

中国酸沉降监测和空气质量监测进展和展望

Status and prospects in acid deposition monitoring and air quality monitoring in China

18,October,2023



中国环境监测总站

China National Environmental Monitoring Centre

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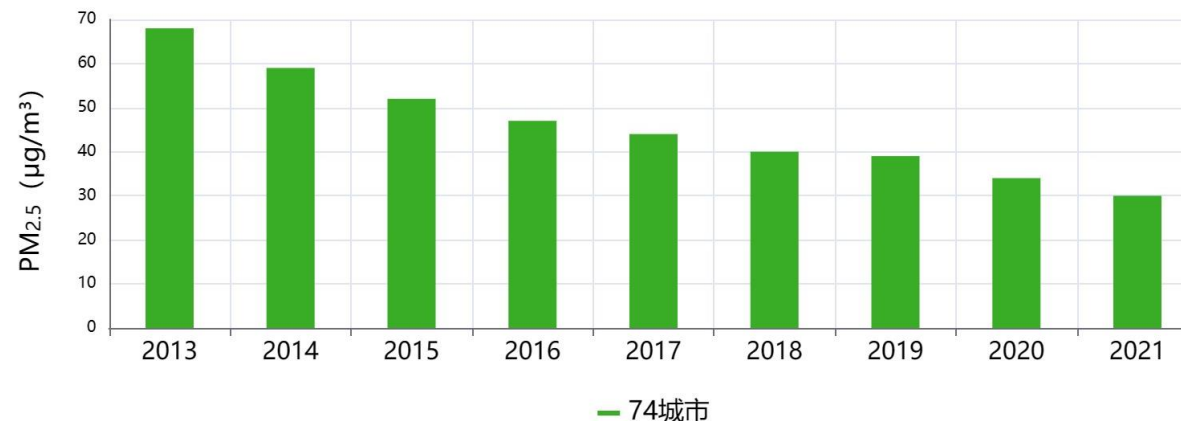
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Remarkable Improvement in Air Quality



- ◆ **More blue sky:** From 2015 to 2021, the proportion of clear days in prefecture-level cities or above presented an increasing pattern, which increased from 81.2% in 2015 to 87.5% in 2021.
- ◆ In the past decade, the annual average concentration of PM_{2.5} decreased by 56%, and the heavily polluted days decreased by 87% in the 74 key cities in China.



Remarkable Improvement in Air Quality



- ◆ In the past decade, China's **economy grew by 6.6%** with a **growth of 3% in energy consumption**.
- ◆ In 2021, PM_{2.5} levels in cities at the prefecture level or above in China **dropped from 46 µg/m³ in 2015 to 30 µg/m³**.
- ◆ China has reduced air pollution nearly as much in seven years as the US did in three decades.

A screenshot of a Bloomberg news article. The article title is "China Reduced Air Pollution in 7 Years as Much as US Did in Three Decades". The author is Kripa Jayaram, Chris Kay, and Dan Murtaugh. The article is dated June 14, 2022, at 12:00 PM GMT+8. The article text states: "China has reduced air pollution nearly as much in seven years as the US did in three decades, helping to bring down average global smog levels in the process." and "The amount of harmful particulates in the air in China fell 40% from". The article is categorized under "Green" and "Greener Living". There are also options to "Listen to this article" (3:07) and "Share this article" via social media icons. The Bloomberg logo and navigation menu are visible at the top.

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Acid Deposition Monitoring

◆ Monitoring site

more than 1000 sites in 469 cities

◆ Monitoring parameter

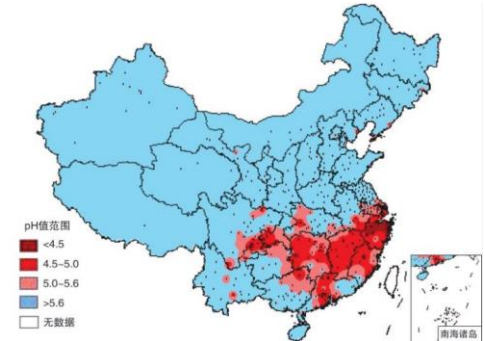
pH, conductivity, raining amount and concentration of 9 ions including sulfate, nitrate, fluorine, chlorine, ammonium, calcium, magnesium, sodium and potassium.

- ◆ Acid deposition areas in China (areas where the annual pH value of precipitation is less than 5.6) are mainly distributed in the south of the Yangtze River and east of the Qinghai-Tibet Plateau.
- ◆ Since 2005, the areas with acid deposition and the degree of acid deposition have been greatly reduced.
- ◆ In 2021, heavy acid deposition was not detected for the first time.

2005年



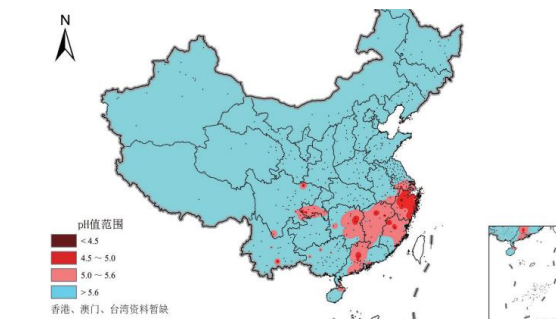
2010年



2015年



2020年



The Acid Deposition Monitoring Network in East Asia (EANET) works:

- ◆ Carried out laboratory comparisons of the precipitation and inland water, and did annual monitoring data verification;
- ◆ Carried out the laboratory comparison of wet deposition in Lijing and Wuzhishan;
- ◆ Organized the annual meeting among the EANET participant cities in China to discuss the monitoring works of acid deposition.

中国环境监测总站

关于开展东亚酸沉降监测网实验室数据分析比对的通知

重庆、西安、厦门、珠海、丽江、五指山市生态环境监测(中心)站:

为进一步提升东亚酸沉降监测数据质量工作,针对丽江和五指山降水离子浓度较低、分析存在困难的情况,兹定于2022年11月-2023年11月,开展东亚酸沉降监测中国网实验室数据分析比对工作,现将有关事项通知如下:

一、工作内容

丽江和五指山市生态环境监测(中心)站负责在雨季采集当地降水样品,重庆、西安、珠海、厦门等生态环境监测(中心)站负责对降水样品进行实验室分析。其中,重庆和西安生态环境监测(中心)站负责丽江降水样品分析,珠海和厦门生态环境监测(中心)站负责五指山降水样品分析,分析结果完成后报送我站,我站适时组织开展分析讨论。

二、监测要求

样品要求:按照东亚酸沉降监测要求采集3-4个样品,每个样品量不少于100mL,样品保存和运输全程需保持冷藏,具体操作参考《东亚酸沉降监测网湿沉降监测技术手册》。



Overview of the National Air Quality Monitoring Network

Space-Sky-Ground integrated atmospheric monitoring

Space → satellite remote sensing monitoring

- aerial survey

Sky → -UAV monitoring

- sounding balloon

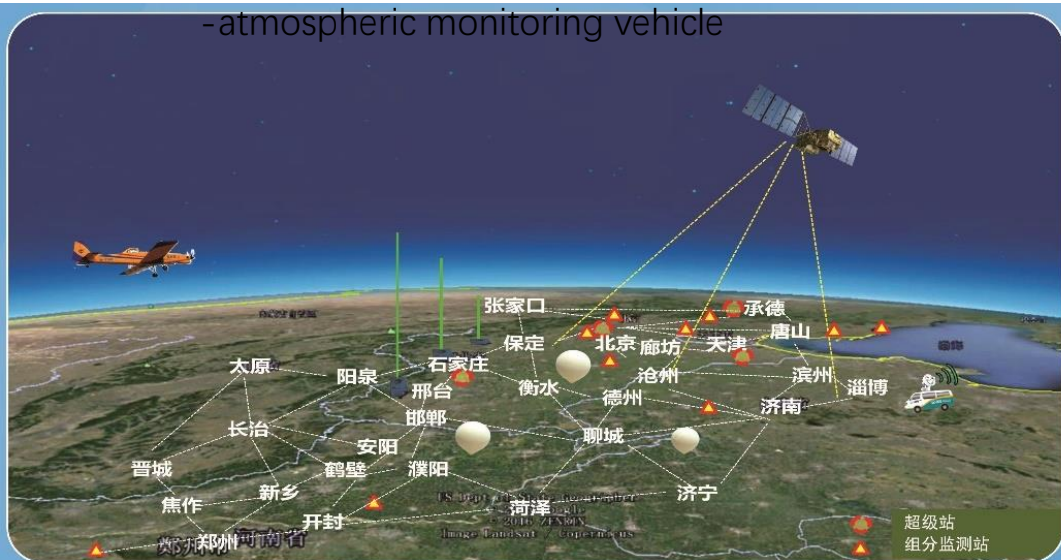
monitoring

- ground environmental quality monitoring network
- atmospheric particulate composition monitoring

network

Ground → -atmospheric photochemical monitoring network

- ground-based/mobile lidar
- atmospheric monitoring vehicle



天空地一体化大气监测

- 天** → 卫星遥感监测
- 空** → 有人机航测
→ 无人机监测
→ 探空气球监测
- 地** → 地面环境质量监测网
→ 大气颗粒物组分监测网
→ 大气光化学监测网
→ 地基、移动激光雷达
→ 大气环境监测车



提供精准立体的数据集

满足公众知情权

服务环境管理



Provide accurate three-dimensional data set

Guarantee the public's right to know

Facilitate environment management

Air Quality Monitoring for Evaluation



中国环境监测总站
China National Environmental Monitoring Centre

国家网

1734个国控城市环境质量监测站
92个区域环境空气质量监测站
16个国家背景空气质量监测站

Parameters :

PM_{2.5}, CO, O₃, SO₂, NO₂, PM₁₀, etc.



- ◆ **Purpose:** To reflect the air quality and its long-term variations, to evaluate the influence of major sources on air quality, and to assess the health risks of air pollution.
- ◆ An air quality monitoring network at the national, provincial, municipal, and county levels
- ◆ An air monitoring network with high-density to facilitate the air pollution management and source apportionment.

标准
Standard

法律
依据

Legal Basis

环境空气质量标准 (GB 3095—2012) Ambient Air Quality Standard

- 环境空气质量评价的根本法律依据与技术前提
Fundamental legal basis and technical premise of ambient air quality assessment
- 规定环境空气功能区分类、标准分级、污染物项目等
Specify ambient air functional zone classification, standard grading, pollutant projects, etc.

环境空气质量评价技术规范 (试行) (HJ 663—2013) Technical regulation for ambient air quality assessment (on trial)

- 规范环境空气质量评价工作, 保证环境空气质量评价结果的统一性和可比性
Standardize the assessment of ambient air quality to ensure the uniformity and comparability of ambient air quality assessment results.
- 规定环境空气质量评价的范围、评价时段、评价项目、评价方法等
Specify the scope, period, items and methods of ambient air quality.

环境空气质量指数AQI技术规定 (试行) (HJ 633—2012) Technical Regulation on Ambient Air Quality Index (on trial)

- 向公众提供健康指引, 规范环境空气质量指数日报和实时报工作
Provide health guidance to the public, standardize air quality index daily report and real-time report
- 规定环境空气质量指数的分级方案、计算方法、空气质量指数日报和实时报的发布等
The classification scheme, calculation method of AQI, regulation on the release of AQI daily report and real-time report are specified.

评价
Assessment

技术
管理

Technical
Management

发布
Release

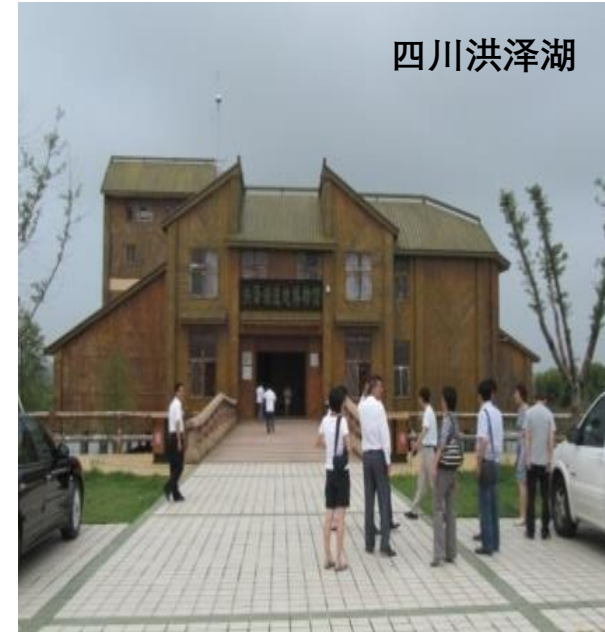
健康
指引

Health
Guidelines

Regional stations



- ◆ **Purpose:** To evaluate the regional air quality and its patterns of spatial-temporal variations; to study the possible long-range transportation and interactions of air pollution.
- ◆ 92 stations in 31 provinces.
- ◆ **Parameters:** SO_2 , NO_2 , PM_{10} , CO , O_3 , $\text{PM}_{2.5}$, visibility, meteorological parameters and VOCs.



Background stations



- ◆ **Purpose: Background information in China**
- ◆ 16 background sites with real-time monitoring data synchronously uploaded to the national centre.
- ◆ **Parameters:** SO_2 , NO_2 , PM_{10} , CO , O_3 , $\text{PM}_{2.5}$, visibility, meteorological parameters and VOCs.



青海门源



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Enhance the supporting ability of monitoring data in environmental management

- ◆ Optimize the national environmental quality monitoring network, strengthen abilities on the chemical composition of PMs and photochemical monitoring, and improve the abilities on data application to enhance the support on the management of synergistic control of PM_{2.5} and ozone.
- ◆ Conduct air monitoring in traffic and industrial environments, and measure the toxic and harmful substances in the air to facilitate the control of pollution sources.
- ◆ Gradually conduct greenhouse gases, ODS, and mercury monitoring.
- ◆ Establish a quality control system suitable for environmental management.
- ◆ Optimize the construction of the big data platform, and enhance the support for decision-making of environmental management.





谢谢

THANK YOU