

# **1 The present situation of flood risk map in China**

## **1.1 Present phase**

The flood threatening area of the seven great river basins in China is about one million km<sup>2</sup>. In these areas, the level of flood risk mapping in different regions is far different because of the difference of social economic development level and the consciousness of flood management. There are all kinds of flood risk maps from phase C to G. For some regions where the historical flood inundation maps have been investigated and mapped, they are in the phase of C or D; for regions where typical historical floods and design floods have been simulated using hydrological and hydraulic methods, the phase is E or F; only in several regions, the flood forecast and warning has been implemented using real-time rainfall and water regime information. However, most of forecast is concentrated on the flood stage and discharge in river course instead of inundation of flood flowing out of river course.

Map A: map without elevation data

Map B: map with elevation data

Map C: inundation map of single historical flood event

Map D: inundation map of several historical flood events

Map E: inundation map of historical flood events simulated

Map F: inundation map of design flood

Map G: forecast map by real-time analysis

## **1.2 Present condition**

Since 1980s, some institutions, provinces, cities and insurance companies have been carried out the study on flood risk maps and mapped various flood risk maps for different uses.

The study areas of those flood risk maps include the flood detention area such as floodplain of Yongding River and flood diversion area of Xiaoqing River, etc., river basins such as Taizi River Basin and Liao River Basin etc., cities such as Shenyang, Guangzhou, Tianjin, etc. as well as the whole province area such as Zhejiang and Fujian province.

### **1) The first phase**

In early 1997, the Office of State Flood Control and Drought Relief Headquarters (SFDH) released the document No.1 which required the whole country to carry out the flood risk mapping. Whereafter, the SFDH used the form of supplementary document to put forward that the drawing of flood risk maps in China would be divided into three steps. The first step is to draw the flood influence area according to

historical flood data and existing study achievements, and give the distribution of population and assets in flood influence area in the form of table. The second step is to analyze and calculate the distribution characteristics of flood risk in a region according to the features of study area and provide reference information for making flood planning and flood control preparedness. The third steps is to combine with the monitoring and forecast system of real-time rain, water and flood control projects information to provide service for flood-prevention and dispatch command and disaster evaluation, etc.

## 2) The second phase (2003.7-2008.1)

In July 2003, the SFDH started to formulate the *Guideline for Flood Risk Mapping* to guide and standardize the flood risk mapping in the whole country. In February 2005, the main contents of the *Guideline for Flood Risk Mapping* were finished, and the mapping of flood risk maps in pilots began all over the country. The number of pilots is 36 which cover all kinds of flood risk maps (including river basin, city, flood detention area and reservoir). The pilot project was finished in January 2008.

The formulation of *Letter of assignment for Flood Risk Mapping Program in the Whole Country* was started in the middle July, 2005. The draft of the *Letter of assignment for Flood Risk Mapping Program*, the *Preliminary Work Outline for Flood Risk Mapping in the Whole Country* and the *Letter of Assignment for Preliminary Work* were finished in the end of July, 2006.

## 3) The third phase (2007.11-2010.12)

In November 2007, the *Letter of assignment for Flood Risk Mapping Program in the Whole Country* (Phase □) was approved. The main tasks in this phase including:

- Investigate and summarize the study at home and abroad
- Formulate the technical standard and measures for the administration of flood risk mapping
- Develop the models and software for flood risk mapping
- The collection and processing of basic data for flood risk mapping
- Develop the flood risk map management platform software
- Map the templates of flood risk maps
- The pilot projects of flood risk mapping in each river basin.

## 1.3 Two cases

- Flood risk map in the middle and lower reaches of Beijiang

Where: in the middle and lower reaches of Beijing River Basin which includes flood protection area of Beijiang levee, Feilaixia reservoir, Pajiang flood detention area, Guangzhou and Foshan city.

Why: This project is the pilots of flood risk mapping for both SFDH and Guangdong province. The five pilots represents flood protection area, reservoir, flood detention

area and city respectively. Beijiang is one of the key flood control areas in Guangdong province. In the flood protection area of Beijiang levee, there area high value of assets and dense population.

When: 2007.5-2008.1

By Whom: IWHR

To Whom: Office of Flood Control, Drought Relief and Typhoon Protection Headquarters of Guangdong Province

How: Phase E, hydraulic method

- The demonstration project of flood risk maps in Hubei province

Where: Hubei province, including Dujiatai flood detention area, Honghu flood diversion area and Zhanghe reservoir

Why: This project is the pilots of flood risk mapping for Hubei province, the three pilots represent flood detention area, flood protection area of levee and reservoir respectively and the study area is the key flood control area with high value of asset and dense population.

When: 2008.1-2008.12

By Whom: IWHR

To Whom: Office of Flood Control, Drought Relief and Typhoon Protection Headquarters of Hubei Province

How: Phase E, hydraulic method

## **1.4 Stage objectives**

In my opinion, the map G should be the objective the flood control departments hope to carry out. The reasons include two aspects as follows:

One is the requirement of flood control commander. The map G can help decision makers give reasonable warning and decision in order to reduce casualty and property losses furthest by simulating possible inundation area and affected population and assets according to real-time rain, water information.

The other is that the basic data in China has been satisfied the demand of flood risk mapping. Currently, the Flood Control Command System of China (Phase I ) covers the main flood threatening area of the country on the whole. The automatic monitoring and data acquisition of rain and water information have been carried out basically. However, because of the secrecy system, the terrain data are hard to obtain and use. This difficulty is being solved now.

## **2 Flood risk mapping**

### 1. System for flood risk map

In China, there is still no relevant law for flood risk map. The work of flood risk mapping is led by the Office of State Flood Control and Drought Relief Headquarters.

### 2. Data condition

Hydrological and terrain data, etc.

Currently, the Flood Control Command System of China (Phase I) covers the main flood threatening area of the country on the whole. The automatic monitoring and data acquisition of rain and water information have been carried out basically.

Terrain data are kept by State Bureau of Surveying and Mapping. Because of the secrecy system and benefit relation between different departments, the terrain data are hard to obtain and use. This difficulty is being solved now. In addition, the terrain data with scale of 1:250,000 have been shared in public. The DEM data are hard to be obtained.

### 3. Problems during the mapping of flood risk maps

In my opinion:

#### 1) System and administration measures

Up to now, there is no clear system for flood risk map in China. It indicates that the problems on status and use of flood risk maps, the qualification of departments who draw the flood risk maps, the source of outlay, organization who publishes the maps and, the update and maintenance, etc. exist in current situation.

#### 2) Technology

The technical manual is still being formulated. The practicality of technical method for flood analysis needs to be improved. The technical training still needs to be reinforced. There is no relevant certification department.

#### 3) Basic data

The share of data is difficult. The density of data is not enough, for example, the water level station and Stream Gauging Station are lacking in mountain area.

## **3 The publishing and use of flood risk map**

### 1. The system of publishing and use

The systems of flood risk map publishing and use are being formulated. They include

*Measures for the Administration of Flood Risk Map, Quota of Flood Risk Mapping* and relevant laws such as the suggestion on flood risk map in the *Flood Control Law*.

## 2. Problems during publishing and use

As the lack of correlative laws, the legal status of flood risk map in flood control and disaster reduction or land use planning, etc. is not clear. The problems also exist in the mapping, publishing, use and update of flood risk map. At present, flood risk maps are only taken as reference by water sectors in the formulation of flood control planning or flood control decision making.

## 3. How to use flood risk map?

Flood risk maps can be used in following fields:

- Land use planning
- Flood control and land drainage planning
- The establishment of flood contingency plan
- Flood control and warning
- Evacuation
- Emergency flood fighting

# 4 Suggestion for the flood risk map project of ICHARM

## B- (1) – (1) Efficiency of disaster prevention

In 2006, the total number of households of television audiences in the whole country reached to 306 million. The total number of television audiences reached to 1.07 billion. The average popularization rate of television was 85.88%.

## B- (1) – (2) Process of flood evacuation information

The weather sectors of state, river basin, province and city release the rainfall forecast data; the offices of flood control and drought relief headquarters of state, river basin, province and city (generally consists of weather, water conservancy, armed policy and civil administration sectors.) release flood forecast, warning and evacuation information.

## B- (1) – (3)

In China, the disaster prevention consciousness of people is less, the general disaster prevention knowledge is lacking. The flood control drill is generally implemented in the flood control sectors.

## B- (2) Suggestion on the *Guideline for Flood Risk Mapping*

China published “The Guidelines for flood hazard mapping” in 2005. It is revising now. I think “Guidelines for flood hazard mapping in developing countries” can be used for reference in the revising work.