

NATIONAL HYDRO-METEOROLOGICAL SERVICE IN VIETNAM
NATIONAL CENTER FOR HYDRO-METEOROLOGICAL FORECASTING

ME KONG RIVER COMMISSION
FLASH FLOOD GUIDANCE SYSTEM
(MRCFFGS)

<http://www.nchmf.gov.vn>

29 Nov – 1 Dec 2016, Phnom Penh, CAMBODIA

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1. General introduction

Viet Nam is located in the tropical monsoon of Southeast Asia- one of the most disaster-prone regions in the world.

Many kind of natural disasters including: typhoons, floods, flash floods and landslides

Flooding and typhoons are major annual occurrence in Viet Nam causing massive damage and loss for people life.



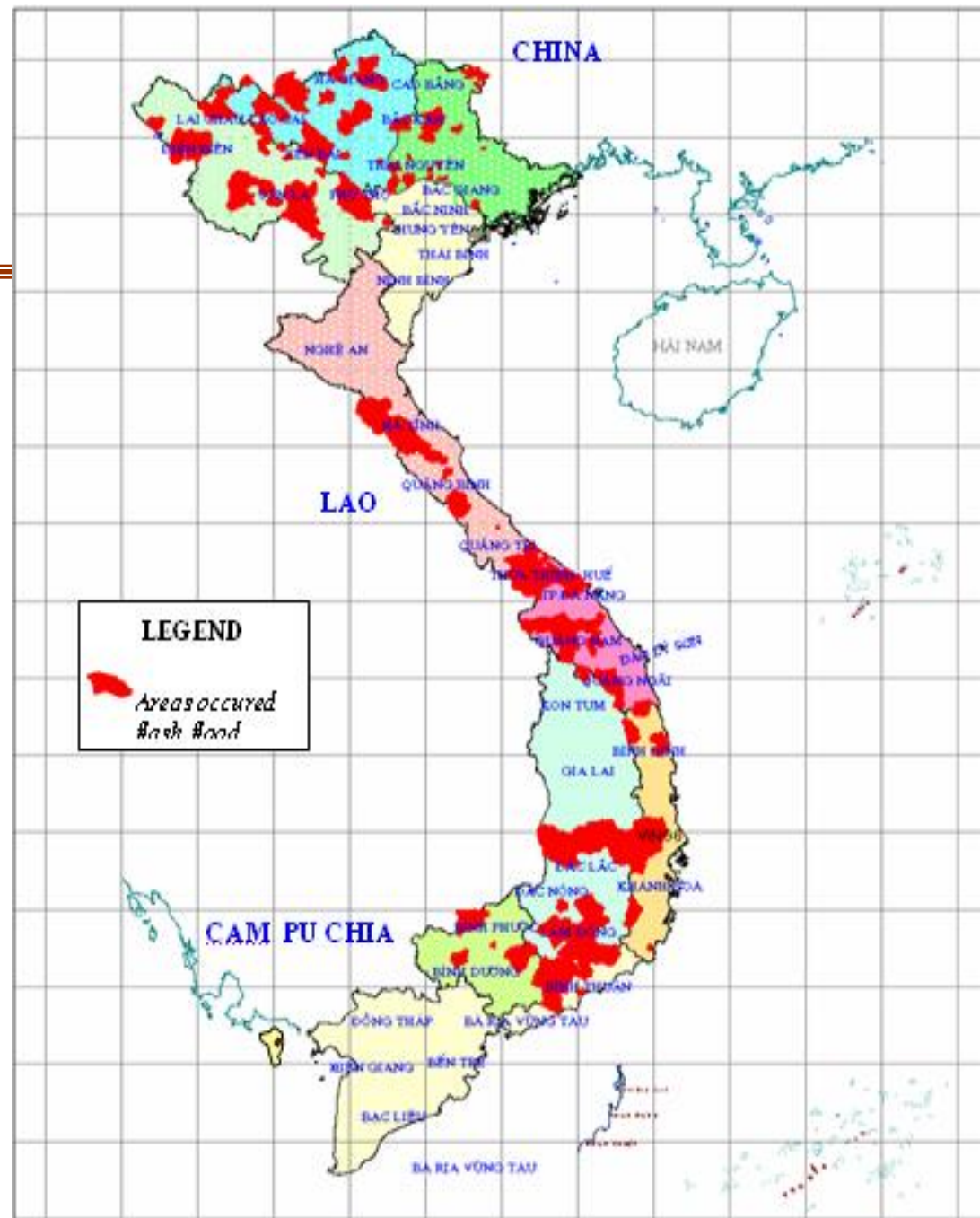
-Heavy rain, flash floods, landslides occur very often in the mountainous region of the country.

-An average 10 flash floods occur each year, in some year this number amounted to 15-20 events (1998:18; 2002:15; 2007: 18; 2008: 21; 2009: 15; 2010: 14; 2011: 16; 2012: 8; 2013: 11; 2014: 10; 2015:8; 2016: 10)

Provinces with high potential for flash floods

- **In Northern:**
- **Including the provinces:** Lai Chau, Son La, Dien Bien, Lao Cai, Yen Bai, Thai Nguyen, Ha Giang, Tuyen Quang, Bac Can and Cao Bang.
- **In Central and Highland:**
- **Including the provinces:** Thanh Hoa, Nghe An, Ha Tinh, Quang Binh, Quang Nam, Binh Thuan, Kon Tum, Gia Lai and Dak Lak.

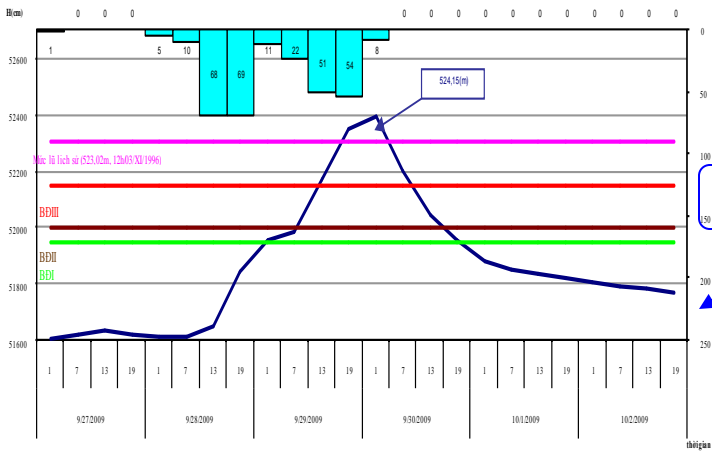
**MAP OF AREAS CCURED
FLASH FLOODS IN VIET
NAM IN 1990-2010**



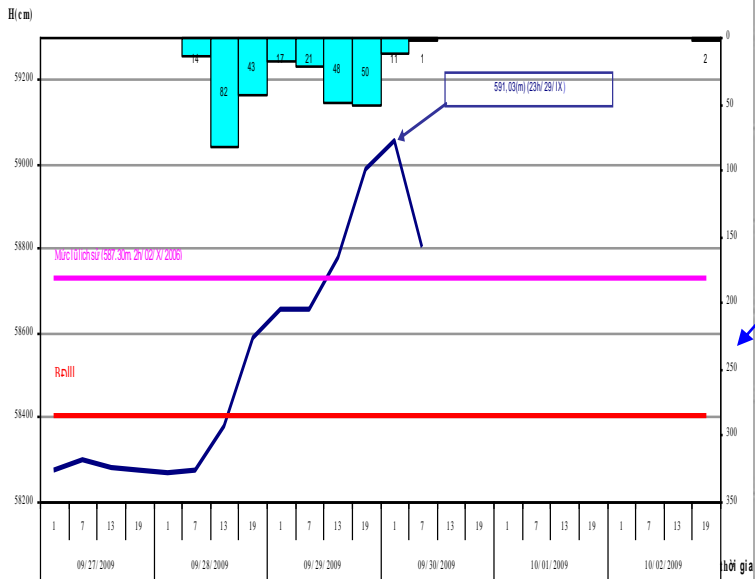
Flash foods in 2016



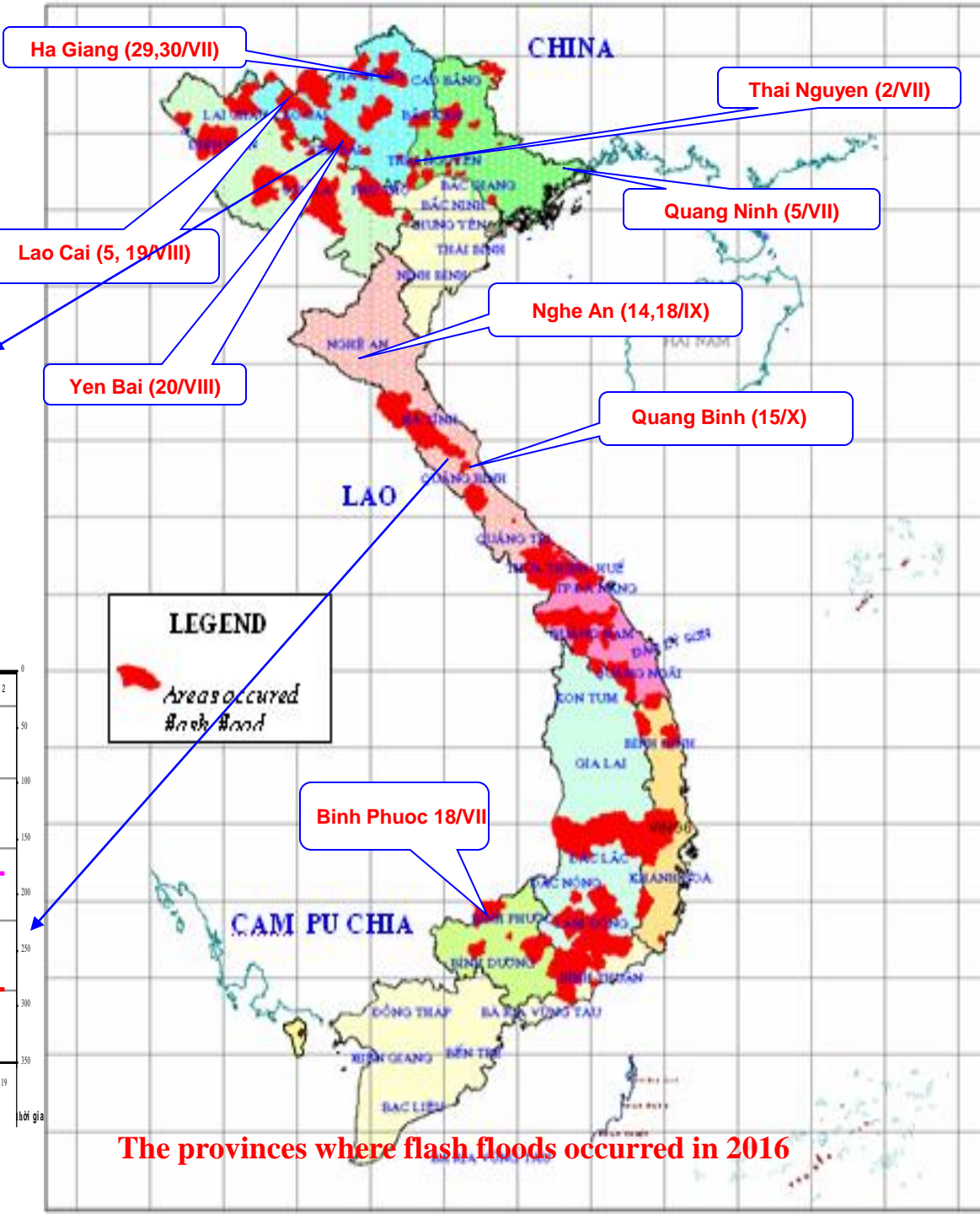
- 10 flash floods occurred in 8 provinces in the North and Central of Vietnam such as Thai Nguyen (July 01st), Binh Phuoc (July 18th), Quang Ninh (July 5th), Ha Giang (July 29-30th), Lao Cai (August 5th, 19th), Yen Bai (August 20th), Nghe An (September 14, 18th) and Quang Binh (October 15th).
- The flash floods caused extreme damages on human lives and properties to these provinces.



Hydrograph at Yen Bai station



Hydrograph at Mai Hoa station



The provinces where flash floods occurred in 2016

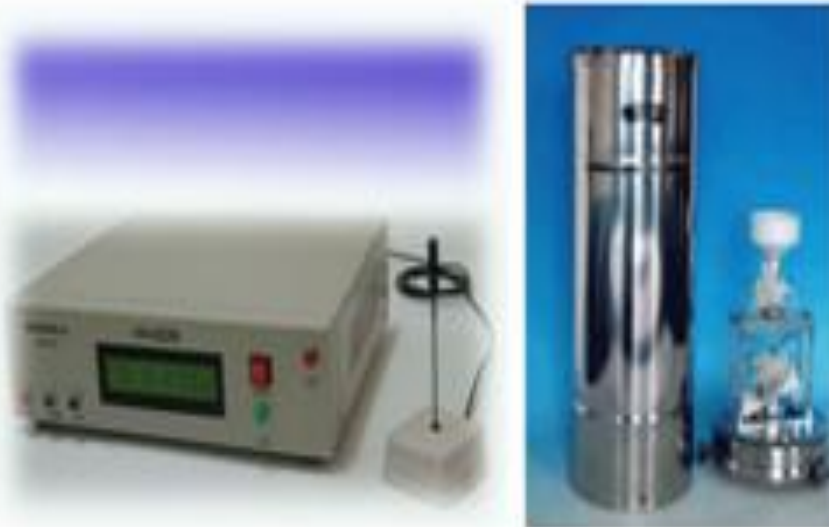
2. Flash flood warning and forecasting

Hydrometeorological Forecasting undertake warning by two methods:



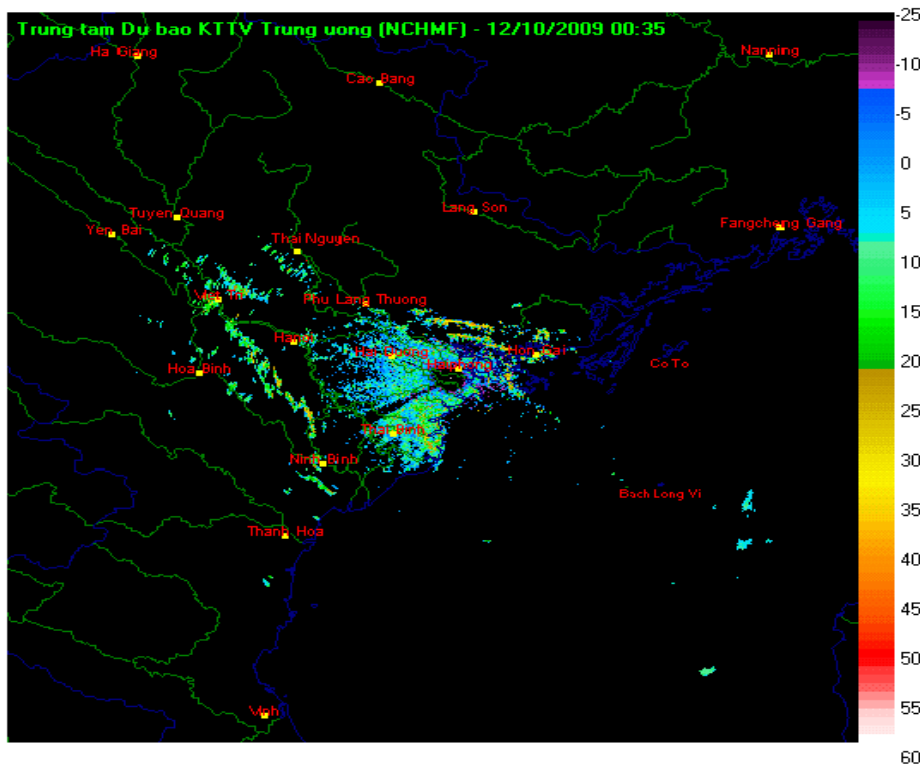
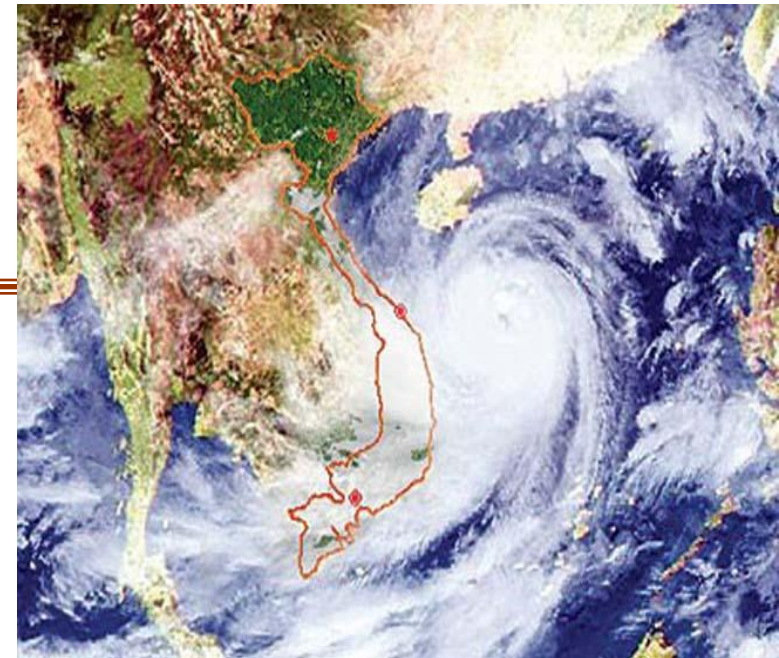
a- General forecasting and warning

b- Automatic warning

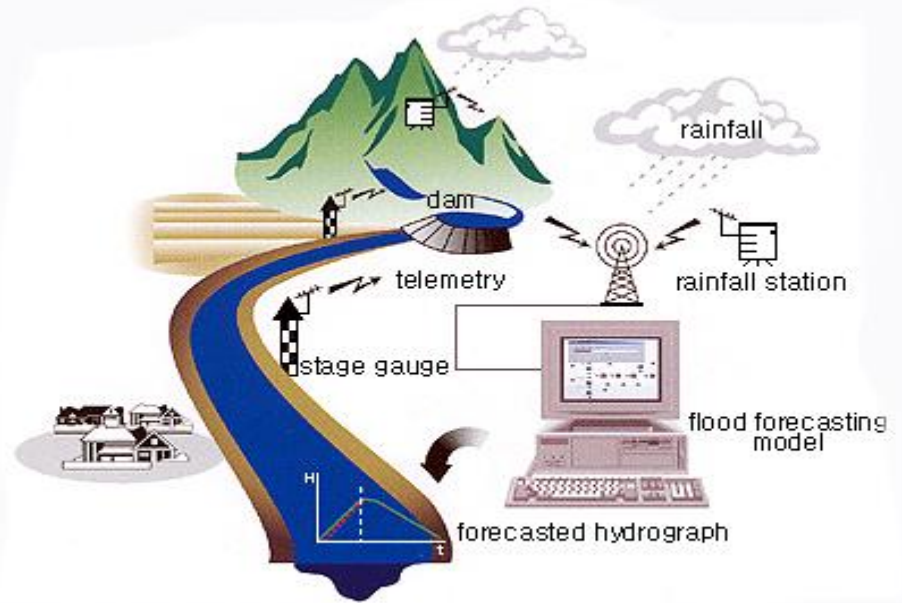


a- General warning and forecasting

Flash flood warning and forecasting are made daily for the areas with high risk of flash flood as follow in three steps:

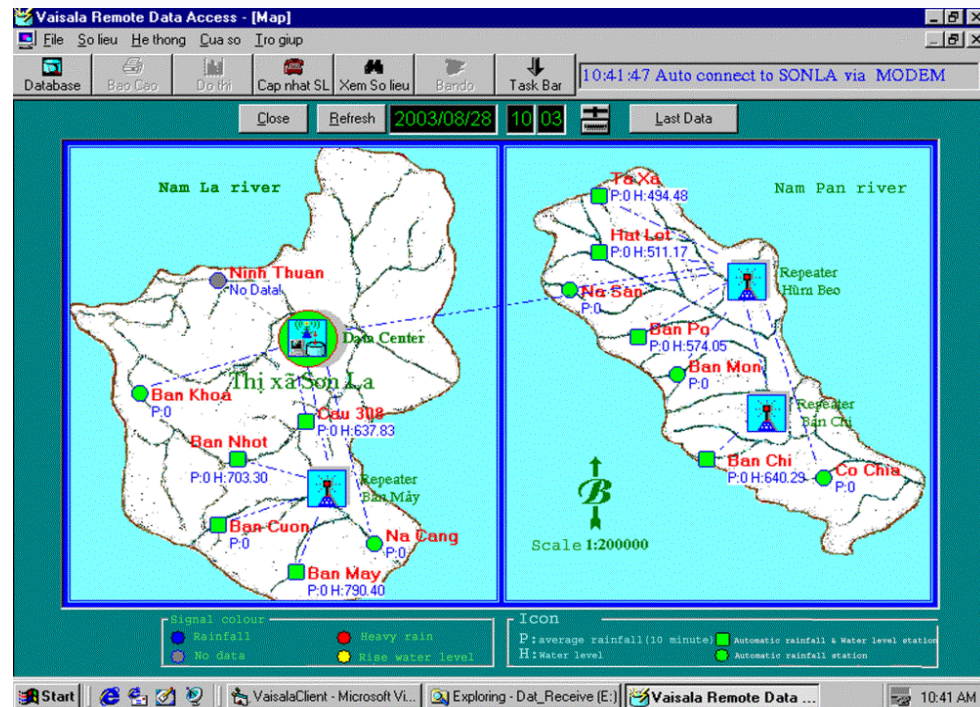


- 1. To detect and forecast development of heavy rain causing weather pattern in integration with basin's hydrological condition and coverage.*
- 2. To give warning on possible flash flood within the small area based on the predicted rainfall.*
- 3. To give a warning based on heavy rain and analysis observed rainfall map.*



b- Automatic warning

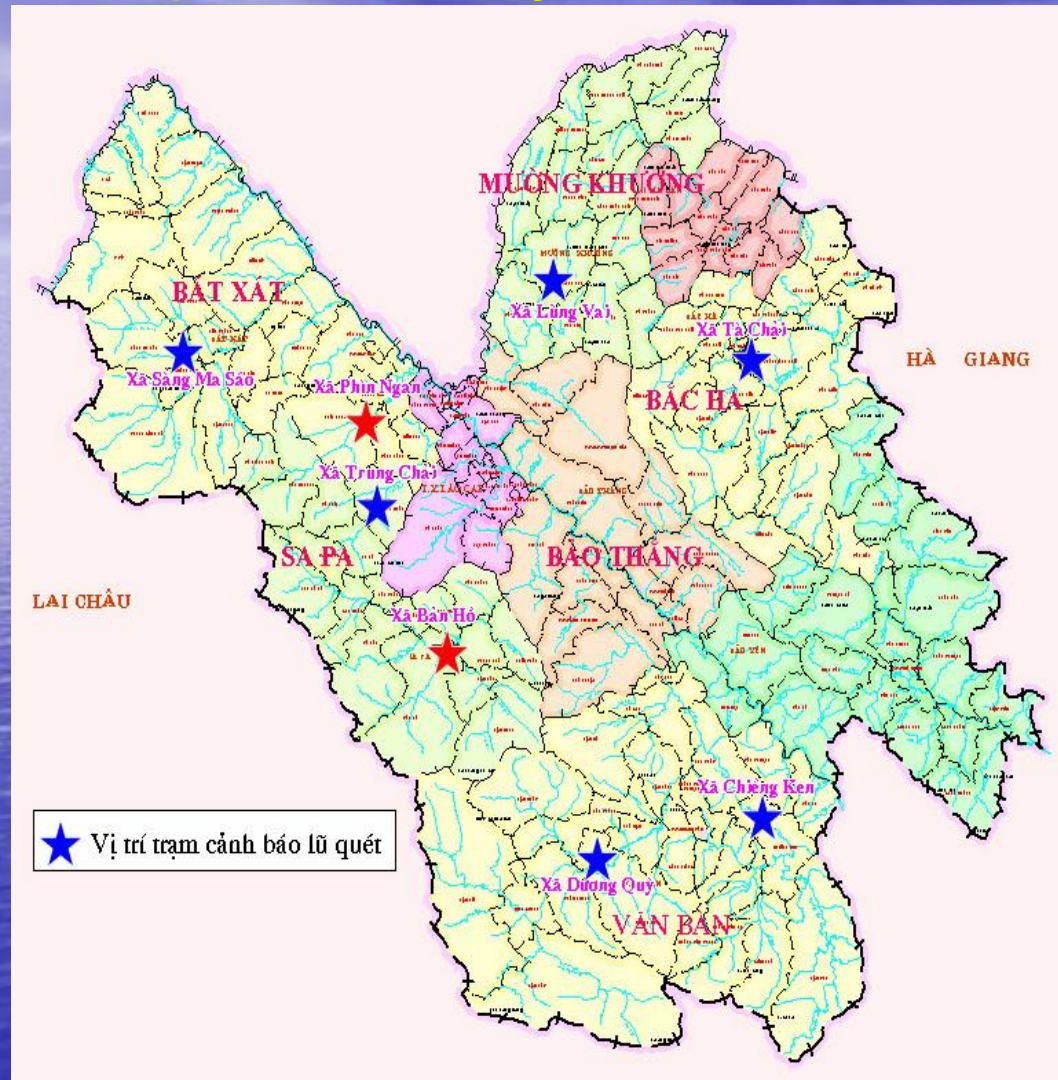
Flash flood warning and forecasting System in Son La Province were established in 2000. This system has been maintained and developed up to now.

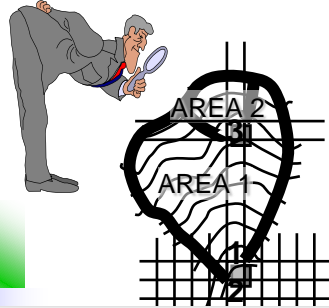


The flash flood warning system in Lao Cai province

Established the flash flood warning system with 8 automatic rainfall gauges in Lao Cai province.

Mạng lưới trạm cảnh báo lũ quét - tỉnh Lào Cai





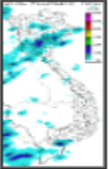
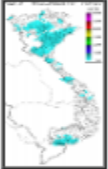
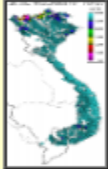
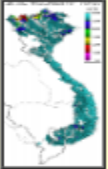
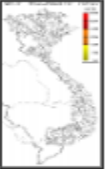
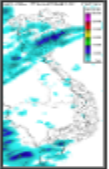
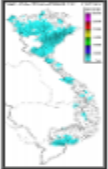
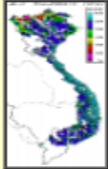
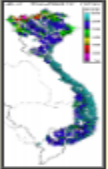
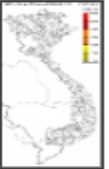
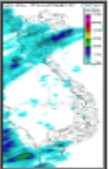
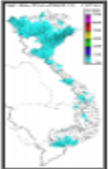
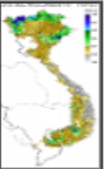
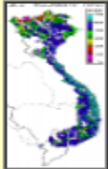
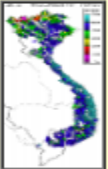
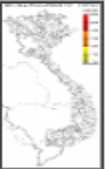
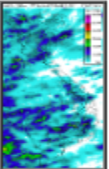
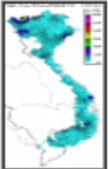
Application of the MRCFFG System

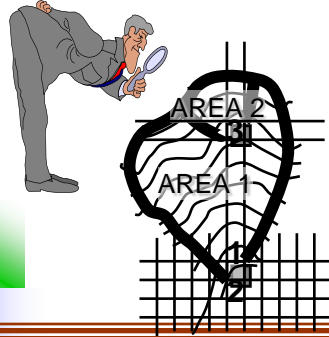
MRCFFG - Mekong River Commission Flash Flood Guidance System

Current Date: 2016-11-26 09:23 UTC

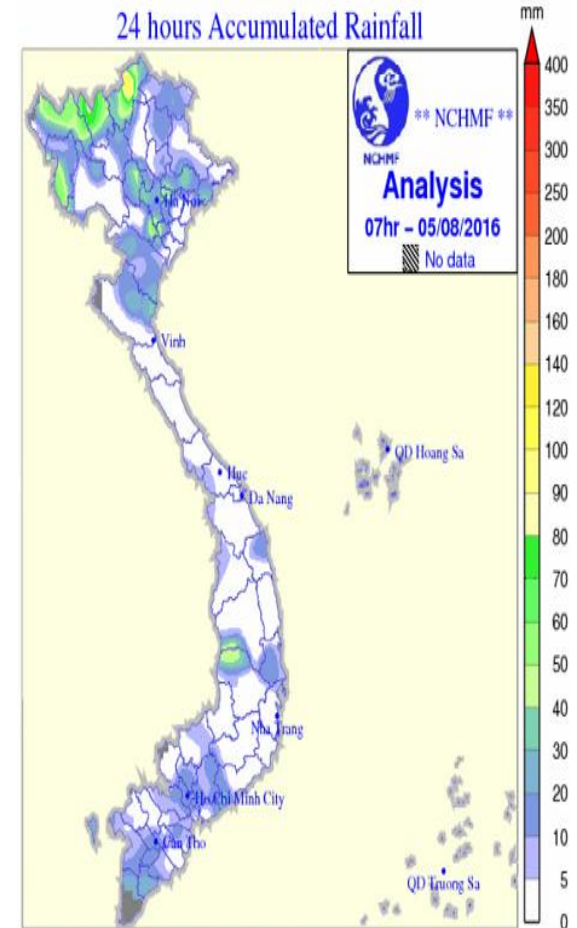
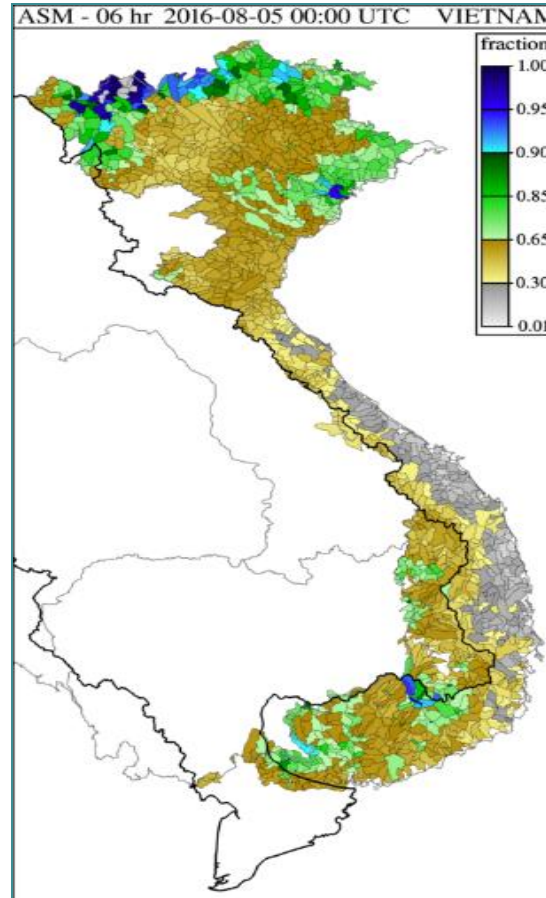
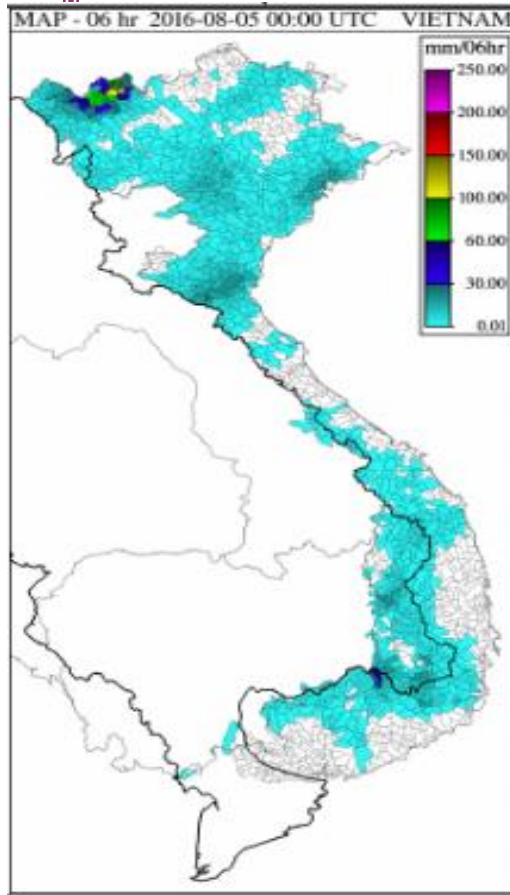
Product Date: 2016-08-05 06:00 UTC

Year:
 Month:
 Day:
 Hour:
 REGION:

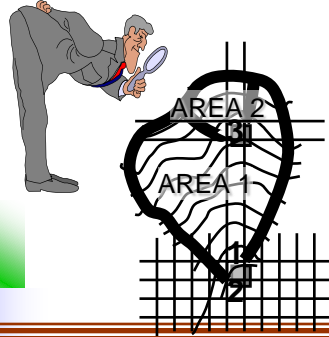
Time-Scale	HE Satellite	Merged MAP	ASM	Previous FFG	FFG	PFFT
01-hr	 2016-08-05 06:00 UTC	 2016-08-05 06:00 UTC view text		 2016-08-05 00:00 UTC view text	 2016-08-05 06:00 UTC view text	 2016-08-05 06:00 UTC view text
03-hr	 2016-08-05 06:00 UTC	 2016-08-05 06:00 UTC view text		 2016-08-05 00:00 UTC view text	 2016-08-05 06:00 UTC view text	 2016-08-05 06:00 UTC view text
06-hr	 2016-08-05 06:00 UTC	 2016-08-05 06:00 UTC view text	 2016-08-05 06:00 UTC view text	 2016-08-05 00:00 UTC view text	 2016-08-05 06:00 UTC view text	 2016-08-05 06:00 UTC view text
24-hr	 2016-08-05 06:00 UTC	 2016-08-05 06:00 UTC view text				



Application of the MRCFFG System



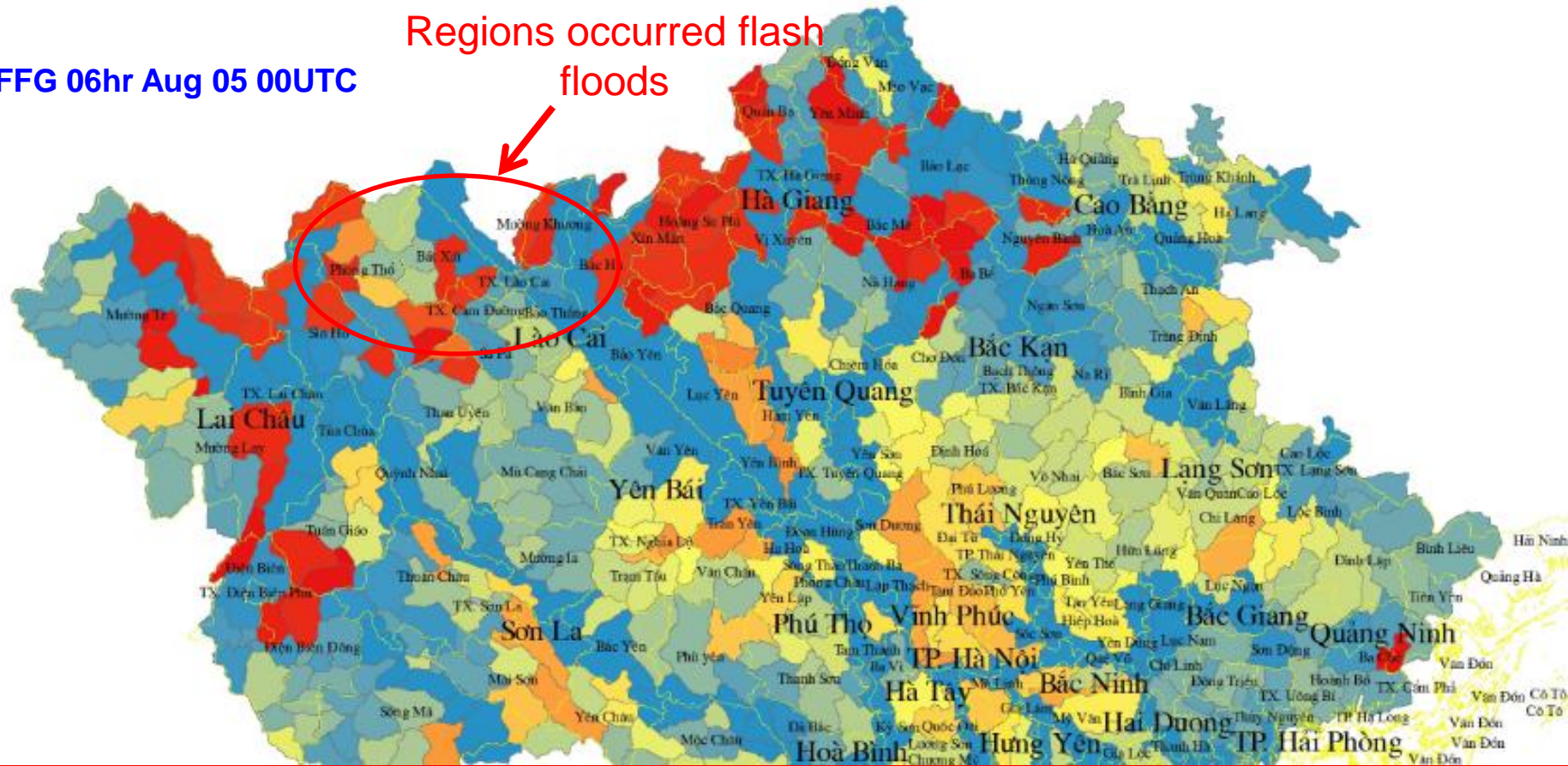
Application in warning flash flood in heavy rainfall on August 05, 2016 in Northern mountains



Application of the MRCFFG System

FFG 06hr Aug 05 00UTC

Regions occurred flash floods





Some figures in the flash flood event in Lao Cai province on August 05, 2016



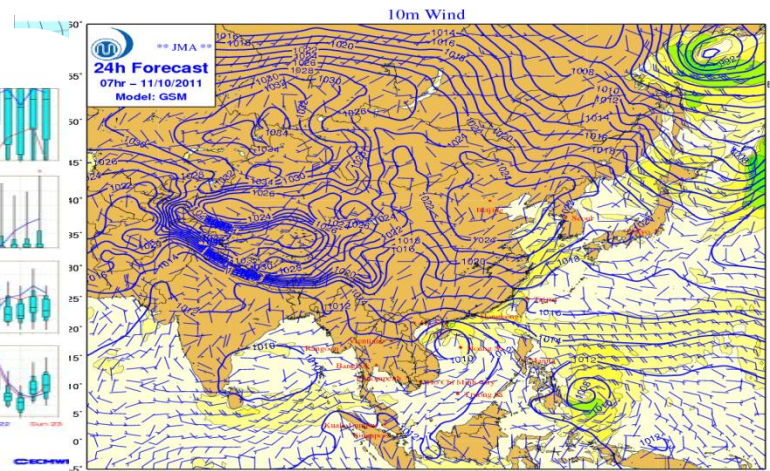
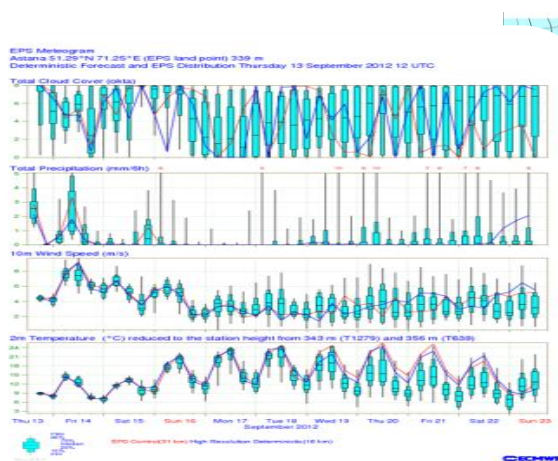
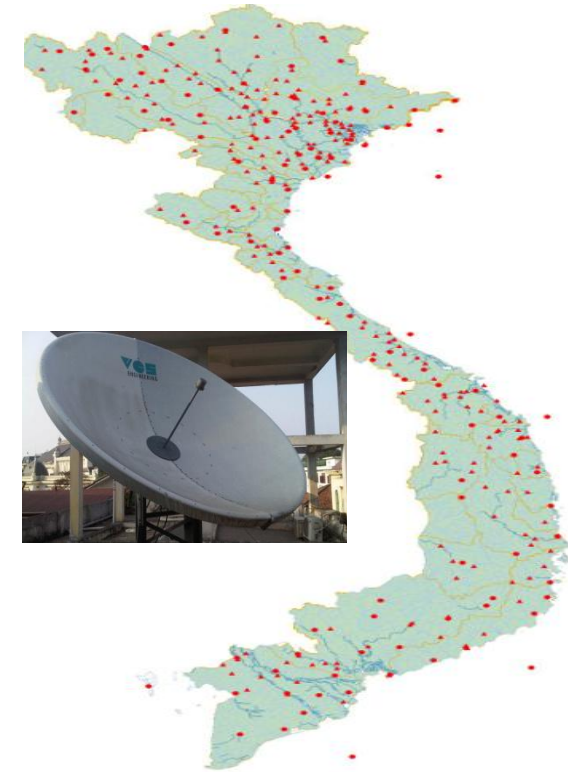
3. Weather forecasting and nowcasting

Data sources:

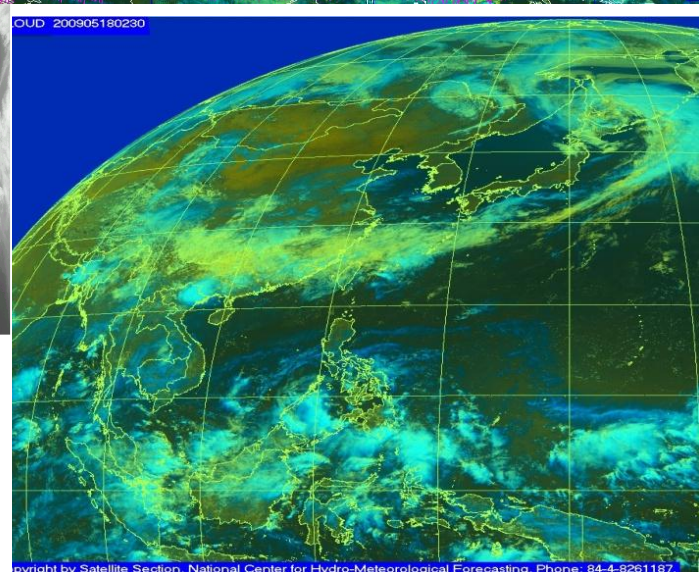
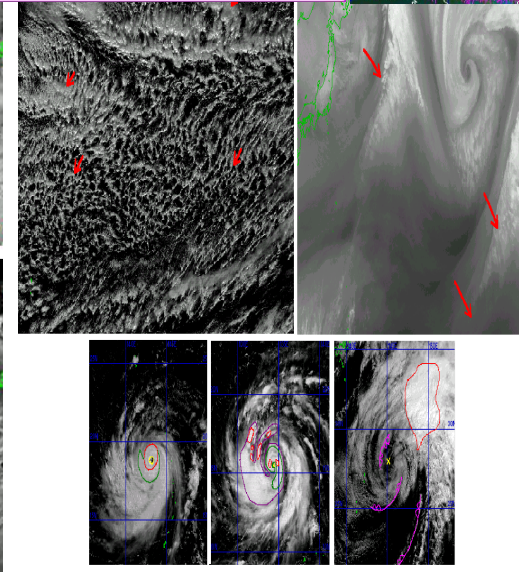
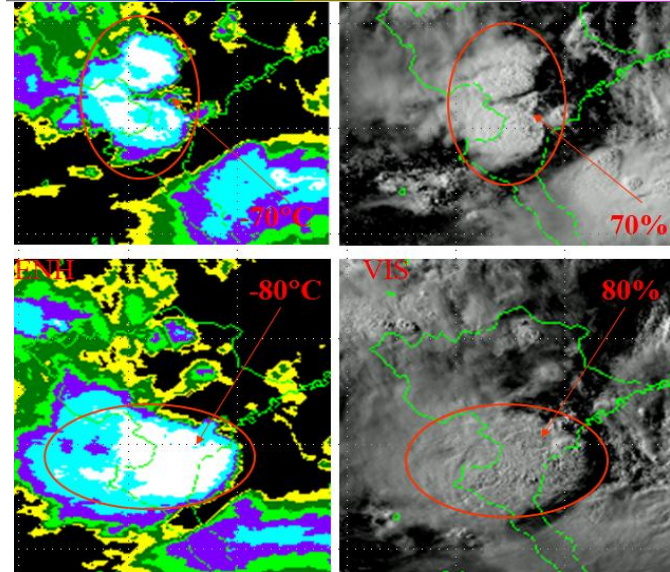
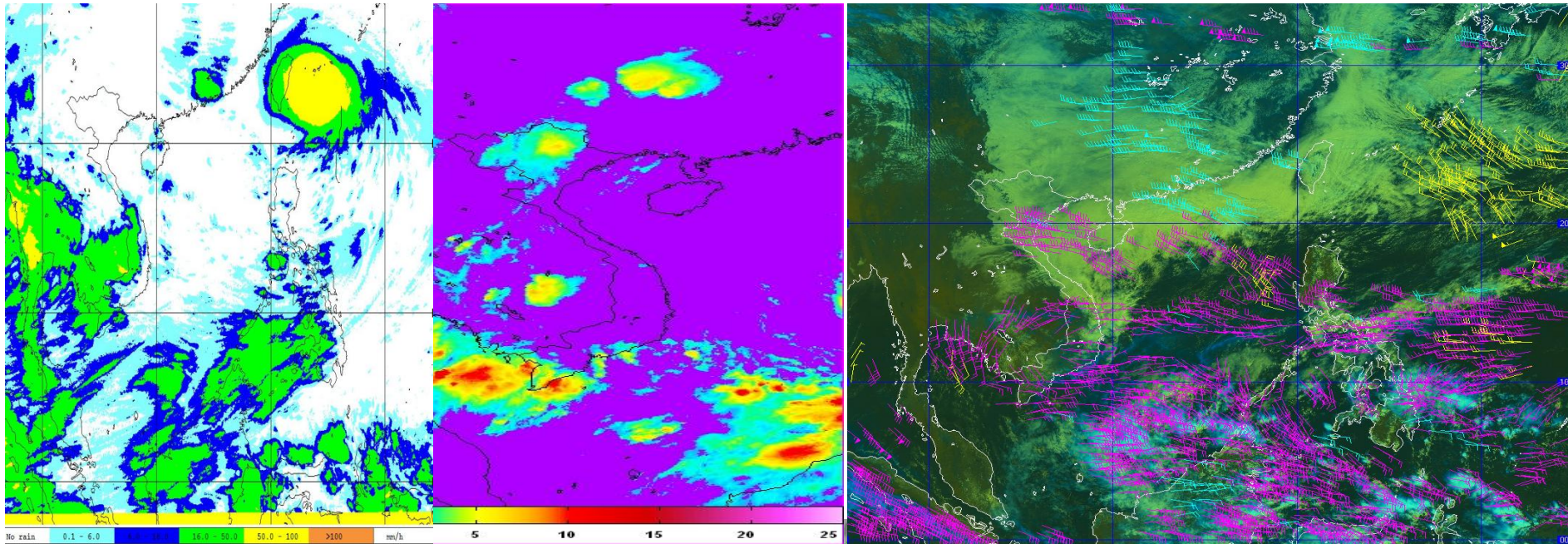
- Geostationary satellite: MTSAT, FY-2, Himawari;
- Polar Satellites: NOAA, METOP, FY-1, TRMM;
- Weather Radar, Microwave, NWP, radiosonde;

Forecasting models:

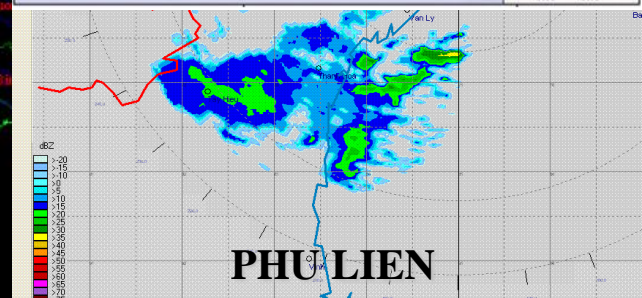
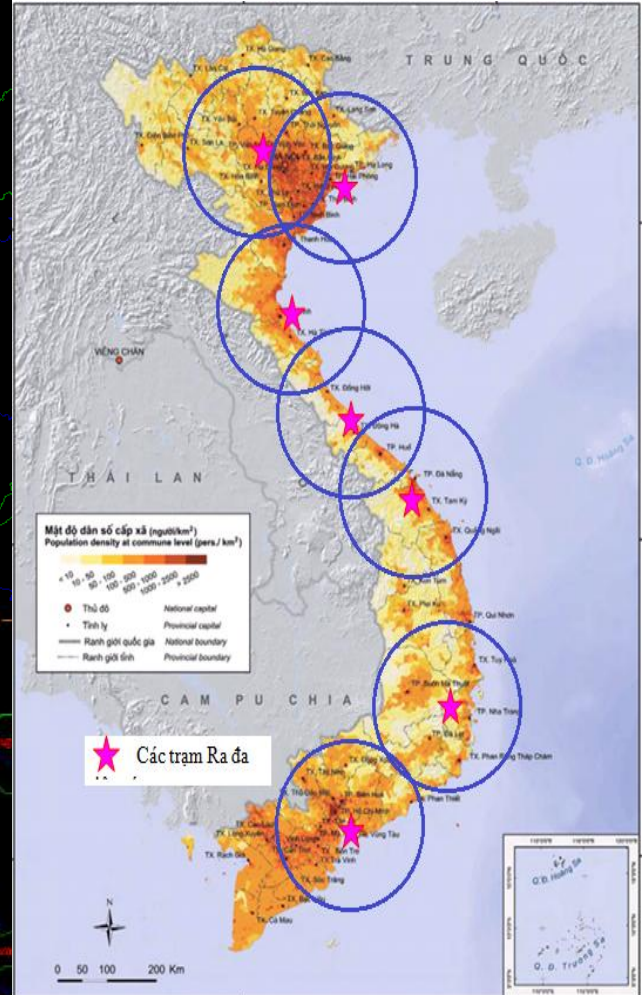
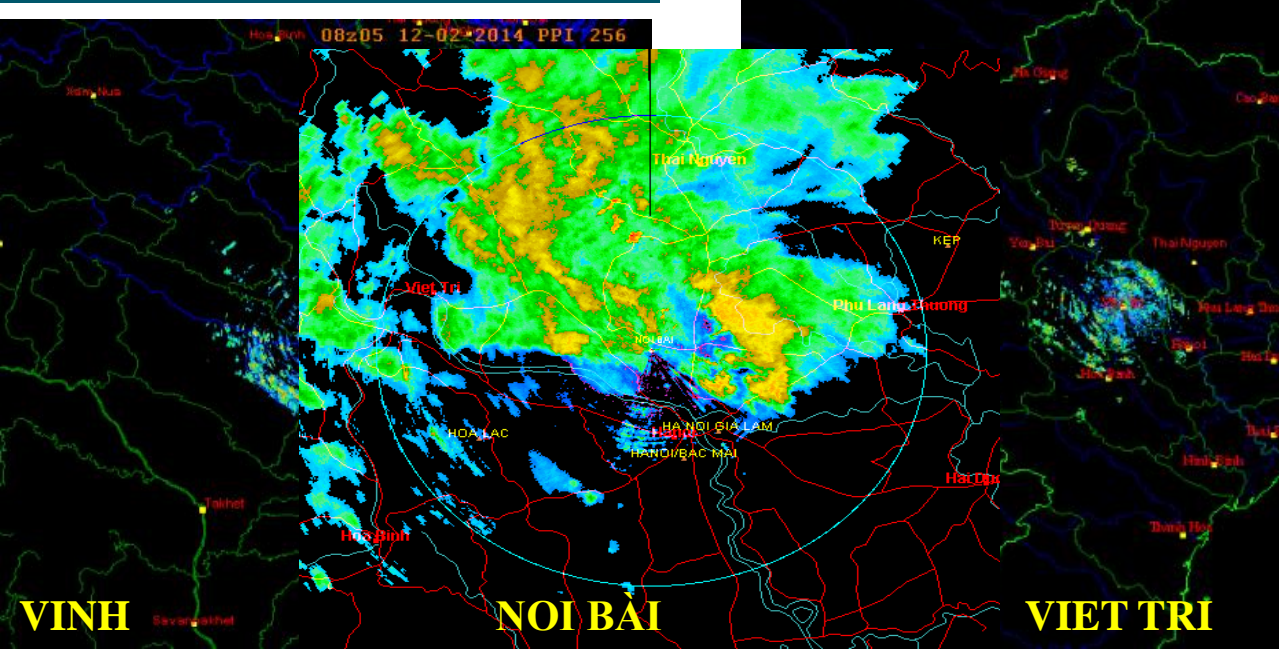
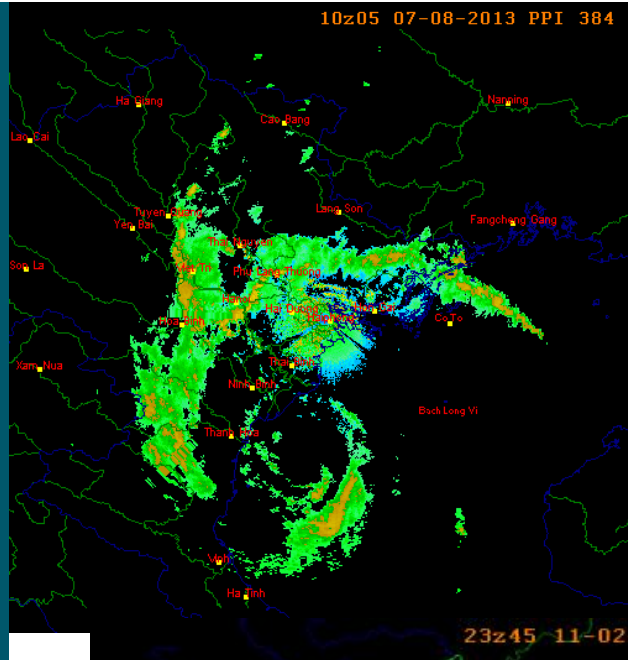
- Global models: GSM, GFS, IFS
- Regional models: HRM, WRF, COSMO, NHM



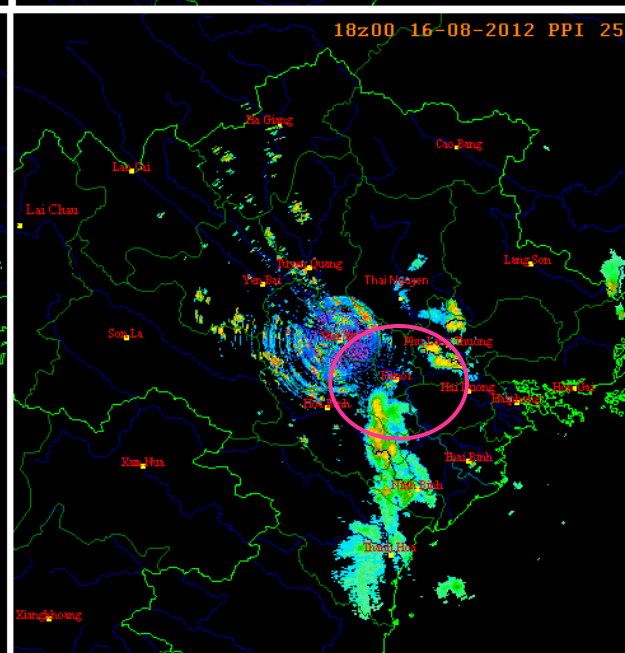
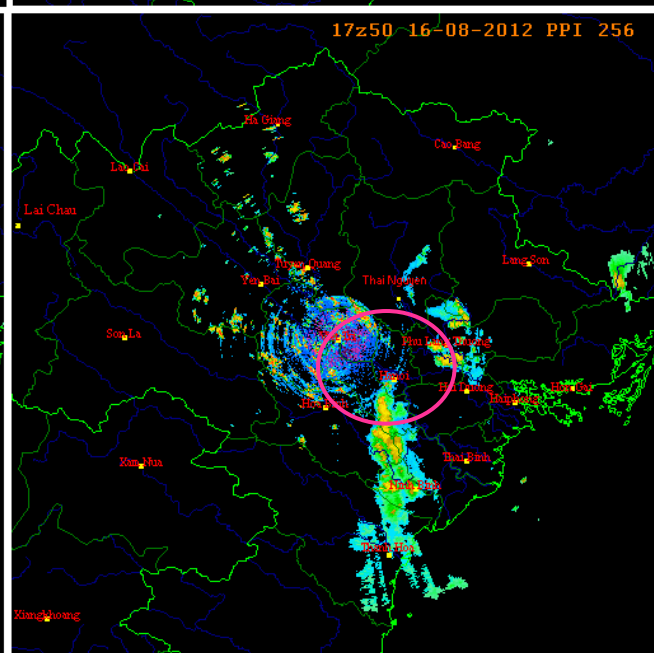
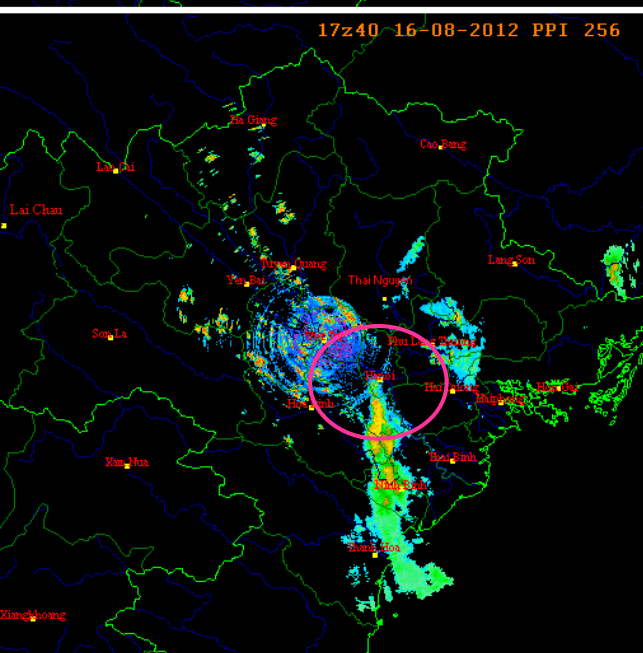
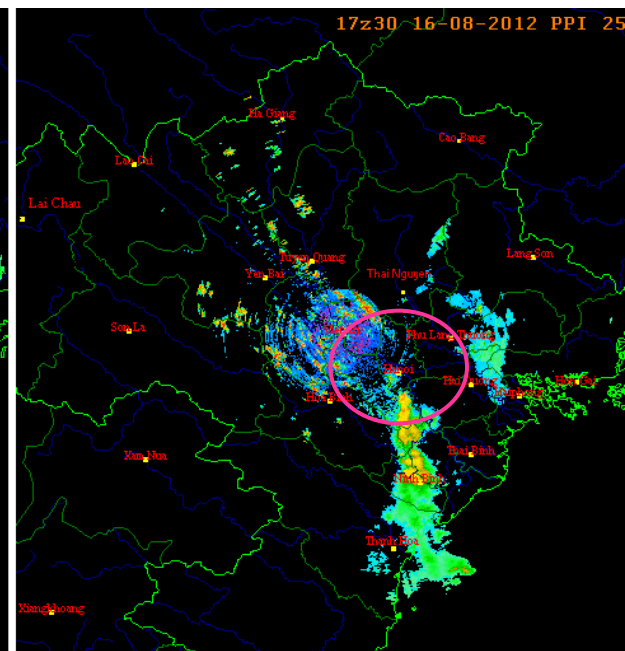
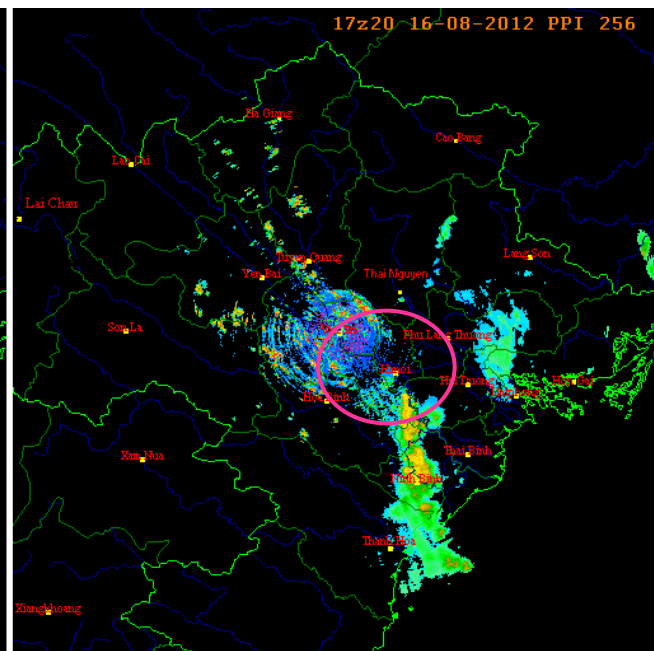
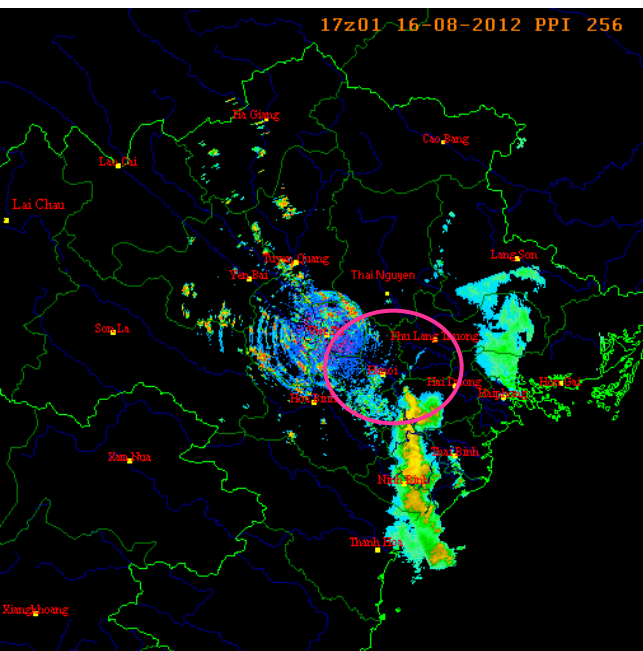
Satellite Data



Weather Rada Data



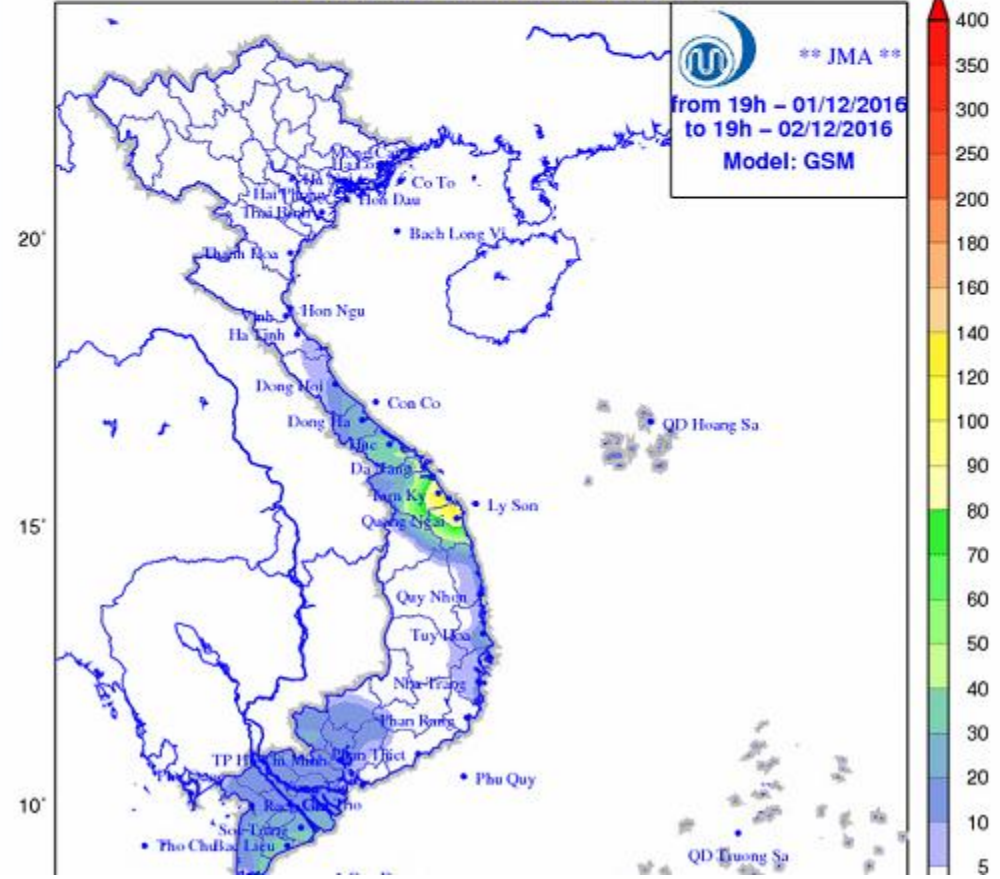
Analysis illustrates thunderstorms from radar



- ★ Mô hình GSM 0.25 x 0.25
- ★ Mô hình GSM 0.5 x 0.5
- ★ Mô hình GSM 1.25 x 1.25
- ★ Mô hình GFS 0.5 x 0.5
- ★ Mô hình GME 0.3 x 0.3
- ★ Mô hình GEM 0.6 x 0.6
- ★ Mô hình COSMO 7km
- ★ Hệ thống SREF 0.15 x 0.15
- ★ Hệ thống LEPS 0.2 x 0.2
- ★ Mô hình WRF 15km
- ★ Mô hình IFS 0.125 x 0.125
- ★ Mô hình WRF 5km
- ★ Sản phẩm SOM

Tạo chuyển động Tạo file ảnh động Xem toàn bộ trường 11/25/2016 12:00

24 hours Accumulated rainfall



Pointing forecast charts from the deterministic products

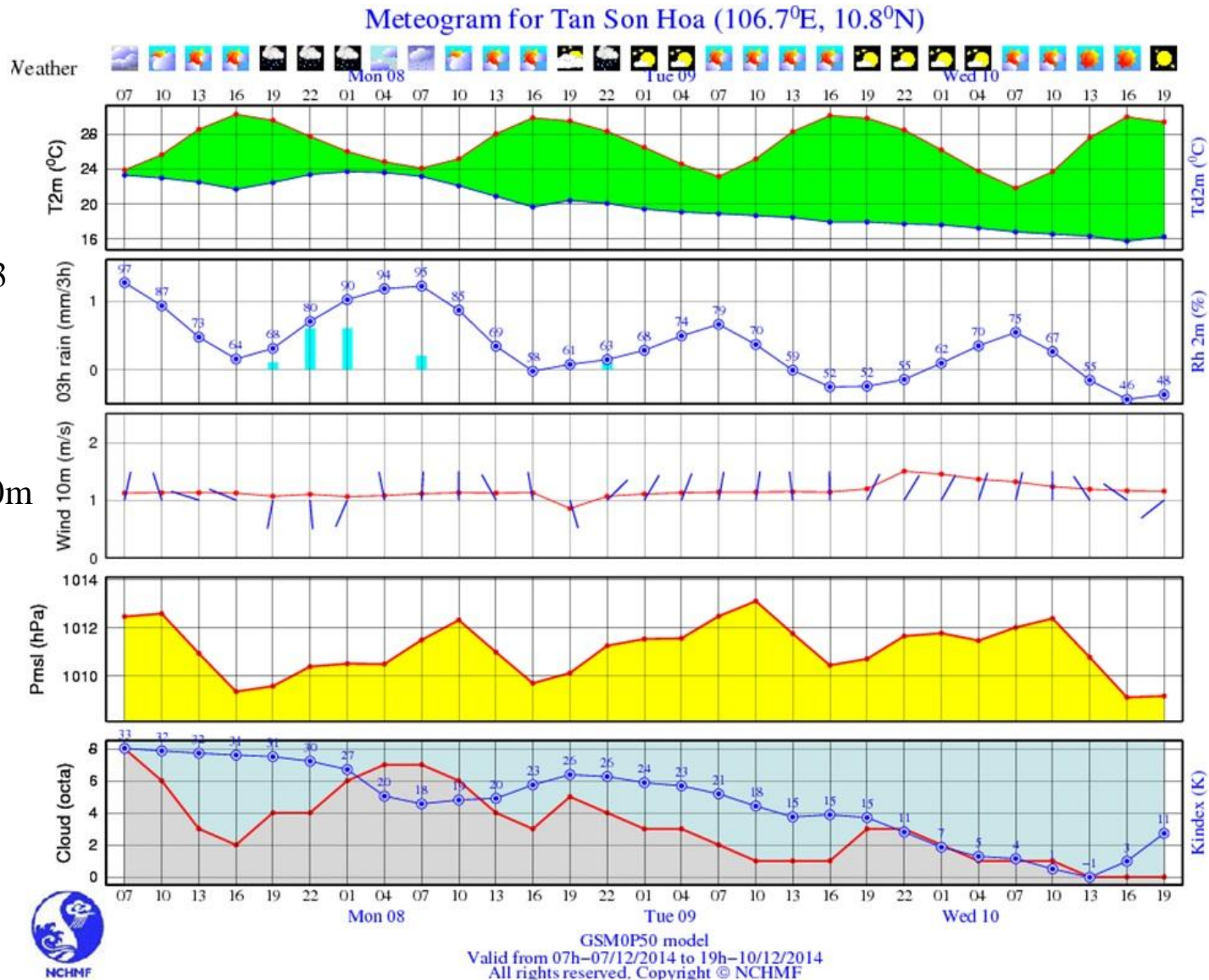
Temperature and dew point temperature

Accumulated rainfall in 3 hours and the relative humidity

Wind level at a value of 10m

Sea level pressure

Cloud cover and Kinder index



Pointing forecast charts from the combinatorial products

Kindex index relative thunderstorms forecast



Rainfall speed mm/3h



Temperature at the level 2m



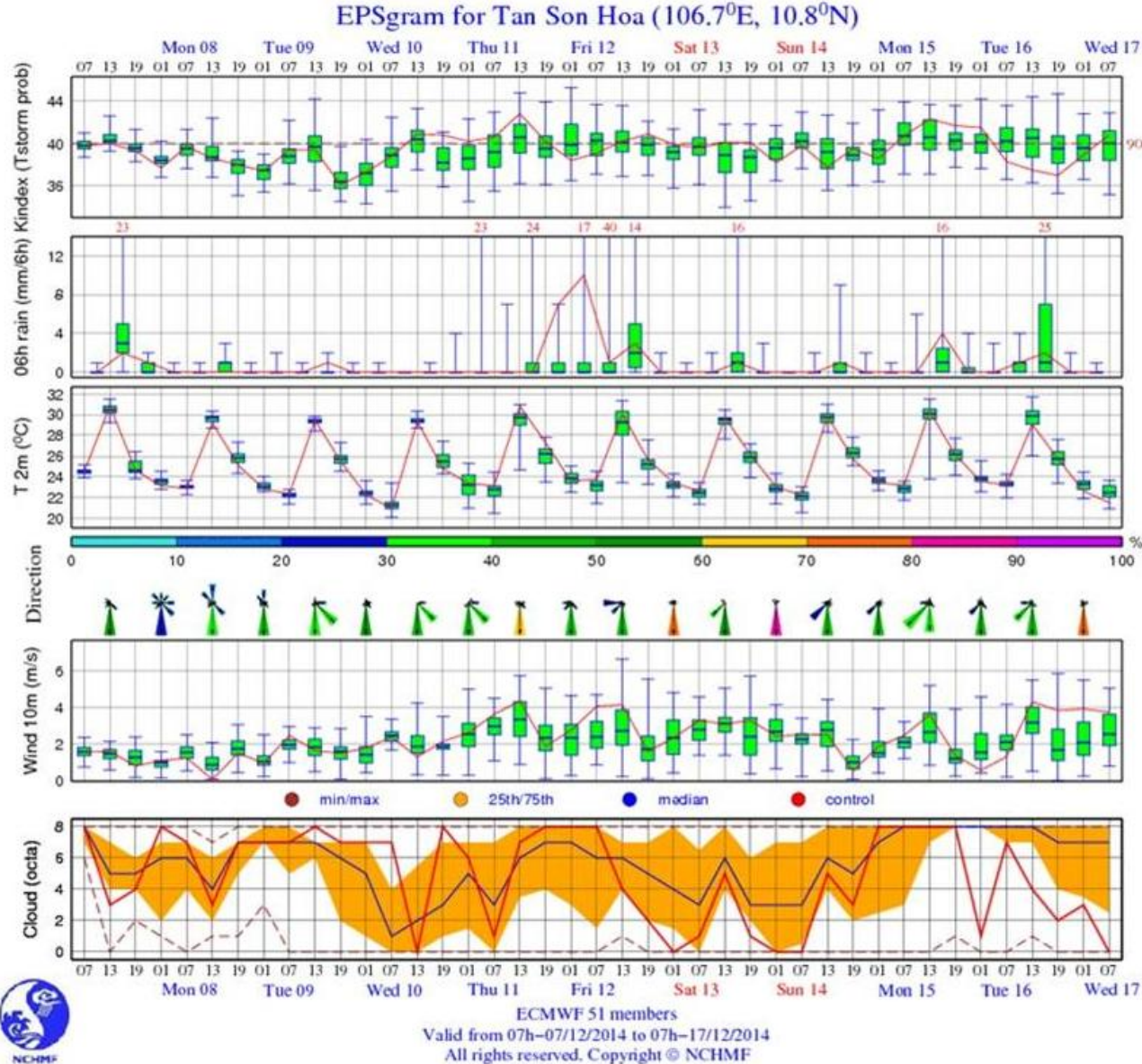
Wind direction at 10m



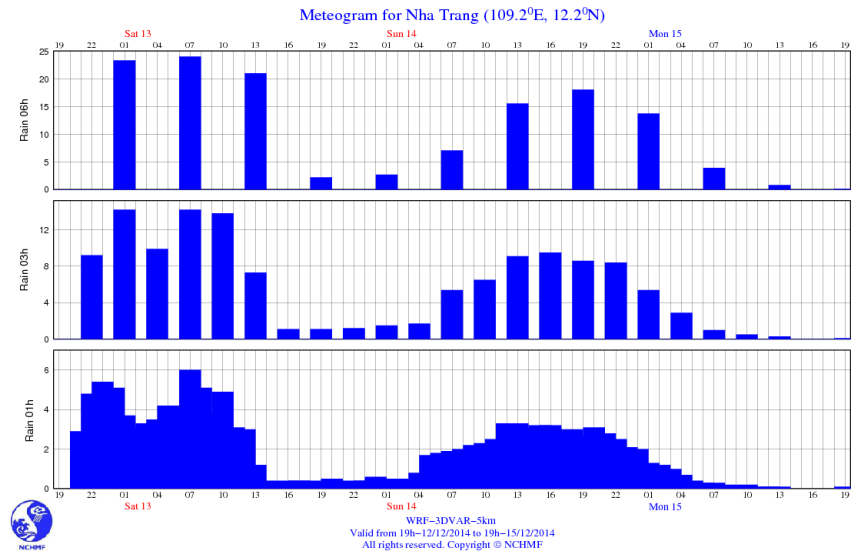
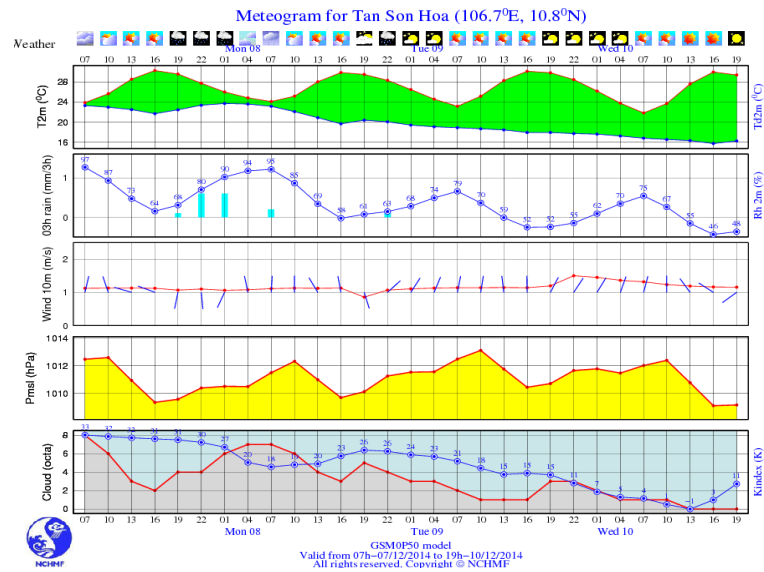
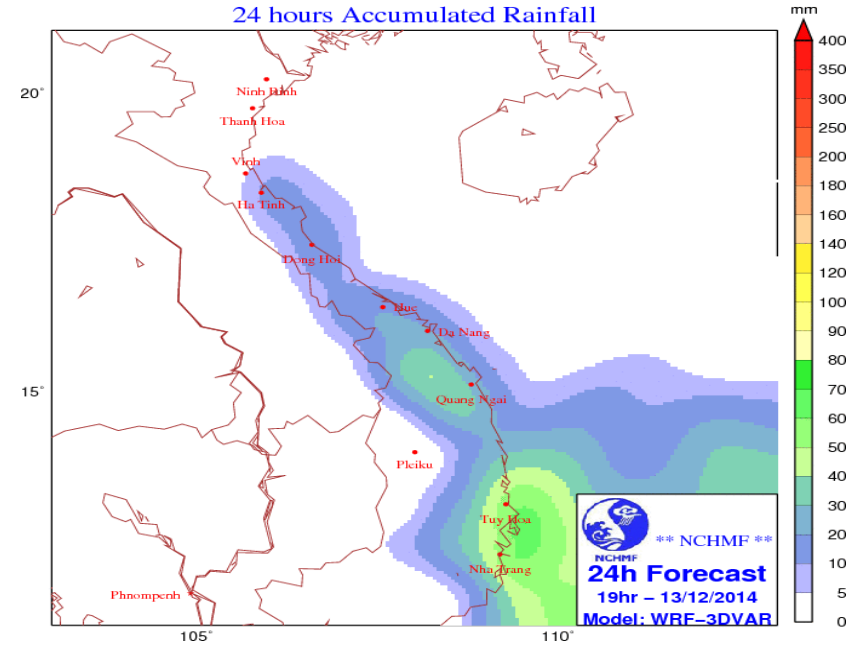
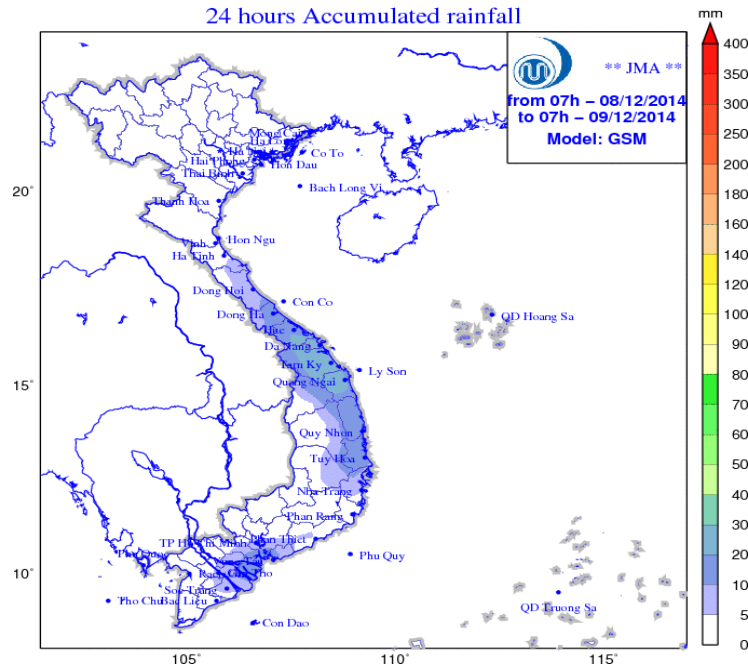
Wind speed at 10m



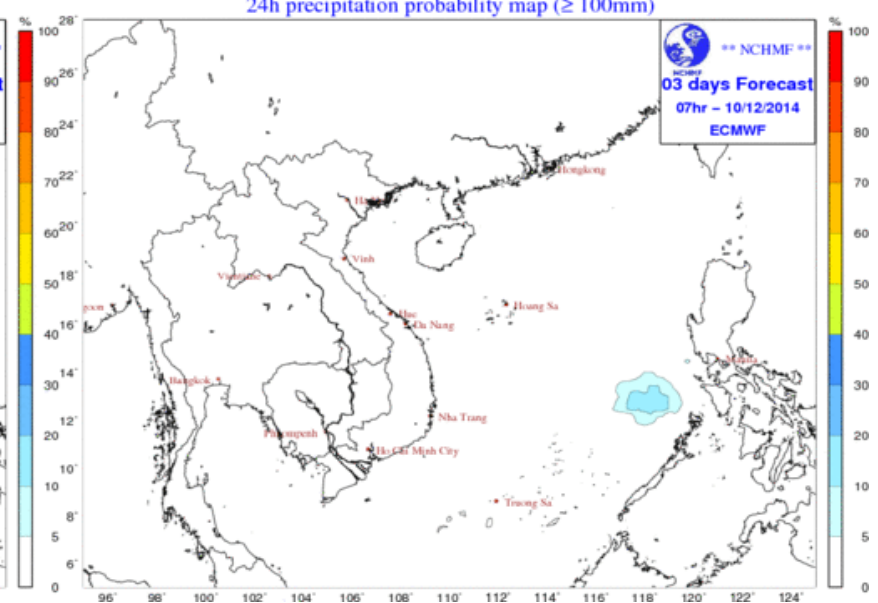
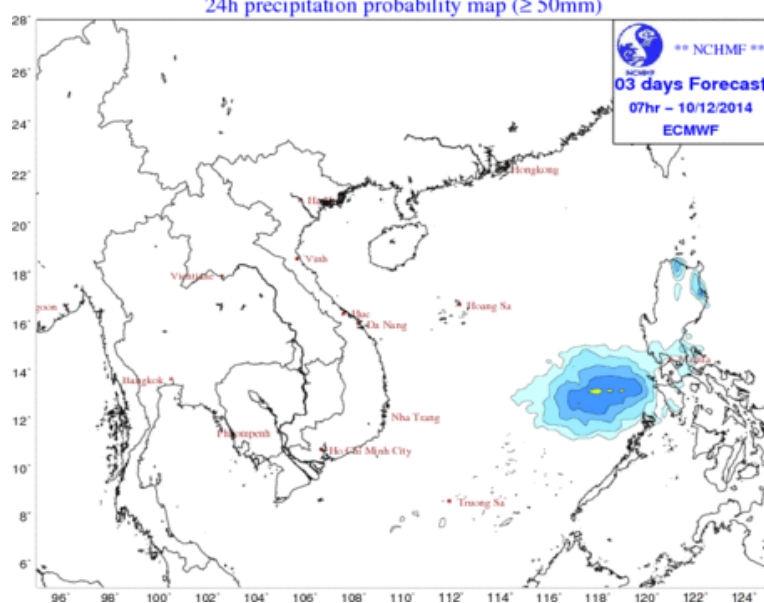
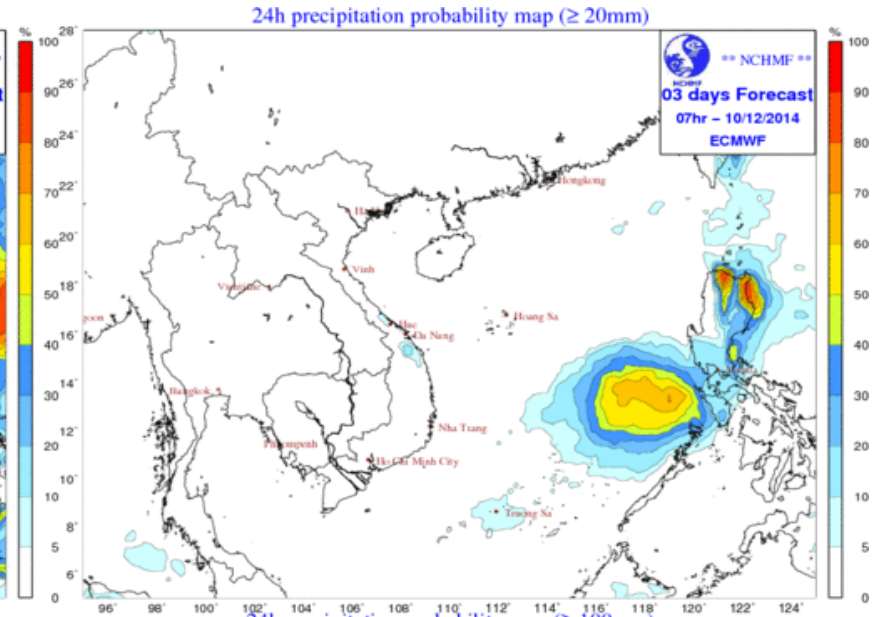
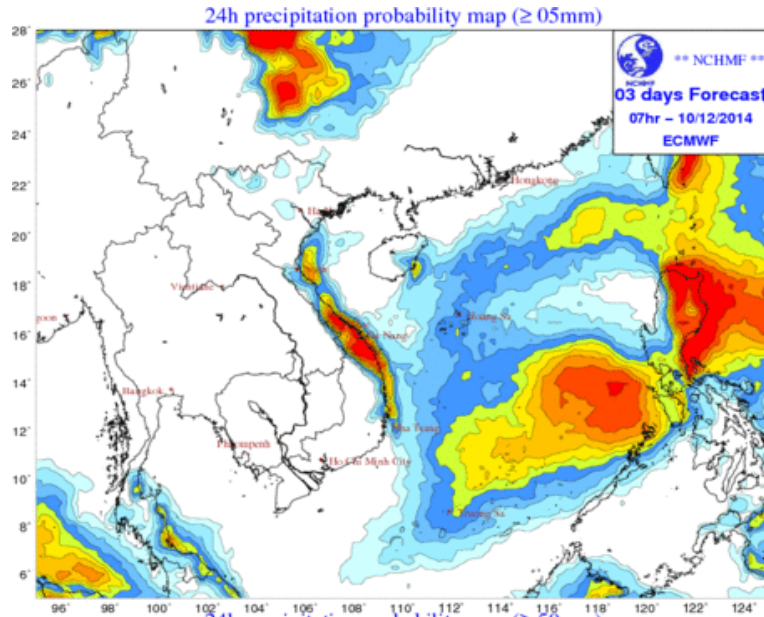
Cloud cover



The rainfall forecast regional, points (global and regional)

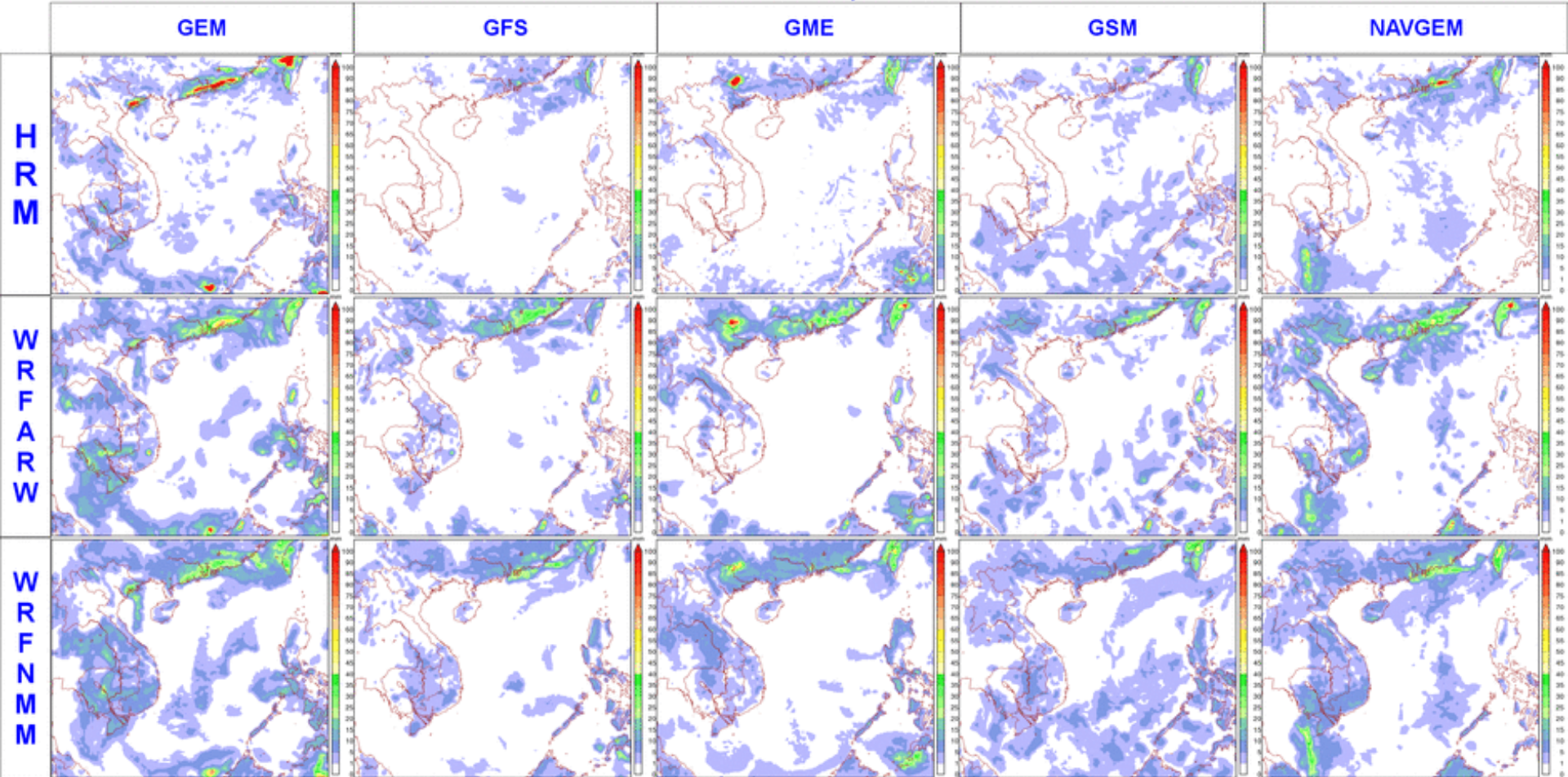


The probability of rainfall forecast from combining



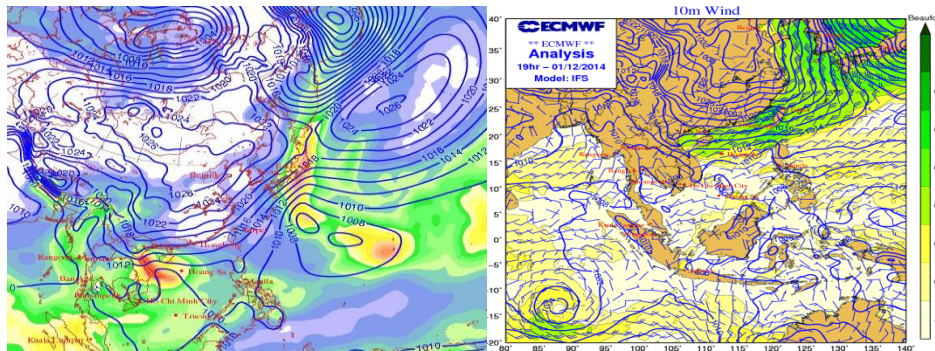
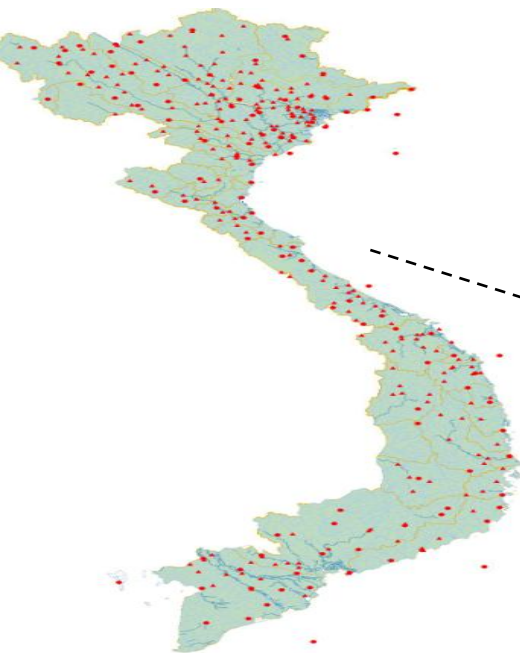
Short-term complex system SREPS

06hrain stamp map
006h Forecast, 06hr - 20/05/2014
SREPS: 15 members, NCHMF

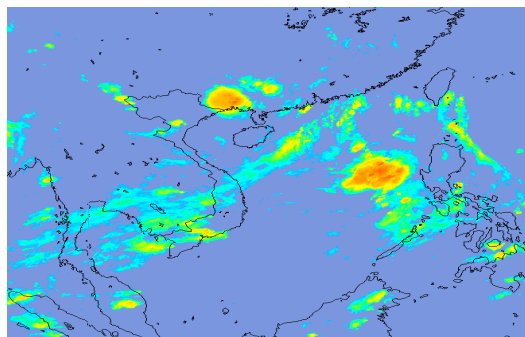
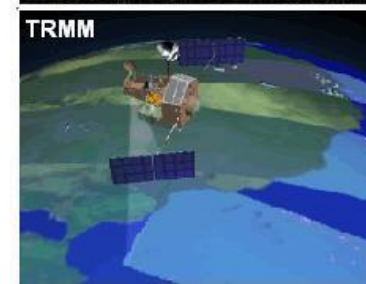


**3 regional models HRM, WRFARW và WRFNMM and
5 global models GEM, GFS, GME, GSM, NAVGEM**

The structure simulate warning and forecasting rainfall



Quantitative precipitation forecasting



4. Hydrometeorological networks

- International Station Network

- National Telegraphic Station Network consisting of:

+ 186 synoptic stations;

+ 1322 rain gauges, including 531 rain gauges in hydro-met. stations and 791 independent rain gauges;

+ 400 automatic rain gauges;

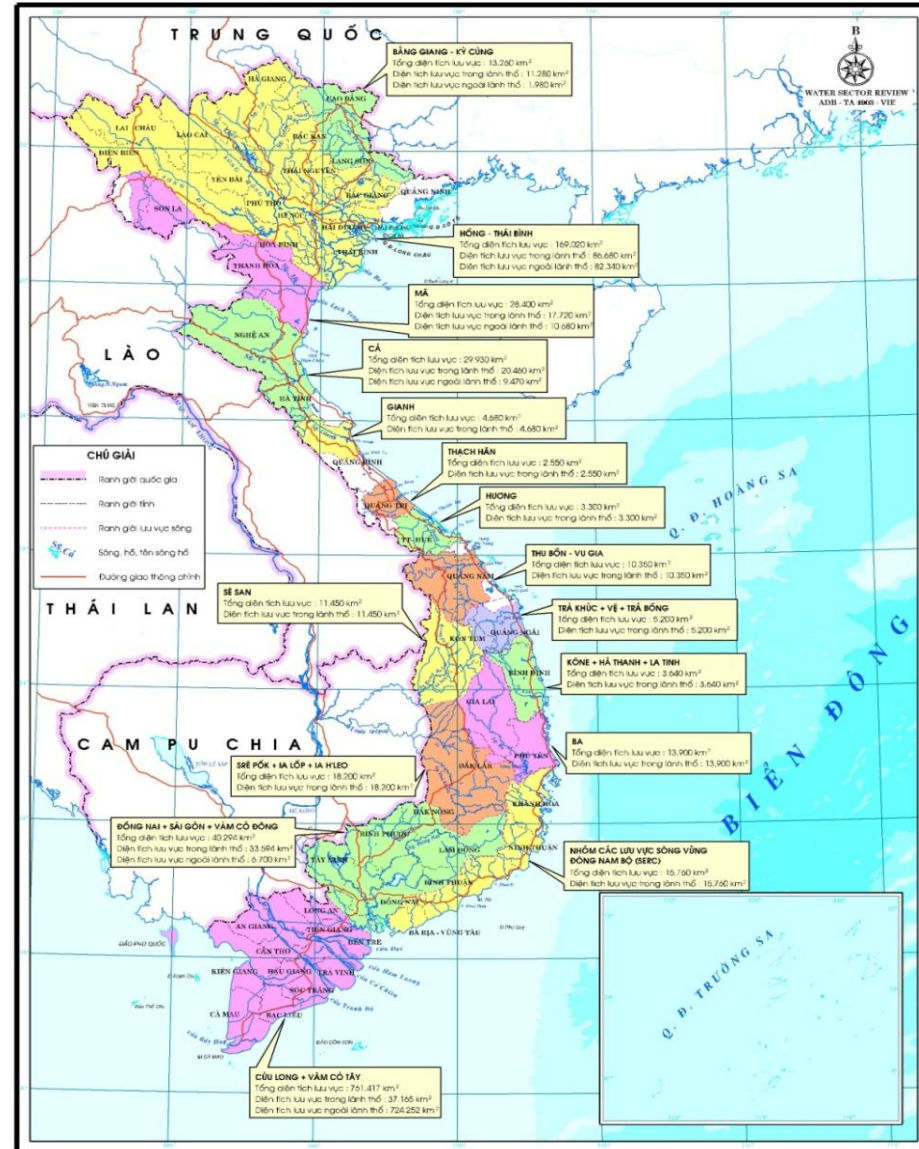
+ 257 hydrologic stations;

+ 8 Pilot stations;

+ 6 Radiozone stations;

+ 21 ocean-meteorological stations;

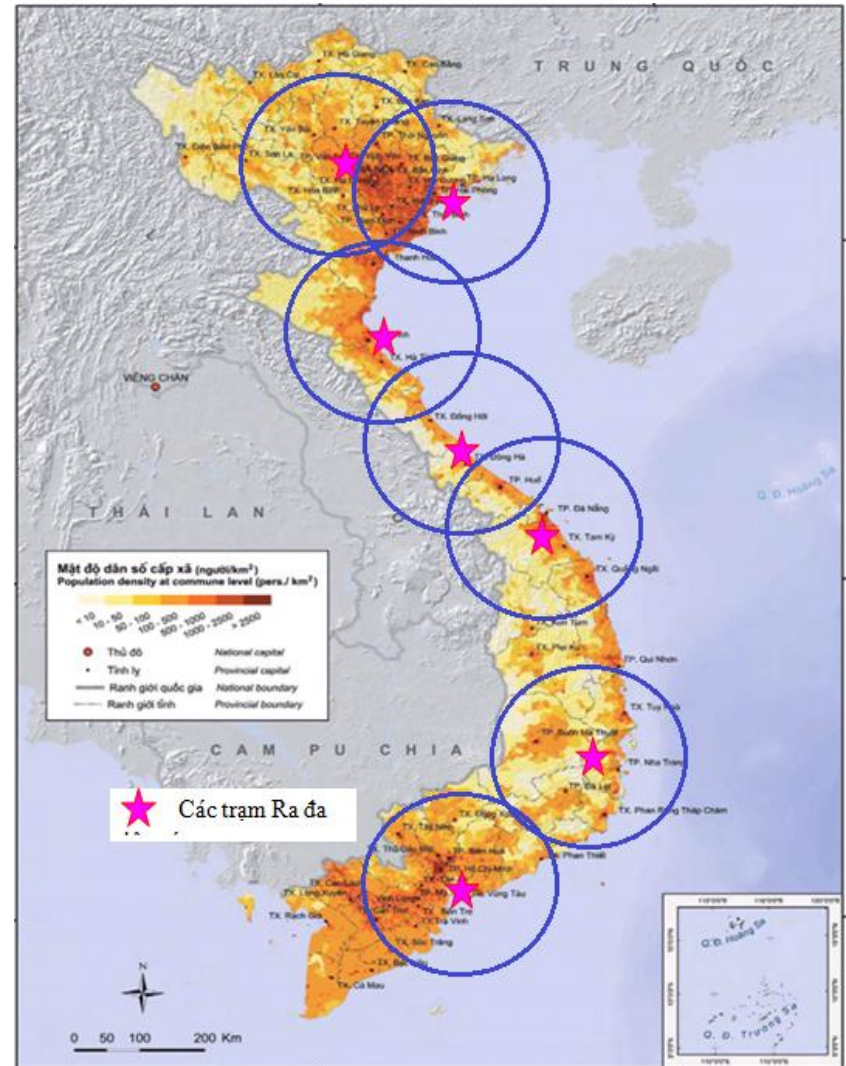
W1 - BẢN ĐỒ LƯU VỰC SÔNG



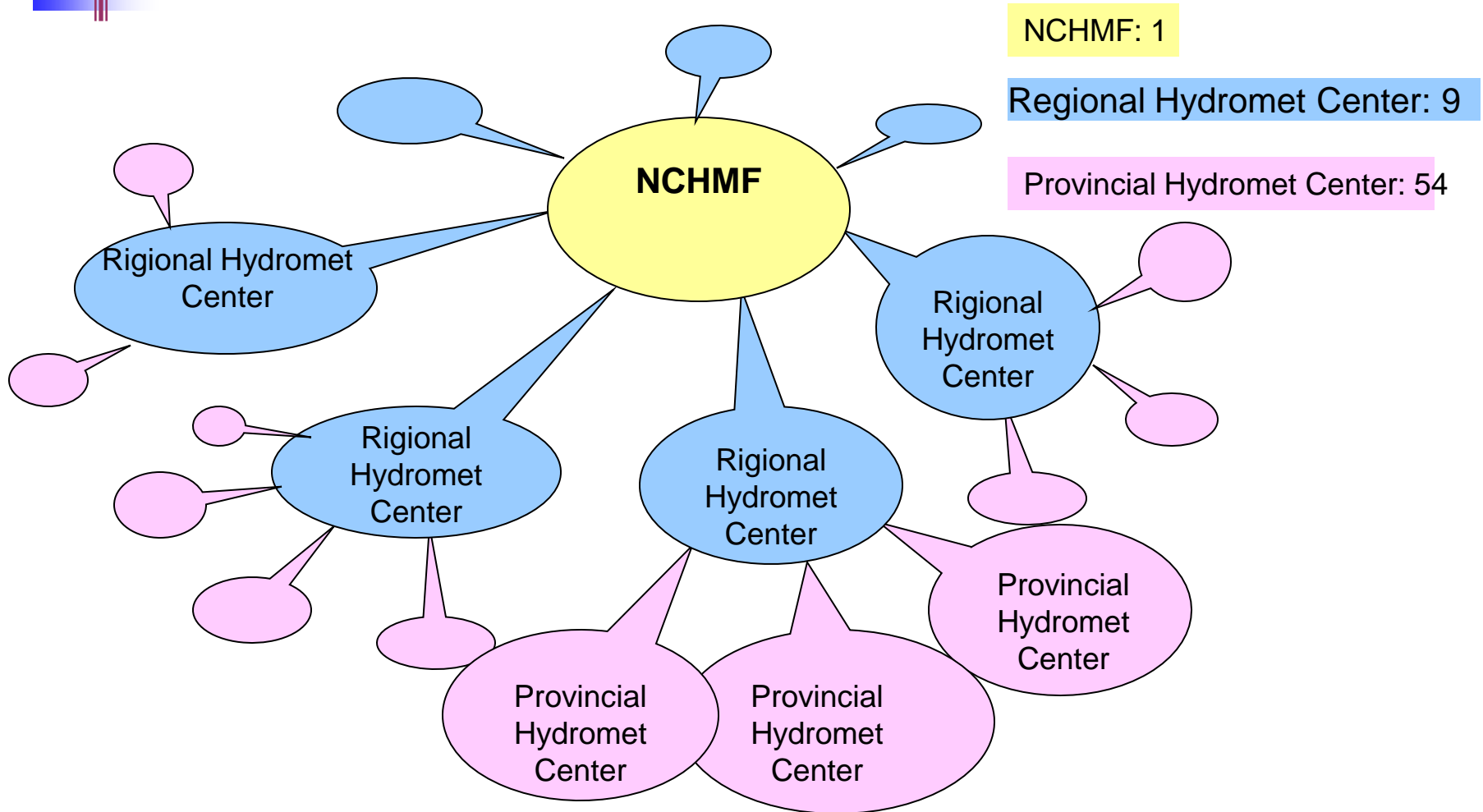
4. Hydrometeorological networks

Weather radar network:

- 7 stations including:
Viet Tri, Phu Lien, Vinh, Dong Ha, Tam Ky, Nha Trang and Nha Be.
- 5 radar types:
MRL-5 (Russia); TRS 2730 (France); DWSR-93C, DWSR-2500C, DWSR-2501C (USA)



5. Organizational structure hydro-meteorological forecasting in viet nam



Human resources

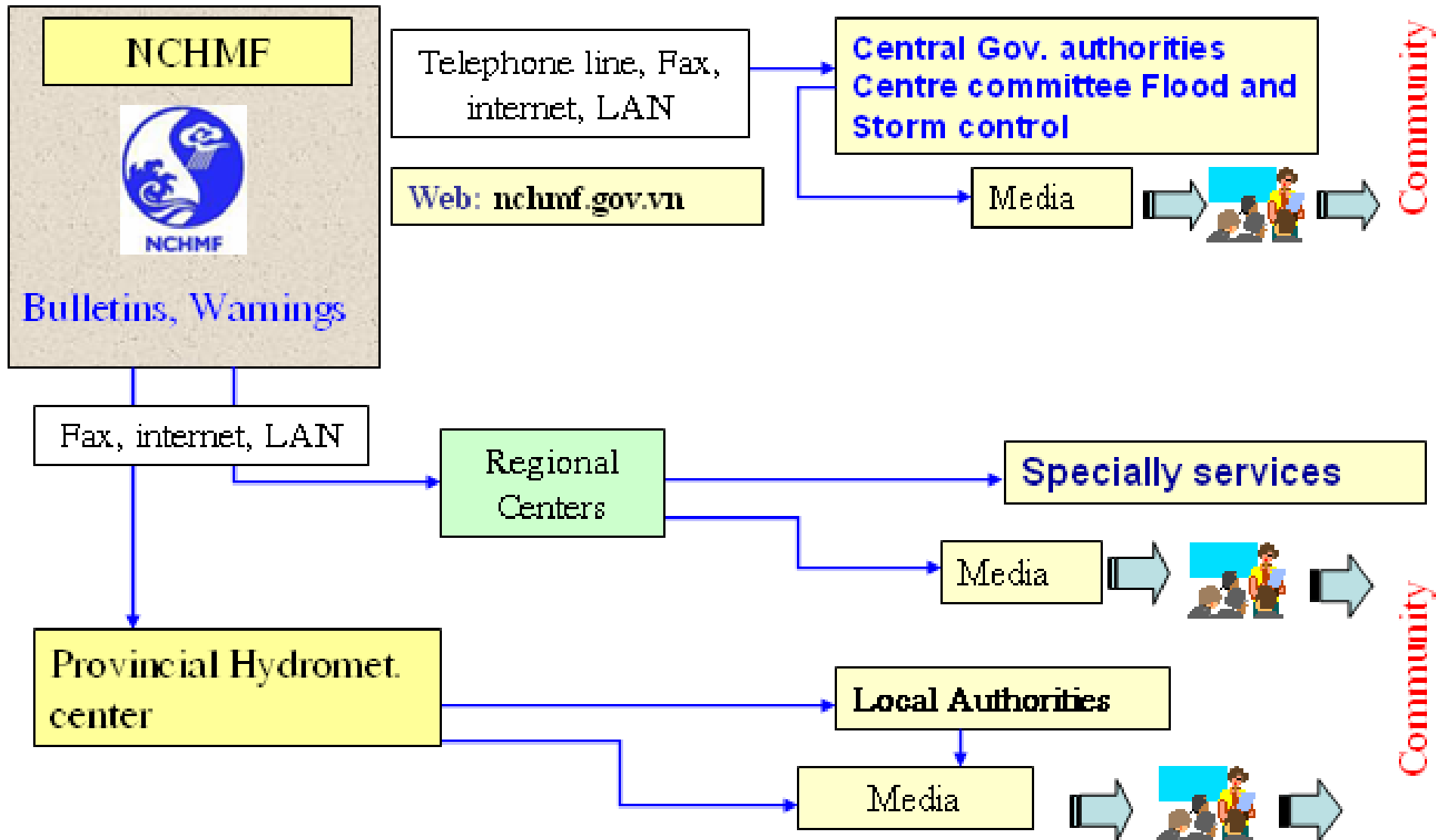
Doctor has 20 people, accounting about 0.64% rate on the total number of employees, including: Specialized meteorological has 08 people (0.25% percent); Specialized hydrological has 03 people (0.1% percent); Specialized oceanography has 03 people (0.032% percent); Specialized environmental has 2 people (0.064% percent); Other specialized 06 people (0.19% percent).

Master has 151 people, accounting about 4.81% rate on the total number of employees, including: Specialized meteorological has 41 people (1.31% percent); Specialized hydrological has 34 people (1.08% percent); Specialized oceanography has 05 people (0.16% percent); Specialized environmental has 20 people (0.637% percent); Specialized climate change has 03 people (0.1% percent); Specialized information technology has 03 people (0.1%); Specialized electronics and telecommunications have 04 people (0.13% percent); Specialized economics, accountants have 11 people (0.35% percent); Other specialized 30 people (0.955% percent).


Human resources

Bachelor has 1,233 people, accounting about 39.3% on the total number of employees, including: Specialized meteorological has 453 people (14.4% percent); Specialized hydrological has 391 people (12.4% percent); Specialized oceanography has 10 people (0.318% percent); Specialized environmental has 37 people (1.178% percent); Specialized information technology has 55 people (1.75%); Specialized electronics and telecommunications have 33 people (1.05% percent); Specialized economics, accountants have 127 people (4.04% percent); Other specialized 127 people (4.04% percent).

INFORMATION COMMUNICATION SYSTEM



The products and provided services



NATIONAL HYDRO - METEOROLOGICAL SERVICE
NATIONAL CENTRE FOR HYDRO - METEOROLOGICAL FORECASTING

Sunday, November 27, 2016
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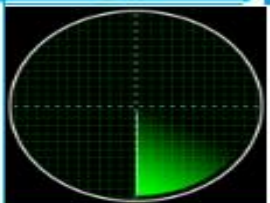
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Radar Imagery



+Tropical cyclone

TROPICAL STORM WARNING

TC TRACKS



● Vùng có thể có gió mạnh bão cấp 6
● Vùng có thể có gió mạnh bão cấp 10
● Vùng có bão áp thấp nhiệt đới có khả năng đi qua
● Vùng bão bão áp thấp nhiệt đới đi qua
● Vùng bão bão áp thấp nhiệt đới đi qua

INFO NO 9 - BÃO TROPICALE
 To phát: 23.08 - 20/11/2016
 Ngày phát dự: **Thứ Bảy Cấp bão: STS** **Phạm vi:**
 17.13 - 23.08 - 14.48 - 117.20 - 14.00 - 14.00 - 14.00 - 14.00
 17.13 - 23.08 - 14.48 - 117.20 - 14.00 - 14.00 - 14.00 - 14.00
 17.13 - 23.08 - 14.48 - 117.20 - 14.00 - 14.00 - 14.00 - 14.00

<< PREVIOUS STOP NEXT >>

TROPICAL STORM WARNING

Analysis positions and Intensities					
Local time (GMT+7)	Date	Position		Classification	Maximum sustained wind
22h	Saturday, November 26, 2016	14.8	117.2	STS	91 km/hour

THANK YOU FOR ATTENTION

