National Emergency Management of Meteorological Disasters

—Towards Improving the Effectiveness of Meteorological Disaster Prevention and Mitigation

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Outline:

I. Situations: Meteorological Disasters

II. Towards the Meteorological Disasters Emergency Management

III. Cases of Emergency Response and the Effectiveness
I. Meteorological Disasters

_Climate Background_

Meteorological Disasters in China, in terms of Frequency, Variety and Severity.
The Distribution of Meteorological Disasters in China
Features 1: Severity

**The Economic Losses Caused by Meteorological Disasters**

Averagely Losses per year: **250 billion RMB**

Averagely Death per year: **4427 death**

Meteorological Disaster: **70% of Natural Disasters**

Losses: **1%-3% of GDP**
An Extreme Rain Storm in Jinan, Capital of Shandong Provence
Hourly Maximum Rainfall 151 mm
Caused 37 Deaths
A heavy lightening event hit a school in the rural area and caused 7 children death and 43 people injured.
Features 3: Abnormality

Typhoons with abnormal tracks increase, and extreme weather & climate events increase.

Major typhoon tracks for China

Number of strong TC landing in China during 1961-2006
The number of days with heat waves in China.

The total number of days with high temperature (heat waves) broke the historical records.

Monthly mean temperature variations in China.
Extreme Weather & Climate Events in China (2006)

1. Warmest year since 1951

2. Super typhoon Saomei landed on China.

3. Tropical storm Bilis swept 7 provinces in South China

4. Heat wave & persistent drought

5. High risks of Spring forest fires related with drought


7. Heavy snow storm blocked the traffics

8. Summer heavy rain led to floods

9. Most serious acid rain in Northern China

10. Frequent solar activities
Huge Impacts of Meteorological Disasters on Society

Serious Impacts on:
- Agriculture,
- Industries,
- Human health and daily activities ……

—— How to keep our society in safety and security
II. Towards the Meteorological Disasters
Emergency Management

Why do We Need Emergency Management?

Forecasting and Warnings ≠ Safety and Security

Key Point: Actions for Prevention and Mitigation

Government: Awareness of the urgency from two big events
A National Plan for Emergent Response was Set Up in 2005

The 911 Event in USA

SARS Event in 2003
Key Points:

• Warning Information
  – Efficient Monitoring and Warning on Severe Weather
  – Information Dissemination System

• Collaboration Mechanism
  – Government Agencies Working together
  – Information Exchanging
  – Emergency Response Actions
Monitoring and Warning System

Satellite (every 15 Min)

AWS (2-10 Min)

Radar Mosaic

Lighting
Early Warning Signals

• ‘Meteorological Disaster Early Warning Signals And Guidance for Preparedness’ was issued in August 2004
• Four categories of Signals: Blue, Yellow, Orange and Red
• Guidance for preparedness was included

Typhoon, Torrential Rain, Thunderstorm......,
11 categories in total
Multi-Channels of Warning Information Deliveries
- Television
- Telephone
- Cell Phone
- Radio
- Internet
- Newspaper
- Electronic billboards

Over 1 billion people/times receive weather forecast and warning information every day.
Wide Coverage of Weather Information

◆ Weather TV programs

- **100 daily programs on 7 channels of the National CCTV**
- Nearly **4,000 daily programs** are shown on the **76 provincial TV channels**, **360 city TV channels** and **1,800 county TV channels**.
- **China Weather Channel** is broadcasting weather information **24 hours plus 7 days**.
- **All the TV stations** are request to broadcast warning information in time.
Wide Coverage of Weather Information

◆ Cell phone text message

● A nationwide SMS platform

● The SMS on warning information was sent to the those people who work for emergency response, totally 620,000 both in national and local agencies;

● SMS on severe weather warnings will sent to 83 millions mobile phone users.

● Example: 83.352 millions of SMS on typhoon warning were sent to people in the influenced area

    ---- A very efficient way for the emergency response
Collaborations on Emergency Response

• Collaboration with Government Agencies
  – Working together with 54 Government agencies in National Level
  – Team: 500 persons in national level
  – Same Mechanism in Provinces, Cities and Counties

• Warnings and Actions
  – Working together to issue warning of disaster risks
  – Organizing the prevention actions
Issuing the risk of landslide warning and the response action will be taken.
Collaboration with National Forest Ministry

Issuing the risk of forest fire warning together
Disasters Risk Map:
A guidance to the disaster prevention and mitigation.

Factors of Disaster Risk
• Frequency of Severe Weather
• Geographic Information
• Population Density

Flooding Risk Map in Hubei Province
III. Cases of Emergency Response and the Effectiveness

Meteorological Disasters Emergency Response:

- Regional Heavy Rainfall and Flooding
- Typhoon Landing
- Drought and Forest Fire
Case 1: Heavy Rainfall and Flooding in Huaihe River Basin

Total Precipitation in *Huaihe* River Basin in rainy season

<table>
<thead>
<tr>
<th>Location</th>
<th>Precipitation (mm)</th>
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<tbody>
<tr>
<td>Wuhe Anhui</td>
<td>844.8</td>
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<tr>
<td>Jigong Mount Henan</td>
<td>842.3</td>
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<tr>
<td>Guzheng Anhui</td>
<td>825.1</td>
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<tr>
<td>Xinyang Henan</td>
<td>823.5</td>
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</table>

Continuous heavy rainfall leads a quickly rise of water level. A serious situation of flood diversion was faced.
On site monitoring and forecasting
Flooding Forecast focus on the vital area with detail information
Working closely together with decision-makers

The Vital Area
The flooding covered three provinces, where a total of 29 millions people and 3 million hectares of cropland were affected.

- 10 flood zones including detentions and storages have been opened for diversion.
- More than million of people were evacuated to the safe area.
- All the actions were taken depending on the flooding forecast.

Not A Single Death!
Thanks to the Meteorological Emergency Response.
Case 2: Typhoon Emergency Response

- Super Typhoon with the intensity of 55.3 m/s (Grade 16)
- Torrential rain with a total rainfall of 531 mm
- Risk of flooding, wind destroy, landslide etc.
- High life loss risk in the very high population area

Actual Pathway of *Wipha* (16-20 September 2007)
Emergency Response Actions

For Meteorological Section

• Early warning issued 3 days ahead
• Enhance the monitoring: positing typhoon every hours, forecasting the movement every three hours.
• Working face to face with government, Decision-Makers and keep them with fresh information and warnings
• Closely contact with the media to deliver the fresh information to public
  ----83millions SMS were sent to users

For the local government

• Issue the typhoon emergency response order
• To organize the people evacuating from the risk area according to the Typhoon landing warning
  ---- Totally 2.5 millions people were evacuated from the risk area
The dearth was the least among the top list of most intensive typhoon

<table>
<thead>
<tr>
<th>Intensity</th>
<th>No &amp; name</th>
<th>Date</th>
<th>Location</th>
<th>Scale &amp; speed</th>
<th>Central pressure</th>
<th>Direct losses (100 million)</th>
<th>Deaths</th>
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<td>0608 Saomai</td>
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<td>920</td>
<td>196.6</td>
<td>483</td>
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<td>5612 wanda</td>
<td>1.8.1956</td>
<td>Zhejiang</td>
<td>16, 55 m/s</td>
<td>923</td>
<td>Not available</td>
<td>Over 5000</td>
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<td>Xiangshan</td>
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<td>0515 Khanun</td>
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<td>92.5</td>
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<td>0713 Wipha</td>
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<td>950</td>
<td>202.95</td>
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</table>
21 May – 2 June 2006, forest fires occurring in Heilongjiang and Inner Mongolia because of drought climate
Emergency Response Actions

• Rain-making action was employed to control the forest fires
• Cloud conditions of model output were used as a guidance to the Rain-Make actions

Mesoscale rain-making clouds
Total supercooled cloud water column forecasting (g/m²)
Facing the Challenges

Emergency Meeting for Typhoon Landing Preparedness

Challenges of Emergency Management

- Better early warning, quick information deliveries, well organized response actions,......
Thank you for your attention!