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Natonal report of Vietnam

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I. INTRODUCTION

- Vietnam is located on the Indochina Peninsula of Southeast Asia, with different characteristics of natural geographic conditions and topography between the areas; ¾ of its square is mountains and only ¼ is plains.
- Vietnam has a dense River system and long coastline exceeding 3200 km.
- Population of Vietnam is approximate 80,000,000 people now, they are living mainly in the plains and cities.
- Vietnam has a typical bi - seasonal tropical monsoon climate regime. Yearly, it is influenced by natural calamities, as typhoons, monsoons, storm surge, floods and droughts that damage Human and estates.
- *Marine Hydrometeorological Center is responsible for:*

+ Marine Hydrometeorological station network in the whole country.
+ Data collection, processing and management.
+ Marine hydrometeorological research including technology for ocean or forecasting: surface temperature, salinity, current, waves and storm surge. but only wave and storm surge forecasting are put into professional mode and others are in modeling.

+ Marine hydrometeorological service: data providing, calculation of climate characteristics and regime, tide prediction,ect.

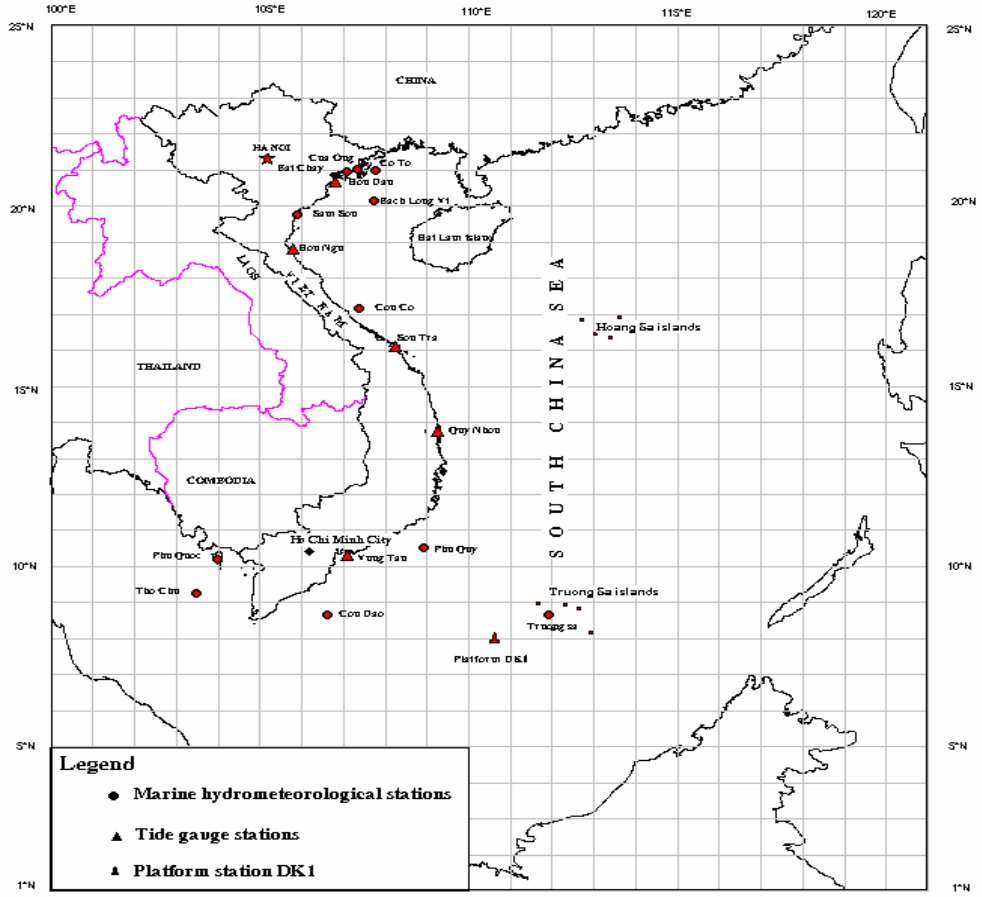
II. MARINE HYDROMETEOROLOGICAL OBSERVING SYSTEM

2.1. Station network

- Sea level measurement and monitoring are one of the important tasks of the Marine Hydrometeorological Center.
- The Marine hydrometeorological observing system of Vietnam consists of 20 stations (see fig 1) located along the coast and on islands.
- The observation parameters are main meteorological (Wind, Pressure, Air temperature, Humidity...) and oceanographic (wave, sea level, salinity, water temperature...). Almost the parameters are observed four times per day at 01, 07, 13 and 19 o'clock, local time.
- Among 20 stations there are 7 Tide gauges recording sea level every one hour. Those stations have been established for long time.
-The observation system also includes an offshore network. We own a vessel of thousand tonnage nemed "Marine Research". Annualy, the vessel carries out two oceanographic surveys in the Vietnamese waters.
- Marine Hydrometeorological Center is government institution and responsible for operation and maintenance of the observation system in Vietnam.
- Marine Hydrometeorological Center is planning to have a Project "Modernization and Automation of the Marine hydrometeorological observing system" period 2006 - 2010. The purpose of the Project is to enhance the station network and improve quality of data collection.

2.2. Schema of tide gauge network in Vietnam

Fig 1. SCHEMA OF MARINE HYDROMETEOROLOGICAL STATION NETWORK



2.3. The list of the gauge sites

Among 20 stations there are 7 Tide gauges recording sea level every one hour. Those stations have been established for long time.

No	Name of Station	Location		Established	Remarks
		Lat.(N)	Long.(E)		
1	Hon dau	$20^0$40'	$106^0$48'	1956	
2	Hon ngu	$18^0$48'	$105^0$46'	1961	
3	Da nang	$16^0$06'	$108^0$13'	1963	
4	Quy nhon	$13^0$46'	$109^0$13'	1963	Gloss Station
5	Vung tau	10^0 20'	$107^0$04'	1918	
6	Phu quoc	10^0 13'	$106^0$35'	1976	
7	DK1-7	8^0 01'	$110^0$37'	1995	flatform station

2.4. An overview of the tide gauge technology employed in the network

- Before, in the station network, tide gauge recorders CYM type made by Russia are installed.
- Now, some equipment are old and have been changed by tide gauge recorders Stevens type A71, A90 and A91 made by USA
- There are some kinds of tide gauge (tide recorders) oparating in the network:

- Onshore type: - CYM (made by Russia)
  - Stevens (made by USA)
- Offshore type: - OT - 600 (made by France)
  - WRL (made by Norway)

2.5. An overview of the GPS technology in the network

The GPS technology is not used in the network station. But, at present in Vietnam there are two GPS near the sea level stations: Hon Dau in the North and Vung Tau in the South. Those stations belong to Sea Mapping Office.

2.6. An overview of the data availability

Purposes of sea level Observation:

- for the scientific research of marine phenomena
- provide "real time" data for the port operations, engineering constructions and disaster prevention
- for the calibration and validation of models
- for the determination of local climate , etc.

Sea level data processing:

- Hourly sea level data recorded by the tide gauges are checked carefully at stations, after that they are sent to Marine Hydrometeorological Center, in here the data will be analyzed, processed by ORKAN (European), TIDE (Canada) software and results are mainly stored in paper formats, CD and floppy disks.
- All of data have been checked carefully before using, and the data have been collected according to the standards issued by Hydrometeorological Service of Vietnam(HMS) and they are sufficient and available for using.

The data availability:

- Based on historical data measured in different areas along the coast, sea level rise has been calculated.
- The determined rate was considered in making strategy of Social economic development of Vietnam.
- Data supplying for social economical requirement.
- Calculation of extreme and average of sea level.
- Calculation of extreme values of rare frequencies with different return periods for sea level.
- Using for tidal prediction, storm surge and wave forecasting.
- Calculation of marine hydrometeorologycal condition, ect.

2.7. Web, email address of data banks and of source

All of Data from network station are stored in paper formats, CD in Network Station and Management Division at MHC, and users card access by requirement.
email address:

III. TRAINING

- Mostly observers working at Marine hydrometeorological stations are trained with term of four years at University or Hydrometeorological College in Hanoi.
- Apart from, yearly, observers are trained in short term by Marine Hydrometeorological Center.

IV. Technical problems encountered

- Lack in new and advanced epuipment and technology
- The facilities should be updated and upgraded.

Picture1 (Flatform station – DK1-7)

Picture 2(Hon Dau station)