

Viet Nam

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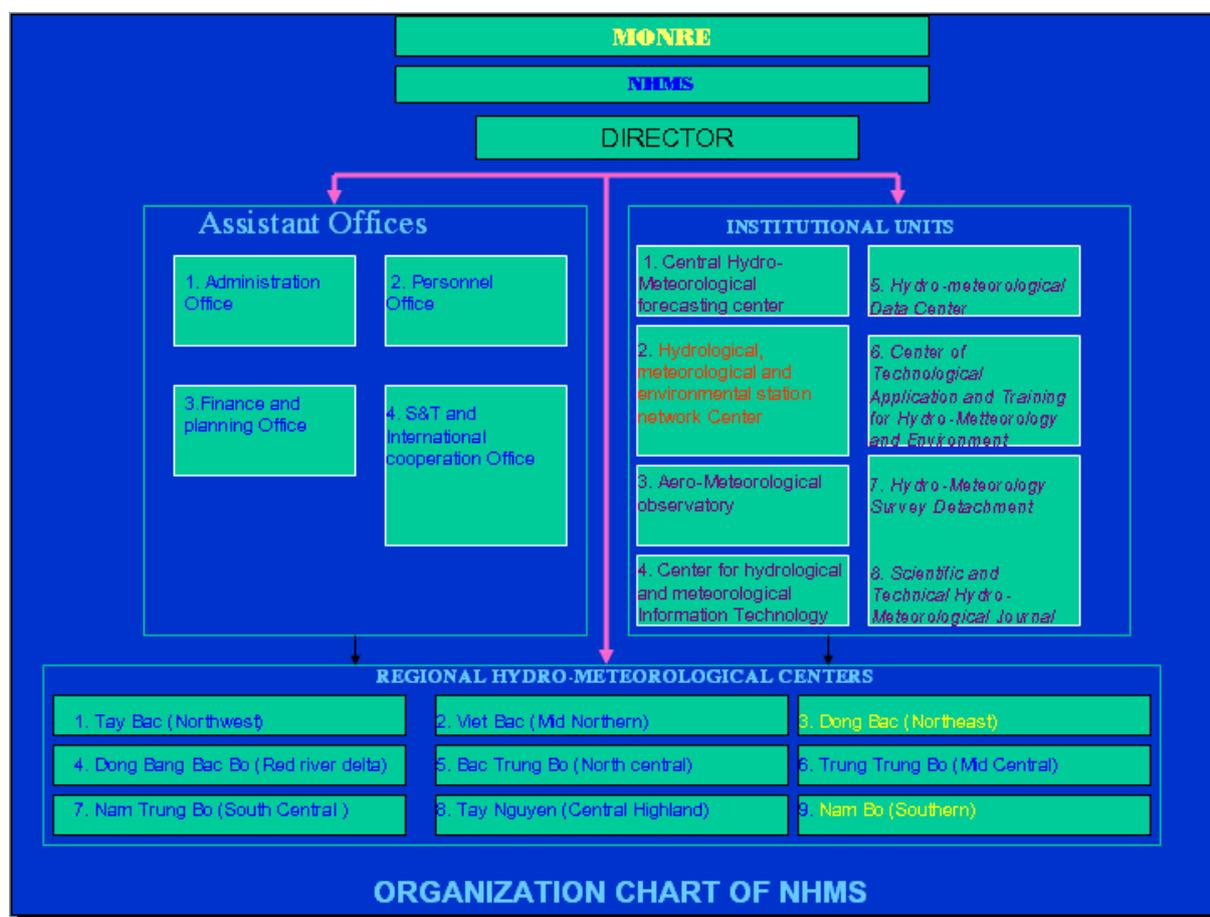
**CURRENT STATUS AND FUTURE PLAN OF SURFACE,
CLIMATE AND UPPER-AIR OBSERVATIONS OF NATIONAL
HYDRO-METEOROLOGICAL SERVICE OF VIET NAM**

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Summary and Purpose of Document

This report introduces National Hydro-Meteorological Service of Viet Nam, its activities and organisation. Current status and future plan related to surface, climate and upper-air observations of Viet Nam are also presented.

The National Hydro-meteorological Service of Viet Nam (NHMS) is a body under the Ministry of Natural Resources and Environment of Viet Nam. The main responsibility of NHMS is to manage and operate network of meteorological, hydrological and environmental stations, conduct hydro-meteorological forecast and other services related to these field of operation for socio-economic development of the country.



1. Observation networks

1.1 Surface observation

In total, there are 174 surface meteorological stations in operation in the whole territory of Viet Nam. All stations are manned stations. In the past, some stations were equipped with automatic instruments but all of them are out of work at the present.

1.1.1 Number of stations: RBSN, RBCN, GSN, manned stations and AWS*

Table 1: Number of stations

	RBSN	RBCN	GSN	Manned stations	AWS *
number	174	174	25	174	0

*An automatic weather station (AWS) is defined as a “meteorological station at which observations are made and transmitted automatically”.

1.1.2 Station map

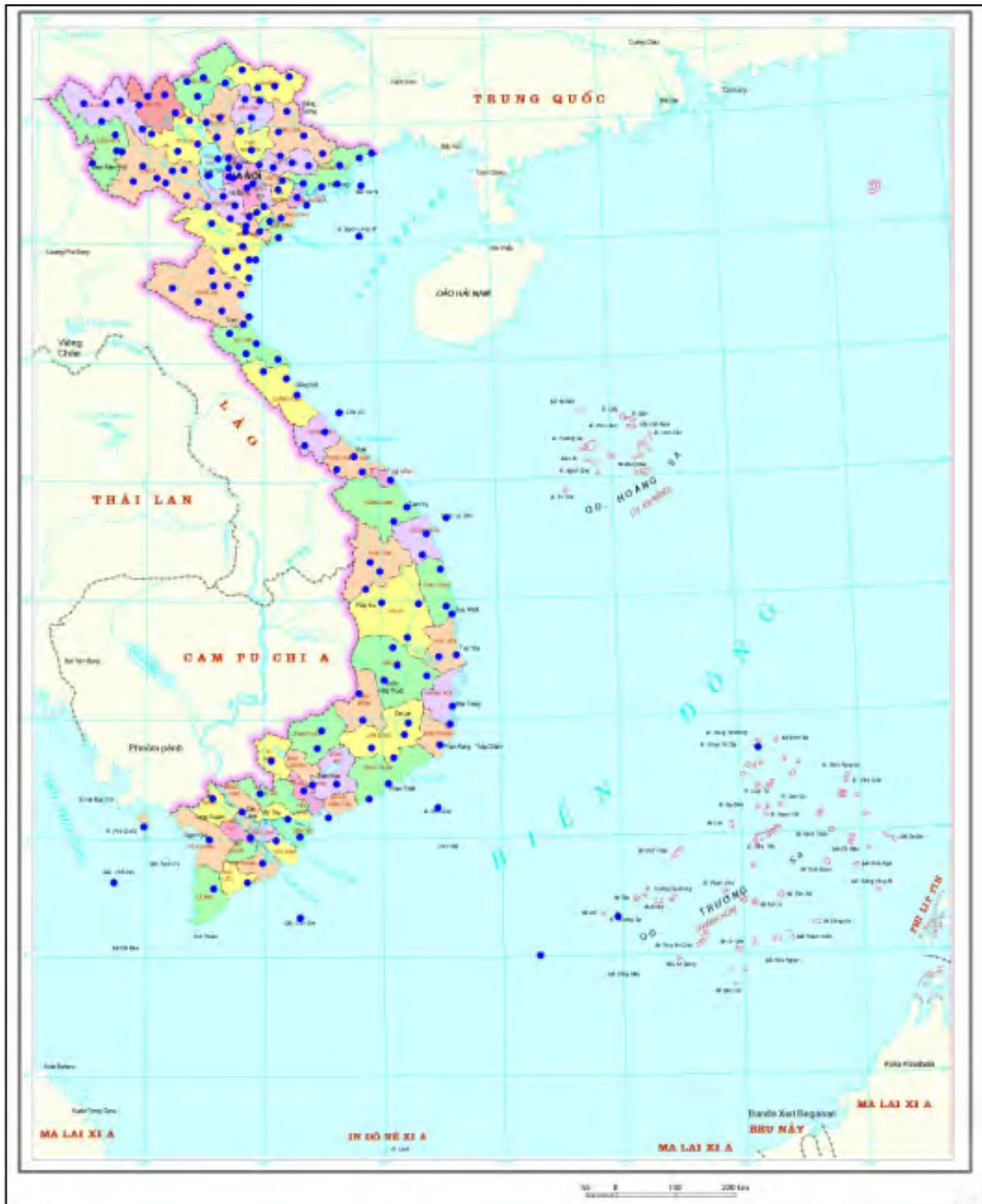


Figure 1: Map of Meteorological stations of Viet Nam



Figure 2: Global Synoptic Network of Viet Nam

1.1.3 Time and frequency of observations

From these 174 stations, 43 stations conduct and report 8 observations per day at 01h, 04h, 07h, 10h, 13h, 16h, 19h, 22h by local time (18h, 21h, 00h, 03h, 06h, 09h, 12h, 15h by UTC respectively) and other 131 stations do 4 observations and reports per day at 01h, 07h, 13h, 19h by local time (18h, 00h, 06h, 12h by UTC).

For the stations affected by typhoon, during typhoon time the observation of wind speed and direction, rain will be conducted and reported at least every hour. Except that, during typhoon time forecasting bureau can request stations in the typhoon affected area to do observation and report every 30 minutes.

1.1.4 Data flow to users and archives

Data collected at the stations will be transmitted to the forecasting center in near real time by telephone or ICOM (for the stations where there is no telephone line). Hard copy of collected data will be sent to the regional centers for primary processing and checking. In the next step, after primary processing and checking at regional level, all data will be sent to the National Center for final processing and checking before archiving. At the present, all data are archived only in hard copy form (paper).

The users can get data in regional centers or in central data archive center.

1.2 Upper-air observation

1.2.1 Number of stations: RBSN, RBCN, GUAN, manned stations and automated system stations

Table 2 Number of stations

	RBSN	RBCN	GUAN	Manned stations	Automated system stations
number	13	13	13	13	

1.2.2 Station map



Figure 3: location Map of the upper-air stations.

1.2.3 Time and frequency of observations

At the present, from 13 upper-air stations, 3 stations carry out observation and report at 07h and 19h of local time (00 UTC and 12 UTC respectively), one station - at 13h of local time (06 UTC) and others at 00 UTC.

1.2.4 Data flow to users and archives

Upper-air observation data collected at the stations will be transmitted to the forecasting center in near real time by telephone or internet. Hard copy of collected data will be sent to the regional centers for primary processing and checking. In the next step, after primary processing and checking at regional level, all data will be sent to the National Center for final processing and checking before archiving. At the present, all data are archived only in hard copy form (paper).

The users can get data in regional centers or in central data archive center.

2. Siting and metadata

Technical documentation (station book) is created for all stations. There are two hard copies of technical documentation for each station, one for station and one for network management center.

The content of technical documentation consists:

- Siting specifications: location map, longitude, latitude, pictures (at least from two sides), elevation above sea level, horizontal visibility.
- Station history and duty.
- Instruction how to go to the station.
- Description of landscape around the station in radius of 300m, 3000m, and 8000-10000m. Record all changes in landscape around the station.
- Description of garden and location of observing instruments in the garden.
- Description of horizon line at the station.
- Station staff: number of staff, education, staff change.
- Instrument: number of instruments in use and spare, technical specifications, calibration time.

Every supervision visit to the station will be recorded in this book with comments and recommendations of head of supervision team or expert.

3. Instruments, sensors, upgrade, maintenance, instrument intercomparisons and traceability

In recent years, observing instrument and equipments used in the network are improved and upgraded. Under NHMS of Viet Nam there are 3 calibration laboratories (one central and two regional) that are located in the North, Central and South part of the country. The regional laboratory is responsible for calibration of temperature, humidity and air pressure sensors and simple maintenance and repairing work. Central laboratory is responsible for calibration of wind, rain and other sensors that request experts of high

skill and modern equipment.

According to the cooperation program with China Meteorological Administration (CMA), every two years Vietnamese experts bring air pressure standard to China for conducting instrument intercomparisons.

4. Quality assurance / quality control (real-time, non-real time)

After each observation head of the station have to perform checking of collected data before coding and transmitting to the forecasting center and on the Global Telecommunication System.

Every station is provided with technical instruction and guide book and operators at the station have to strictly follow all procedure related to observation and data processing in this book.

Experts from regional centers regularly perform visits to the stations for looking at operation of instruments, complying of technical regulation and guide and other issues related to the operation of the station that can affect data quality.

By the regulation on station management and operation, each station will be visited by experts from NHMS one time per three years.

Quality control of observational data will be performed at two levels: regional and national prior to forwarding for archiving.

5. Training

The most of operators at the stations get their education in Colleges of Natural Resource and Environment (There are two of them in Viet Nam that belong to the Ministry of Natural Resources and Environment of Viet Nam).

NHMS of Viet Nam organises training activity for station operators when new technical instruction and guide is issued or changed.

Every 5 years, NHMS organises 7-10 day training course for chief of stations where they can get newest knowledge related to the station management and operation.

In addition, operators at the stations can get on the work training when experts from national and regional centers have visits to the station.

6. Statistics and applications

Observation and collected data is used for forecasting, scientific research and in many fields of national economic activities.

At the present, no any publication of observation and collected data is carried out. All users can come to the data archive center or to the regional centers for getting

observation and collected data. At these centers they can make their request and experts from these centers will provide them with requested data.

7. Current issues and future plan

At the present the number of stations is not enough to meet the need of national socio-economic development. All stations are manned. The most of observation Instruments and equipments are rather old and underdeveloped. The needs of network expand and modernisation is very big.

Recently, in June 2010 Prime Minister of Viet Nam has approved Development Strategy of Hydro-Meteorological Field to the year of 2020 and Modernisation Project for Hydro-meteorological Forecasting and Observation Network for the period from 2010 to 2012.

The main objectives of these strategy and Project are as follow:

- To the year of 2015 the number of stations is increased in 50% and 75% Of them are automatic. All observation data is automatically processed and transmitted to the centers, 75% of observation and collected data are archived in digital form.
- To the year of 2020 the density of stations can be compared with which of developed countries and 90% of them are automatic. All observation and collected data are archived in digital form.