WMO Task Force on Socio-Economic Application
Geneva, 15-18 May 2006

Discussion on Identification of Prototype of Education and Training Tools for NMHSs

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Outline

- Purpose and goal (Why)
- Principles to identify the prototype (What)
- Some approaches of prototype (How)
- Examples of prototype

1. Purpose and goal

Purpose:

- To assist NMHSs to more fully exploit and appraise the benefit of weather, water and climate information in different user sectors, including agriculture, water resources, health, energy, risk management etc.
- To develop education and training tools for NMHSs to improve service delivery capabilities by identifying users' needs and requirements for new or improved data, products and services and assessment of their social and economic value.

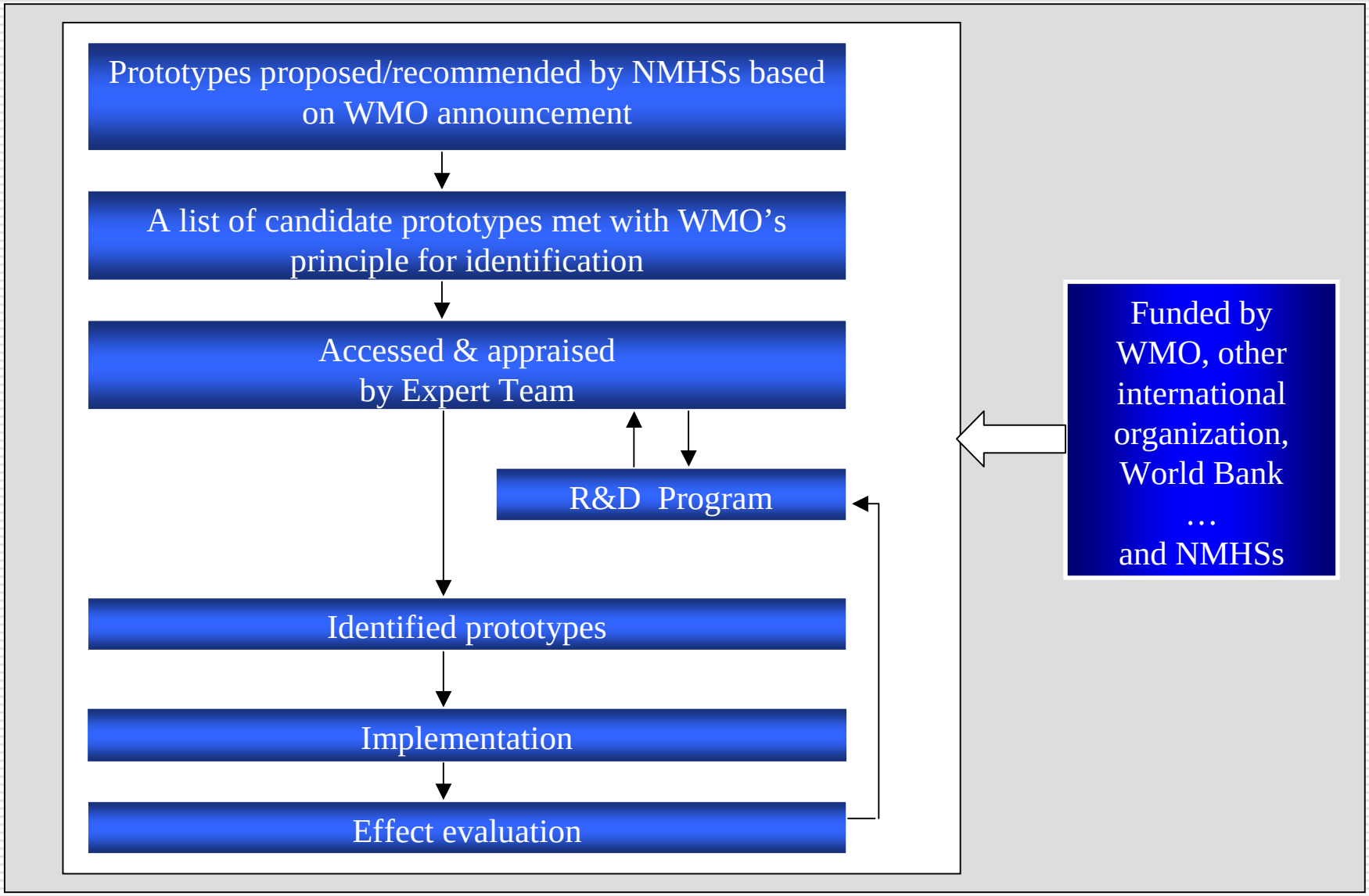
Goal:

- To bridge the gap between providers and users by identifying, developing, implementing education and training tools recommended by some leading NMHSs.

2. Principles for identifying prototype(8 items)

- High impact weather emphasized —Focused on severe weather that threatens lives and livelihoods, as well as ordinary weather that could cause impacts on socio-economic activities
- Partnership required— close collaboration between NMHSs and communities especially the users to optimize the societal benefit
- Requirement drived
- As one component in the users' decision system
- Standardized, universal, systematic
- Accessibility, practibility, cost-effective, sustainability
- Open, flexible, friendly platform
- Tech-transferred and implemented

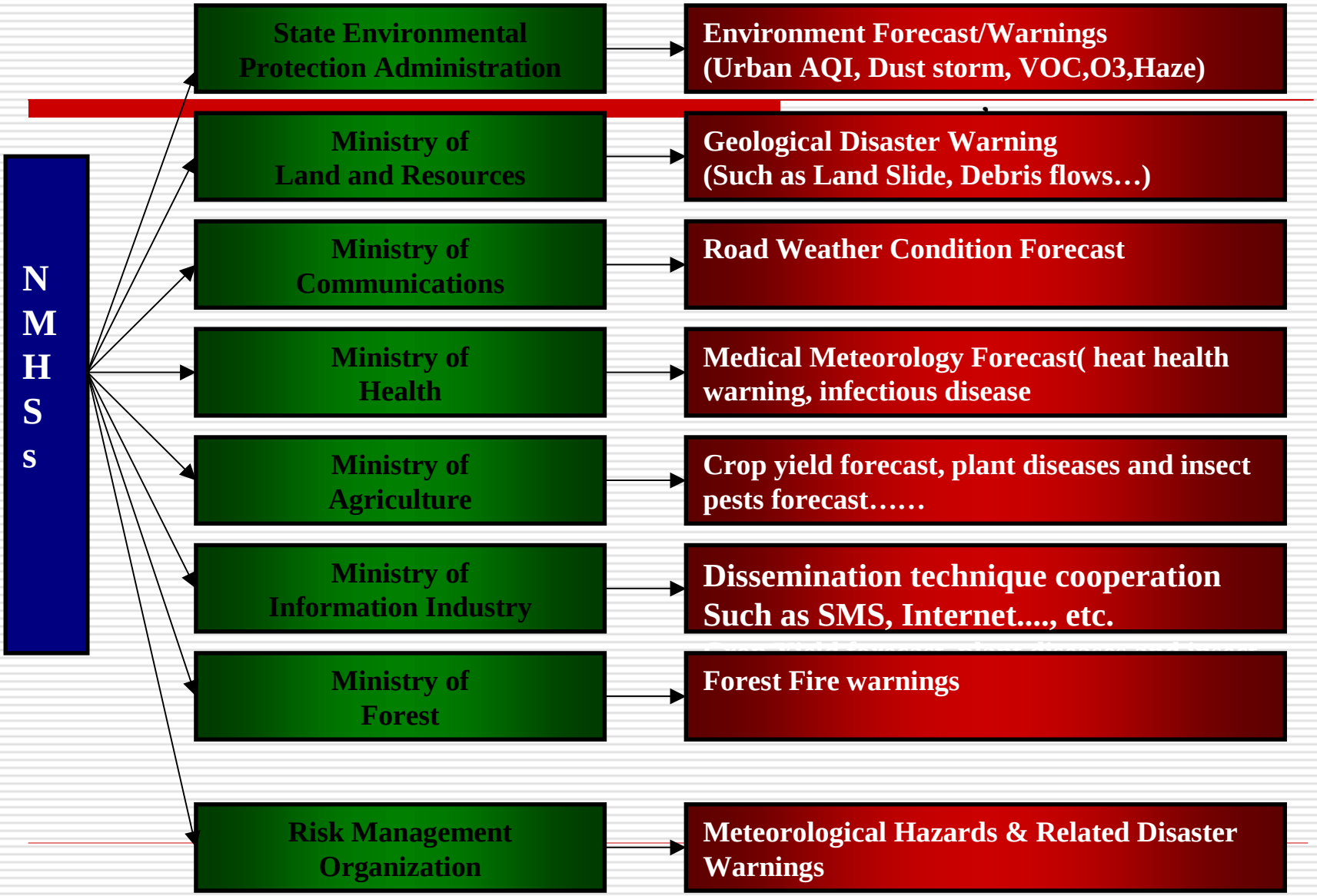
3.How to identify and implement the prototype ?



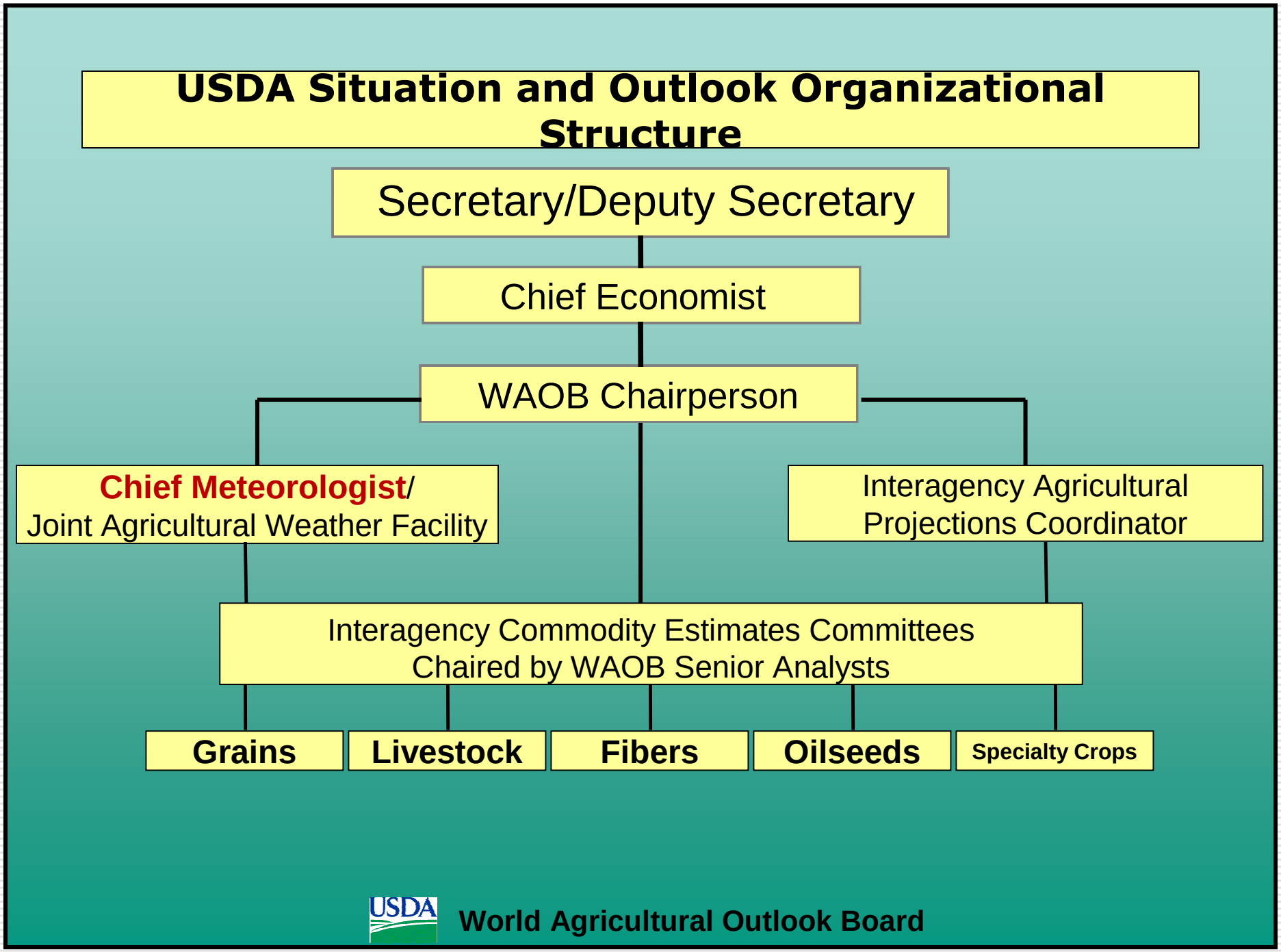
4. Some approaches of prototype (How)

- Partnership prototype
- Jointly issued products (technical improvement)
- Integrated multi-hazard mitigation system and residential community centered grid management
- Education and Training for different level of users
- Social participating based on the experience of Hongkong Observatory

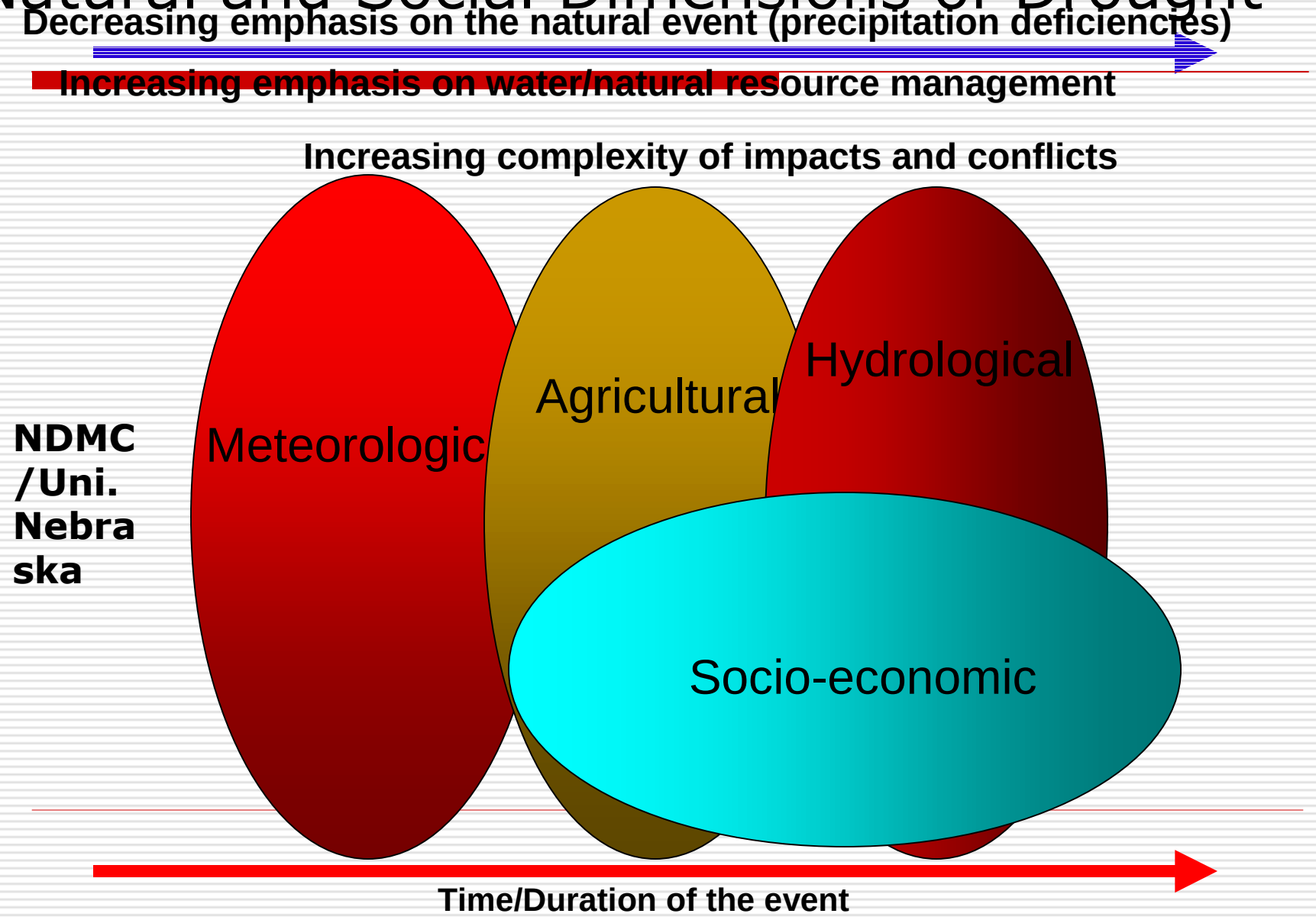
Partnership -----Approach to identify the Prototye



USDA Situation and Outlook Organizational Structure



Natural and Social Dimensions of Drought



Joint-issued specialized service products provided by NMHSs and Other Government Agencies---Approach to identify the prototype

- **Joint-issued service product:**

  The dust storm forecasted; Road met. condition forecasts; Geological disaster warning ; Agro-meteorological products; Forest fire monitoring and warning; Epidemic diseases forecast and warning; Water resources monitoring

- Benefit analysis for Social understanding

- Bilateral and Multilateral cooperation in drought monitoring product

- Cell phone dissemination tech.

Integrated multi-hazard mitigation system and residential community centered grid management -----Approach to identify the prototype

- Preparing plan on emergency response
- Integrated multi-hazard mitigation system
- Grid management based on fined meteorological information
- Warning signals
- Effective service dissemination net

Integrated DPM Framework in Shanghai

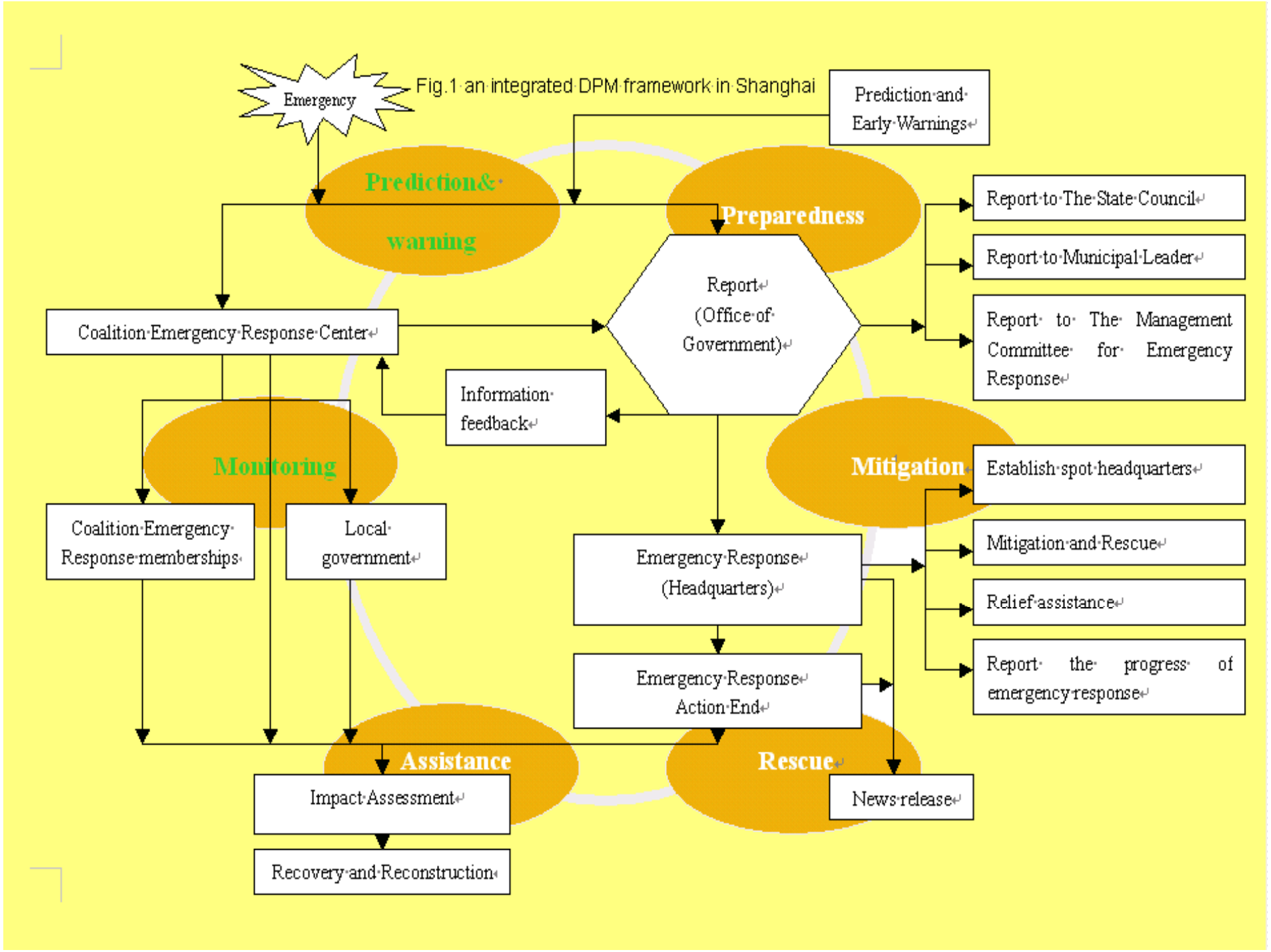
The Management Committee for Emergency Response (MCER) & Shanghai Emergency Response Center

Emergency

Hotline

health | traffic | chemistry | fire | Anti-flood | meteorology

Membership of emergency response center


Emergency
Fig.1 an integrated DPM framework in Shanghai
Prediction and Early Warnings
Prediction& warning
Preparedness
Report to The State Council
Report to Municipal Leader
Report (Office of Government)
Report to The Management Committee for Emergency Response
Coalition Emergency Response Center
Information feedback
Monitoring
Mitigation
Establish spot headquarters
Coalition Emergency Response memberships
Local government
Emergency Response (Headquarters)
Mitigation and Rescue
Relief assistance
Report the progress of emergency response
Emergency Response Action End
Assistance
Rescue
Impact Assessment
News release
Recovery and Reconstruction

Education and Training -----Approach to identify the prototype

- Training for high ranking officials

----The science and technology seminar for members of the state council to understand the climate change and its impact on society and economy presented by Academician Ding Yihui on July 5, 2002.

-----Mayor training course for disaster risk management at provincial levels every year

- Annual technical forum on assessment of multi-hazards by the government

Public Education

- Promote user understanding of the characteristics of different types of weather systems and the nature of weather hazards
- Increase user capability to utilize weather information more effectively
- Collaborative synergy – partnering with other organizations, universities & the media
- Increase visibility and credibility of Met Service

5.Examples of Potential Prototype

Drought outlook;

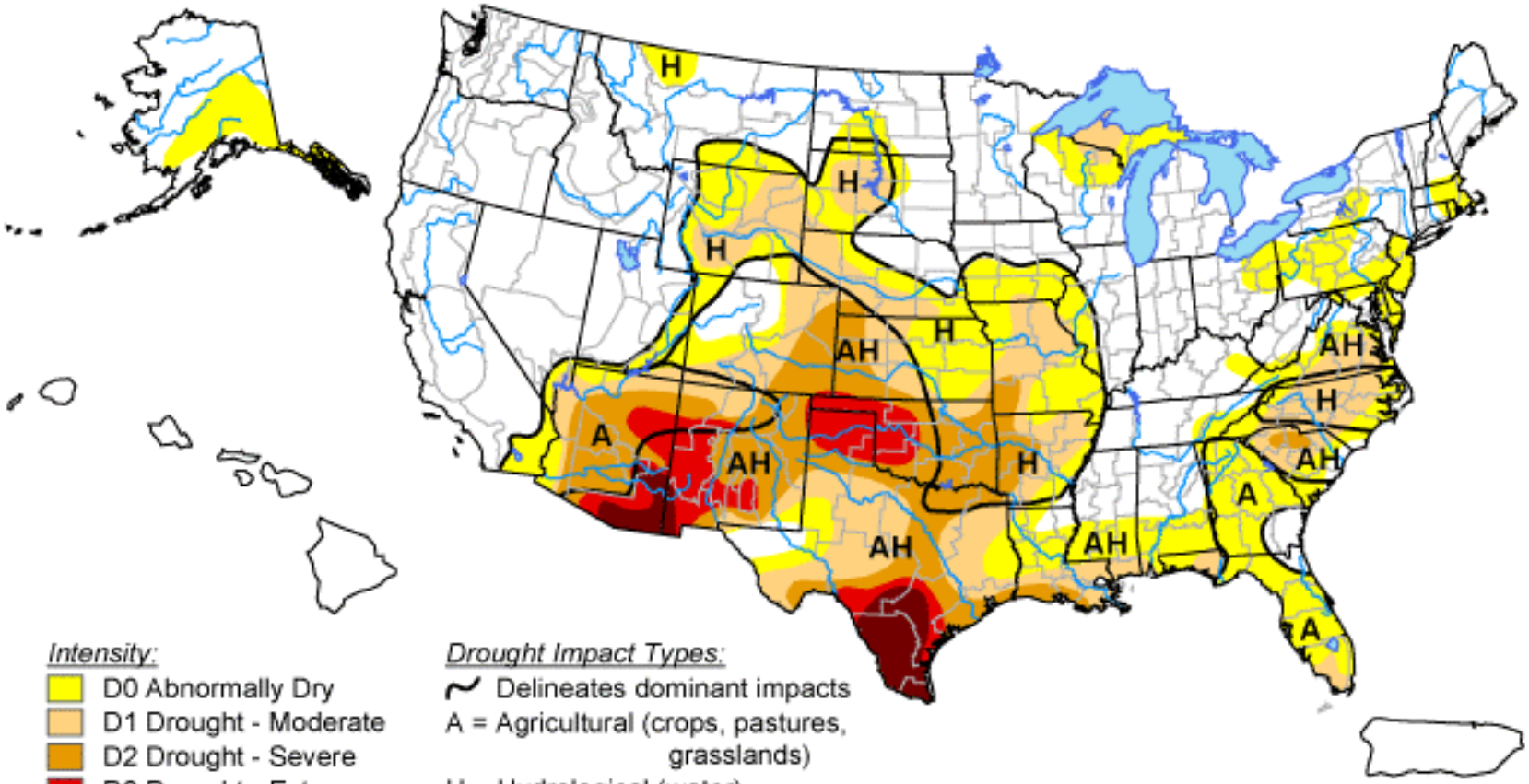
- **SMART TUNNEL;**
- **Lightning webpage for clients;**
- **A National Production Monitoring System**

- Heat/health watch/warning system

- Urban grid management based on fined meteorological information service in multi-hazard emergency response system

U.S. Drought Monitor

May 2, 2006
Valid 8 a.m. EDT



Intensity:
- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

Drought Impact Types:
- ~ Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)
- (No type = Both impacts)

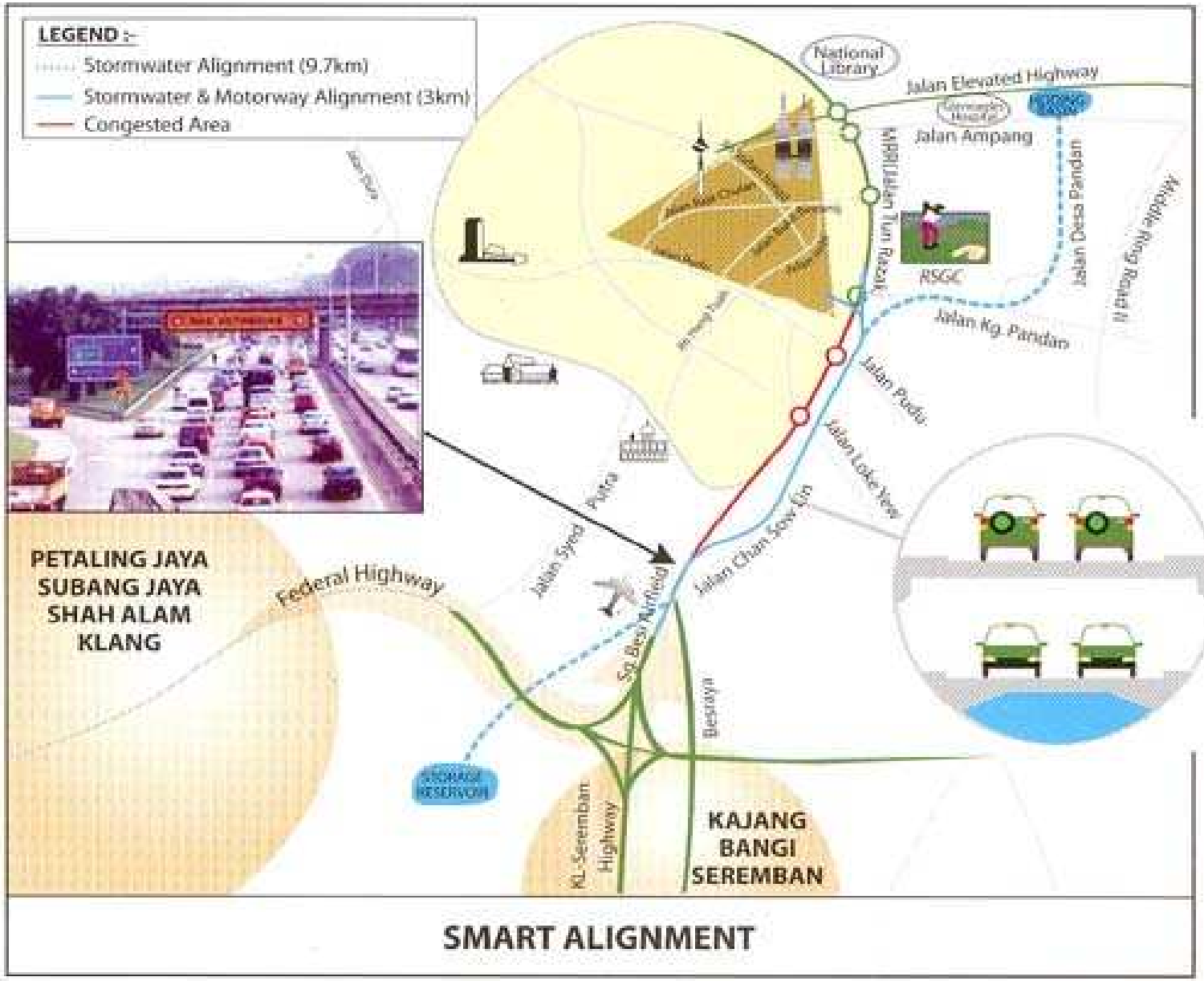
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://drought.unl.edu/dm

Released Thursday, May 4, 2006

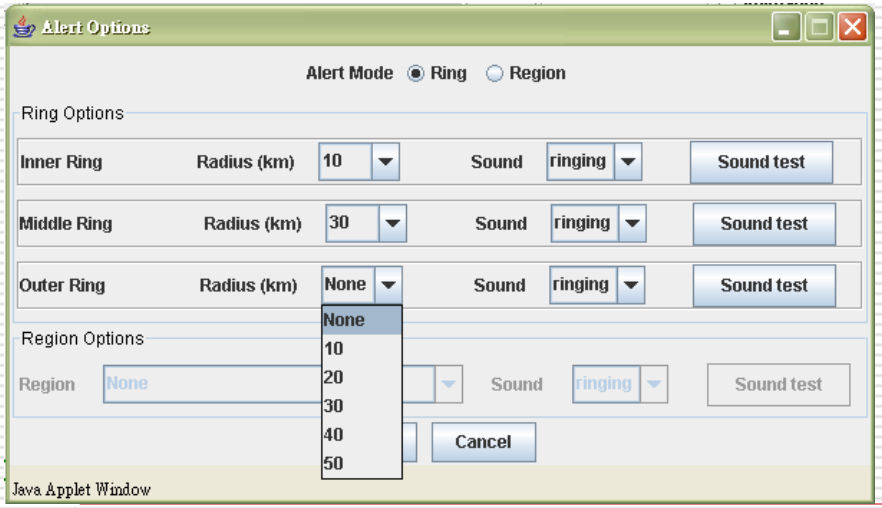
Author: Mark Svoboda, National Drought Mitigation Center

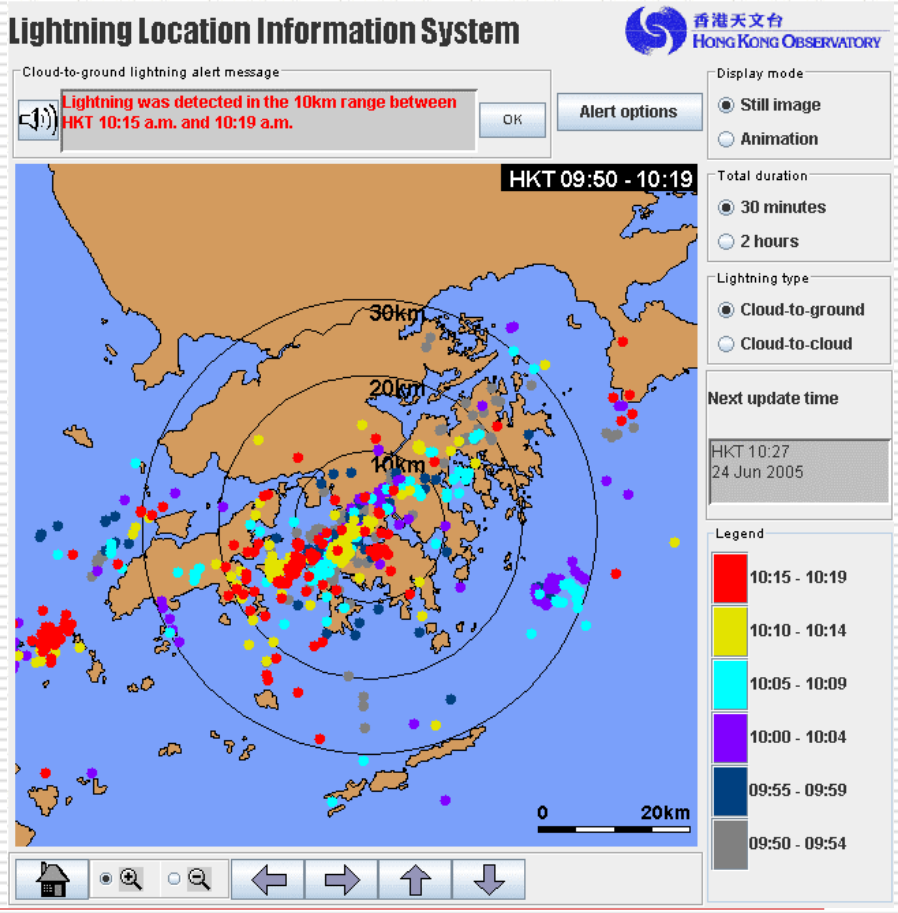
SMART TUNNEL

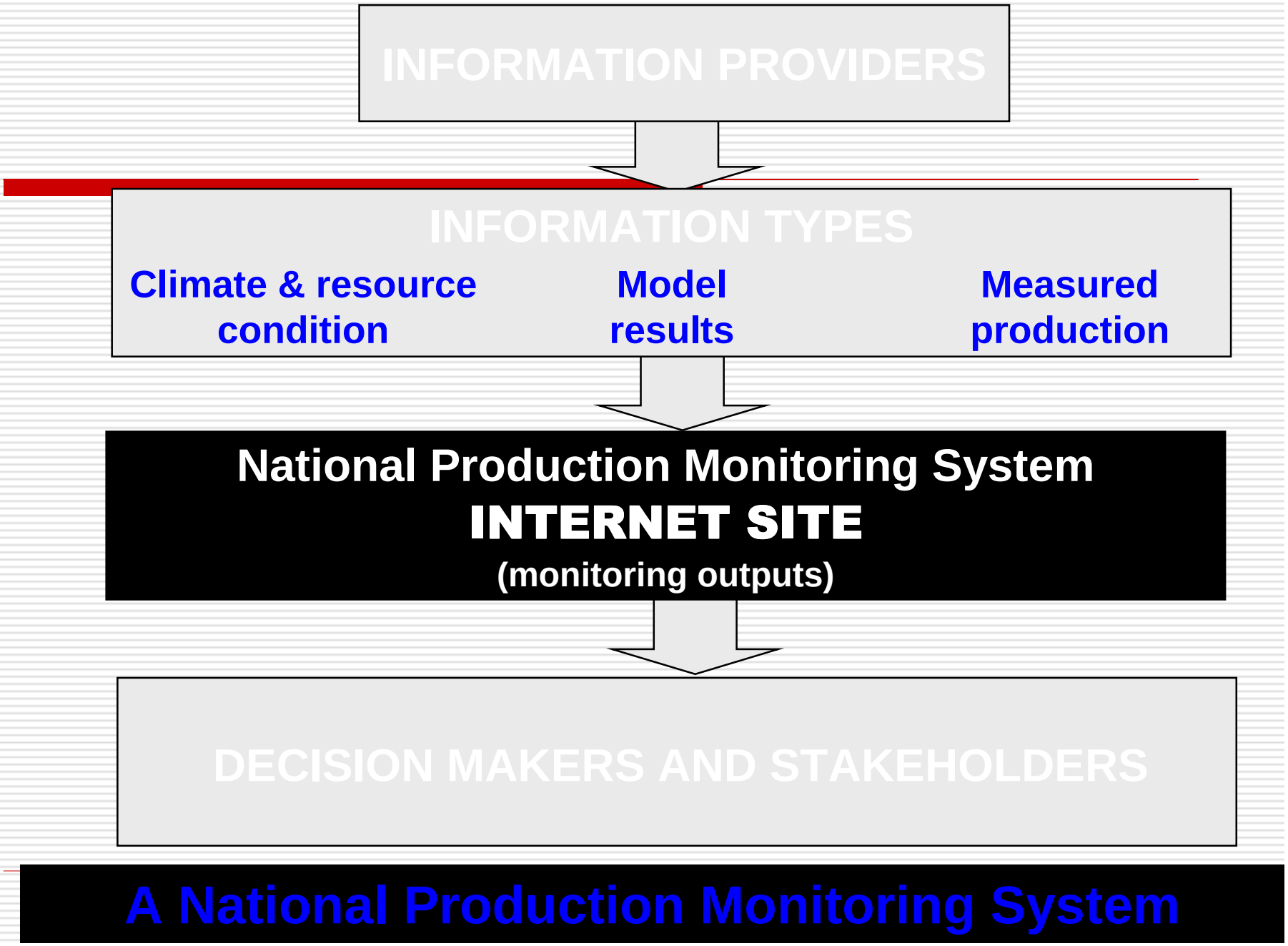


Lightning webpage for clients

- Password protected webpage
- Audio alarm range rings centred at user pre-defined location
- Maximum 3-level Ring Alert






INFORMATION PROVIDERS
INFORMATION TYPES
Climate & resource condition
Model results
Measured production
National Production Monitoring System
INTERNET SITE
(monitoring outputs)
DECISION MAKERS AND STAKEHOLDERS
A National Production Monitoring System

Heat/health watch/warning system

- HHWS is to predict, in advance, potentially oppressive weather conditions that could negatively affect health.
- HHWS includes mitigation plans, in the form intervention strategies, that can be implemented in order to reduce the health effects of heat stress.
- HHWS is therefore of direct benefit to society as it will help people to prepare for “heat waves” and reduce heat-related sickness and death.

Heat/health watch/warning system

- **Shanghai heat/Health Watch/Warning System was a weather/climate and health "Showcase Projects" promoted and financially supported by WMO and WHO.**
- **A lot of localization of the project has been carried on and a multi-approach method was used to establish the Heat/Health warning System.**
- **It has been put it into operation since 2002, cooperated with *Shanghai Health department***

Aim:

to deal with the impact of extreme heat events on human health to develop a coherent set of warning systems, improve mitigation measures and ultimately save lives.

Heat/health watch/warning system

The following components are required for an effective heat health warning system:

- Sufficiently reliable heat wave forecasts for the population of interest (meteorological component);
- Robust understanding in the cause-effect relationships between thermal environment and health (epidemiological or bio-meteorological component);
- Effective response measures to implement within the window of lead time provided by the warning (public health component and electricity department);
- The community in question must be able to provide the needed infrastructure (public health component).

Heat/health watch/warning system

Muti-Approach in establishing the HHWS

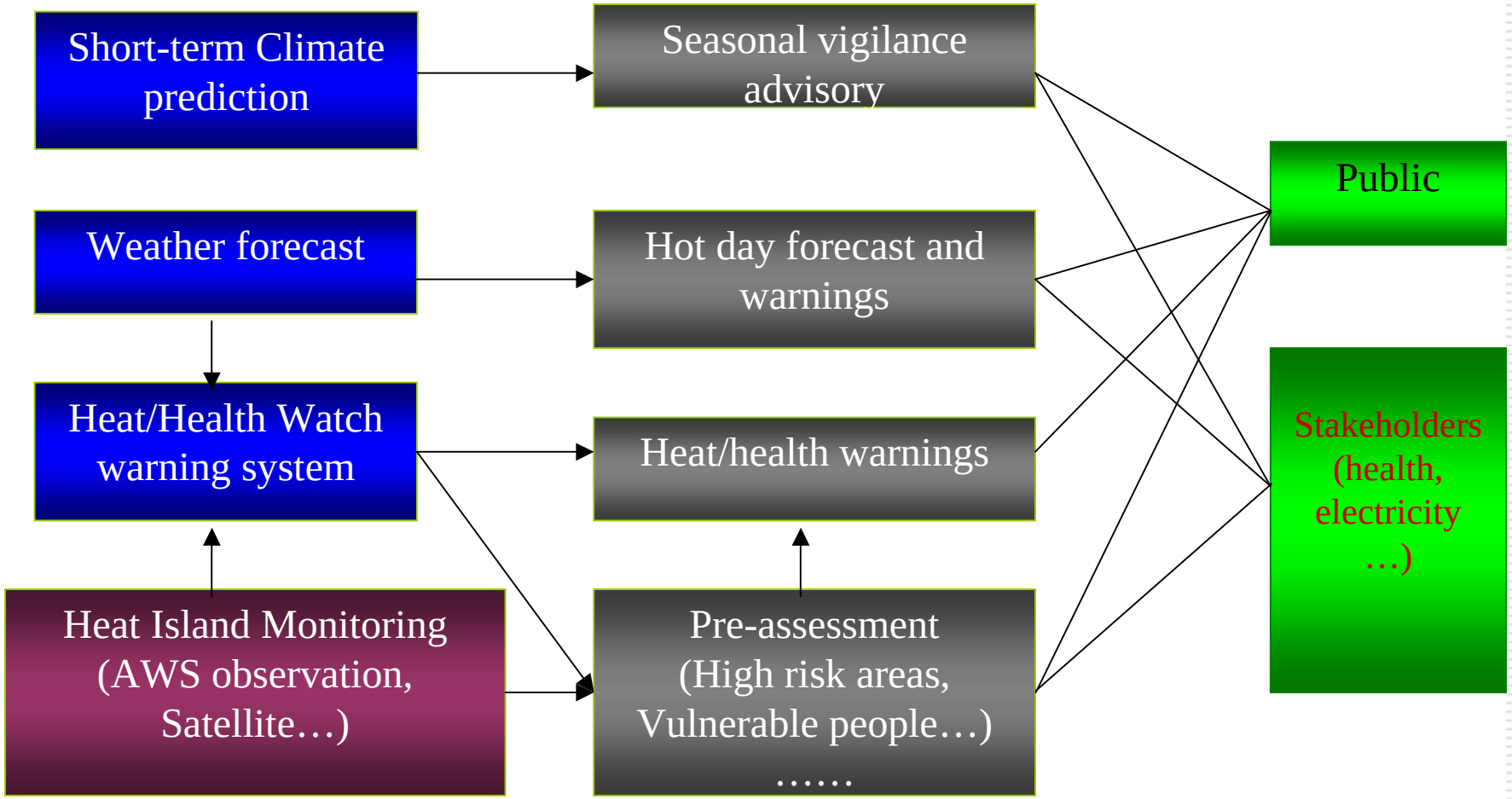
There is no standard international definition of a heat wave. Operational definitions are needed for meteorological services.

Globally, there are two kinds of approaches in establishing the HHWS

- Thermal index based HHWS
  including maximum temperature, heat index, comfortable index , human heat balance model derived thermal index(PMV, PET, PT* etc.)

- Synoptic classification based HHWS
  For example TSI and SSC methods develop by L. S.Kalkstein

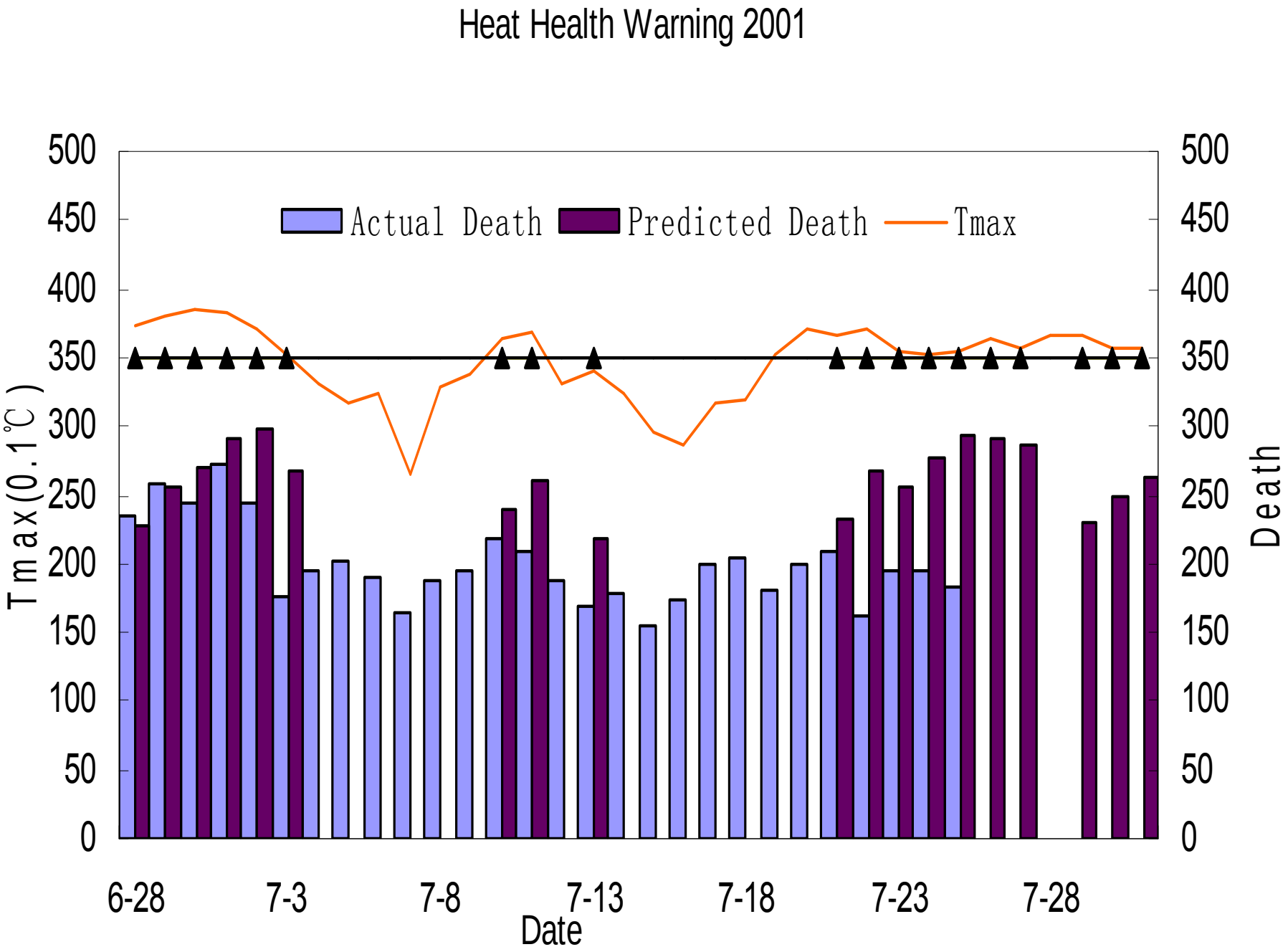
HHWS Operational Flow

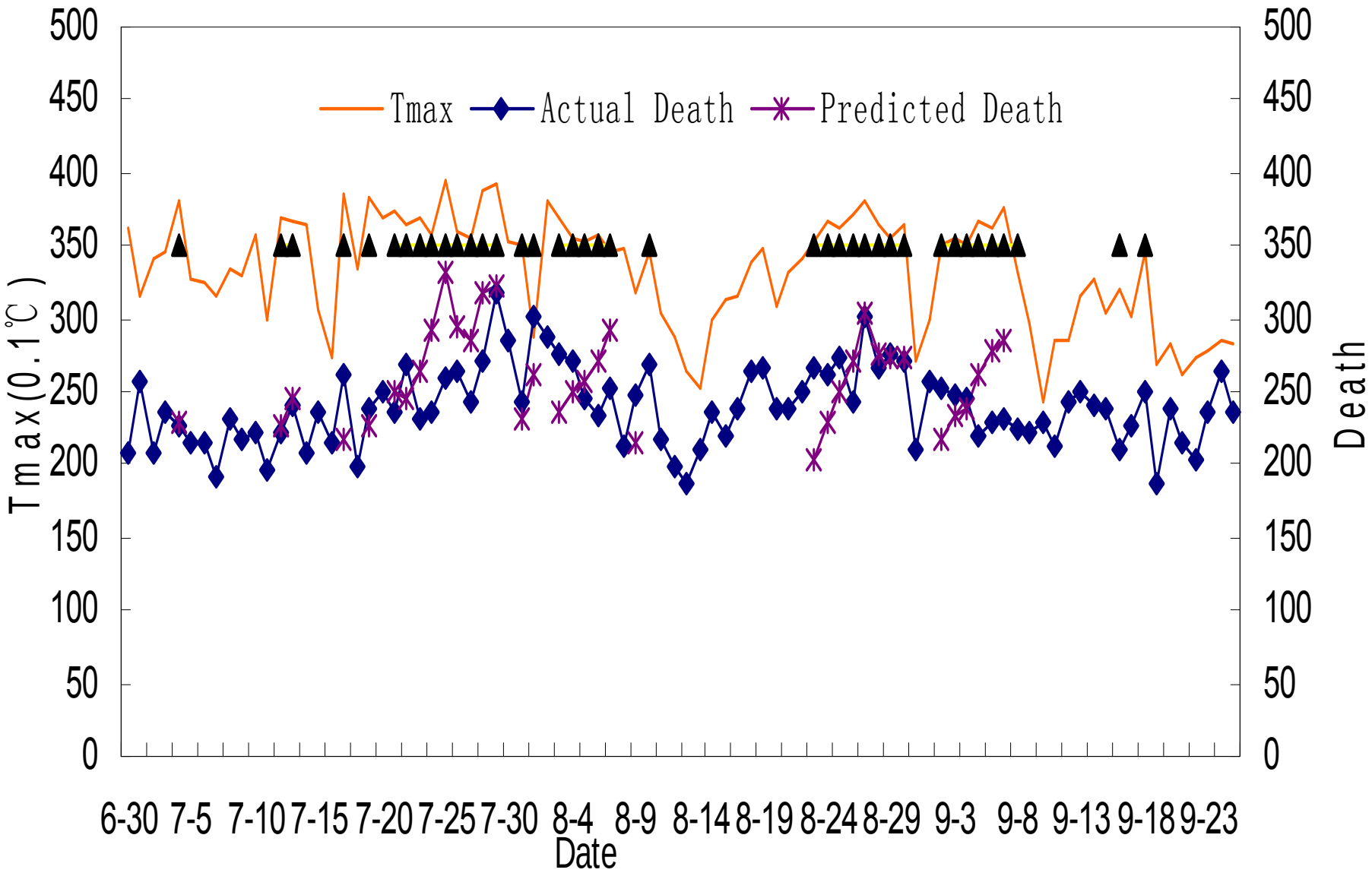


Heat Wave Warning Level and its Criteria

Level		Criteria
Blue	No	No offensive air mass(MT+) or excess deaths less than 39 deaths （≤ 1.0 σ ） be predicted
Yellow	Light	Offensive air mass(MT+) and 40~59 excess deaths(> 1.0 σ and < 1.5 σ) be predicted
Orange	Medium	Offensive air mass(MT+) and 60~79 excess deaths(> 1.5 σ and < 2.0 σ) be predicted
Red	Severe	Offensive air mass(MT+) and more than 80 excess deaths(> 2.0 σ) be predicted

The system become active on 1st June and stopped on 1st October.


Heat Health Warning 2001
Actual Death
Predicted Death
Tmax
Tmax(0.1℃)
Death
Date
500
450
400
350
300
250
200
150
100
50
0
6-28
7-3
7-8
7-13
7-18
7-23
7-28


Heat Health Warning 2003
Tmax
Actual Death
Predicted Death
Tmax(0.1℃)
Death
Date
500
450
400
350
300
250
200
150
100
50
0
6-30
7-5
7-10
7-15
7-20
7-25
7-30
8-4
8-9
8-14
8-19
8-24
8-29
9-3
9-8
9-13
9-18
9-23

Urban grid management based on fined meteorological information service in multi-hazard mitigation system

Urban Grid Management

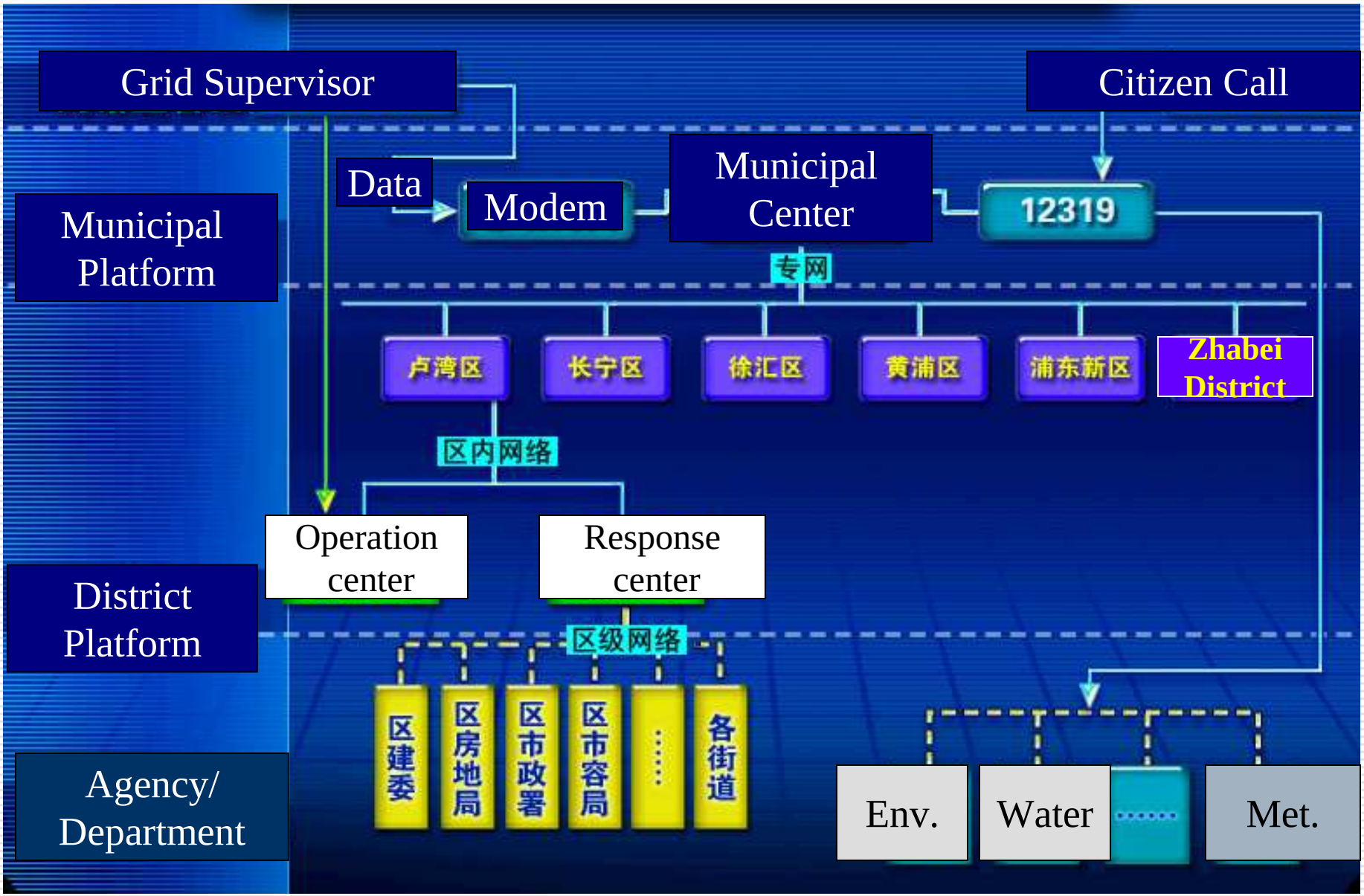
- **is an information collecting, sharing and disseminating platform with a supervisor in every basic unit with about 10,000 m^2 ;**
- **is a specific pattern for multi-hazard risk management in mega-city**
- **reflects the concept of residential community centered in multi-hazard mitigation**
- **has proactive, in-situ features for risk response**

What is the Urban Grid Management(UGM) Based on Fined Meteorological Information Service (FinMIS)

UGM based on FinMIS has the character of:

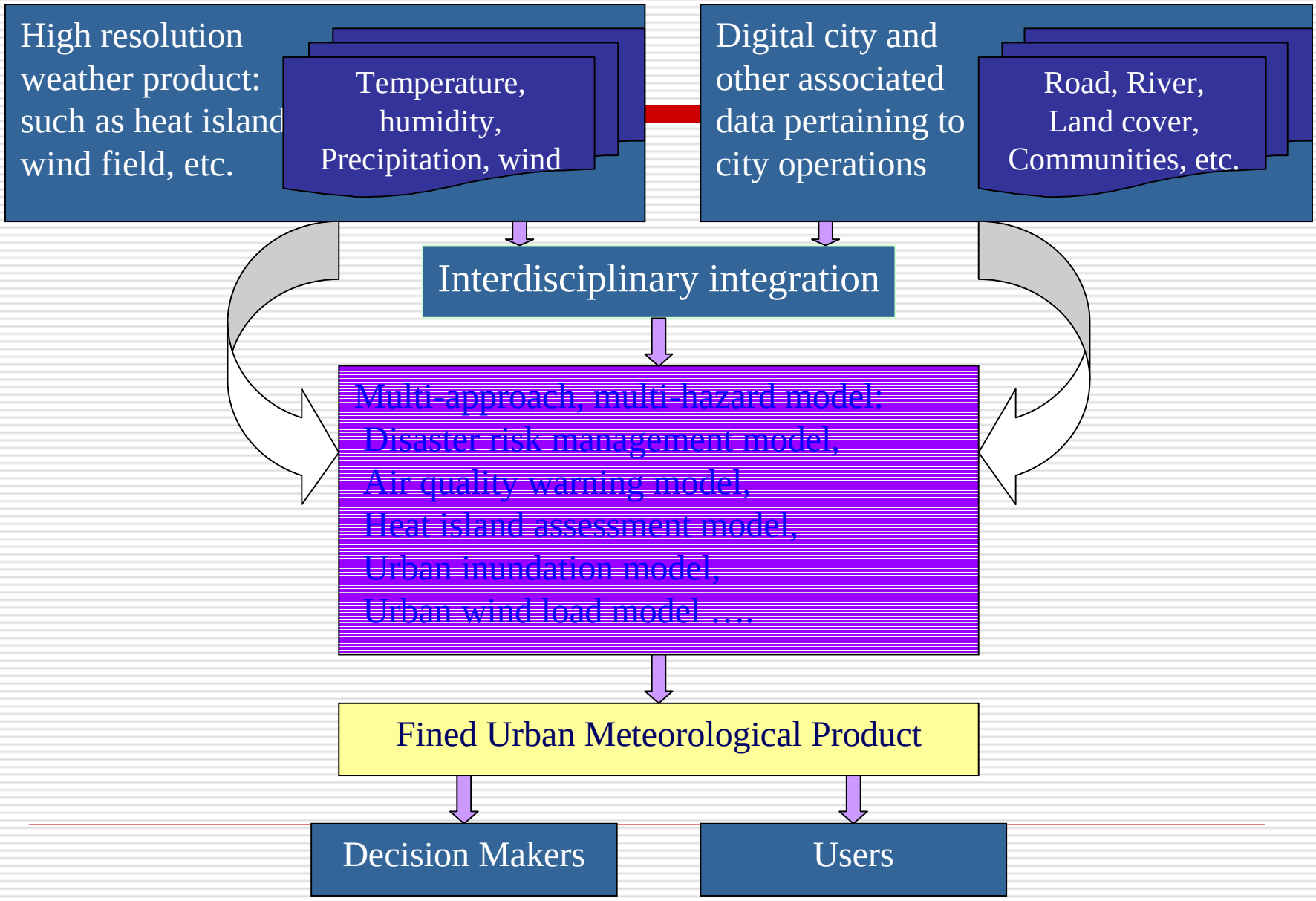
- **An meteorological information collecting, sharing and disseminating platform based on UGM net**
- **Focused on urban meteorological hazard observation, forecast and warning, such as urban inundation, urban wind hazard, fog, heat island, etc.**
- **Interactive service way based on fined met. information service and feedback (high spatial and temporal resolution, real time)from general public users**
- **A key component of the multi-hazard emergency response management**
- **Pre-assessment and scenario product**
- **Preparing plan of response action to multi-hazards**

Information flow of urban grid information management

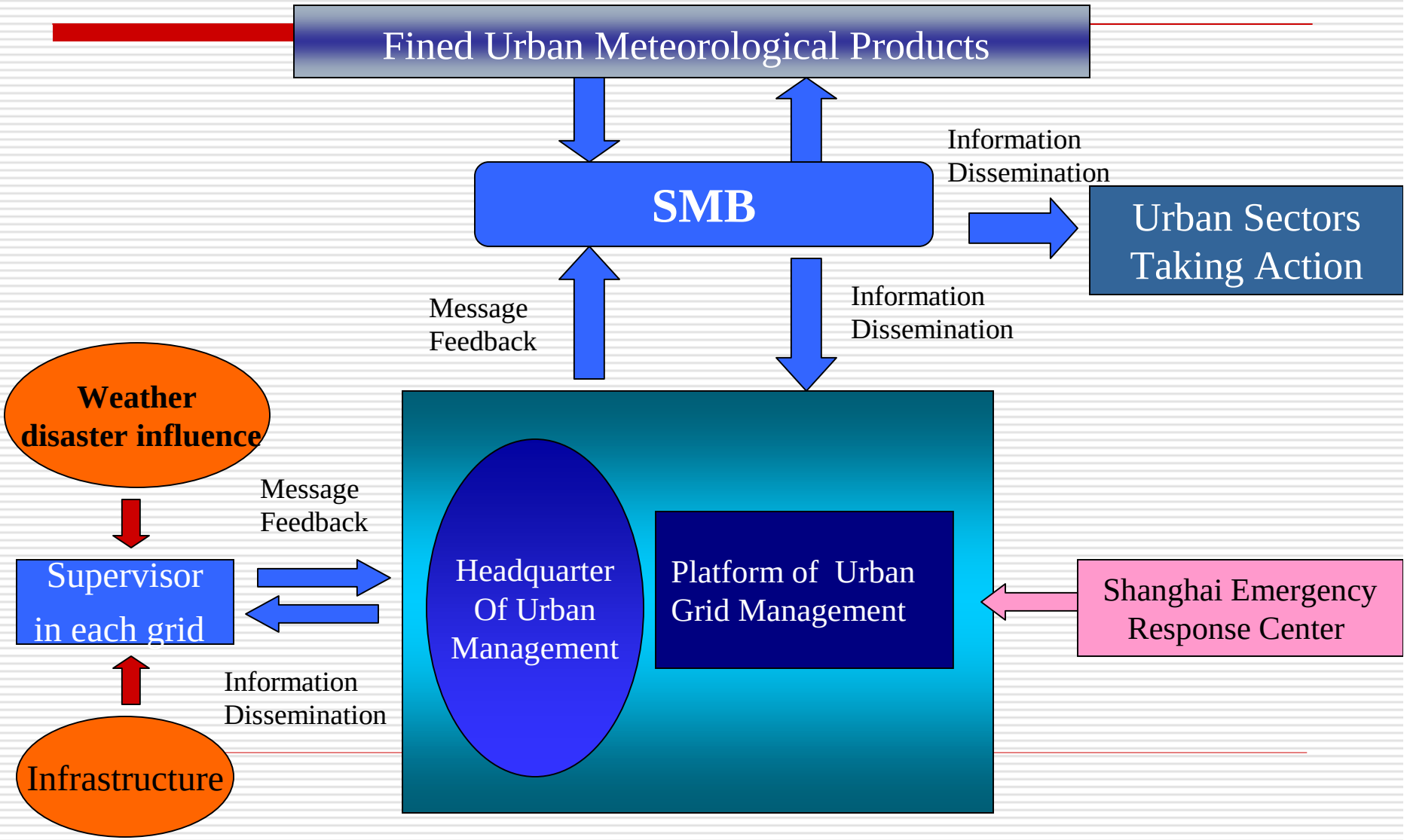


Grid of 10,000 m^2 at residential community

Framework of FinMIS in UGM



How to integrated meteorological products into the UGM

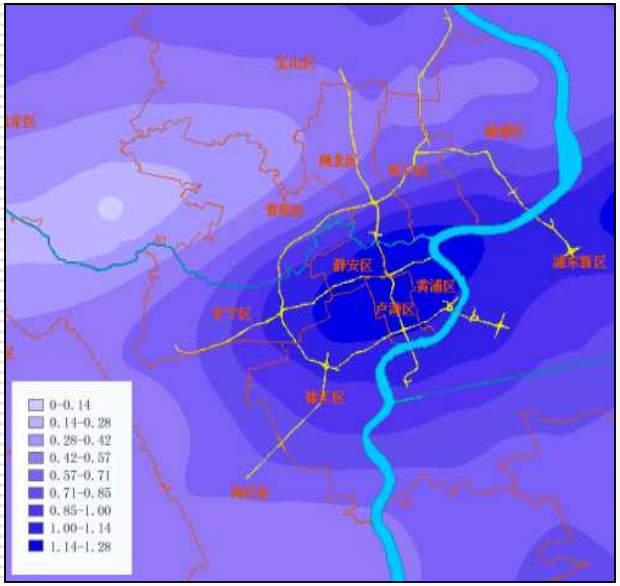


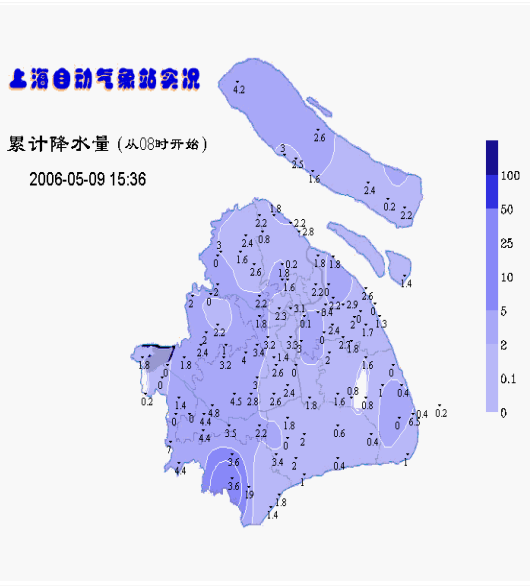
Meteorological service in UGM

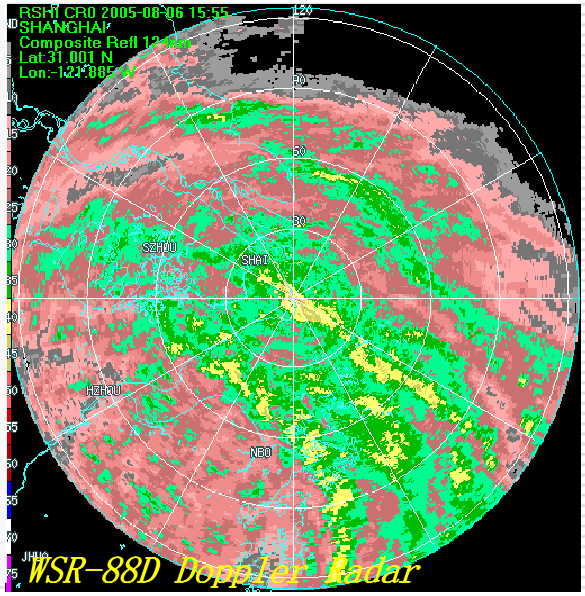
----Case of urban inundation system

Urban inundation system can present potential areas at risk of inundation and the estimate flood damages.

Meteorological input data is derived from high resolution NWP model, AWS and rain gauge acquiring system and C/X band weather radar system.







The data bases for the Shanghai urban area include:

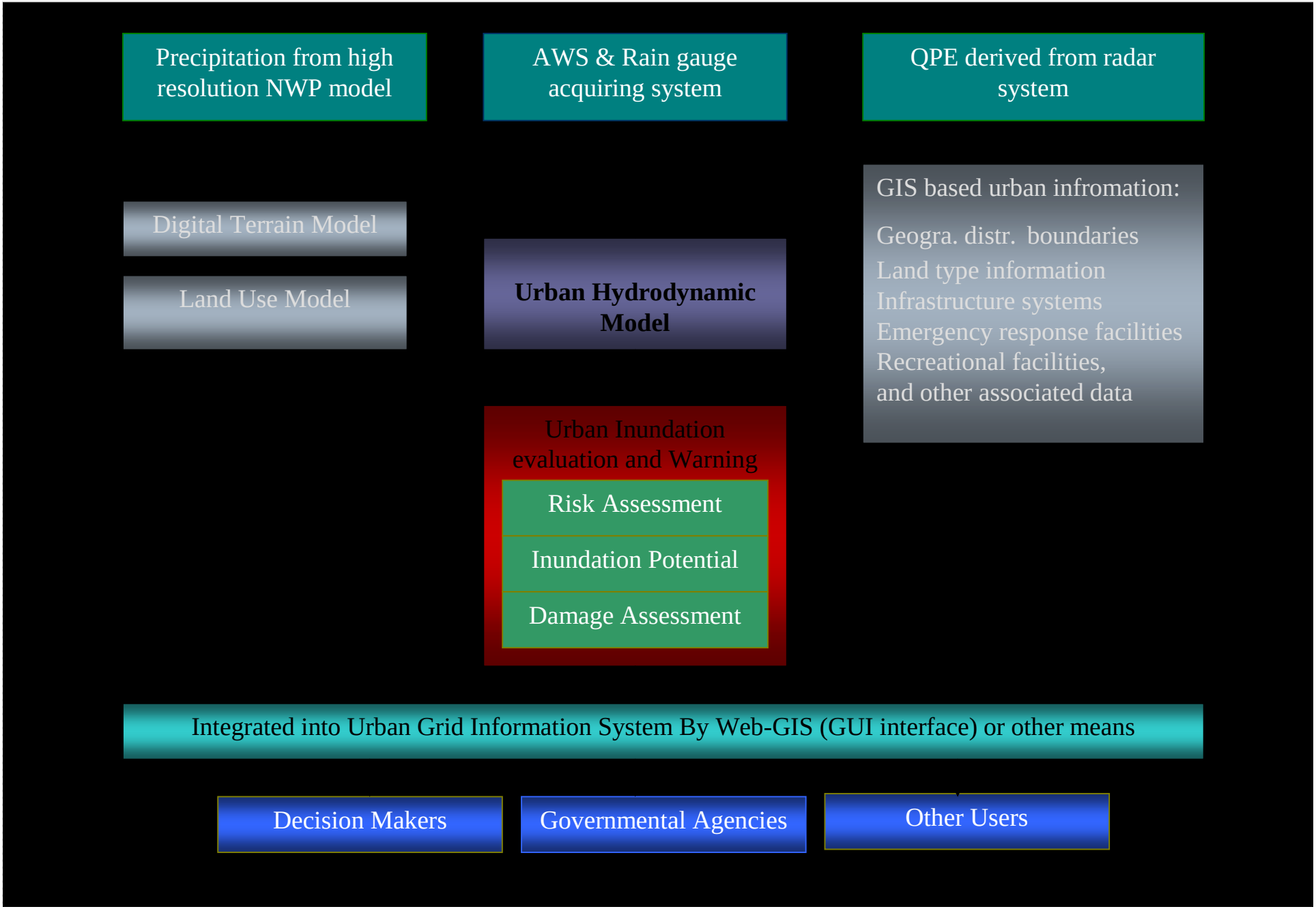
Geographic district boundaries,
land type information,
infrastructure systems (street network, water system, sewer system),
emergency response facilities
recreational facilities,
and other associated data pertaining to city operations

Data is maintained in both computer-aided design (CAD) and GIS file formats.

Urban inundation system also includes:

- A digital terrain model
- Several water surfaces of floods with different probabilities.
- Land use model or land-cover data
- The public economy statistics to estimate the property value on the flood-prone area.
- Damage functions for the computation of the flood damages.

The Framework of Urban Hydrodynamic Model



城市暴雨内涝仿真系统

城市暴雨内涝仿真模拟计算

数据采集

开始时间

2003年06月16日08:00时

结束时间

2003年06月16日08:00时

雨量站采样间隔 1小时

- 自动雨量站监测
- 中尺度数值预报
- 雷达监测

雨量资料采集　雨量数据浏览

资料源路径

资料存放路径

改变路径

面雨量计算

曲面方法　泰森方法

模型前处理

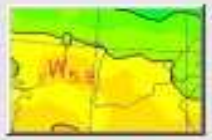
暴雨背景分析

灾情评估

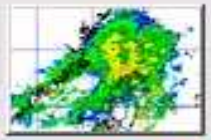
暴雨积水仿真模拟

面雨量类型：曲面法　泰森法

雨量监测模拟



数值预报模拟



雷达监测模拟

仿真模型调试

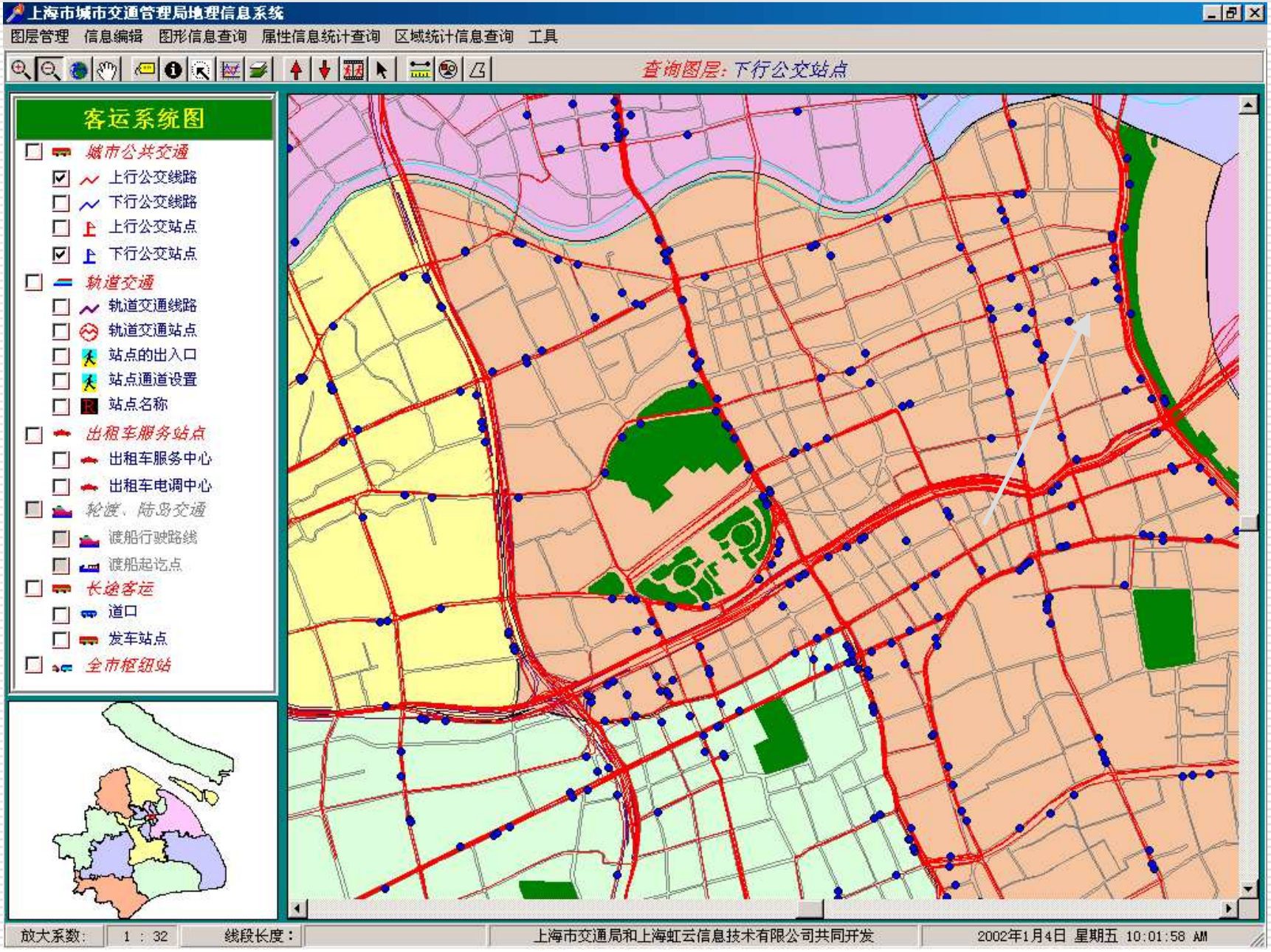
时间步长 10秒

泻流强度 30

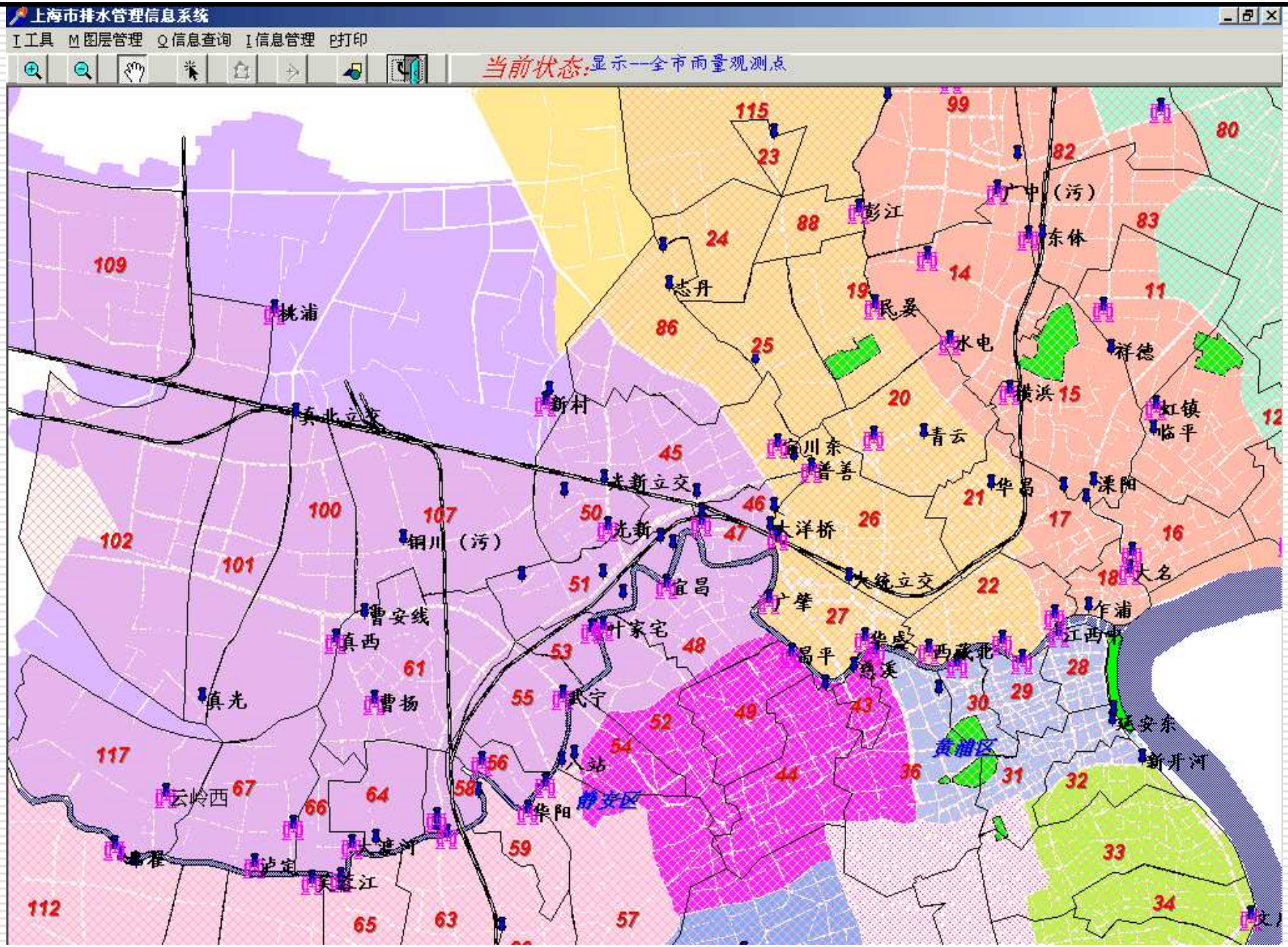
模拟结果显示

退出

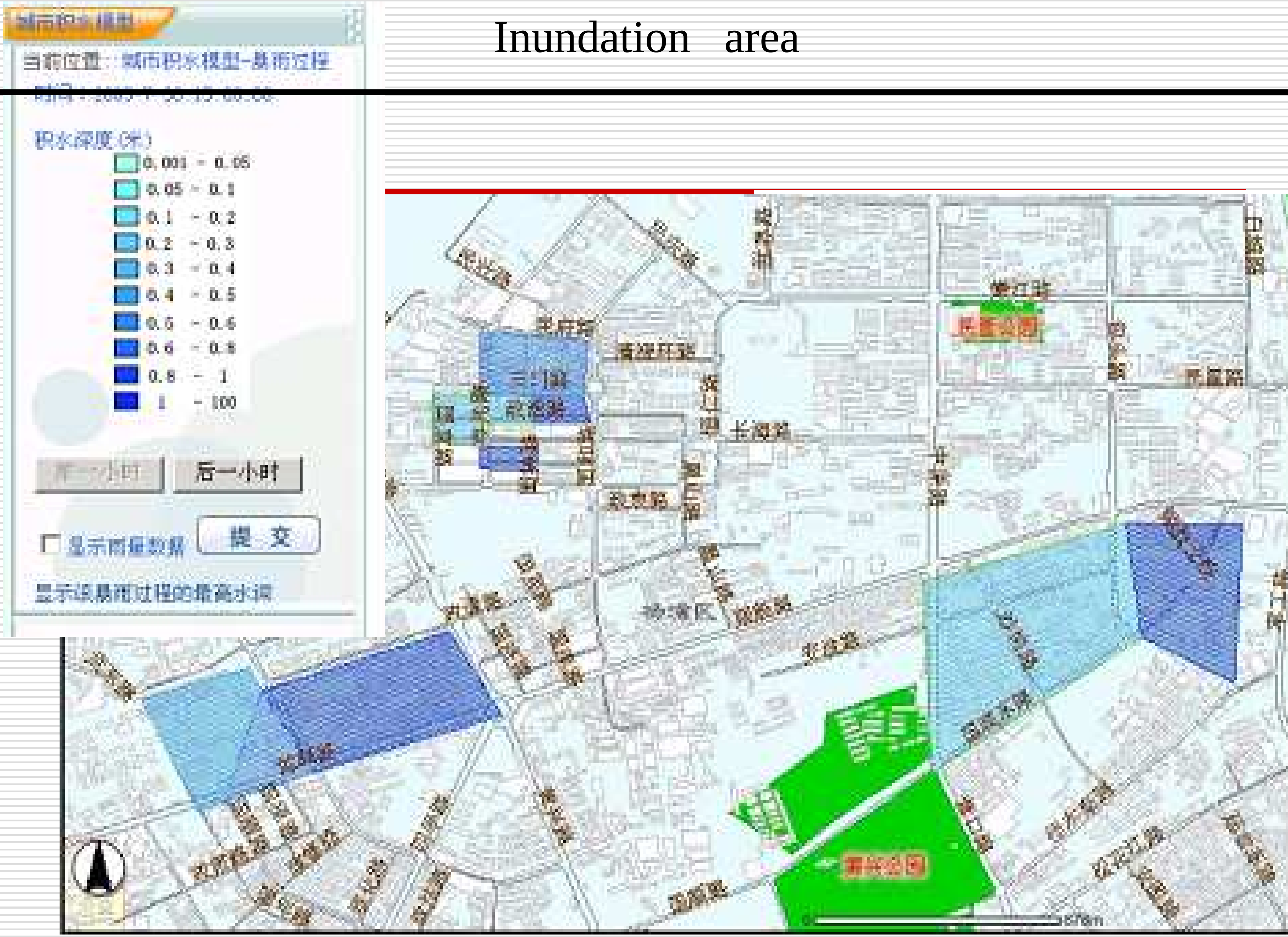
GIS based urban information



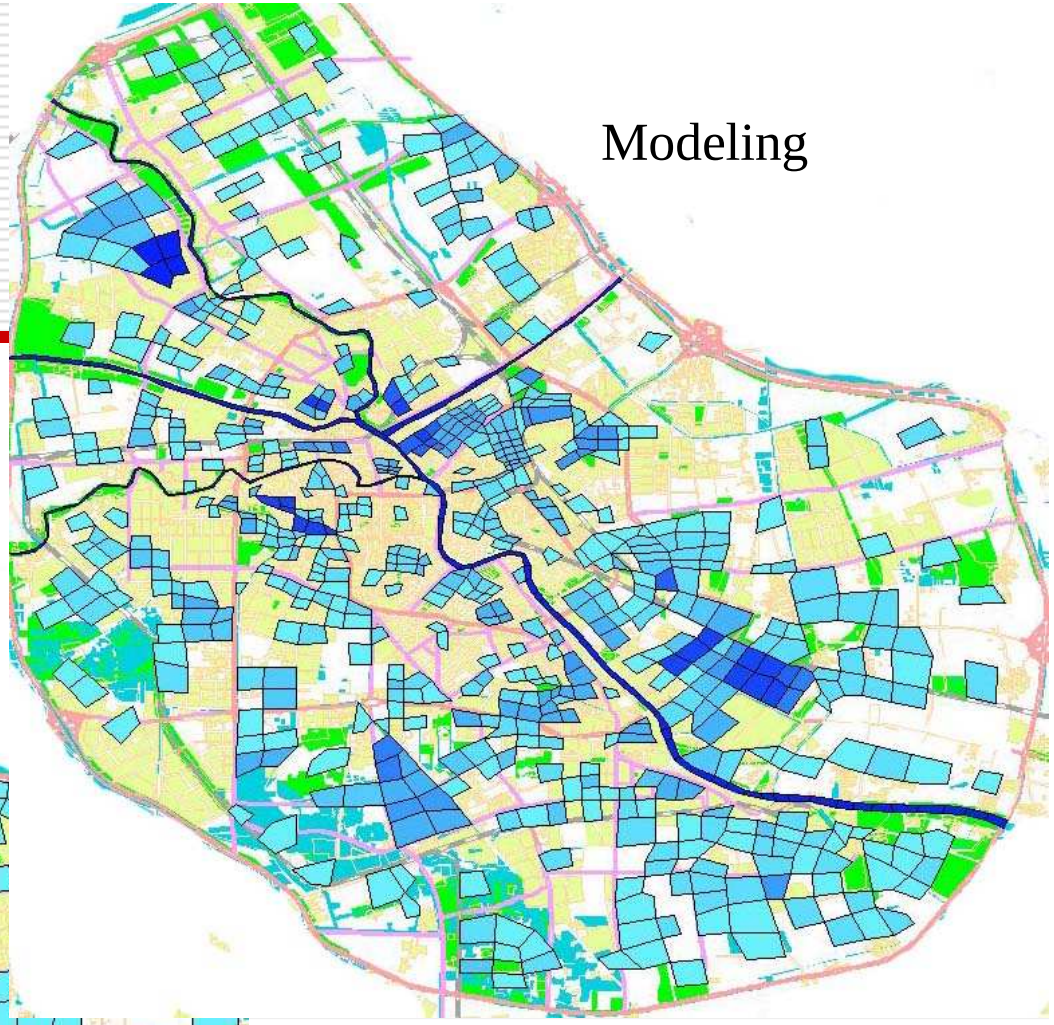
Sewer system



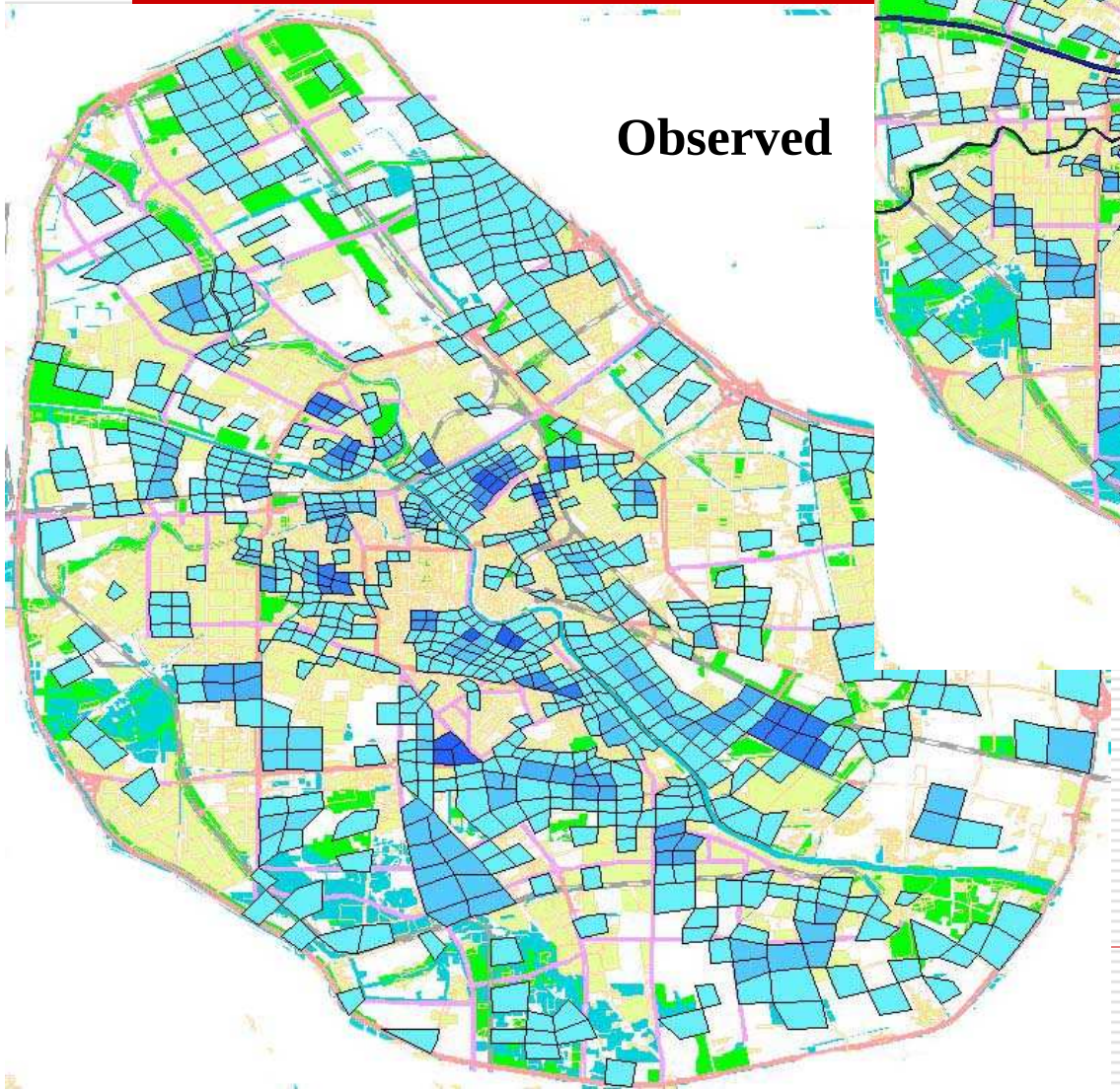
Inundation area



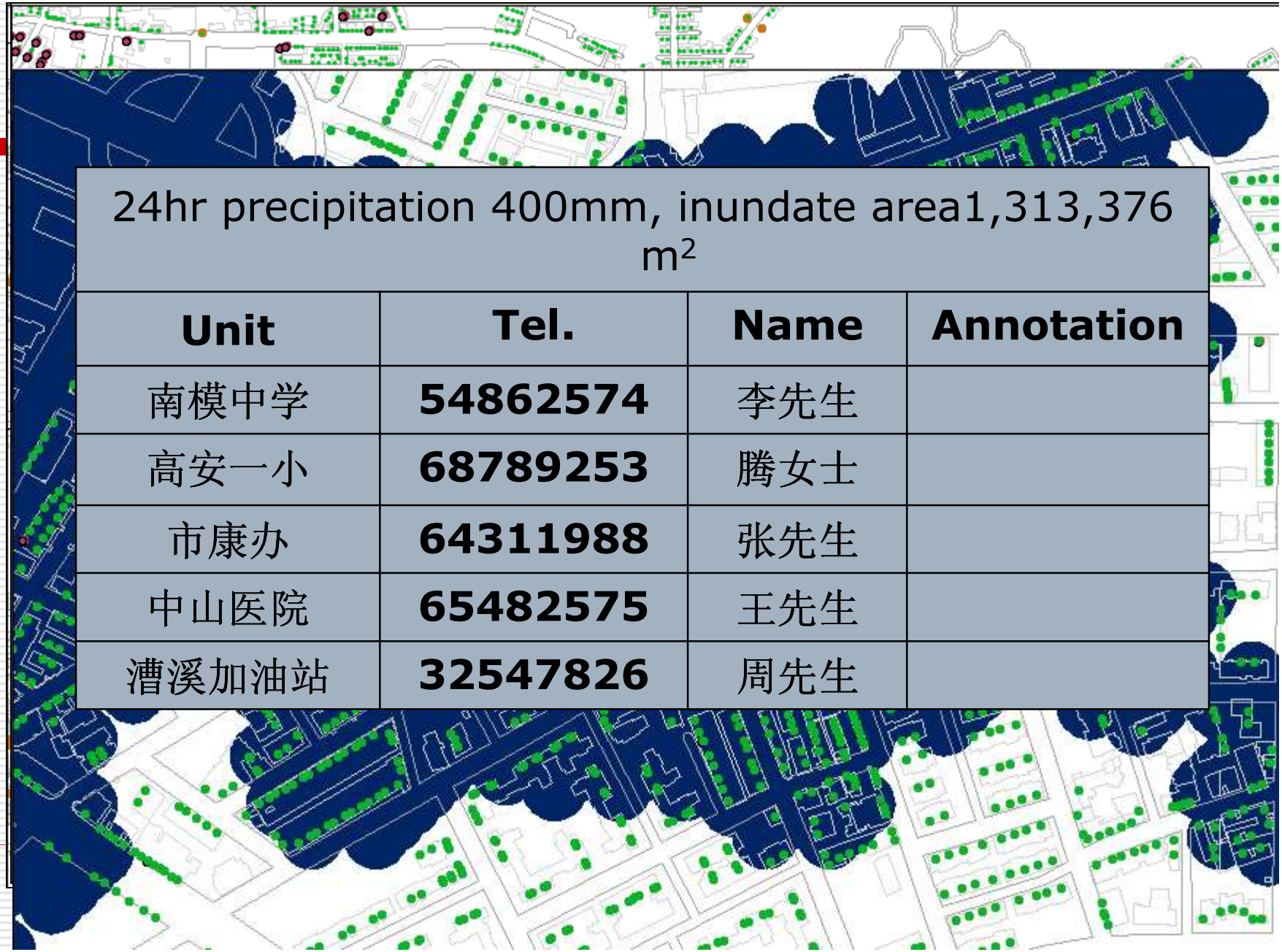
Modeling



Observed



Inundated area and affected unit



24hr precipitation 400mm, inundate area1,313,376 m^2			
Unit	**Tel.**	**Name**	**Annotation**
南模中学	**54862574**	李先生	
高安一小	**68789253**	腾女士	
市康办	**64311988**	张先生	
中山医院	**65482575**	王先生	
漕溪加油站	**32547826**	周先生	

Thank you for your attention!