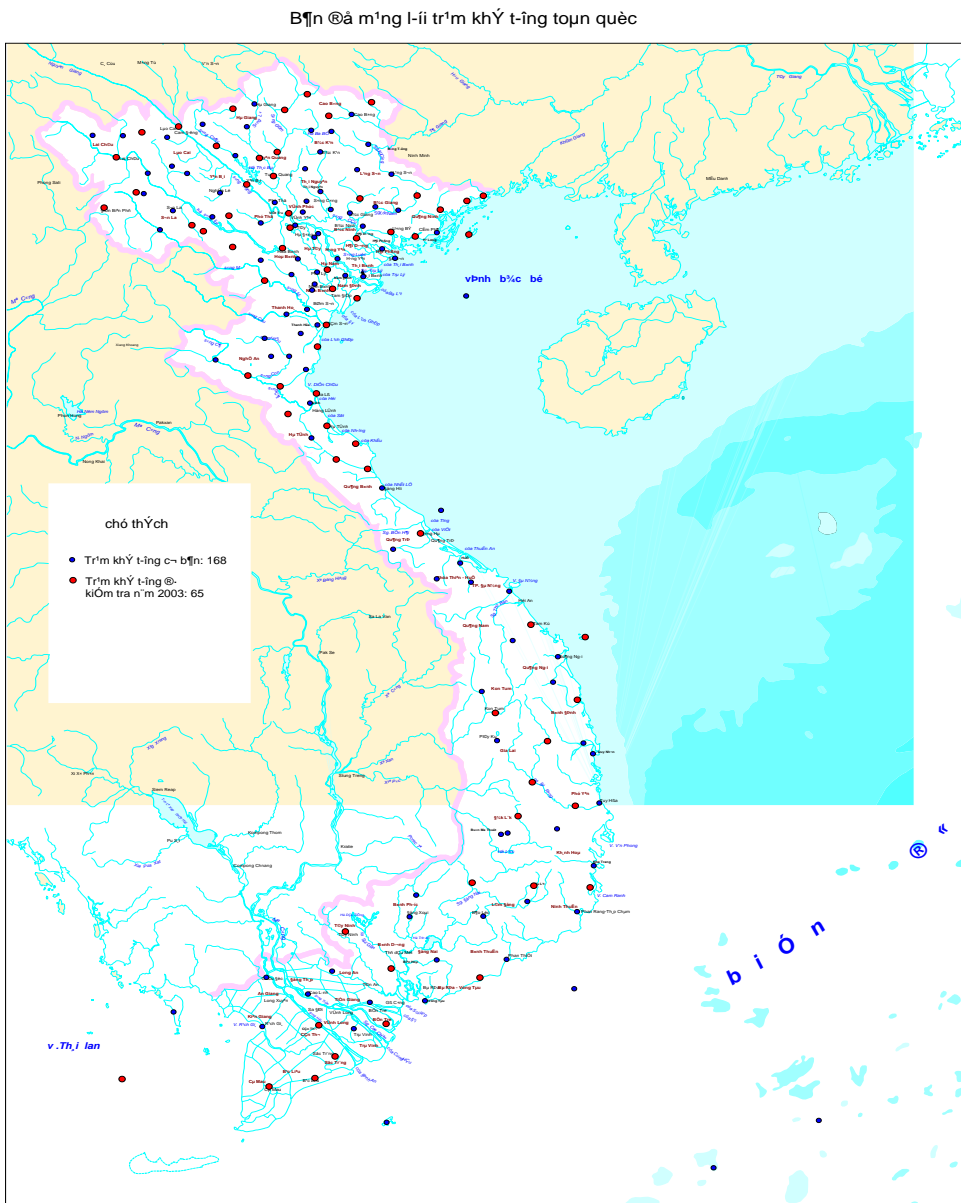# Overview of existing flash flood forecasting and warning infrastructures of NMHSs of Southeast Asia

Hanoi, 20th November 2017

1. Current hydrometeorological network

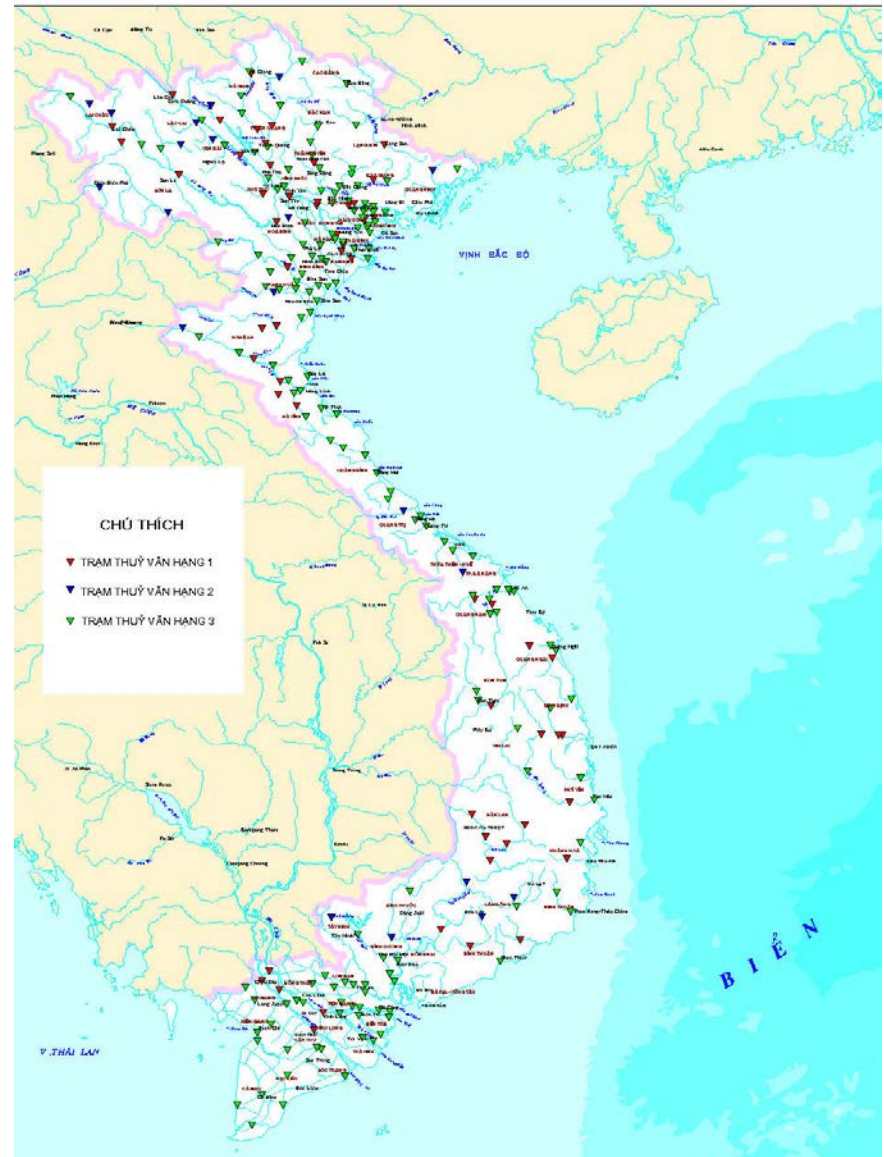- 194 meteorological stations
- 755 rainfall gauging devices

B¶n ®å m¹ng líi tr¹m khÝ tîng toµn quèc

1. Current hydrometeorological network

- 453   hydrological stations
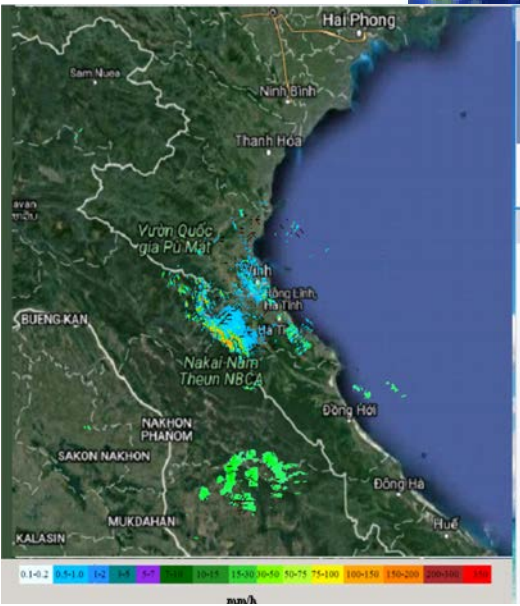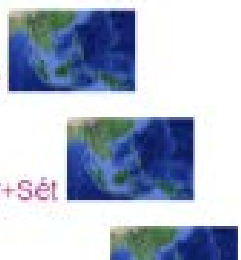

MẠNG LƯỚI TRẠM THUỶ VĂN HIỆN CÓ CỦA NGÀNH KTTV

CHÚ THÍCH
- TRẠM THUỶ VĂN HẠNG 1
- TRẠM THUỶ VĂN HẠNG 2
- TRẠM THUỶ VĂN HẠNG 3

1. Current hydrometeorological network

- 7 radar stations
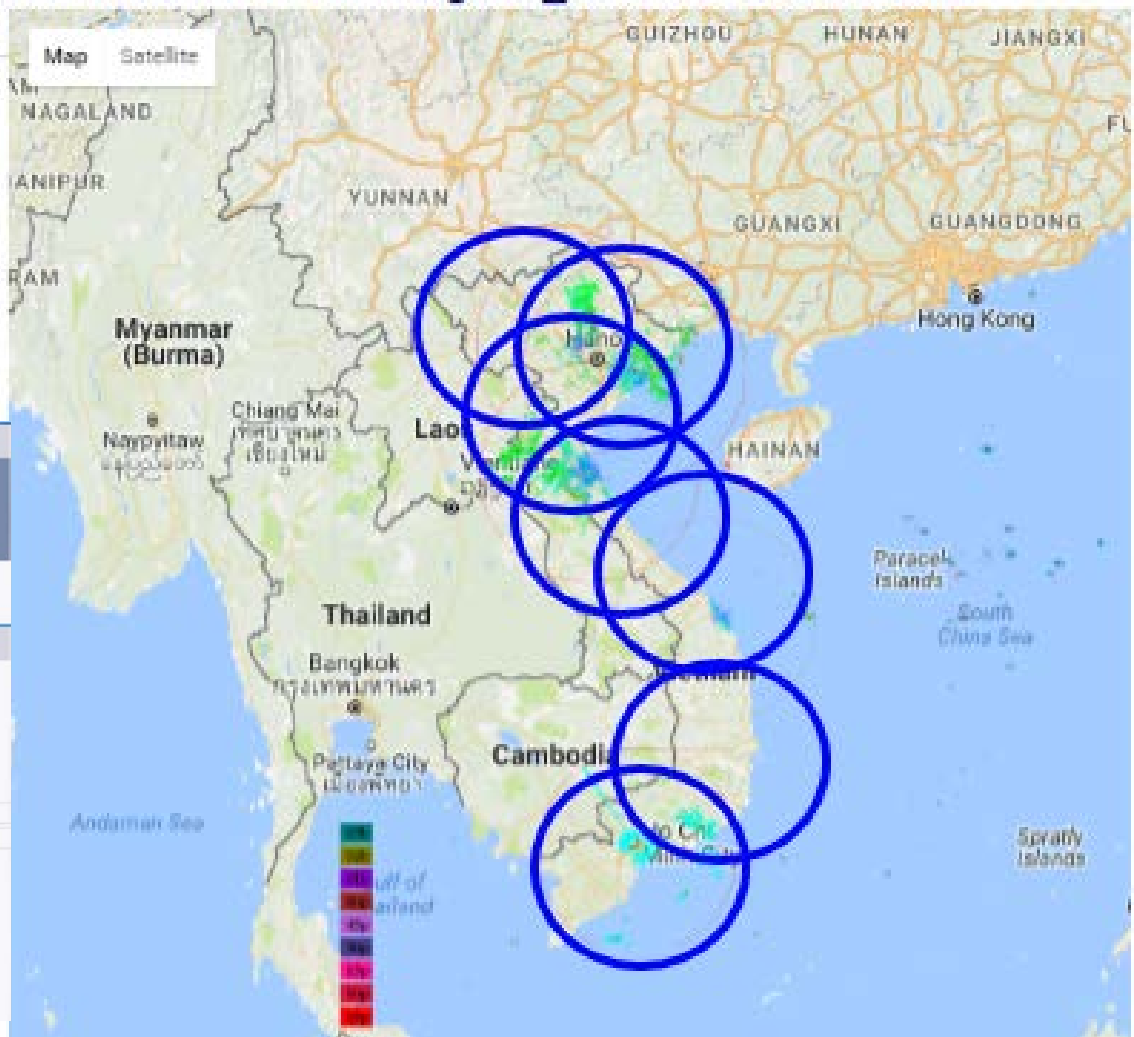
1. Current hydrometeorological network

MTSAT BAND

VIS

IR4

IR3(WV)

IR1

IR2

Band			Wavelength [μm]	Spatial Resolution
1	V1	Visible	0.46	1Km
2	V2		0.51	1Km
3	VS		0.64	0.5Km
4	N1	Near Infrared	0.86	1Km
5	N2		1.6	2Km
6	N3		2.3	2Km
7	I4	Infrared	3.9	2Km
8	WV		6.2	2Km
9	W2		7.0	2Km
10	W3		7.3	2Km
11	MI		8.6	2Km
12	O3		9.6	2Km
13	IR		10.4	2Km
14	L2		11.2	2Km
15	I2		12.3	2Km
16	CO		13.3	2Km

RGB

Aerosol
Water cloud and Ice cloud
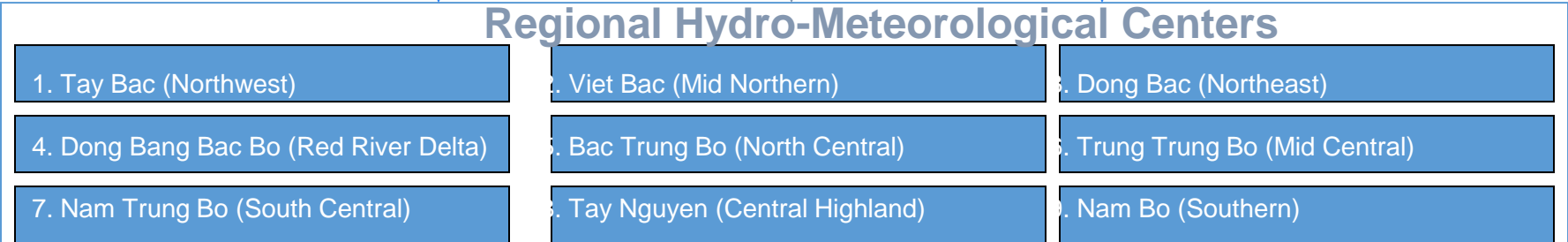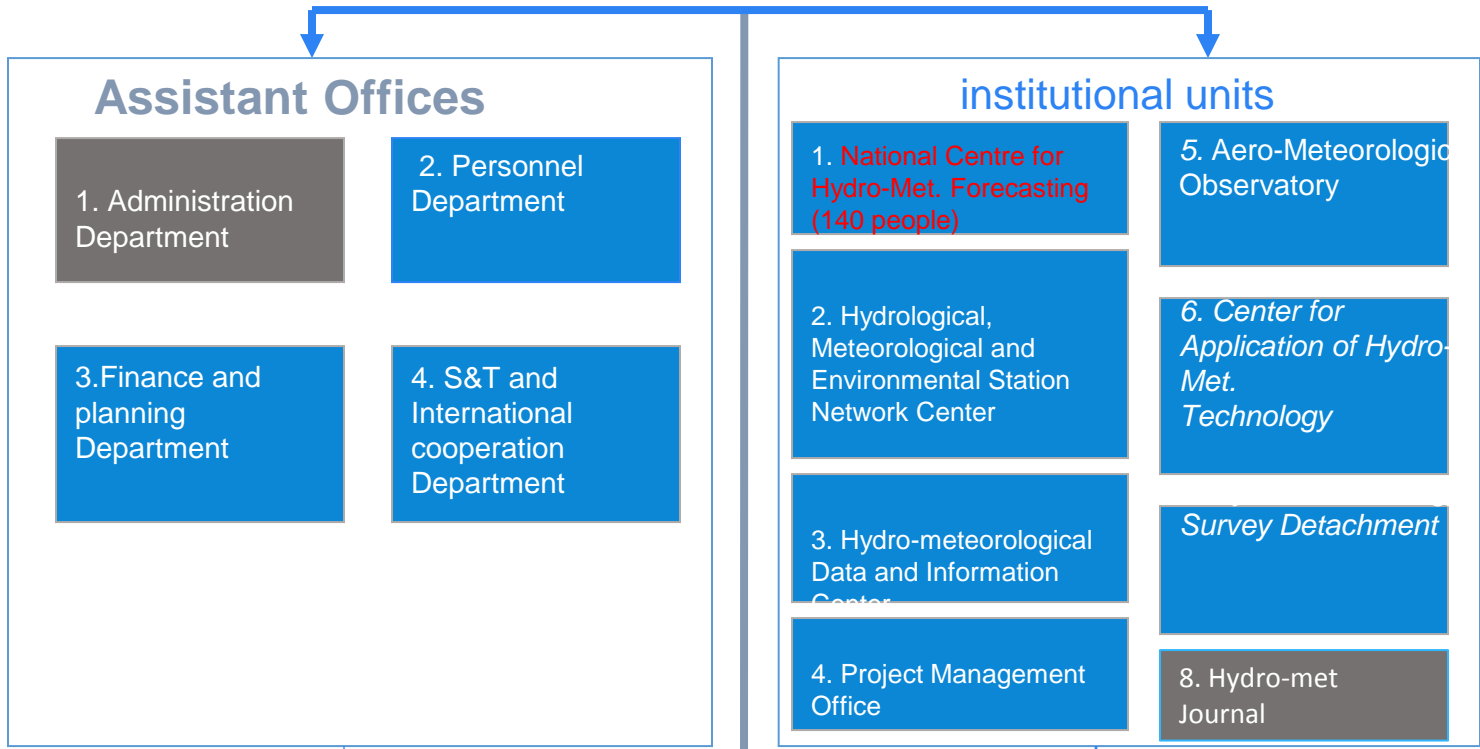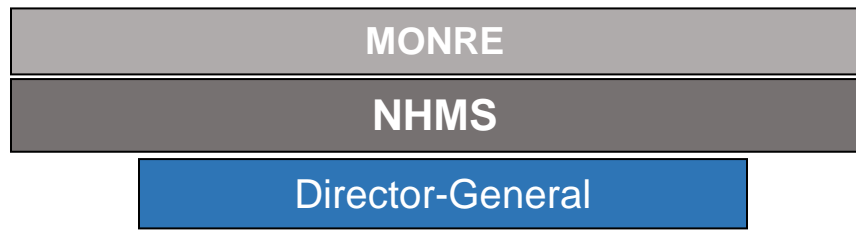Size of the cloud droplet
Fog , Hot spot(Forest fire)

Water vapor

SO_2(Sulfur dioxide)
O_3(Ozone)

Atmospheric Windows

CO_2(Carbon dioxide)

True Color Image

2. Organizational structure and human resources

MONRE

NHMS

Director-General

Assistant Offices

1. Administration Department

2. Personnel Department

3. Finance and planning Department

4. S&T and International cooperation Department

institutional units

1. National Centre for Hydro-Met. Forecasting (140 people)

2. Hydrological, Meteorological and Environmental Station Network Center

3. Hydro-meteorological Data and Information Center

4. Project Management Office

5. Aero-Meteorological Observatory

6. Center for Application of Hydro-Met. Technology

Survey Detachment

8. Hydro-met Journal

Regional Hydro-Meteorological Centers

1. Tay Bac (Northwest)

2. Viet Bac (Mid Northern)

3. Dong Bac (Northeast)

4. Dong Bang Bac Bo (Red River Delta)

5. Bac Trung Bo (North Central)

6. Trung Trung Bo (Mid Central)

7. Nam Trung Bo (South Central)

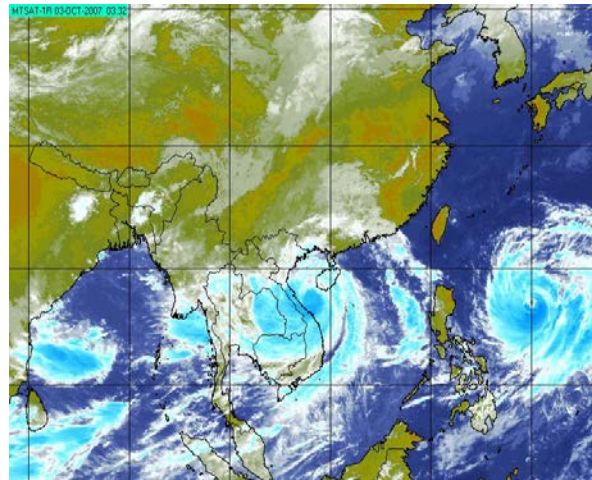8. Tay Nguyen (Central Highland)

9. Nam Bo (Southern)

3. National capacity for flash flood forecasting and warning

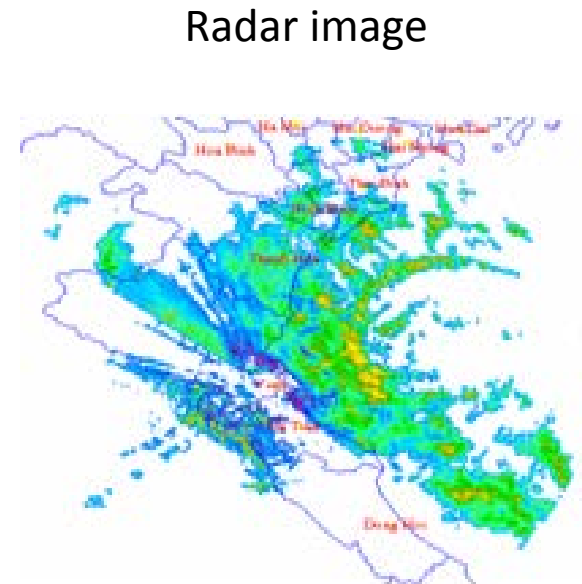## Flash flood forecasting and warning procedure

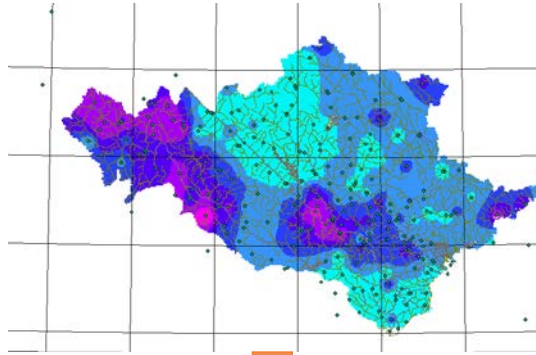1. Forecast weather patterns for extensive rainfall based on the satellite, radar images and observations
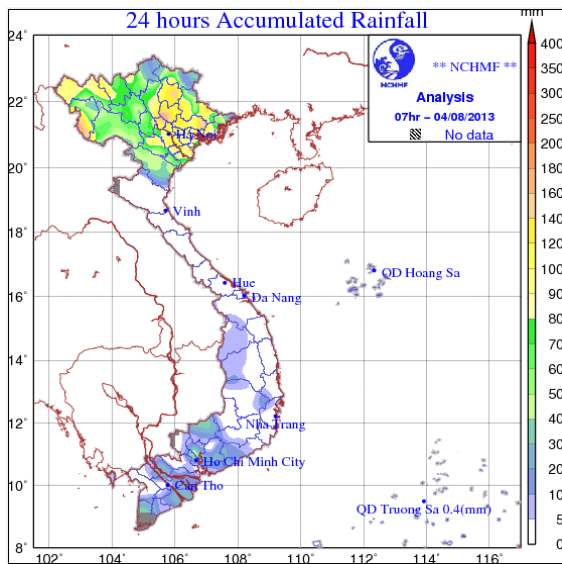
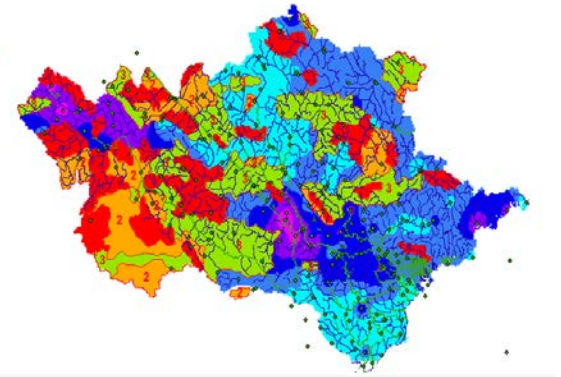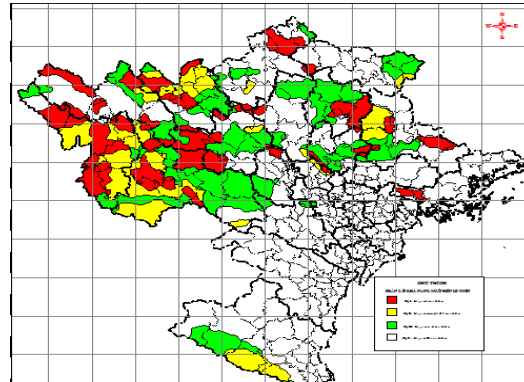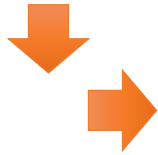Observed rainfall

Satellite image

Radar image

3. National capacity for flash flood forecasting and warning

2. Analyze and forecast rainfall using the numerical weather models for different provinces and river basin catchments.

3. Overlap the observed and forecasted rainfall, land cover, hill's slope, river network and provincial maps to obtain the flash flood risk map.
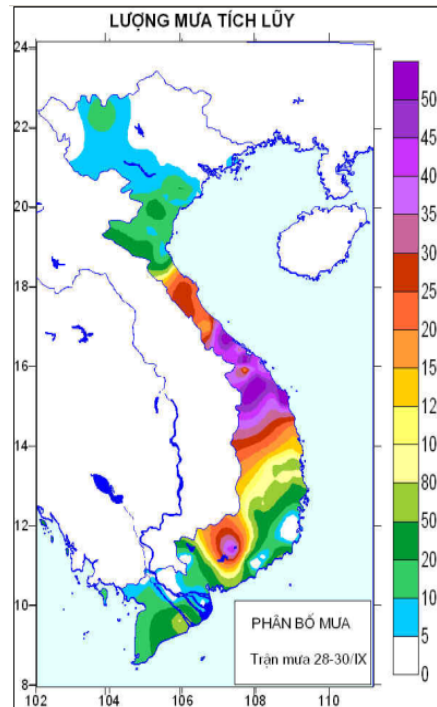
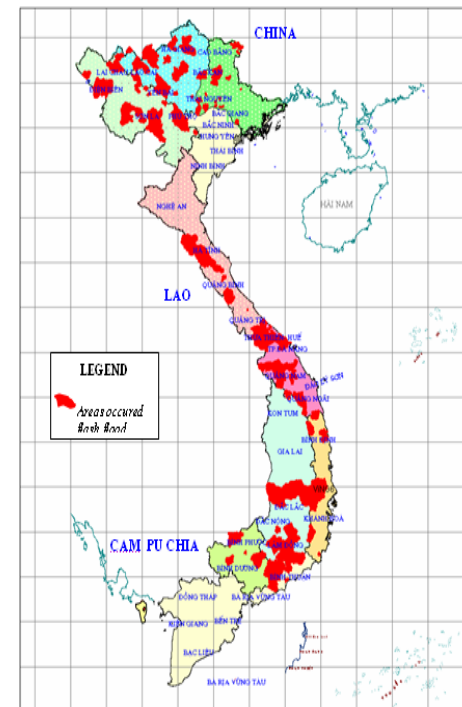# 5. National capacity for flash flood forecasting and warning

Observed rainfall
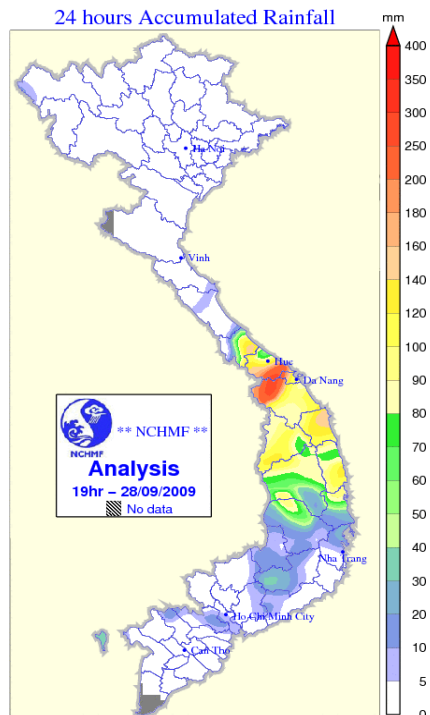

Forecasted rainfall


Potential flashflood map

4. Analyze the forecasted rainfall pattern and potential flash flood map, then issue the flash flood forecasting and warning

3. National capacity for flash flood forecasting and warning

The NCHMF has been applied the Flash Flood Guidance System (**FFGS)** software provided by the Mekong River Commission (MRC) for flash flood forecasting and warning in Vietnam since 2009
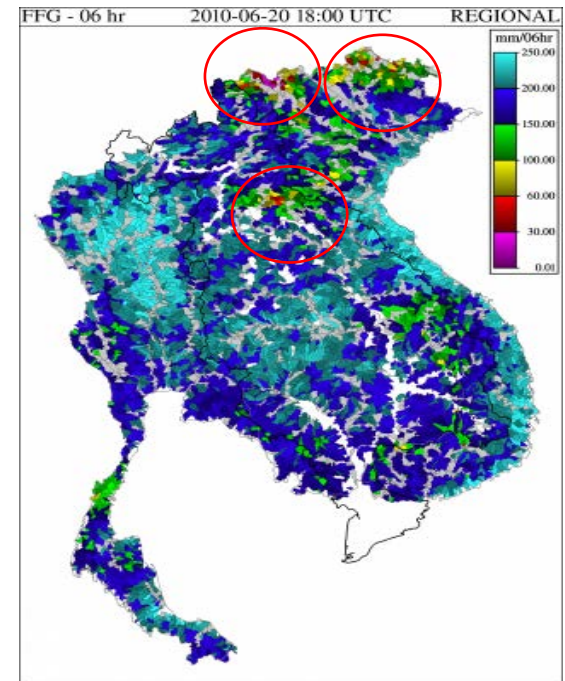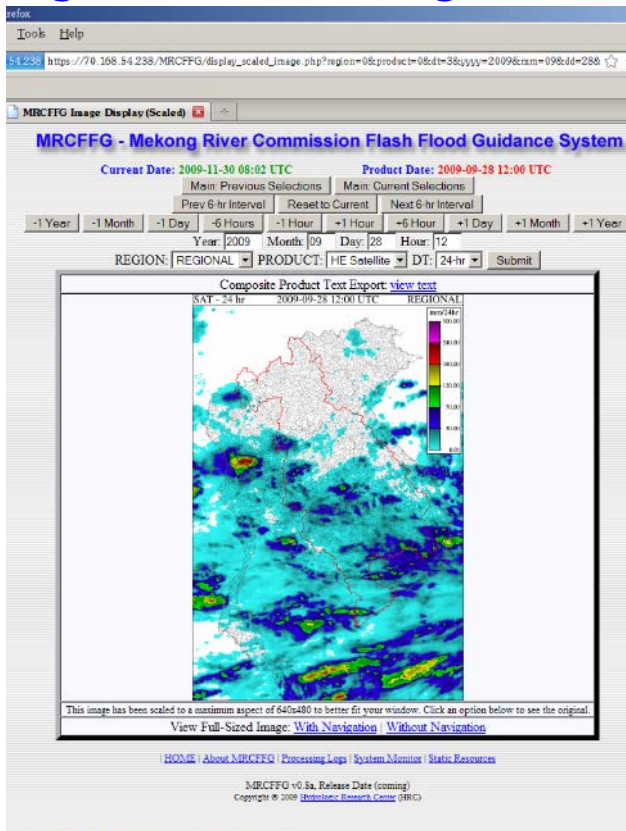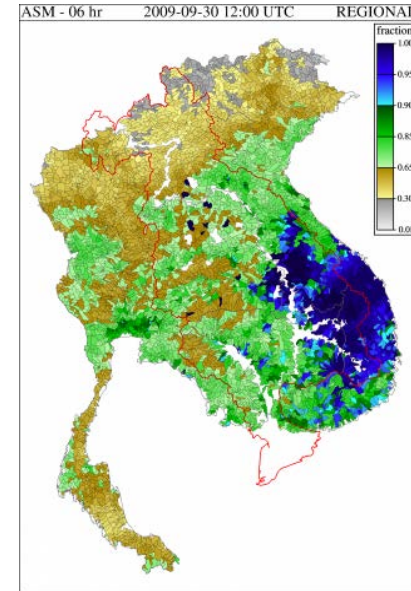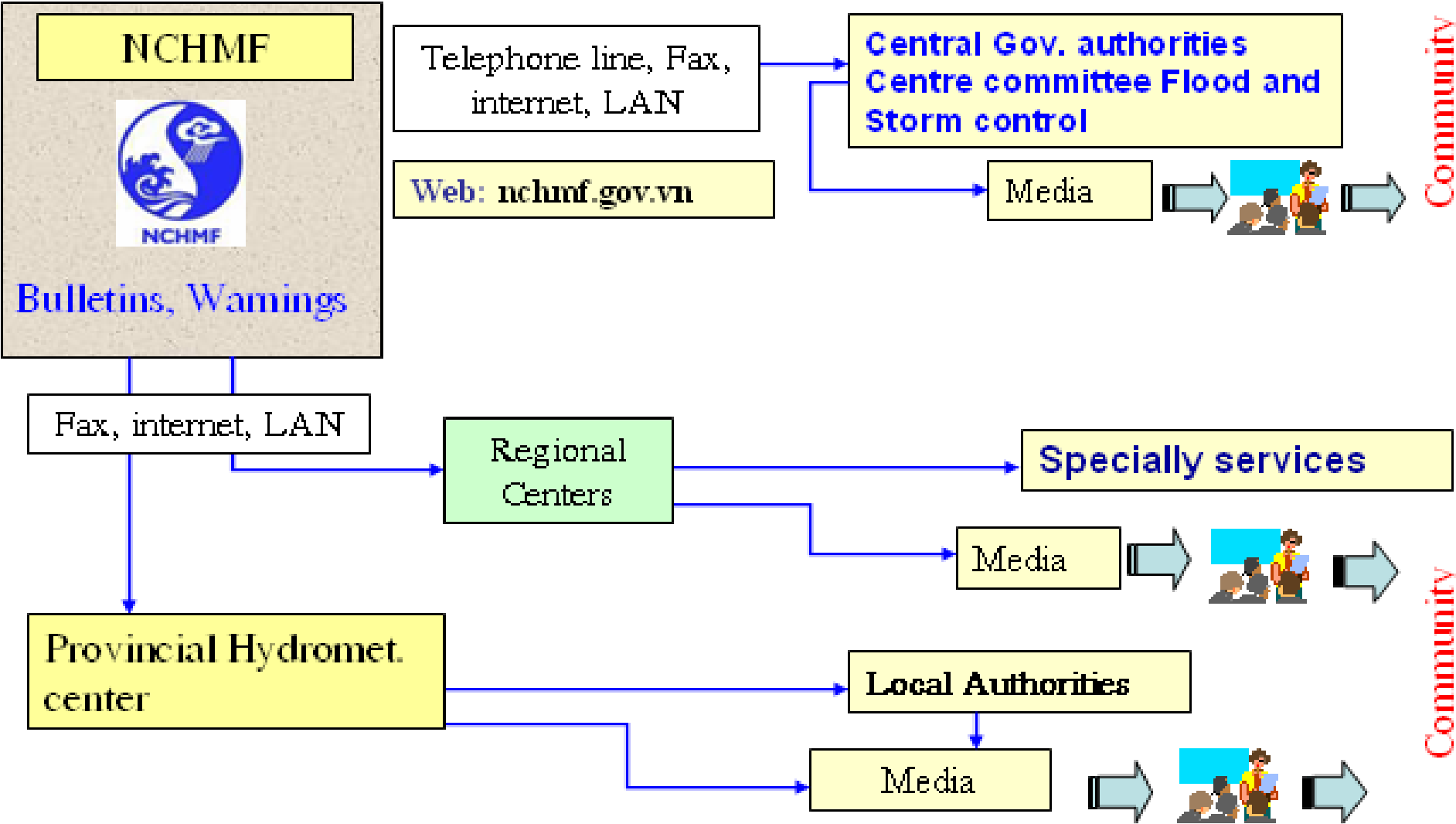
3. National capacity for flash flood forecasting
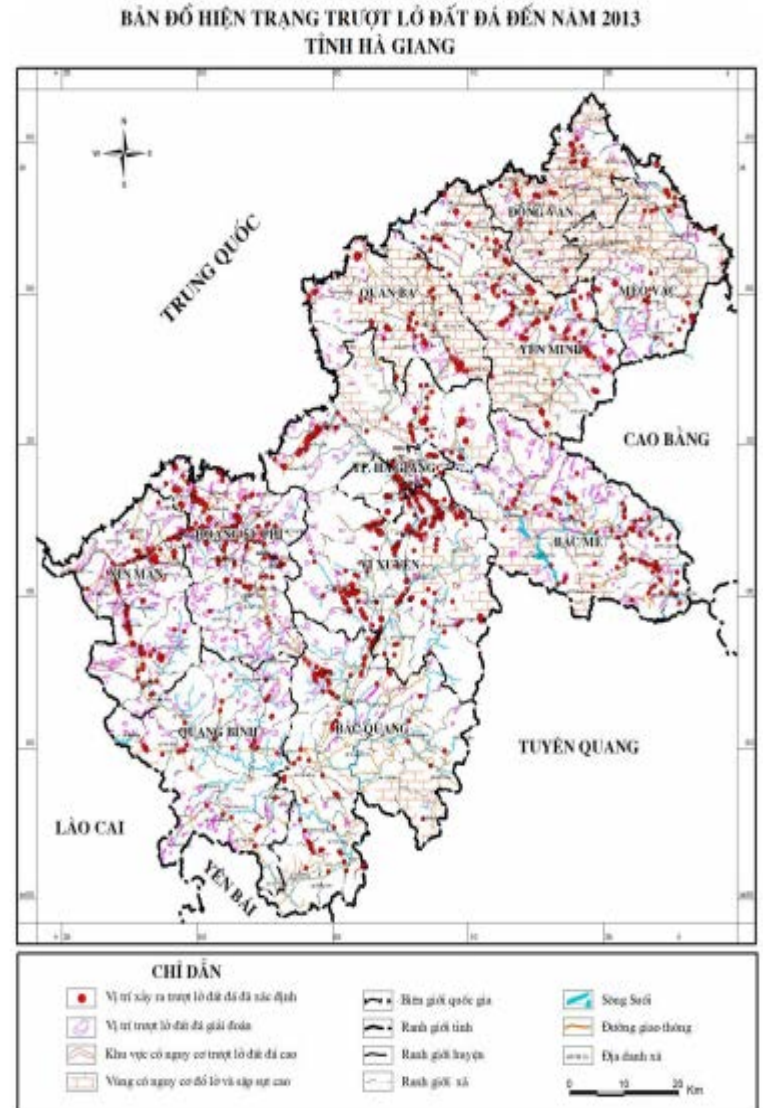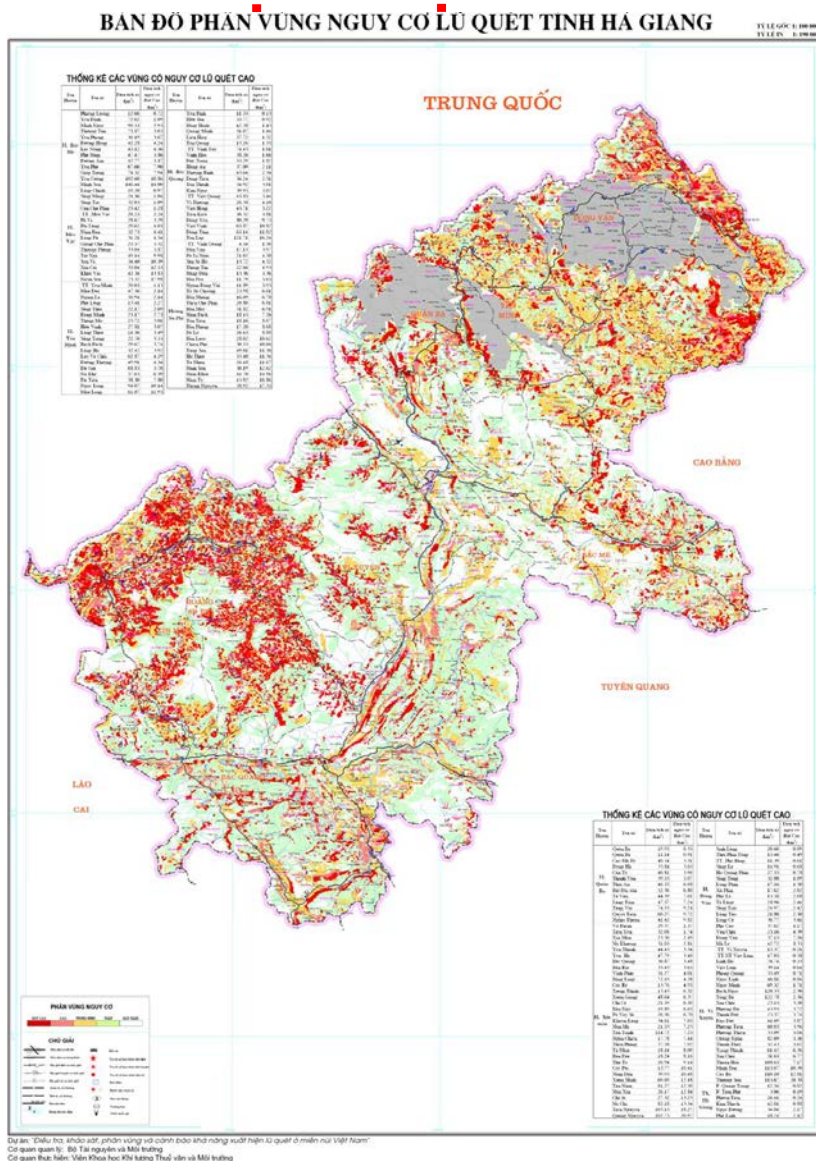
Flash flood and landslide risk map for 14 provinces in Northern Vietnam (based on hill's slope and land cover maps)

4. Collaboration with emergency management, governmental and non-governmental agencies

Thank you for listening