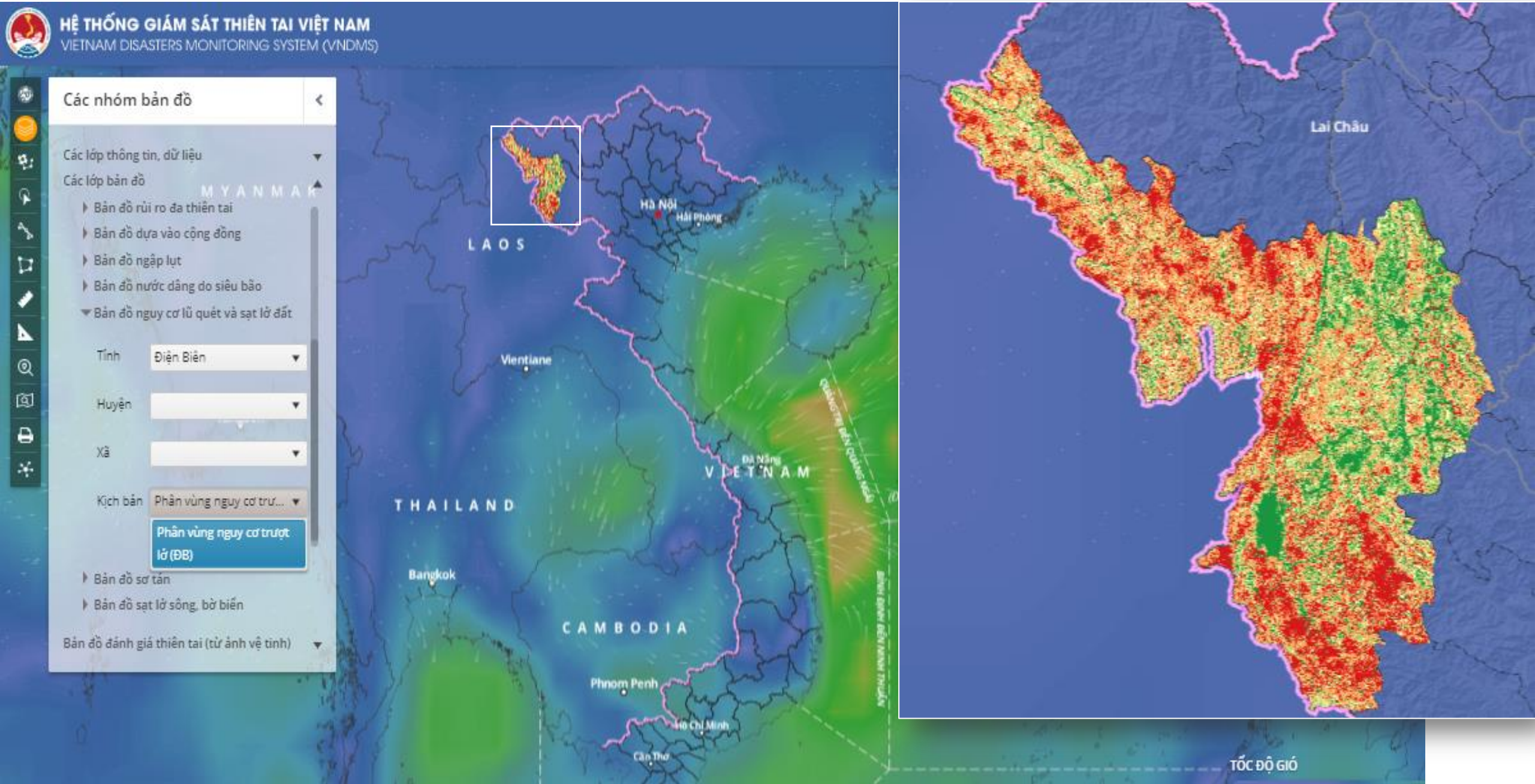


Space Technology Institute
(HoChiMinh city processing)

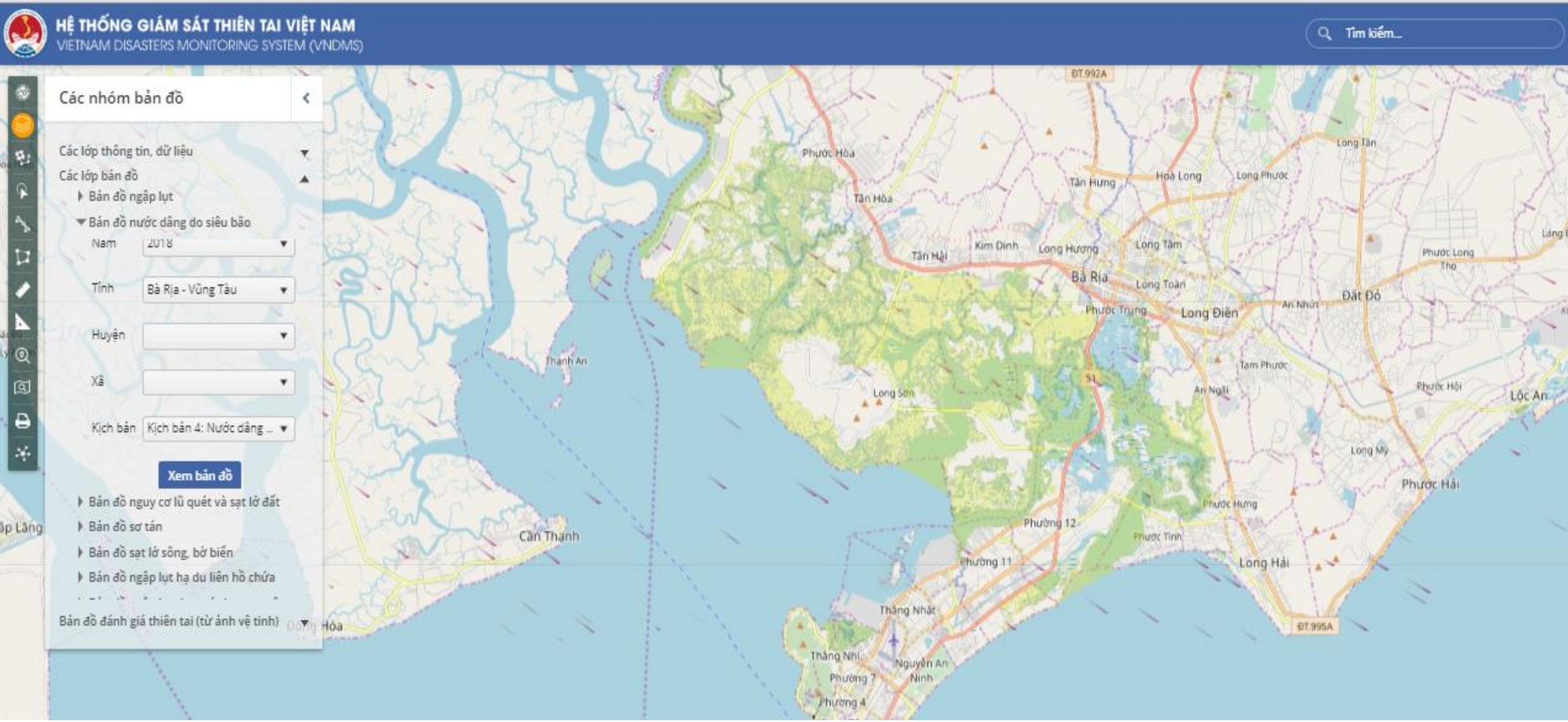
Heavy rain in Thanh Hoa to Quang Binh province (10/Sep/2019)



Landslide risk zoning map for Dien Bien province in 2018 *(scale 1:50.000)*



Inundation map cause by super tropical storm/ typhoon for Ba Ria- Vung Tau city



DISCUSSION AND RECOMMENDATIONS

1. Cooperation to national and international system, private organization to improve the applying of space technology in DDR.
2. Support for monitoring and provide satellite images in case of disaster occurred.
3. The officer need more technical training for space technology, advanced technique.

THE END

THANK YOU FOR LISTENING