

## **AIR QUALITY MONITORING IN BEIJING**

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## [AIR QUALITY MONITORING IN BEIJING](#)

### Introduction of Beijing Municipality

- 39°08'-- 41°05'N latitude, 115°25'-- 117°30' E longitude
- Total area of 16,800km<sup>2</sup>, the urban planning area 1040km<sup>2</sup>
- The 62% of Beijing is mountainous area and in the west, the north and the north-east.
- So the local wind directions change every day and night. South wind in the day and north wind in the night.

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## [AIR QUALITY MONITORING IN BEIJING](#)

### Introduction of Beijing Municipality

- The annual average temperature is 11-12°C and four distinct seasons
- The annual average precipitation is less than 500 mm with 76% occurring between June and August
- Inversion days more than 250 days/year, most in the Autumn and Winter

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## [AIR QUALITY MONITORING IN BEIJING](#)

### Introduction of Beijing Municipality

- About 120 days each year the daily average-temperature is lower than 6°C, the heating season make up a major part of the energy consumption.
- The little precipitation in winter and spring.
- Threatened by the dust storms originating in northwest China, where centuries unrestricted use of land, poor forest and grassland cover, and strong persistent winds.

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## AIR QUALITY MONITORING IN BEIJING

### Excessive Centralization of Urban Development

- The urban planning area is about 6% of the whole Municipality, but
  - \* hold about half of the population(7 million)
  - \* about 80% of the building
  - \* 60% of the energy consumption.

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## AIR QUALITY MONITORING IN BEIJING

### Others

- Industrial structure
- Inadequacy of the Infrastructure
- Energy composition
- The amount of vehicle increases rapidly

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## AIR QUALITY MONITORING IN BEIJING

### AIR QUALITY MONITORING NETWORK

#### 1. Monitoring Network

- Auto Air Monitoring System set up in 1983. Now 28 Stations in Beijing.
- Pollutants of SO<sub>2</sub>,CO,NO-NO<sub>2</sub>-NO<sub>x</sub>, O<sub>3</sub>, TSP, PM10,Pb and Bap are monitored.
- Meteorological data: WD/WS T/RH .

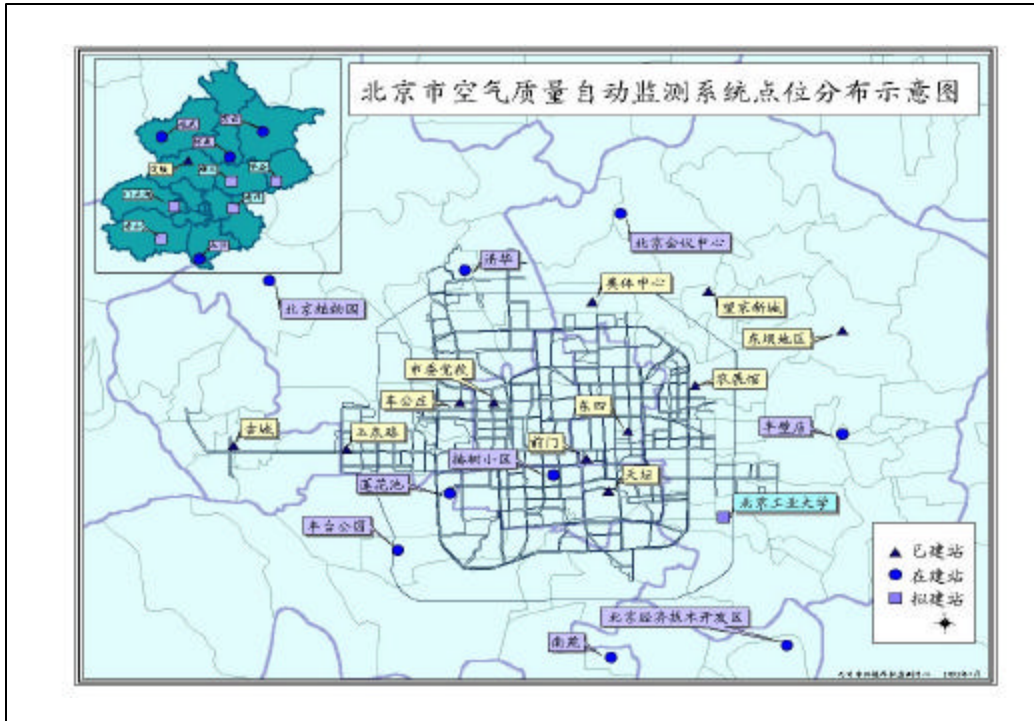
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## AIR QUALITY MONITORING IN BEIJING

### Instruments

- TEOM based analyzers are used for continue measurement of PM10
- High volume samplers are used for TSP and PM10 mass, and for Sulphates ,Nitrates, Pb and Bap analysis
- GENT samplers are used for particulate(coarse and fine ) mass and elements analysis.
- EC/OC in PM10/2.5 are measured with R&P5400.

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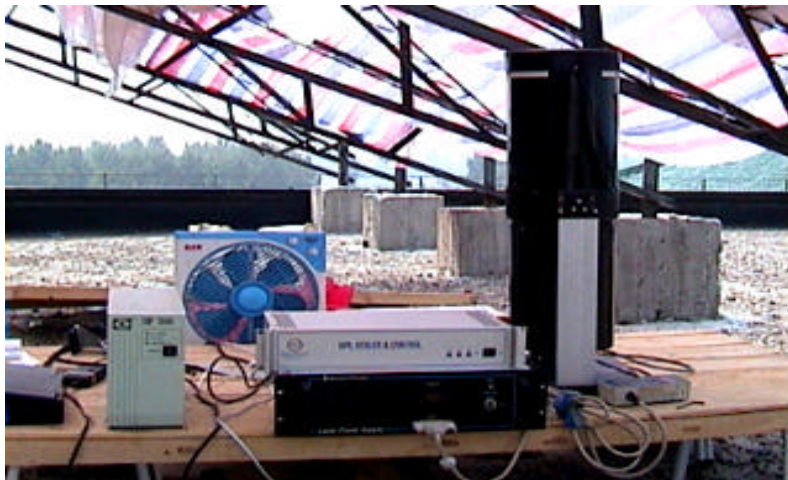


## AIR QUALITY MONITORING IN BEIJING



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## AIR QUALITY MONITORING IN BEIJING

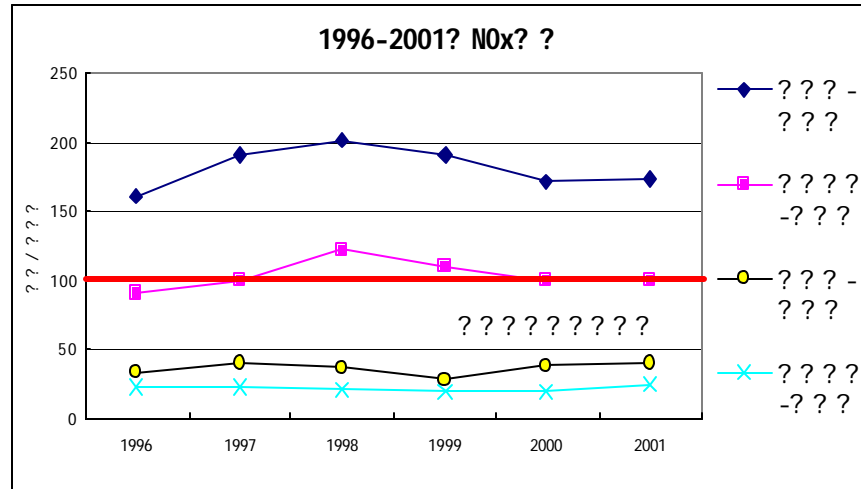
### AIR QUALITY MONITORING NETWORK

#### 2. Passive Sampler Network is Made from 1999

- Up to 150 sampling points to monitor the  $\text{NO}_2$  in summer and winter
- Up to 100 sampling points to monitor the  $\text{O}_3$  in Summer
- Up to 100 sampling points to monitor the  $\text{SO}_2$  in Winter

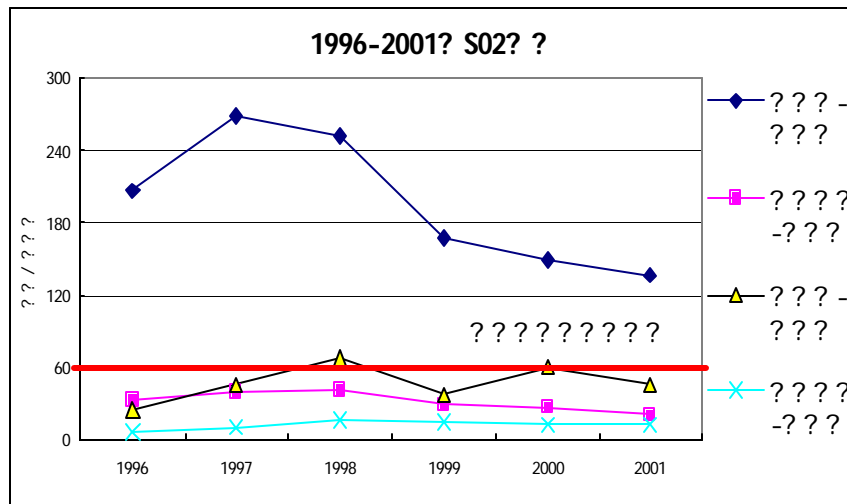
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## AIR QUALITY MONITORING IN BEIJING



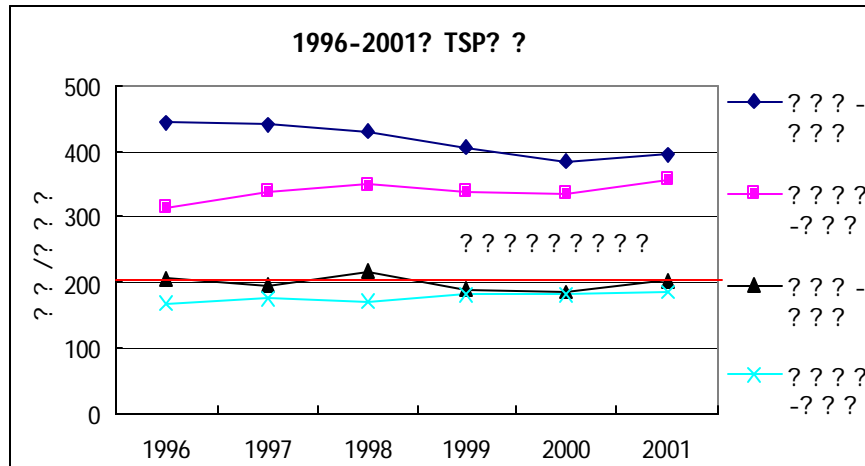
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## AIR QUALITY MONITORING IN BEIJING



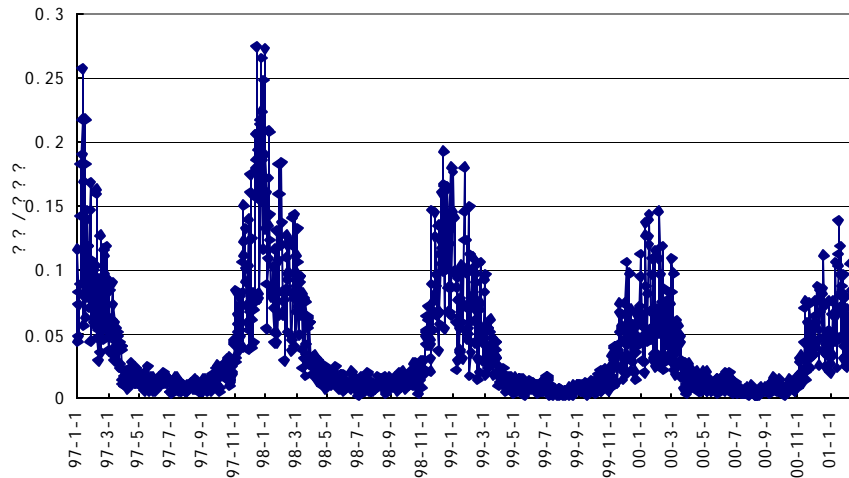
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## AIR QUALITY MONITORING IN BEIJING



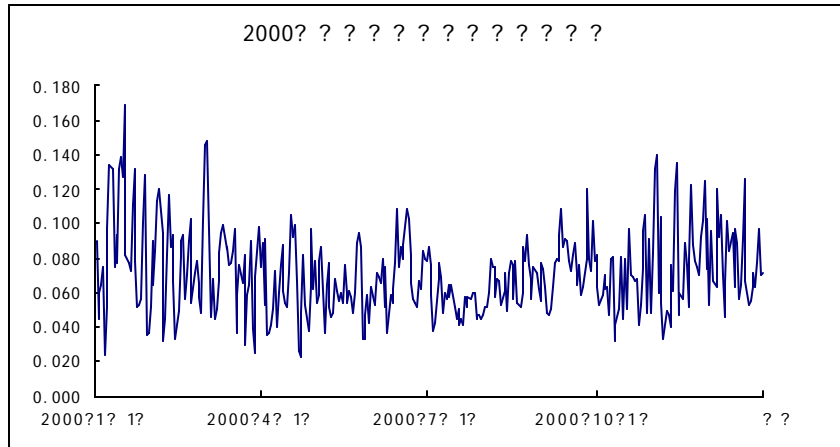
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## AIR QUALITY MONITORING IN BEIJING(SO<sub>2</sub>)



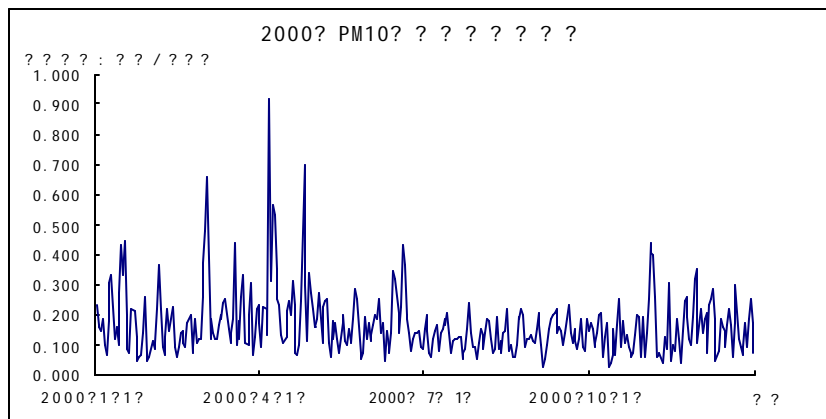
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## AIR QUALITY MONITORING IN BEIJING YEAR 2000 -DAYLY CONCENTRATION ( NO<sub>2</sub>)



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## AIR QUALITY MONITORING IN BEIJING Year 2000- Daily PM<sub>10</sub> Concentration



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## AIR QUALITY MONITORING IN BEIJING

<b>1995-2001.6 Dust Episode</b>							
		Heating Season		Non Heating Season		Sand Storm Day	
Year	Days	Days	Per cent	Days	Per cent	Days	Per cent
1995	14	11	79%	3	21%	2	14%
1996	11	8	73%	3	27%	0	0%
1997	14	11	79%	3	21%	2	14%
1998	20	15	75%	5	25%	3	15%
1999	10	7	70%	3	30%	6	60%
2000	11	6	55%	5	46%	5	46%
2001.6	9	1	11%	8	89%	6	67%

\* Statistic on API Grade 5 of TSP(1995-1999) and PM10(2000-2001.6)

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## AIR QUALITY IN BEIJING

### **Episode Category: FOUR Types**

- 1. Regional Episode from Stable Weather Process**
  - Include Several City Area, Normally The Beijing, Tianjing, Shijiazhuang and Taiyuan.
  - For Several Days, pollutants Accumulating 1-3 days
  - All pollutants Are Higher
  - High Concentrations both Urban and Suburb
  - Ending by a Strong Weather Process and very Fast
- 2. Local Episode from Local Stable Weather Process**
  - Only in Beijing Area
  - 1 or 2 days
  - Only Urban area
  - All pollutants Are Higher

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## AIR QUALITY IN BEIJING

### Episode Category: **FOUR** Types

#### 3. Special Episode

- Unusual pollutant emission
- Strong Inversion
- Several Hours
- Some pollutants

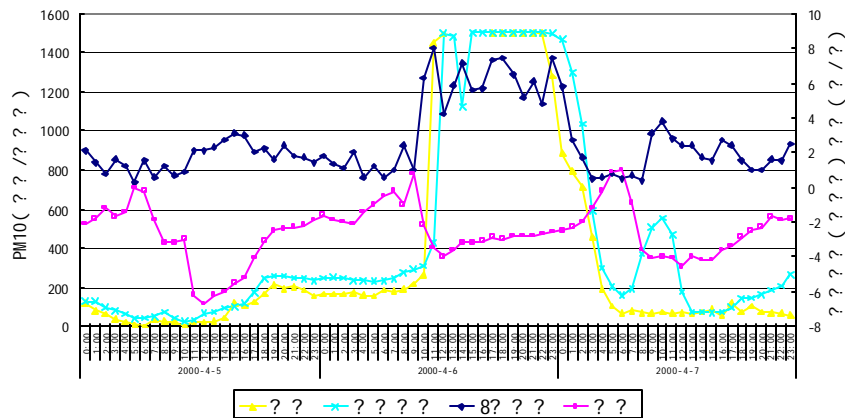
#### 4. Dust or Sand Storm

- Most From the West-North
- Only the Dust
- Regional or Local

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## AIR QUALITY and SOURCES IN BEIJING

A Yellow Sand Storm Process:  
 2000? 4? 5 ? ? ? ? ? ? ? ? 8? ? ? ? ?



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## AIR QUALITY and SOURCES IN BEIJING

### Air Quality Models for management are used:

- Statistic Model for Forecasting
- CART Model for O3 and PM10 forecast
- CMB
- ISC Model and Mobile 5 for Planning
- APOPS for Forecast and Simulation Analysis
- ADMS will be used for Energy-Environment Management of Beijing

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## AIR QUALITY MONITORING IN BEIJING

- Air Pollution Index (API) standard in 1998
- From Feb 1998 Beijing publishes the API weekly
- From April 1999 Beijing publishes the Daily API
- Air Quality Forecast Models are completed and now report on the TV, newspaper and Internet everyday( From May Day of 2001)

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## AIR QUALITY MONITORING IN BEIJING

Based on serious particulate pollution:

- 16 new high volume samplers are equipped in year of 2000, and RAAS2.5- 400 sampler will be equipped next year
- DOAS and FTIR
- More attention on O<sub>3</sub> and VOCs

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## AIR QUALITY MONITORING IN BEIJING

Based on particulate pollution:

- Visibility study is in progress
- PM<sub>2.5</sub> and PM<sub>1.0</sub> measurement is introduced this year
- MPL will be installed next year
- EOS/MODIS receive system is equipped for regional aerosol study
- To improve the emission inventory.

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## AIR QUALITY MONITORING IN BEIJING

### Based on Air Pollution:

- Clean Energy -- Natural Gas
- New Vehicle Exhaust Gas Standard-- EUII next year
- Public Awareness.

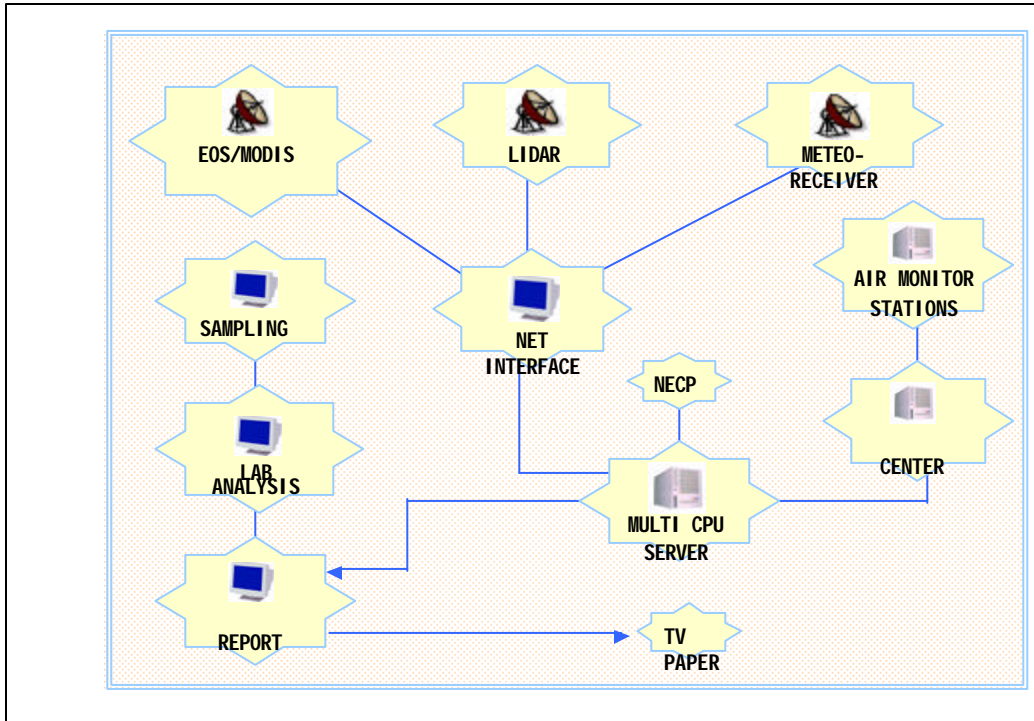
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## AIR QUALITY MONITORING IN BEIJING

### Public Awareness :

- New Environmental Program on Beijing TV Public Information Channel--- BTV-9, From January First of 2003
- Everyday and Fixed Schedule
- News on Environmental Protection
- Daily Air Quality Report
- Daily Air Quality Forecast and Suggestions
- Hot Line - Response

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# THANK YOU