

MEMBER REPORT

ESCAP/WMO Typhoon Committee
11^h Integrated Workshop

DPR of Korea

Cebu, the Philippines
24 - 28 October 2016

CONTENTS

- I. Overview of tropical cyclones which have affected/impacted Member's area this year**
- II. Summary of progress in Key Result Areas**

I. Overview of tropical cyclone which have affected / impacted DPRK's area this year

1. Meteorological Assessment

DPR Korea is located at seasonal wind zone of East Asia, is often affected by natural disasters due to climatic changes.

There is a large natural disaster in the northern part of Hamgyong province of our country caused by typhoon Lionrock (1610).

Exactly, it wasn't direct impact of typhoon Lionrock (1610).

Typhoon LIONROCK(1610) was downgraded into extra tropical cyclone, and then it was merged with another strong depression at northern part of Korea East Sea.

The strengthened extra tropical cyclones landed into the basin of Tuman River, it caused heavy rain, strong wind, tidal wave in northern part of Hamgyong province from 30 Aug to 1 Sep.

Total rain amount during 12:00 29 Aug 2016-24:00 30 Aug 2016 are 247mm at Gyonhhung County, 217mm at Rashon County(36 hour).

This is the second record since the starting of the meteorological observation at this area.

Also there was 115cm tidal wave at Rashon County on 31 Aug.

Although there was a lot of damages caused from typhoon 10, but we forecasted the track, downgrading, landfall, intensity rather exactly based on synoptic data, ECMWF, CMA, RSMC, JMA NWP products 5 day ago, so that we could reduce the damages from typhoon impact.

The characteristics of typhoon activities this year is more rare case.

There wasn't any typhoon generated until 30, Jun, but after Jun, there generated a continuous typhoons.

We think it result from the EL Niño phenomenon lasted from last year.

2. Hydrological Assessment

After typhoon LIONROCK(1610) is downgraded into extra tropical cyclone, it is merged with a depression at Korea East Sea and landed at the Tuman River basin of our country.

There rained over 300mm during 3 days (29-31 Aug) at the northern part of Hamgyong Province.

So, the water level of Tuman River is over the dangerous water level

on 31 Aug, it result overflow and flood and landslide owing to the heavy rain.

At this case, we forecasted the amount of rainfall, inflow, and outflow, so calculated the water level of Tuman river and issuing Early Waning System 5 days ago, it was more effective for reducing damage.

3. Socio-Economic Assessment

There was a great loss caused by typhoon Lionrock(1610) in the northern part of Hamgyong province.

The rainfall amount at the basin of Tuman river during 29-31 Aug 2016 is over 300mm, which is the second record in there observation history, it had flash flood with landslides in Hoeryong, Mushan, Yonsha, Wonsong, Gyongwon, Gyonghung, Rashon county in northern part of Hamgyong province and lasted less than one week.

There was several hundred loss of human life including dead and missing during the flash flood and land sliding.

And also 11,600 houses collapsed and were buried under a landslide, so 68,900 peoples left homeless.

900 public buildings such as hospital, school, cinema and factory were collapsed or damaged due to heavy rain and flood, landslide.

There was road destruction at 180 places in this area and 60 bridge were destroyed or damaged and the landslide also blocked the railway at 100 places.

The electric power station in Mushan, Yonsha county of Hambuk province were waterlogged and buried into mud, it resulted cutoff of electric power and communication more than one week.

27,400 hectares of rice field were washed out and buried into mud, no imagine rice crop this year at this area.

The Early Warning was issued 5 days ago, which could reduce the loss of human life and economic property.

4. Regional Cooperation Assessment

Two meteorologist from SHMA, DPR Korea visited STI/CMA for a month last year.

They implemented the tropical cyclone genesis products in real time based on ECMWF-IFES gridded output in Typhoon Forecast Evaluation and Assessment System (TFEAS) hosted and funded by STI/CMA.

Two typhoon forecasters attend the CMA Typhoon Forecaster Training Programme 2016 course supported by TC.

An AWS device provided by Hong Kong(China) through WGDRR AOP 6 2014 is in installation in a community weather station of Pyongyang, DPR Korea.

II. Summary of progress in Key Result Area

➤ Improvement of Typhoon Forecasting

In order to improve the typhoon forecast, we developed the Typhoon Forecast System (TFS) which helps forecasters to make decision about the track of typhoon by monitoring the typhoon forecasting information of various Numerical Weather Prediction Centers.

This year, we upgrade the version of the TFS into the web-based TFS 2.0.

Using the web-based TFS 2.0 operationally, it can be analyzed and estimated the tendency of typhoon track forecasting of NWP Centers.

And also it can show the statistic error chart of typhoon track forecasting of NWP Centers, so that forecasters can make decision on the track of typhoon more timely and accurately.

Especially Web-based TFS 2.0 can support the method of similarity analysis for typhoon forecasting.

It has database of synoptic data and observations, typhoon track and intensity during the past 70 years, it can search the meteorological environments of the similar typhoon.

| KRA = | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Meteorology | | | | | | ✓ | |
| Hydrology | | | | | | | |
| DRR | | | | | | | |
| Training and research | | | | | | ✓ | |
| Resource mobilization or regional collaboration | | | | | | | |

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➤ Improvement of Typhoon Warning System

SHMA developed and upgraded the version of Real time Weather Forecasting System for mobile phones.

Using the system, users can get the information of weather, typhoon, other meteorological information wherever, whenever they want.

And also using the TV, radio, network, typhoon warning is issued and it is issued 5 days ago, it could help local governments and residents take necessary preparations.

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|---|---|---|---|---|---|---|---|
| KRA = | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Meteorology | ✓ | | | | | | |
| Hydrology | ✓ | | | | | | |
| DRR | ✓ | | | | | | |
| Training and research | | | | | | | |
| Resource mobilization or regional collaboration | | | | | | | |

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➤ Activity for enlightening about typhoon

SHMA of the DPRK have done the research of estimating the climatic changes of typhoon activity and awoke the popular masses to have a correct understanding of characteristics of typhoon activity.

A lot of expert have been educated and trained at several university, after graduated from university, they should start research and operational forecasting for typhoon.

Some textbooks titled with ‘typhoon knowledge’, ‘typhoon forecasting’ were published last year and were used among the students and forecasters.

As a result, the more peoples have correct understanding of typhoon, and can take part in the work for prevention of typhoon-related disasters.

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|--------------------------|---|---|---|---|---|---|---|
| KRA = | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Meteorology | | | ✓ | | | | |
| Hydrology | | | ✓ | | | | |
| DRR | | | | ✓ | | ✓ | |
| Training and research | | | ✓ | ✓ | | | |
| Resource mobilization or | | | | | | | |

| | | | | | | | |
|------------------------|--|--|--|--|--|--|--|
| regional collaboration | | | | | | | |
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➤ Improvements of Flood forecasting (caused by typhoon)

When a typhoon moves forward to the DPRK, SHMA forecasts the track of typhoon and its rain amount, and issues the warning of heavy rain and flood.

When it issues the typhoon warning, according to the hydrological analysis, flood warning is informed and anti-flood measures are taken at the flood damage region.

Real time observation system of rain amount is established all over the country and it is used to prevent typhoon-related disasters.

This is done under the unified leadership of nationwide Typhoon Committee.

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|---|---|---|---|---|---|---|---|
| KRA = | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Meteorology | | | | | | ✓ | |
| Hydrology | | | | ✓ | | ✓ | |
| DRR | | | | | | | |
| Training and research | | | | | | ✓ | |
| Resource mobilization or regional collaboration | | | | | | | |

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➤ Improved Typhoon-related Disaster Risk Management

In order to improve typhoon-related disaster risk management in various sectors, the government of the DPRK organized the National Flood and Drought Rehabilitation Committee, non permanent organization, and offered unified guidance to typhoon-related disasters managements.

This National Flood and Drought Rehabilitation Committee includes various sectors such as agriculture, land and environment, water resource, electric power industry and human health.

It gives unified control and direction over all affairs.

And also, land management campaign is organized every spring and autumn, and necessary measures including tree-planting and river-management are taken at national level.

| KRA = | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Meteorology | | | | | | | |
| Hydrology | | | | | | | |
| DRR | | | | ✓ | | | |
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| Resource mobilization or regional collaboration | | | | ✓ | | | |

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➤ **Strengthened Resilience of Communities to typhoon-related disasters**

Under the unified control of the government of DPRK, resilience capacity of Local communities has been remarkably strengthened and the work for prevention of typhoon-related disasters has been accelerated thorough hazard mapping, evacuation drills and public awareness.

As a result, dangerous areas affected by high wind, flood, landslide and tidal wave were remarkably reduced all over the country.

| KRA = | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Meteorology | | | | | | | |
| Hydrology | | | | | | | |
| DRR | | | | | ✓ | | |
| Training and research | | | | | | | |
| Resource mobilization or regional collaboration | | | | | ✓ | | |

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➤ **Enhanced international collaboration**

Two experts from SHMA will be participated to the Typhoon Committee Research Fellowship (STI) 2016 by support of STI / CMA.

And several experts attend in the training course supported by TCS.

That all give us opportunities for developing the typhoon forecasting skill.

Theme of Typhoon Committee this year is very important for each government of countries to prevent typhoon-related disasters and international cooperation is necessary.

In the future, the Government of the DPRK hopes much help of Typhoon Committee.

| KRA = | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Meteorology | | | | | | | |
| Hydrology | | | | | | | |
| DRR | | | | | | | |
| Training and research | | | | | | | ✓ |
| Resource mobilization or regional collaboration | | | | | | | ✓ |

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➤ **State apparatus for prevention of Flood, Typhoon-related disasters**

During the rainy season, the government of the DPRK organized the National Flood and Drought Rehabilitation Committee(NFDRC) and this committee gives unified guidance to the Local Committee.

And this committee takes necessary measures in dangerous areas affected by typhoons and floods.

From July to September, SHMA of the DPRK is monitoring the situation of the rivers and reservoirs all over the country and issuing the warning of typhoon and flood.

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