

**AREP
GAW**



Overview of GURME

**The WMO GAW Urban Research Meteorology
and Environment project**

**Liisa Jalkanen
WMO Secretariat**

**WMO
OMM**

World Meteorological Organization

Independent technical UN agency

187 Members manage through WMO Congress and Executive Council

Secretariat in Geneva (staff 280)

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

GAW observations

- Stratospheric Ozone
- Tropospheric Ozone
- Greenhouse Gases (CO_2 , CH_4 , N_2O , CFCs)
- Reactive Gases (CO , VOC, NO_y , SO_2)
- Precipitation Chemistry
- Aerosols (chemical, physical, AOD)
- UV Radiation
- (Natural Radionuclides, Rn^{222} , Be^7 , ^{14}CO)

Components of the GAW Programme

Expert Groups
Chapter 2.3

OPAG EPAC
JSSC

Scientific Advisory Groups
Ozone | UV | GHG | RG | PC
Aerosols | GURME

ET-WDC

Administration
Management
Chapter 2.5

WMO/GAW
Secretariat

IGACO Offices
Ozone/UV | GHG | Air Quality | Aerosols

Central
Facilities
Chapter 2.4

QA/SACs
WCCs | RCCs

CCLs

WDCs & GAWSIS
WOUDC | WDCGG | WDCA
WRDC | WDCPC | WDC-RSAT

Observing
Systems
Chapter 3

Contributing
Networks

GAW Stations
Global | Regional
Contributing

Satellites
Aircraft

Users &
Applications

Parties to the
Conventions
UNFCCC | Vienna C.

Systems
GEOSS | GCOS
GMES | ...

Programs
IGAC | SOLAS
iLEAPS | ...

Operational
Centers

Research
Projects

SSHSS

GAW Station Information System

...

GAW SIS Online - comprehensive information on all GAW stations

- **Database**
- **Search / Update**
- **Inventory / Audit**

(Supported by Switzerland)

GAWSIS 2.1 - Microsoft Internet Explorer
Address: http://www.empa.ch/gaw/gawsis/

GAWSIS STATION INFORMATION SYSTEM

Welcome to GAWSIS!
GAWSIS is being developed and maintained by QA/SAC Switzerland in collaboration with the WMO GAW Secretariat, the GAW World Data Centres and other GAW representatives to improve the management of information about the GAW network of ground-based stations. The goal is to provide the GAW community and other interested people with an up-to-date, searchable data base of

- site descriptions
- measurement programs and available data
- contact people

Please provide [feed-back](#) that may help us improve this site. Thanks to all who help keep the underlying information current.

QuickFind

Station Report:
Contact Information:

Select by Station type: Global Regional Contributing

Select by Parameter:

Buttons: Refresh, Reset, Navigation arrows

04-Jun-2004

World map showing station locations (GAW Regional Station, Contributing Station, GAW Global Station)

GAWSIS 2.1 © atmospheric.berlin.de

QA/SAC Switzerland is hosted by the Swiss Federal Laboratories for Materials Testing and Research (EMPA), Dübendorf, Switzerland. Funding provided by MeteoSwiss is gratefully acknowledged.

GAWSIS 2.1 - Microsoft Internet Explorer
Address: http://www.empa.ch/gaw/gawsis/reports.asp

GAWSIS STATION INFORMATION SYSTEM

Station Characteristics
06.04.2004 10:04:29/0

GAW ID Jungfrauoch (Switzerland)

station status full operation
time zone UTC+1
climate zone xx (High Alpine)

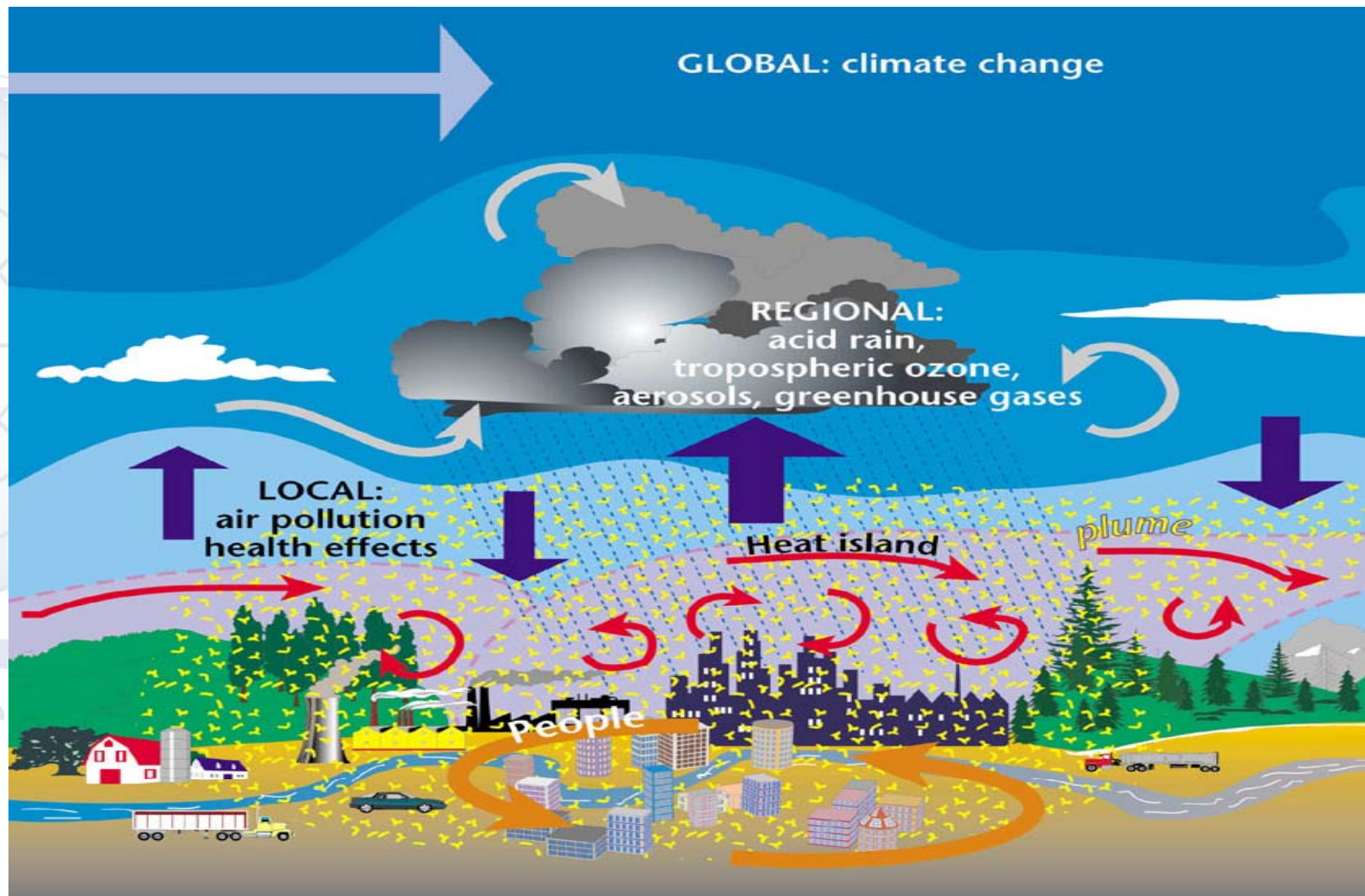
description
The high alpine research station Jungfrauoch is situated on a mountain saddle between the two mountains Jungfrau (4158m) and Mönch (4099m). The station is located in the center of Europe and is surrounded by highly industrialized regions. This special geographical situation offers the opportunity to monitor background concentrations but also to investigate the transport of anthropogenic pollutants from the boundary layer to the free troposphere.

Measurement Program

type	parameter	method	start	end	details
Aerosol	Light absorption coefficient	Aethalometer	01.08.1995		i
	Light scattering coefficient	Nephelometer	01.08.1995		i
	Mass (major inorganic components)	Ion Chromatography (IC) [general]	01.07.1999		i
	Mass (total aerosol)	Filter sampling + gravimetry	1973		i
	Number concentration	Condensation particle counter (CPC)	01.08.1995		i
Optical depth		Sunphotometry/Filter Radiometry	01.04.1999		i
Greenhouse Gas	CFCs	GC-MS	01.01.2000		i
	HFCs	GC-MS	01.01.2000		i

www.jfiunqoch.ch

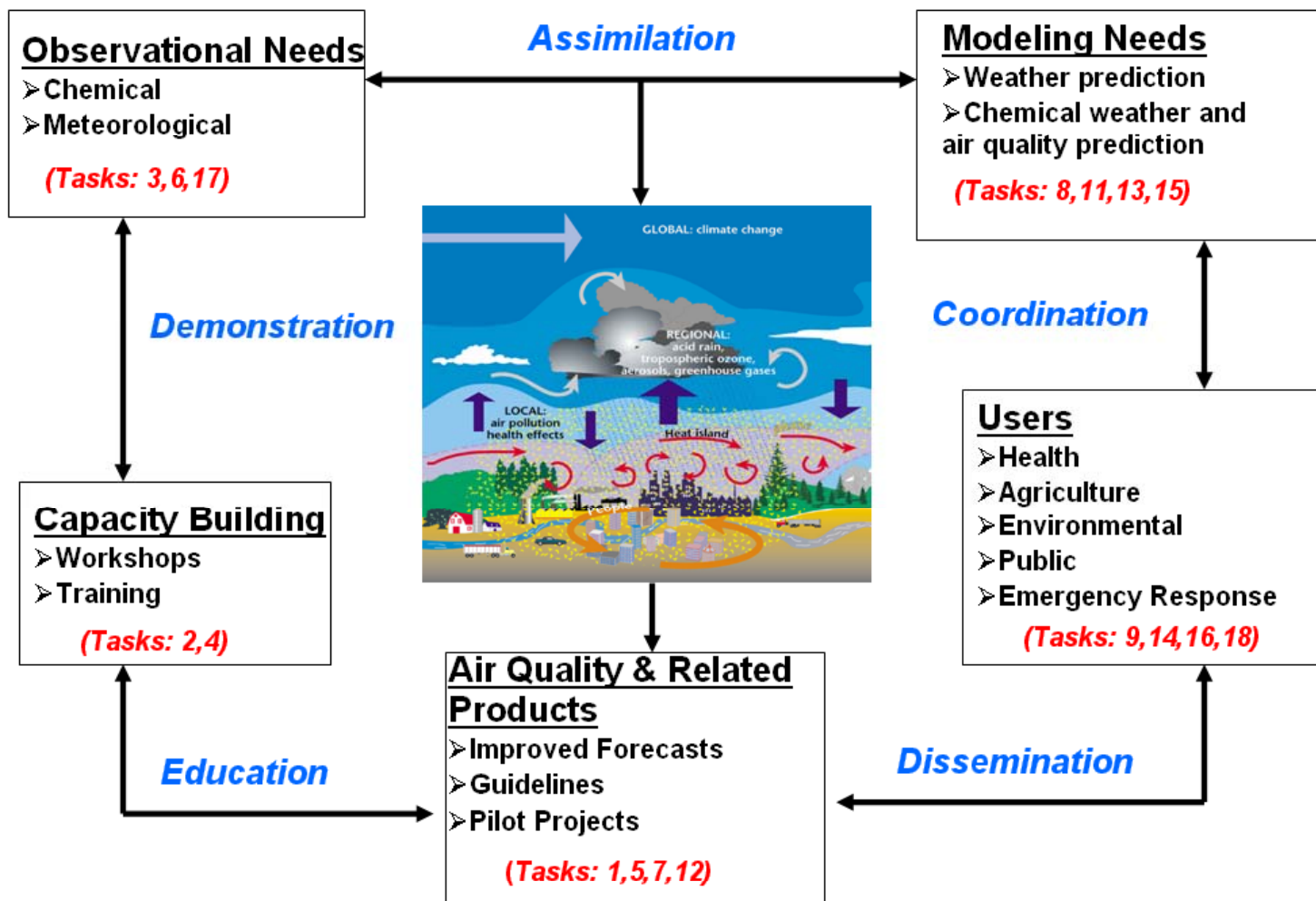
GAW Urban Research Meteorology and Environment GURME project



GAW Urban Research Meteorology and Environment Project (GURME)

- To **enhance the capabilities** of 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



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

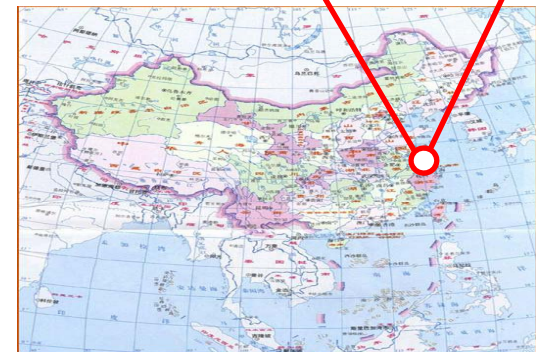
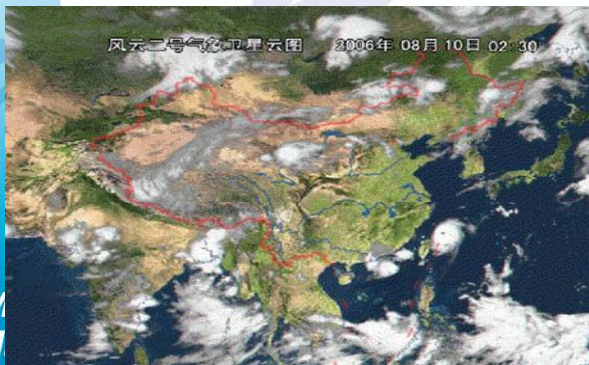
NMHSs - Universities - Environmental Agencies

Another example: Shanghai MHEWS

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**

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



EXPO 2010

Better City, Better Life

WMO has confirmed officially its participation.

The pavilion is planned to have three components:

- Multi-hazard early warning demonstration
- Integrated global observing system
- Climate change

Other agreed activities:

Second World Conference on Broadcast Meteorology

with live weather forecast around the world during the **conference** (planned)

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North Elevation

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A Contour-Design Description of the Pavilion named “Cloud Droplets”

GURME measurements: Passive Samplers

Project lead: Greg Carmichael, Martin Ferm

Measured gases: SO_2 , NH_3 , O_3 , NO , NO_2 , HCOOH , CH_3COOH , benzene, ethyl benzene, toluene, xylenes.

Ideal for: Mapping concentrations in cities, siting of more advanced stations, personal monitoring.

Advantages: small, no electricity needed, no inlets, large measurement range, technical personnel not needed at site, 100 % time coverage can be obtained, simple to deploy, easy to mail, inexpensive.

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GURME FOCUS:

**Air Quality
Modelling and Forecasting**

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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);
 2. Increasing accuracy in the meteorological forecasts;
 3. The act of doing – increased experience will lead to enhanced capability;
 4. Improvements in emission estimates.

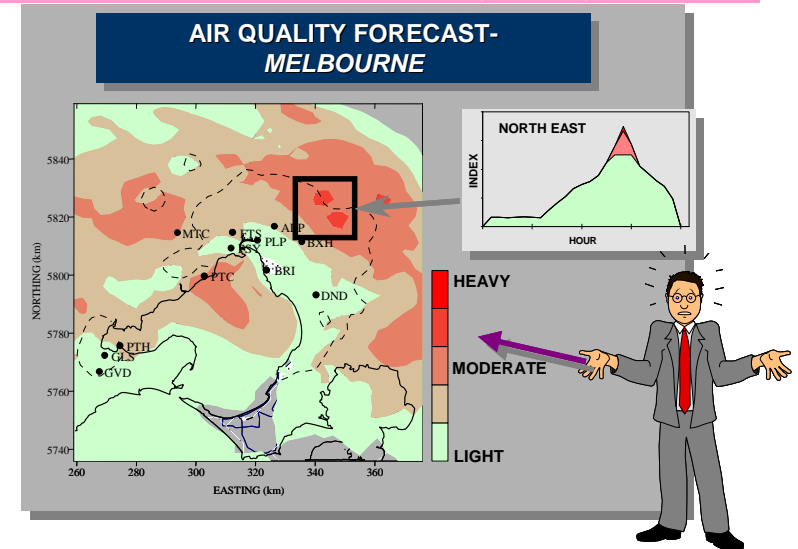


GURME Experts Meeting In Cuernavaca Mexico

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
- First course was developed by the GURME Training Team (GTT) and the first 5-d training workshop was held in Lima, Peru July 2006
- Pune, India, course Dec 2008 new items, local experts
- Mexico City, local and Latin American project expertise, focus on modelling and on WRF
- Course planned to be held in Shanghai
- Material available on the web

**Tomorrow will be fine and sunny
-with moderate to heavy air pollution**





**Good news is:
Air quality forecast
can be changed!**



**WMO large interest in early warning
systems (EWS)
especially multi-hazard (MH),
that is: MHEWS**

Air pollution is part of multi-hazards

GURME

Shifting Disaster Risk Reduction from Reaction to Prevention

- Traditionally, disaster risk management approach has been focused on emergency response and recovery measures
- Shifting disaster risk management to a more comprehensive approach, involving
 - Prevention
 - Preparedness and contingency (unforeseen event) planning
 - Emergency response and recovery measures.

Need for Coordination between Agencies for Development and Issuance of a Warning Message

Early Detection, Monitoring and Warning Services

Develop hazard monitoring and early warning services

Type I

Hazard fully under the mandate of NMHS

e.g. strong winds, strong rainfall, snow/ice, hail, tropical cyclone

Type II

Hazard under joint mandate of NMHS and other agencies

e.g. floods, air pollution, etc.

Type III

Hazard under mandate of other agencies but NMHS contribute

e.g. locust, heat-health and epidemics, volcanic ash transport, man-made hazards

Level of coordination between NMHS and other agencies

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Collaboration critical for success!

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