

AREP
GAW



Overview of GURME

The WMO GAW Urban Research Meteorology
and Environment project

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WMO
OMM



World Meteorological Organization

Technical Departments

Observing and Information Systems (OBS)

Climate and Water (CLW)

Weather and Disaster Risk Reduction Services (WDS)

Research (RES)

Atmospheric Research and Environment Branch (ARE)

Atmospheric Environment Research Division (AER)

Global Atmosphere Watch (GAW)

GURME

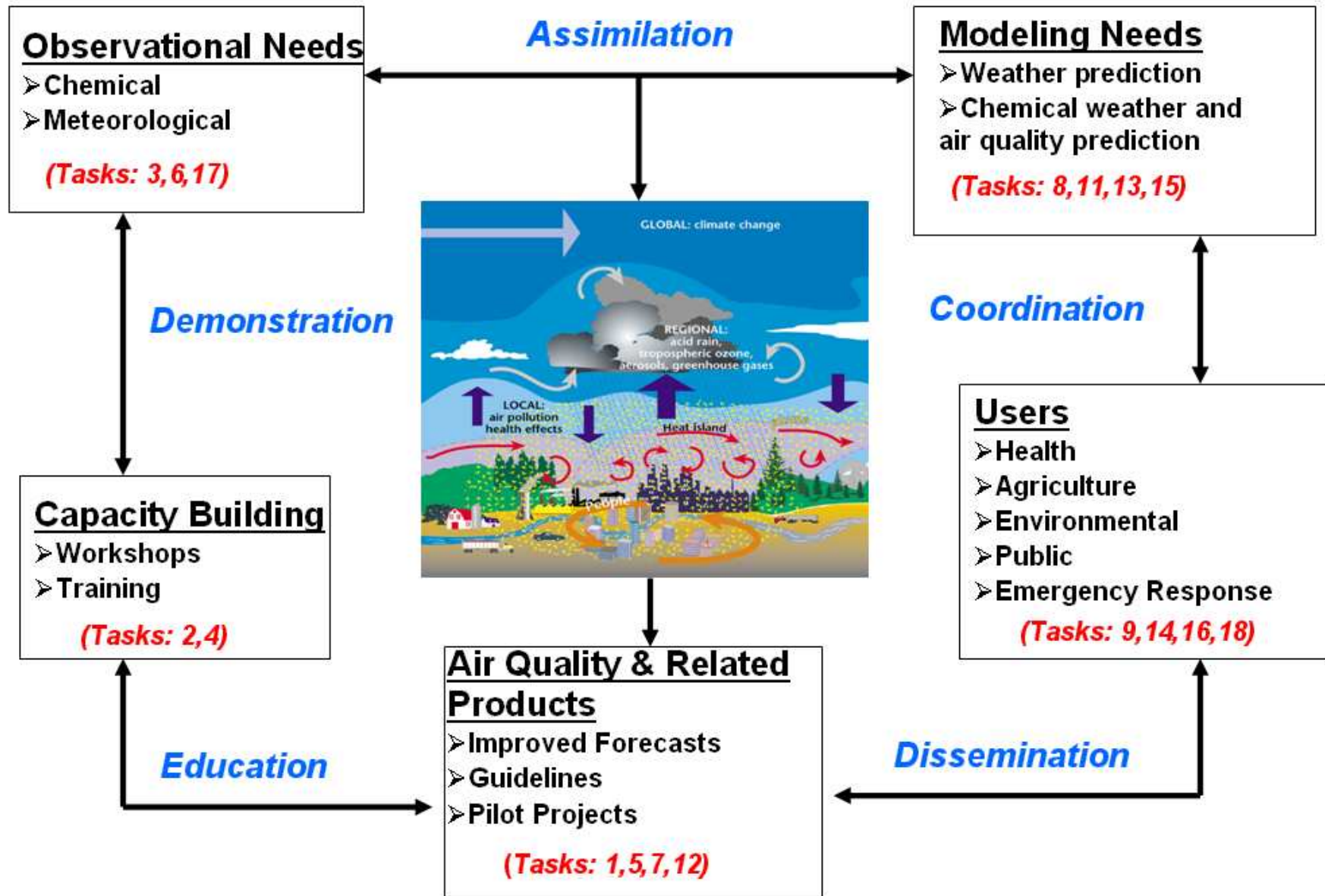
THE GAW MISSION

- Systematic long-term monitoring of atmospheric chemical and physical parameters globally
- Analysis and assessment
- Development of predictive capability
(GURME and SDS)

GAW Urban Research Meteorology and Environment Project (GURME)

- To **enhance the capabilities** of the National Meteorological and Hydrological Services (NMHSs) and others in providing urban-environmental **forecasting and air quality services** of high quality, illustrating the linkages between meteorology and air quality;
- To **provide** NMHSs and others with **easy access** to information on measurement and modeling techniques;
- To **promote a series of pilot projects** to demonstrate how NMHSs and others can successfully expand their activities into urban environment issues;
- In **collaboration** with other WMO programmes, WHO and environmental agencies, to **better define meteorological and air quality measurements** focusing specifically on those that support urban forecasting.

GURME Tasks For The Strategic Planning Period 2008-2015





GURME FOCUS: Urban Air Quality Modelling and Forecasting

- (1) Capacity building**
- (2) Pilot projects**

Example of GURME project: Latin American Cities



Sao Paulo, Brazil

Mexico City, Mexico

Santiago, Chile

Improvement of AQ forecasting in Latin American cities through capacity building

- First Air Quality Forecasting Workshop for the Latin American Cities October, 2003, Santiago, Chile;
- Workshop on application of WRF/Chem Model and Use of Remote sensing, 2006, Sao Paulo
- Training Workshop on AQF for Latin American countries, 2006, Lima
- Training Course on AQ Modelling

NMHSs - Universities - Environmental Agencies

GURME Training Course

- **Develop and deliver to staff in national meteorological services, scientists and others involved in air quality issues.**
- **Designed to provide the background knowledge needed to design, develop, implement and evaluate air quality modelling and/or forecasting activities.**
- **The course contains practical advice, introduces the participants to available tools and methods**
- **Material available on the web**

GURME Air Quality Workshops

- Regional Workshop (WS) on Air Quality Forecasting (AQF)
August 2000, Kuching, Malaysia
- Expert Workshop on AQF
October 2002, Cuernavaca, Mexico
- Expert WS on AQF for Latin American project
October 2003, Santiago de Chile
- Training WS on AQF WRF Chem and Satellites
January 2006, Sao Paulo, Brazil
- Training WS on (Basic) AQF for Latin American Countries
July 2006, Lima, Peru
- Training Course on Air Quality Forecasting for India and South Asia
December 2008, Pune, India
- Training Course on AQ Modelling for Latin American
Cities project
10 – 14 August 2009, Mexico City

Important findings from the AQF workshops include:

- There is growing experience and interest in air quality forecasting;
- Air quality forecasting and management share a common science-base;
- Improvements in AQ forecasting will come from:
 - 1.** Better understanding of local situations and of key processes (e.g., local winds, boundary layer dynamics, emissions);
 - 2.** Increasing accuracy in the meteorological forecasts;
 - 3.** The act of doing – increased experience will lead to enhanced capability;
 - 4.** Improvements in emission estimates;
 - 5.** Observational network to support forecasts through data assimilation.



**GURME Experts Meeting In
Cuernavaca Mexico**

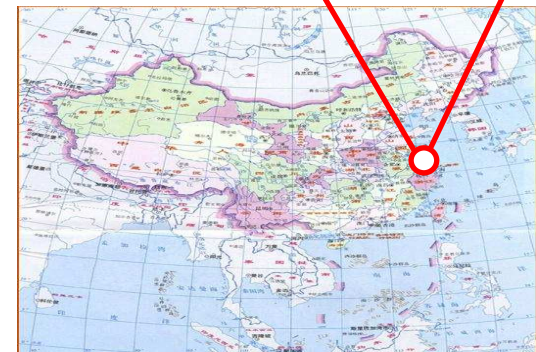
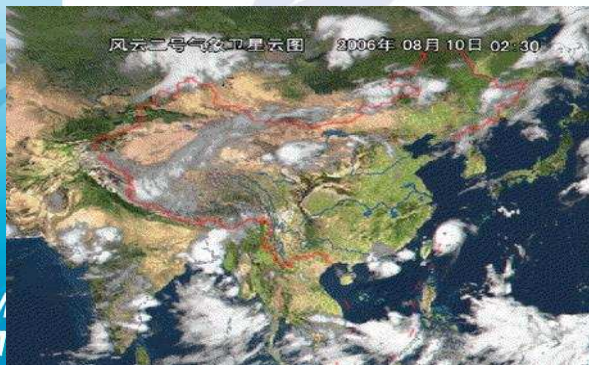
Pilot example: Shanghai MHEWS

Multi-Hazard Early Warning System

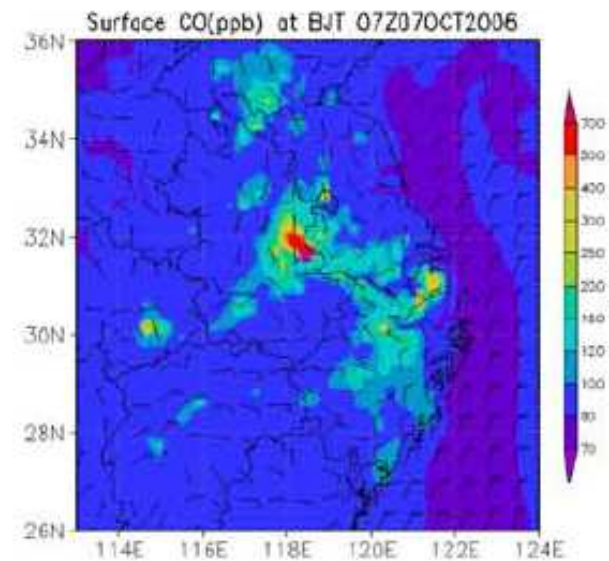
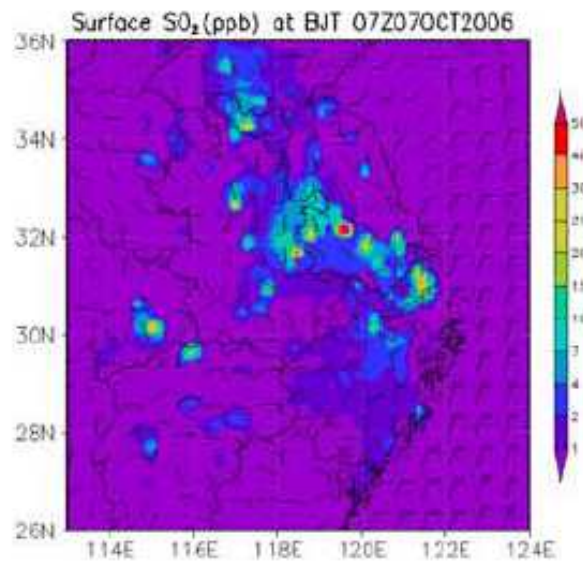
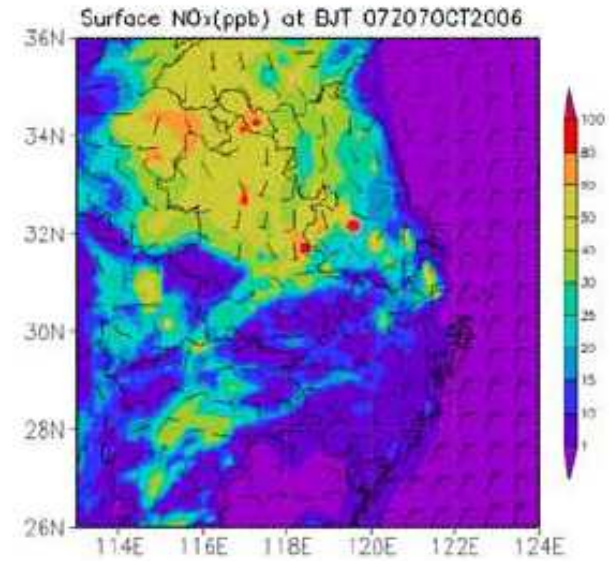
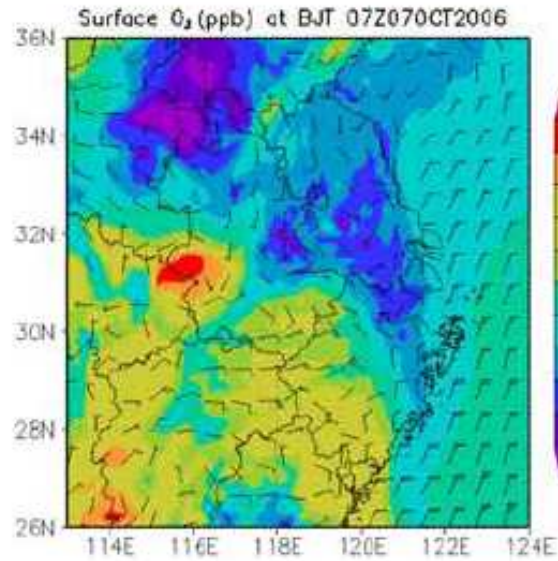
Shanghai is a mega-city situated on the shores of the East China Sea and the Yangtze River Mouth

- dense population: 18 million
- rapid economic development: aiming to be the **economic, financial, trade, and transportation center** of China.
- **Threat of Multi-Hazard to Shanghai:** frequently affected by natural hazards such as **typhoons and associated marine hazards such as storm surge, heavy storms, heavy fog, heat-waves, and by atmospheric pollution episodes $\sim > 100 \mu\text{g}/\text{m}^3$ PM**

Shanghai GURME project: air pollution, heat island, urban relevant meteorological measurements



AQ Forecasts with WRF-Chem and CMAQ-MM5



GURME Role in Shanghai MHEWS Projects

- Provided an overview of the current operational air quality forecasting tools and their requirements, including measurement needs;
- Suggested relevant researches that can be expected to improve operational models in the next few years;
- Developed recommendations for the direction of improving air quality forecasting.

GURME Tasks For The Strategic Planning Period 2008-2015

