



NATIONAL HYDRO-MET SERVICES (NHMS) OF VIET NAM

**THE RECENT PROGRESSES IN
TROPICAL CYCLONE FORECASTING
ACTIVITIES AT **NHMS** OF VIET NAM**

21 - 24 Feb 2017, Yokohama, Japan



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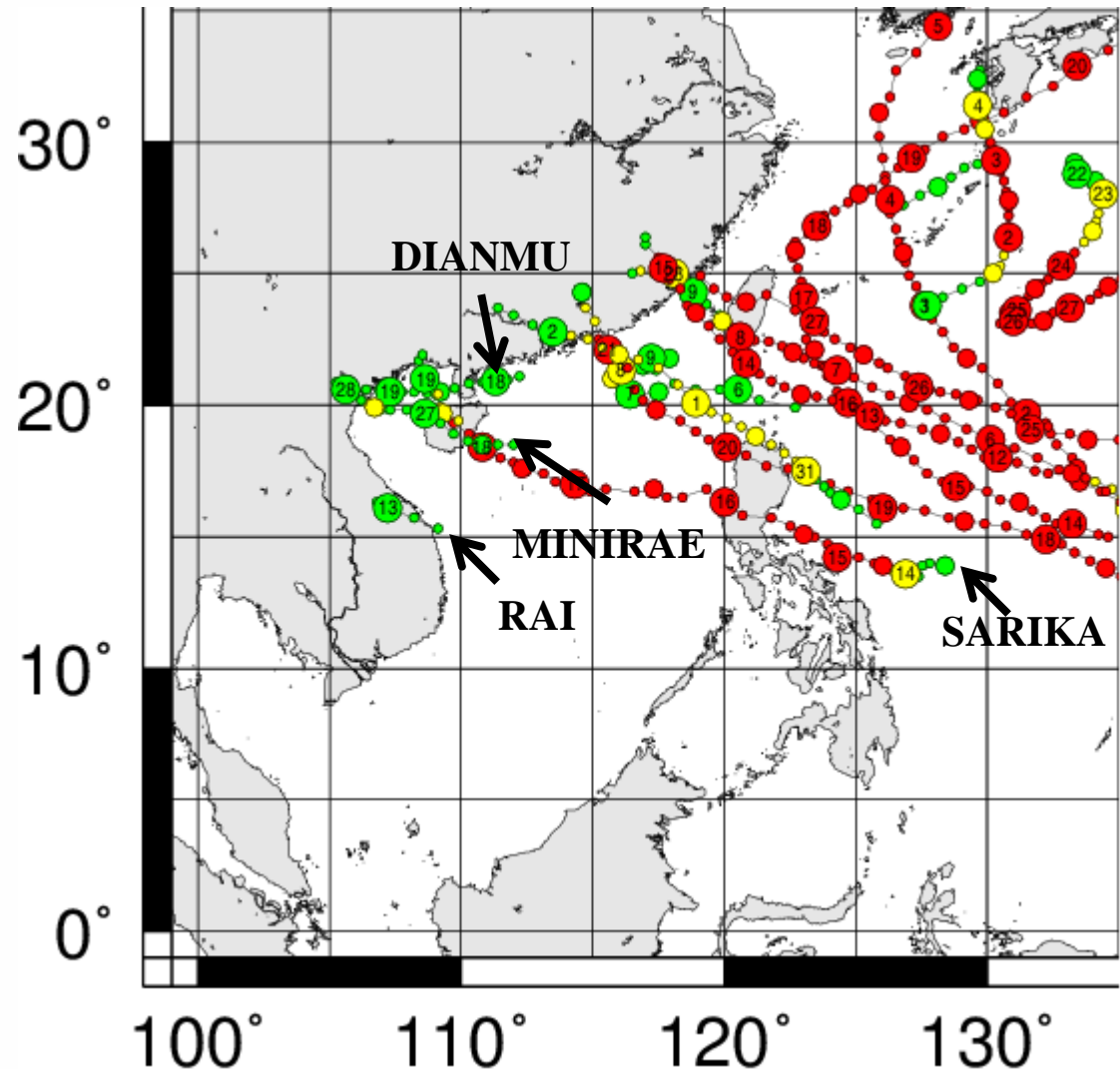
- 1. The difficulties and challenges in operational TC forecasting**
- 2. The recent progresses in TC forecasting**
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1. The difficulties and challenges in operational TC forecasting

❖ In 2016, number of TS and TD are active in East Sea is the same as 2015, and lower than normal

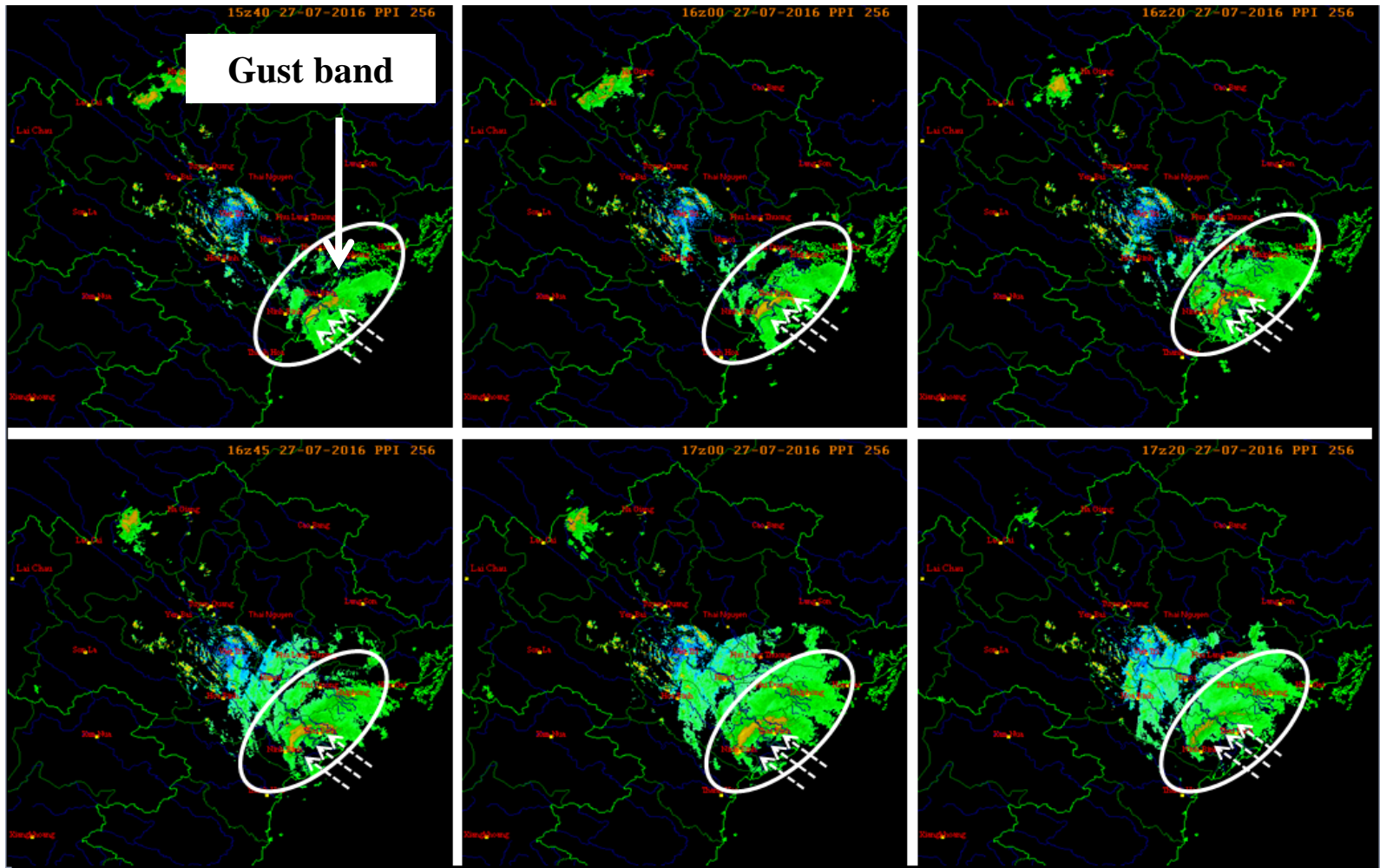
❖ There were 4 TCs made landfall into Viet Nam:

1. Mirinae (1603)
2. Dianmu (1608)
3. Rai (1615)
4. Sarika (1621)



1. The difficulties and challenges in operational TC forecasting

The TS Mirinae (1503) caused a lot of damages in properties (because it intensified prior to making landfall)



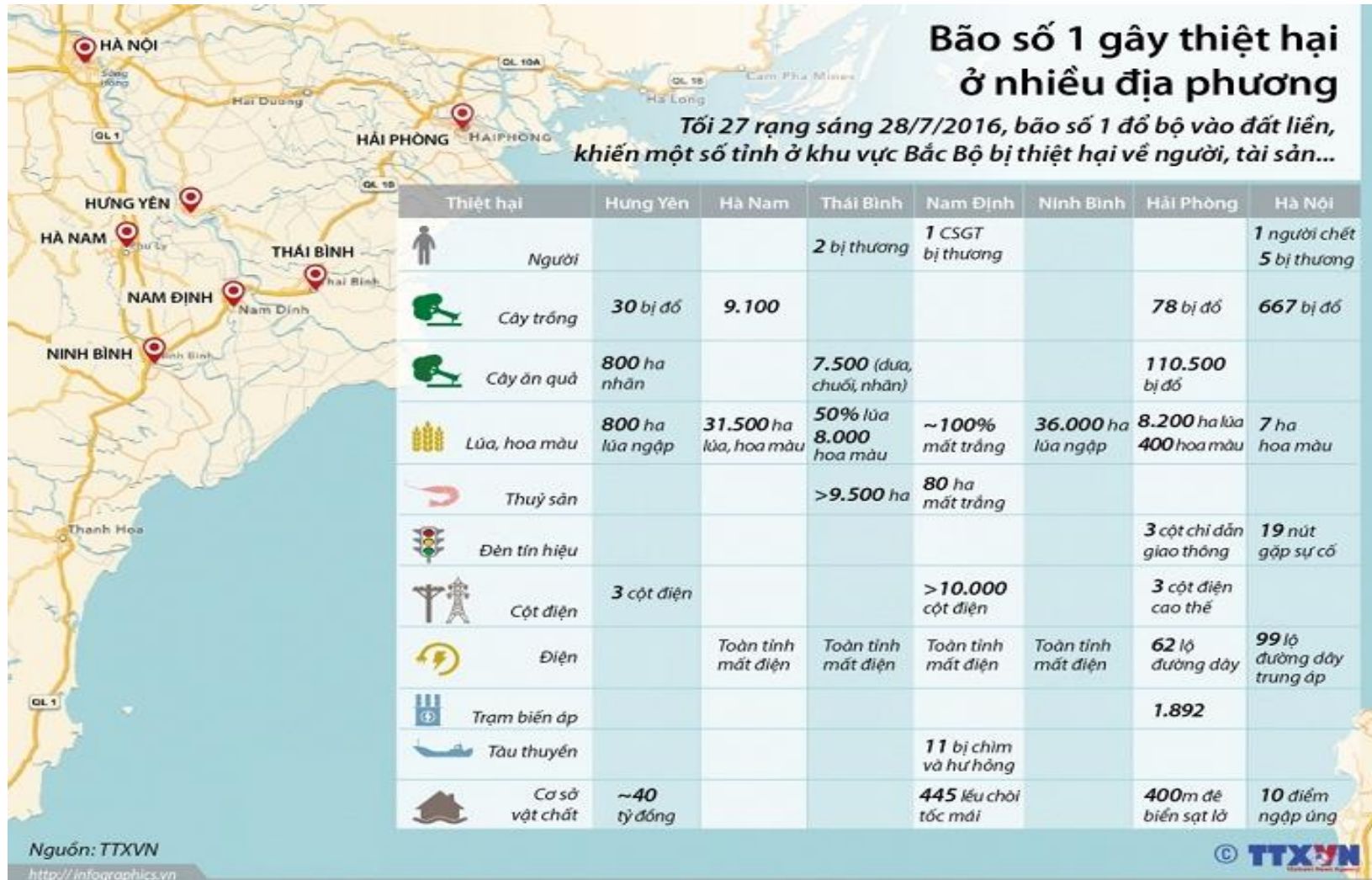


1. The difficulties and challenges in operational TC forecasting



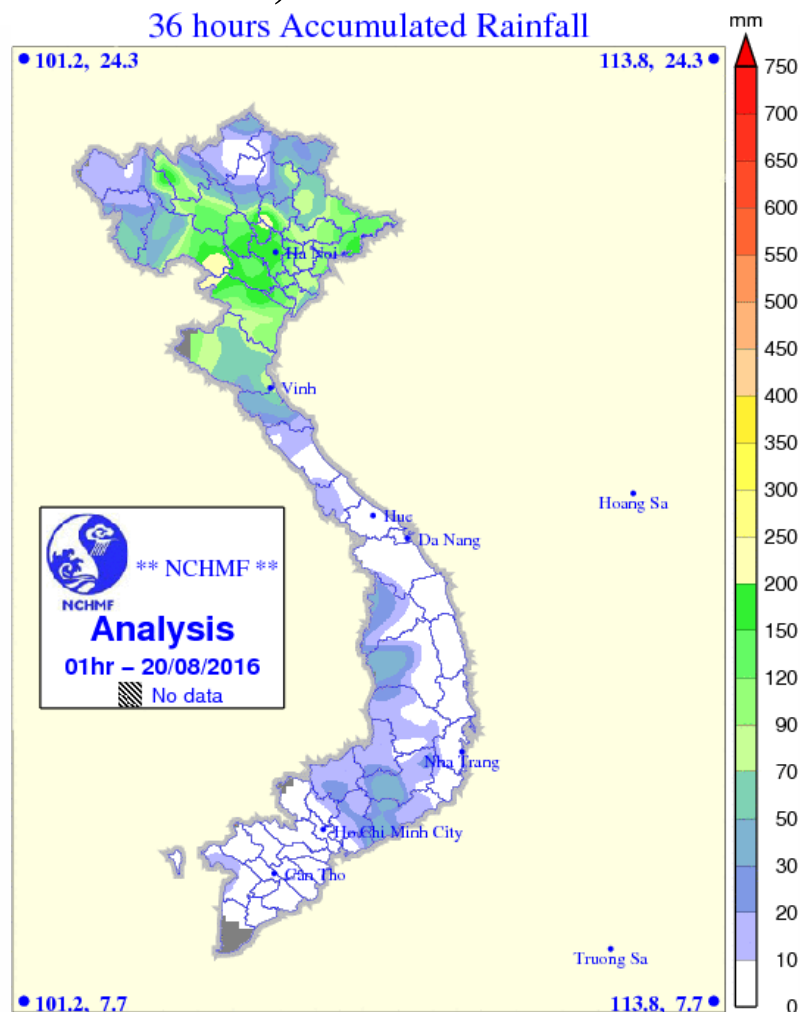
1. The difficulties and challenges in operational TC forecasting

Statistics of damages due to Mirinae (**mainly caused by wind gust**)



1. Overview of TC which have affected Viet Nam area in 2016

Statistics of damages due to Dianmu (mainly caused by heavy rain landslide and flash flood)





1. The difficulties and challenges in operational TC forecasting

The key difficulties and challenges has to face:

- ❖ The TC activities in East Sea is significantly changed in comparison with climatology under climate change.
- ❖ Number of very strong and unusual TC (track and intensity) is recently increased
- ❖ Lack of observation in East Sea area & coastal areas.
- ❖ The surface observation network is mainly manual.
- ❖ Forecasting technology and supporting tools is still obsolete, specially at regional and provincial levels.
- ❖ Lack of senior forecaster in TC forecast
- ❖ TC warning does not meet the need of the public
- ❖ etc



2. The recent progresses in TC forecast

To fill the gaps in TC forecast at NHMS of Viet Nam, recent activities have been being done as following:

- 1. NWP system: very high-resolution regional model and TC track grand ensemble**
- 2. Satellite product: switch to use Himawari-8 products**
- 3. Implementing Law of Hydrology and Meteorology & Law of Natural Disaster Preparedness and Response**
- 4. Usually discuss with CMA's forecaster via telephone when TC move to northern part of Viet Nam (discussing, information sharing, etc)**
- 5. The new severe weather warning bulletin disseminating system based on Cloud computing technology**

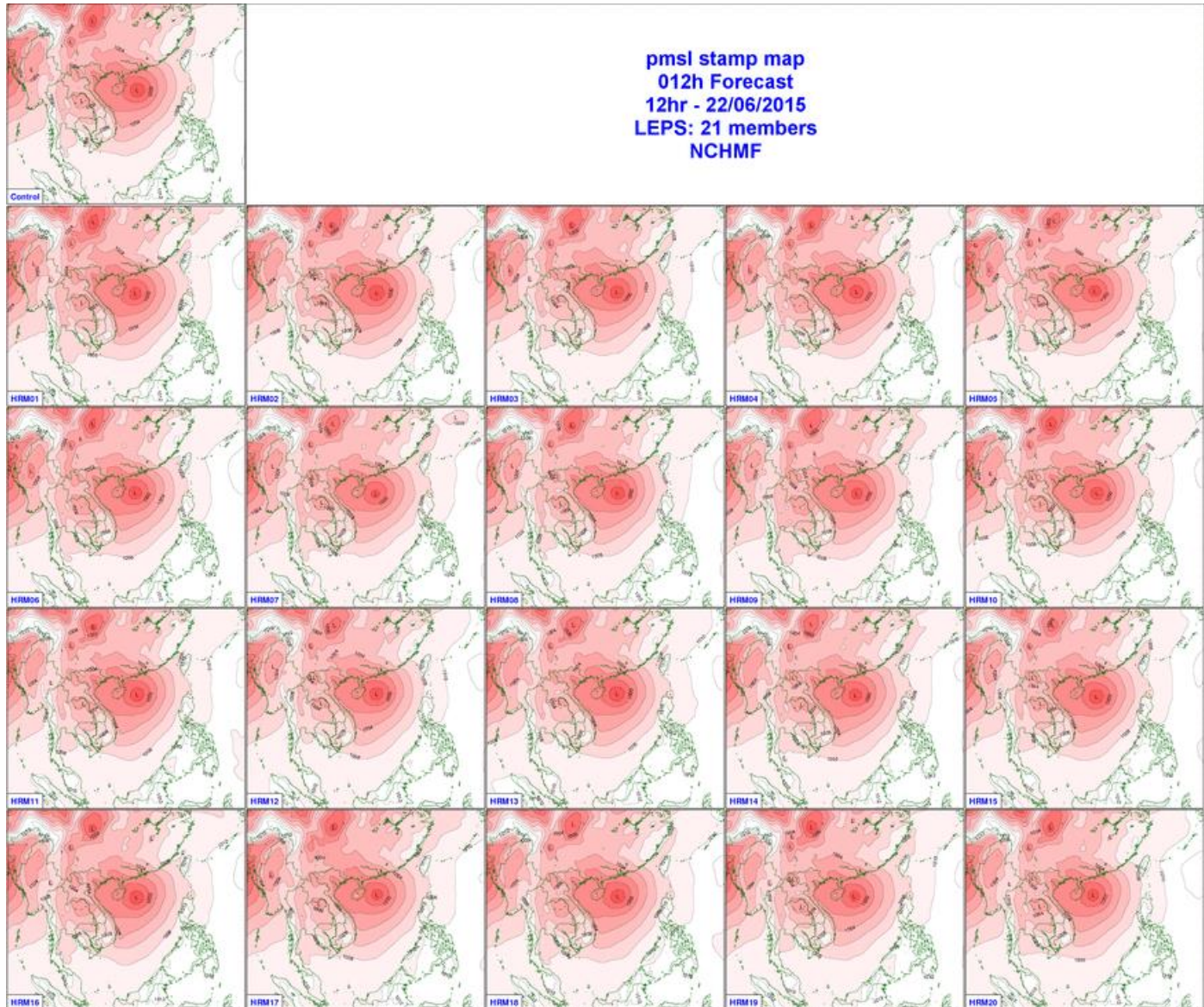


2. The recent progresses in TC forecast

1. NWP system:

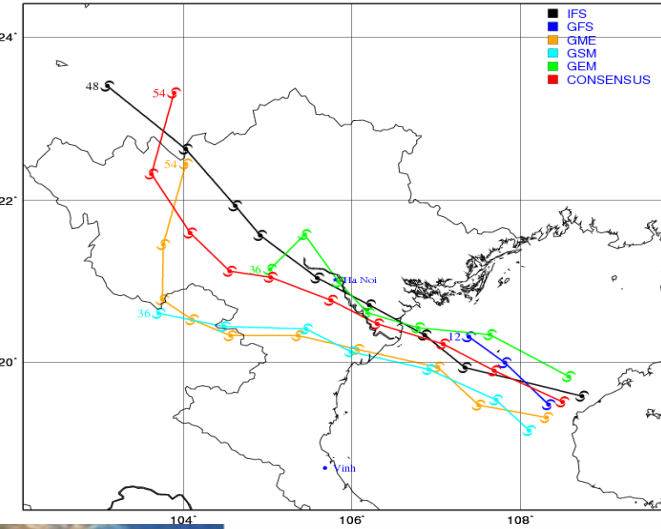
- **Global data & product:**
 - ✓ **ICON (replace for GME): 0.125 deg**
 - ✓ **IFS of ECMWF: 0.125 deg**
- **High-resolution regional modeling:**
 - ✓ **COSMO with 7km (IC & BC from ICON system, one time/day at 12UTC) + DA: nudging method**
 - ✓ **WRF with 5km (IC & BC from WRF 15km (IC & BC, 4 times/day) + DA: 3DVAR scheme**
- **TC ensemble prediction: provide TC ensemble forecasting products based on available global NWP products, global EPS products, operational regional EPS and high-resolution regional models (WRF, COSMO)**

2. The recent progresses in TC forecast

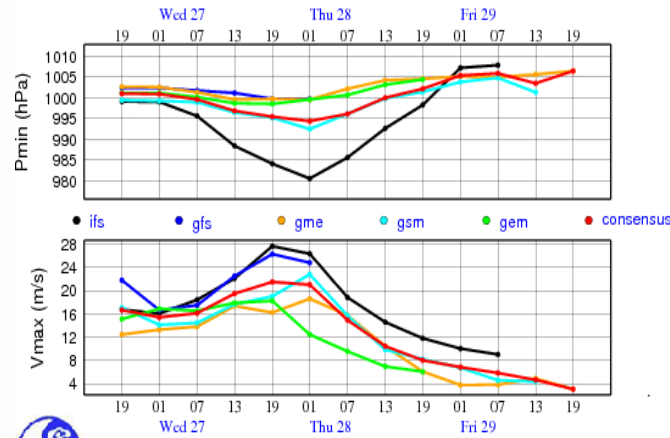


2. The recent progresses in TC forecast

MIRINAE track forecast issued at 07h-27/07/2016

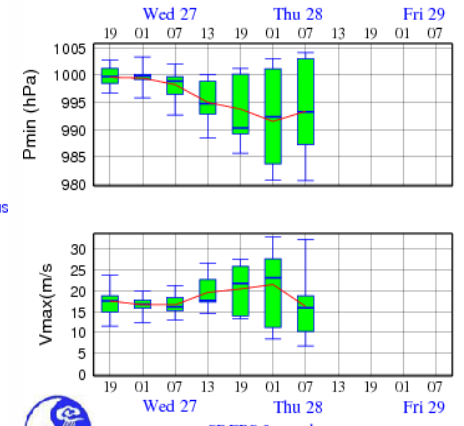


Prediction of Pmin and Vmax for MIRINAE



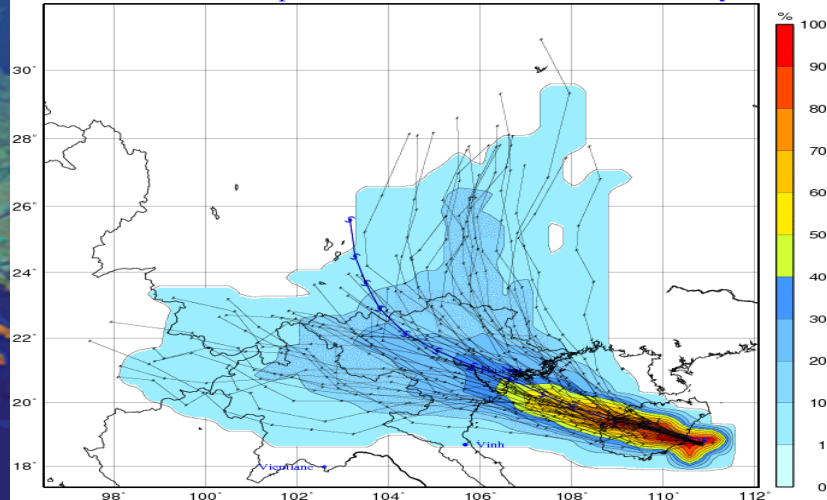
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Prediction of Pmin and Vmax for MIRINAE

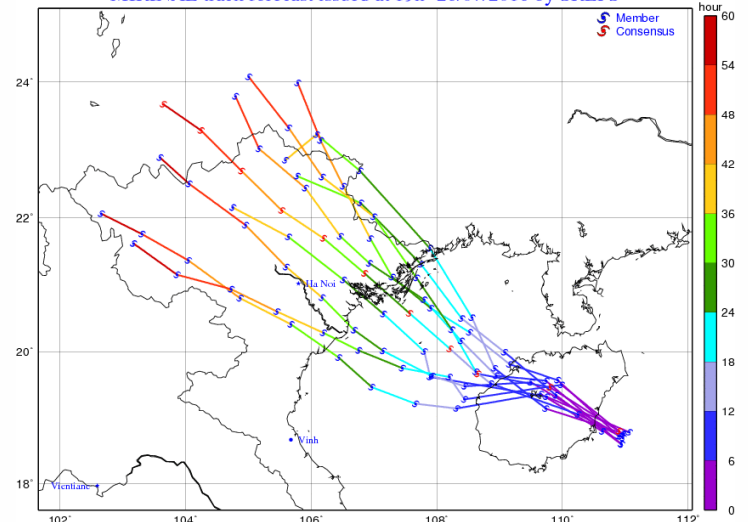


SREPS 9 members
Valid from 19h-26/07/2016 to 07h-29/07/2016
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RINAE 072h strike map forecast issued at 19h-26/07/2016 by ECEFS



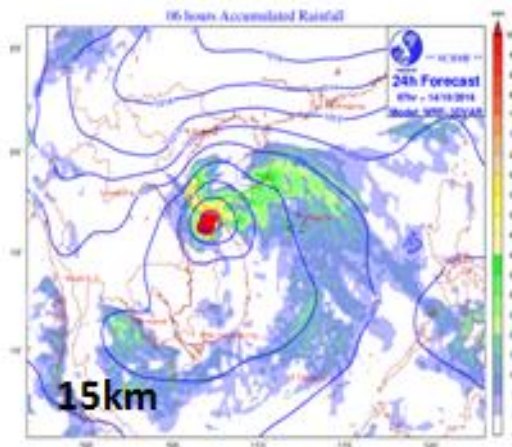
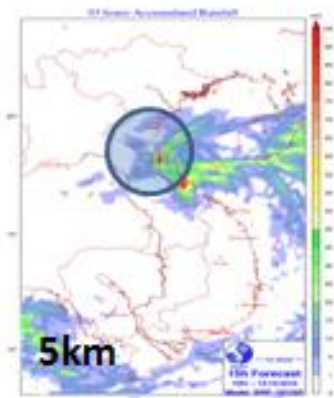
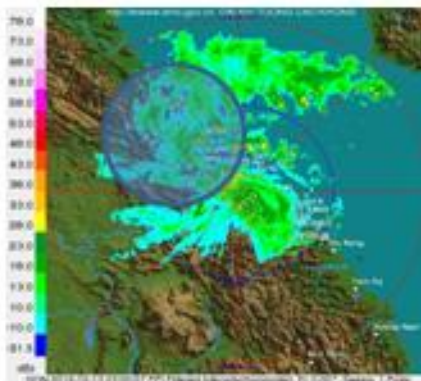
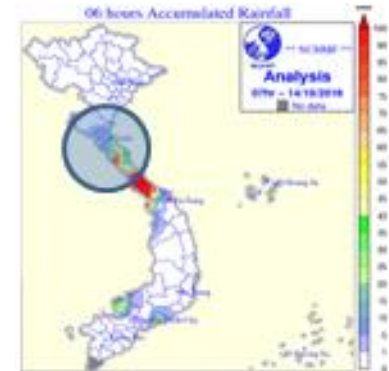
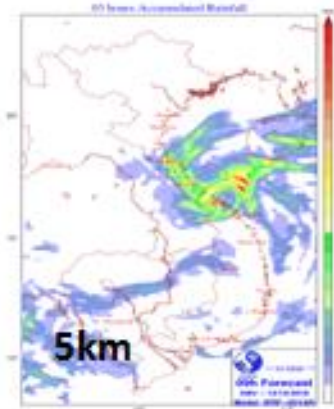
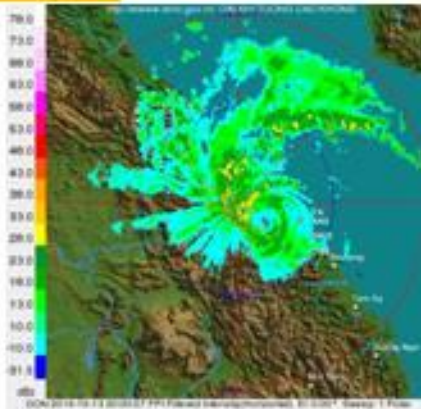
MIRINAE track forecast issued at 19h-26/07/2016 by SREPS



2. The recent progresses in TC forecast

Enhanced tropical cyclone structures with high resolution forecasts

TS 13/10/2016



2. The recent progresses in TC forecast

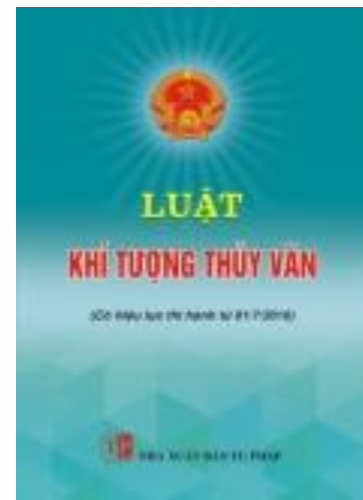
5. Implementing Law of Hydrology and Meteorology & Law of Natural Disaster Preparedness and Response:

Law of Natural Disaster Preparedness and Response is issued 19 June 2013 and validated from 1st May 2014

This Law stipulates for activities of natural disaster preparedness and response, rights and obligations of agencies, organizations, households and individuals involving in natural disaster preparedness and response, ...

Law of Hydrology and Meteorology is issued 23 Nov 2015 and validated from 1st July 2016

This Law stipulates for activities of using and managing observation network; hydro-meteorology warning, forecasting and services; climate monitoring; rights and obligations of agencies, organizations, households and individuals involving in hydro-met activities





2. The recent progresses in TC forecast

Implementing Law of Hydrology and Meteorology & Law of Natural Disaster Preparedness and Response can bring:

➤ **Advantages:**

- ❖ **The effectiveness of TC warning and forecasting bulletin is enhanced due to involving all political and socio-economic system in preparedness and response activities**
- ❖ **The typhoon preparedness and response is significantly improved, hence reduce lost of human and properties**
- ❖ **The investment in hydro-met field in strongly increased from VN Gov. and International Organization & Agency**
- ❖ **The participation of society and public into hydro-met field is significantly increased**
- ❖ **The severe weather monitoring network is expanded due to involving private observation network from military, public aviation, etc**



2. The recent progresses in TC forecast

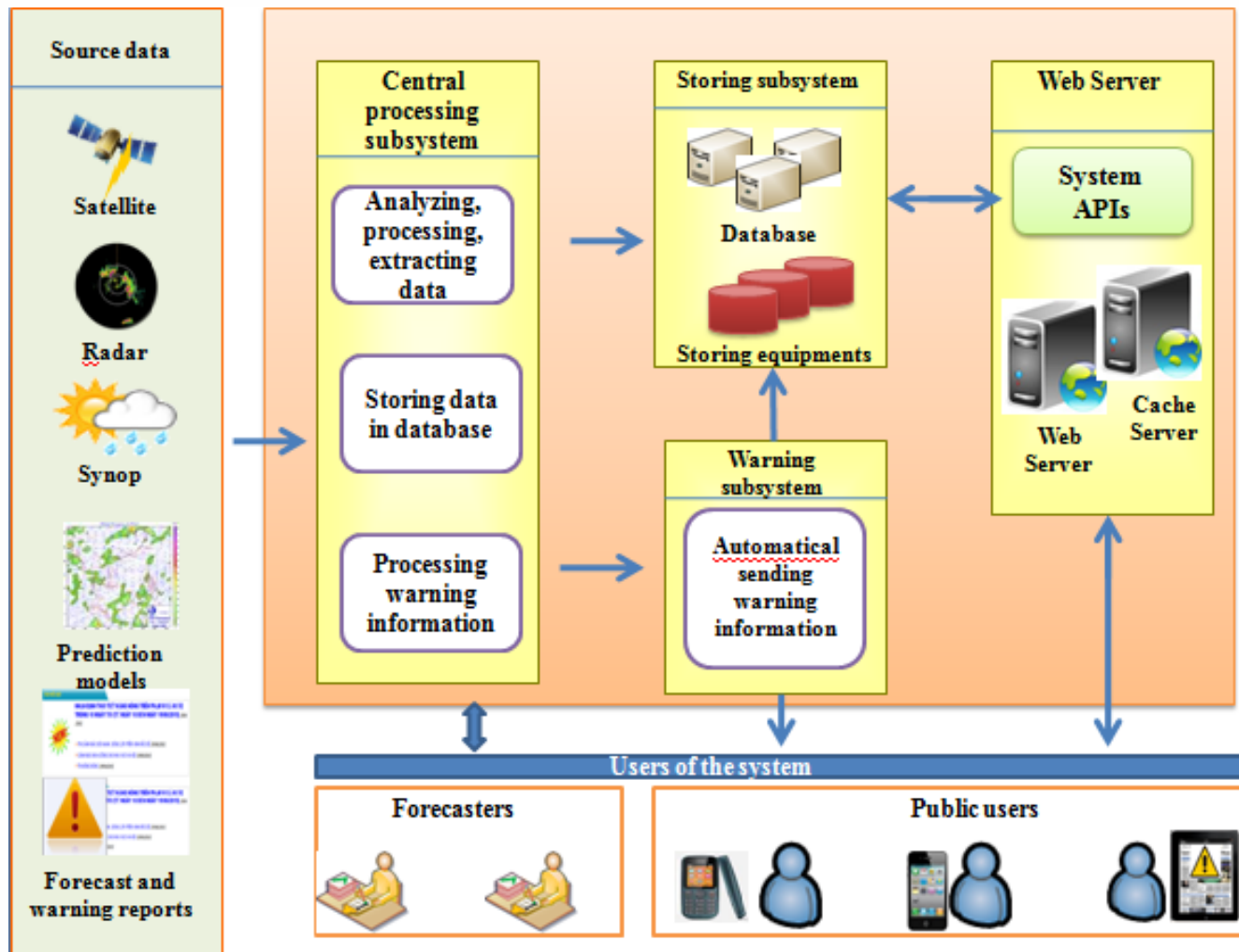
Implementing Law of Hydrology and Meteorology & Law of Natural Disaster Preparedness and Response can lead to:

➤ **Difficultes and challenges:**

- ❖ The quality of warning and forecasting bulletin is highly requested more and more from Gov. and Public
- ❖ The leadtime and frequency of TC warning and forecasting bulletin need to increase
- ❖ The content of TC warning and forecasting bulletin need to change to meet the need of public and private sections instead of only serving for political purpose
- ❖ The observation network need to be more dense and automatic
- ❖ The regional modeling system need to increase horizontal resolution. This leads to need more computing resources
- ❖ etc

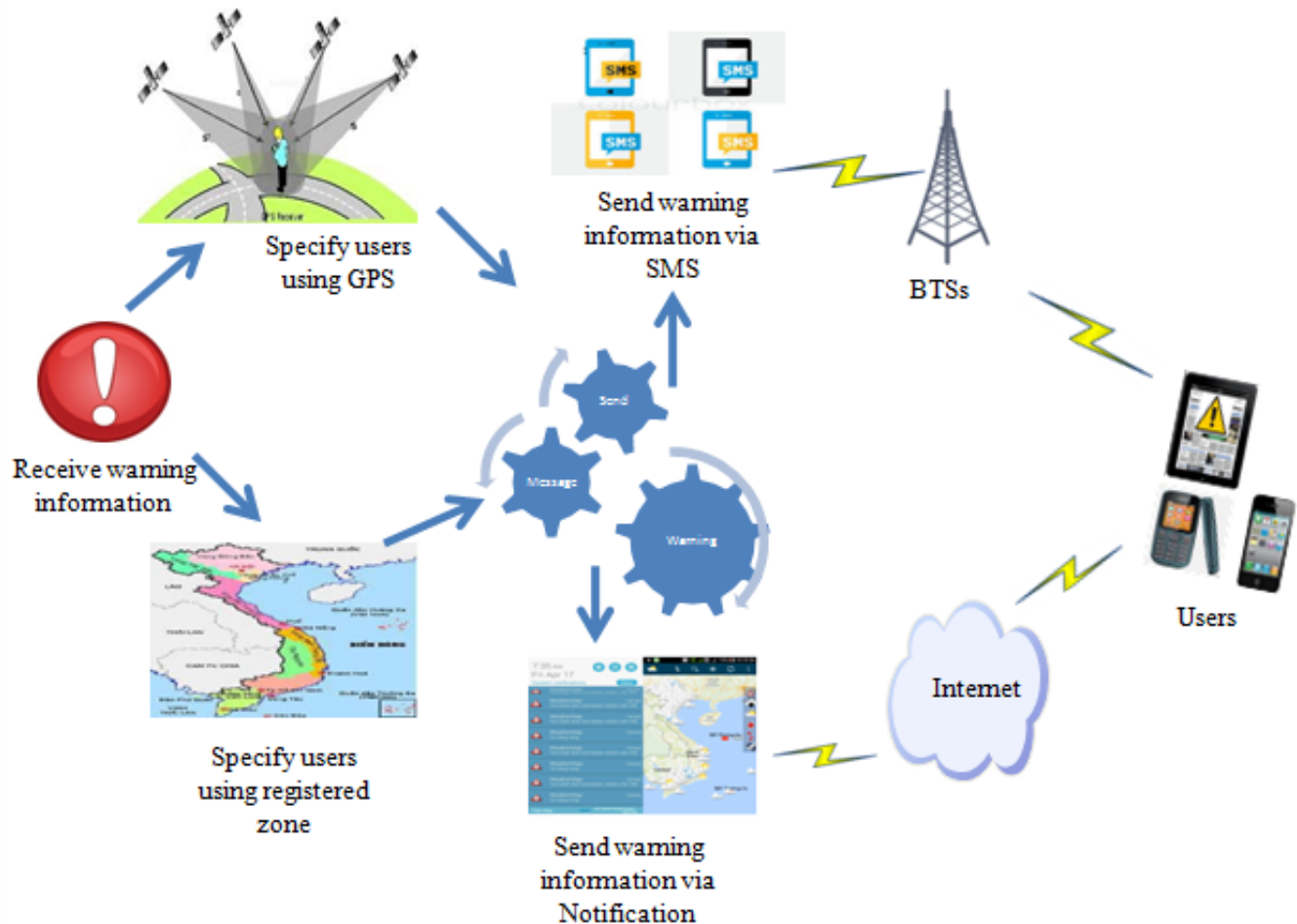
2. The recent progresses in TC forecast

5. The new severe weather warning bulletin disseminating system based on Cloud computing technology



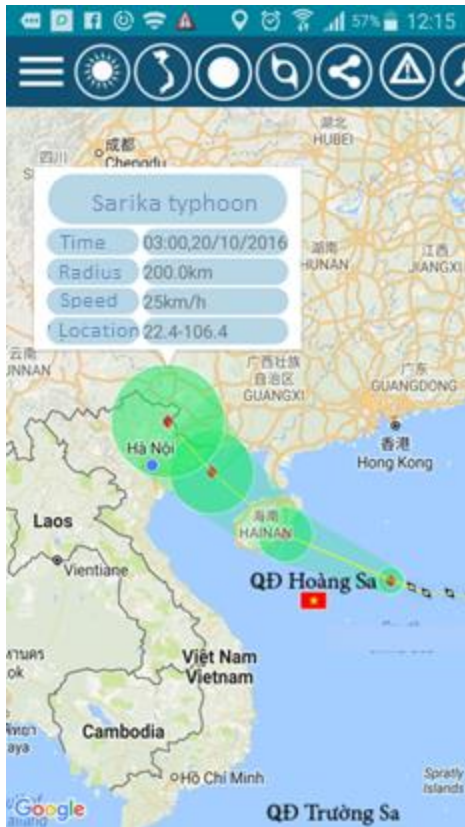
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2. The recent progresses in TC forecast

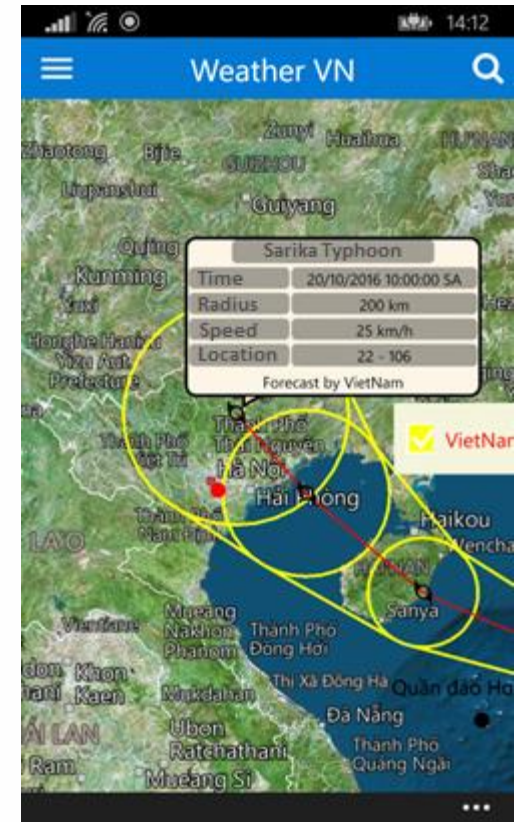
5. The new severe weather warning bulletin disseminating system based on Cloud computing technology



Android



IOS



Windowphone

3. Future plan

- 1. Implementing high ranked roles of NHMS (NHMS will be upgraded into Viet Nam Hydro-Meteorological Administration – VMA in 2017)**
- 2. Continuously modernize forecast technology and observation network by effectively using ODA support from WB, JICA, KOICA, Finland, etc**
- 3. Operating high-resolution deterministic modeling system based on WRF and COSMO along with new HPC**
- 4. Effectively participating some AOPs of TCS such as:**
 - 1. Implementing roles of RFSC Ha Noi in SWFDP-SeA project (providing TC forecast products from our NWP systems)**
 - 2. SeA weather radar network developing (TMD+JMA)**
 - 3. EXOTICA**
 - 4. Developing TC forecast competency (JMA)**



Thank you for your attention

See you in new NHMS/VMA headquarter at TC 50 session

