中国环境监测总站

中国的沙尘暴监测和治理情况

Sand Storm Monitoring and Management in China

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中国环境监测总站

1. 沙尘暴监测现状和计划
---- Status and planning of sand storm monitoring

2. 沙尘暴研究项目和计划
---- Current research and planning on sand storm

3.沙尘天气防治措施和计划
---- Prevention and control policy on sand storm

中国环境监测总站

1.沙尘暴监测现状和计划

Status and layout of sand storm monitoring

◇ 沙尘暴监测网络

----Sand storm monitoring network

◇ 主要监测项目

----The main monitoring component

◇ 沙尘暴影响范围和传输路径分析

----Analysis on influenced regions and transportation of sand storm

◇沙尘天气监测技术规范

----Guideline and regulation of sand storm monitoring

◇质量控制和质量保证

----Quality control and quality assurance

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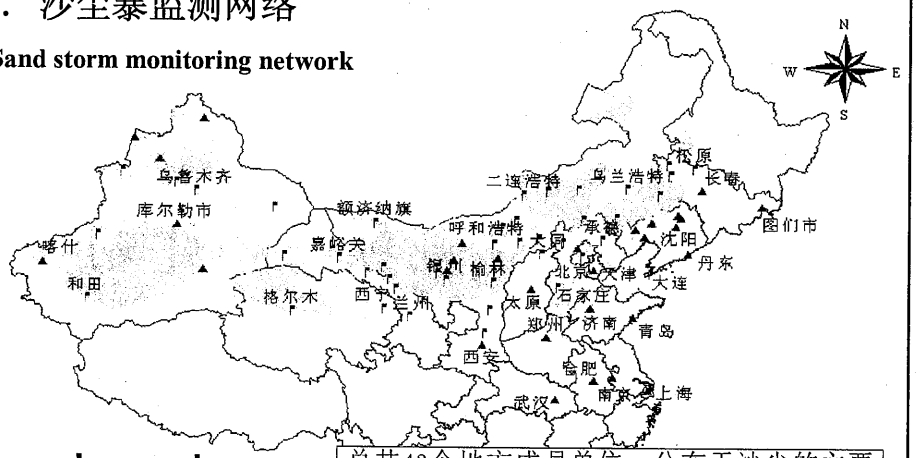
1.1. 沙尘暴监测网络

----Sand storm monitoring network



Legend

- Monitoring station 2003
- Monitoring station 2005
- Desert

总共43个地方成员单位，分布于沙尘的主要源地和主要传输途径。11.5计划监测点位将达到76个。

43 members totally. Covers most of the sand source district and transportation routes. Data from 76 members in next 5-years plan.

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1.2 主要监测项目

----The main monitoring component

◇ 主要监测指标为TSP和PM10在各级监测站推广。

----The key components are TSP and PM10, PM2.5 will be available in some stations .

◇ Lidar在部分监测站推广。

----Lidar will be developed in some sites.

◇ 同时记录风速、风向及水平能见度等气象指标。

---- Meteorologic index such as wind speed, wind direction and horizontal visibility, and so on.

◇ 每年对典型地区生态背景进行监测：地表覆盖度，土壤湿度等等。

----Annually ecological monitoring on typical district: land cover, soil humidity, etc.

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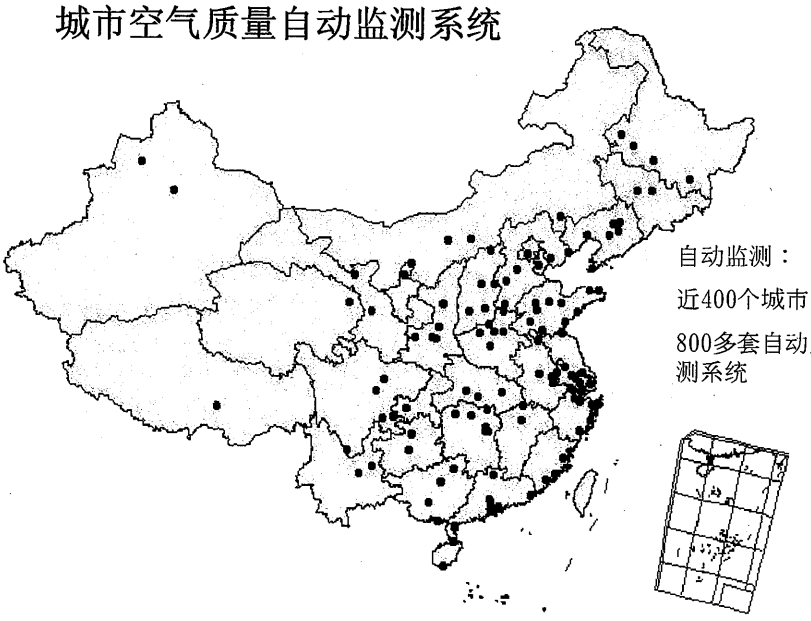
城市空气质量自动监测系统



自动监测：

近400个城市

800多套自动监测系统

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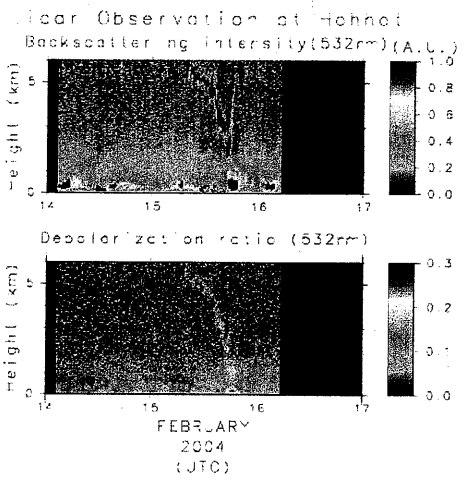
Lidar Monitoring Result



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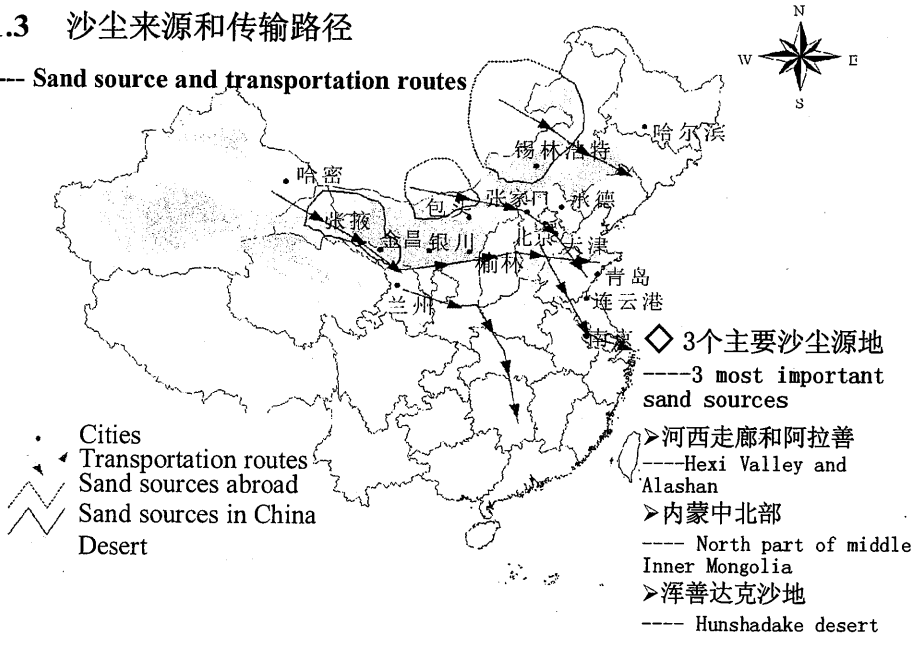
1.3 沙尘来源和传输路径

---- Sand source and transportation routes



◇ 3个主要沙尘源地

----3 most important sand sources

➢河西走廊和阿拉善

----Hexi Valley and Alashan

➢内蒙中北部

---- North part of middle Inner Mongolia

➢浑善达克沙地

---- Hunshadake desert

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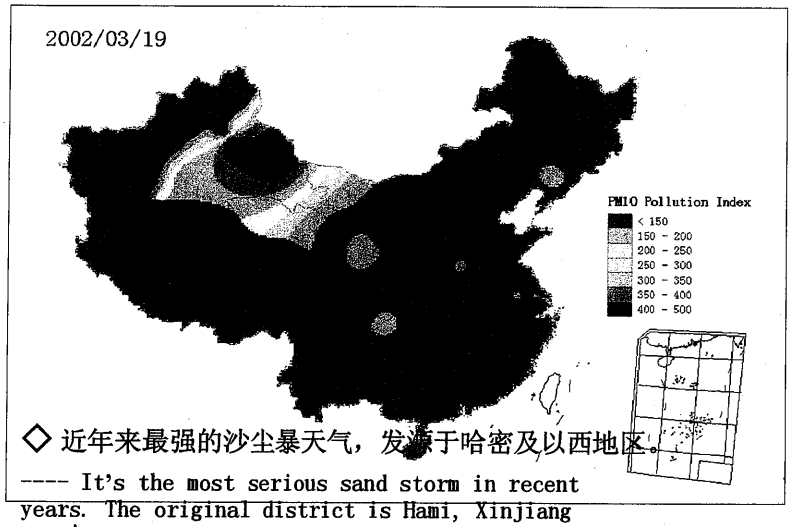
2002年3月19～21日沙尘天气概况

Overview of the sand storm on March 19~21, 2002



◇ 近年来最强的沙尘暴天气，发源于哈密及以西地区。

---- It's the most serious sand storm in recent years. The original district is Hami, Xinjiang province.

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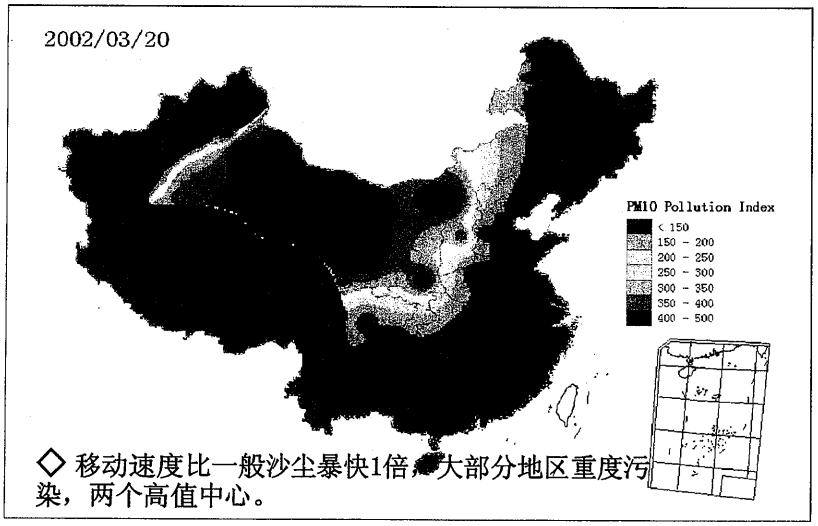

◇ 移动速度比一般沙尘暴快1倍，大部分地区重度污染，两个高值中心。

---- The moving speed is 2 times than normal sand storm. Most of the districts are polluted seriously, two districts with higher PM10 concentration.

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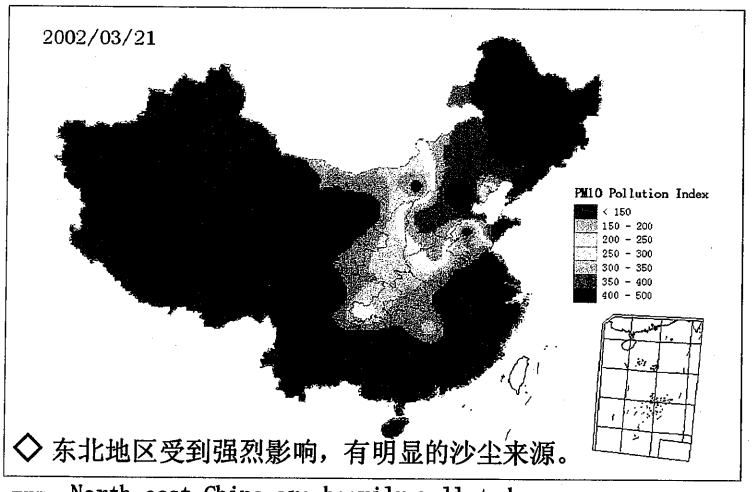

◇ 东北地区受到强烈影响，有明显的沙尘来源。

---- North east China are heavily polluted, some sand sources were determined upwards.

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1.4 沙尘天气监测技术规范

---- Guideline and regulation of sand storm monitoring

◇ 规范点位布设方法

----Formulate the layout of monitoring sites.

◇ 滤桶采样代替滤膜采样，提高TSP检出上限

----Using filtration barrel instead of filtration film for sampling, enhance the detection upper limit.

◇ PM10自动监测方法，获得连续监测数据

---- Automatic monitoring method on PM10, series measurements.

◇ 规范监测数据报送格式，加快数据处理流程

----Formulate the data format to CNEMC, efficiency data flow management.

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1.5 沙尘天气监测质量控制和质量保证

---- QA/QC of sand storm monitoring

◇ 采样人员加强防护措施，采样仪器、设备严格校正

----Security rules and clothes of the sampling person, strict calibration of the sampling equipment and material

◇ 定期对自动监测仪器进行检查，定期校准

----Regular inspection and calibration on automatic instrument

◇ 标准化操作程序和数据三级审核

----Standard Operation Program & Three Grades of Checkup and Verification

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2.沙尘暴研究项目和计划

Current research and planning on sand storm

◇ 沙尘天气分级标准研究

---- Research on classification of sand storm

◇ 沙尘来源解析工作

---- The sand source apportionment

◇ 沙尘天气发生条件和传输方式研究

----Planning research on burst and transportation mode of sand storm

◇ 沙尘天气危害研究

---- Planning research on harmfulness of sand storm

◇ 空气质量预报、预警研究

----Forecast of sand storm and air quality

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2.1 沙尘天气分级标准

---- Classification of sand storm

◇ 主要根据空气中颗粒物浓度和监测结果制定分级标准

---- Mainly according to concentration of particular in ambient air and monitoring results

◇ 风速一般大于8米/秒

---- In generally, Wind speed higher than 8m/s

Classification	TSP Con.(mg/m³) (Hourly)	PM_{10} Con.(mg/m³) (Hourly)	Time
浮尘 drifting dust	1.0≤TSP< 2.0	0.60≤PM_{10}< 1.00	More than 2 hours
扬沙 blowing dust	2.0≤TSP< 5.0	1.00≤PM_{10}< 2.00	
沙尘暴 dust and sand storm	5.0≤TSP< 9.0	2.00≤PM_{10}< 4.00	More than 1 hour
强沙尘暴 severe dust and sand storm	≥9.0	≥4.00	

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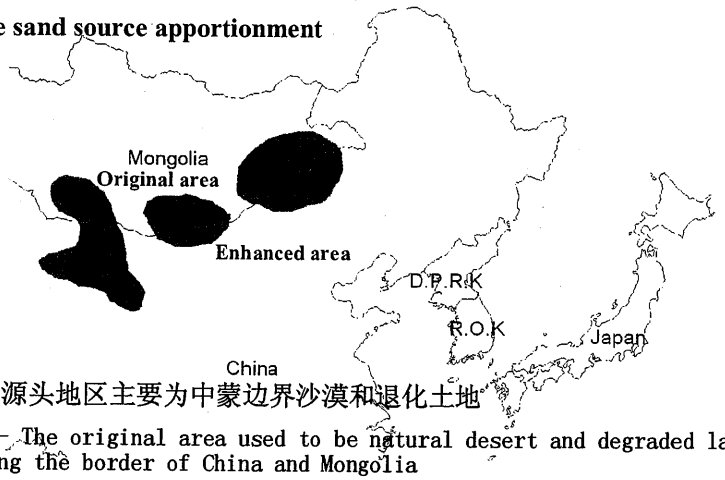
2.2 沙尘来源解析工作

---- The sand source apportionment



◇ 源头地区主要为中蒙边界沙漠和退化土地

---- The original area used to be natural desert and degraded land along the border of China and Mongolia

◇ 沙尘加强地区主要为农牧交错带

---- The enhanced areas are agriculture-rangeland belt

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2.3沙尘天气发生条件和传输方式研究

----Planning research on burst and transportation mode of sand storm

◇ 三个基本发生条件：强风、沙源和热力不稳定

---- Three key factors of occurrence: Strong wind, sand source and unstable atmosphere

◇ 大气颗粒物的传输研究已经达到定量化水平

---- Research on transportation of aerosol could be quantitative analysis

◇ 有关沙源的定量研究不足，扬尘量估算需要更准确的模型

---- The quantitative analysis on amount of blew-up sand need more advanced models

◇ 沙尘垂直分布定量化研究不够，需要更多的激光雷达等设施

--- The quantitative research on vertical distribution of sand just started, more laser diffraction particle size analyzer will be needed

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2.4沙尘天气危害研究

---- Planning research on harmfulness of sand storm

◇ 影响地区分类：源头区、加强区、降尘污染集中区、远距离飘尘影响区

---- Different kinds of influenced area: original area, enhanced area, heavily influenced area, far-distance influenced area

◇ 源头区和加强区主要危害：毁坏建筑物，填埋/带走土壤，危害人身、牲畜安全

---- Original and enhanced area: damage of construction, burying/remove soil, injuring of human and cattle.

◇污染集中区和飘尘影响区主要危害：影响生产和危害人体健康

---- Heavily and far-distance influenced area: influenced on production and human health.

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2.5 沙尘天气空气质量预测预警研究

---- Forecast of sand storm and air quality

◇ 建立起沙、传输模型

---- Models focus on sand blew-up and transportation

◇ 根据沙尘天气实时监测结果和天气预报进行空气质量预警分析

---- Forecast of air quality according to real-time measurements and weather forecast

◇ 依据历史资料和地表覆盖、土壤湿度等监测结果进行沙尘天气年度趋势分析

---- Tendency analysis basic on history data and monitoring results of land cover, soil humidity, etc

◇ 建立完善的历史资料数据库和高效的监测网络

---- Construction of sand storm database and efficient monitoring network

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3.沙尘天气防治措施和计划

Prevention and control policy on sand storm

3.1 源区保护行动和政策

----Policy and action on original area

◇ 保护沙尘暴源区的固化表层，强化工程监理

---- Conservation on the shell of the original source area, strict surveillance on construction projects

◇ 实行区域性禁牧措施，进行生态移民

---- Restrict range and ecological emigrant in special districts

◇加强生态监测工作

---- Ecological monitoring on key factors

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3.2 沙尘暴减弱行动和计划

---- Policy and action to decrease sand storm

◇ 因地制宜建立生态防护带，防风固沙

---- Suitable ecological construction in different regions, windbreak and sand-fixation

◇ 宜牧地区退耕还草

---- Convention farmland to grassland in area suitable to range

◇ 宜农地区推行保护性耕作，留高茬，不深翻土地

---- Spread protective cultivation in area suitable to agriculture, keep stubble, no plough up

◇下游地区生态补偿措施

---- Compensation from the developed area influenced by sand storm

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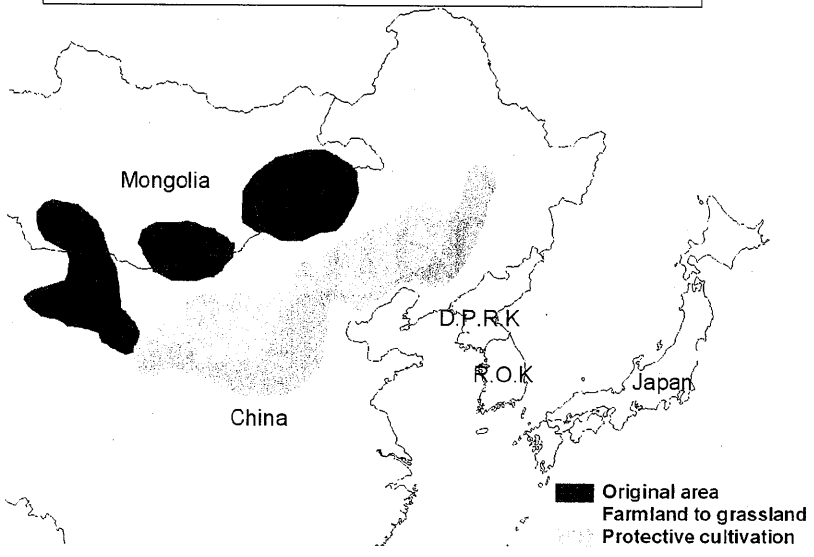
防沙土地利用规划

The expected land use



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3.3 开展国际合作

---- International cooperation on sand storm

◇ 完善数据传输和共享机制，进行预报预警工作

---- More efficient data transfer, forecast in time

◇完善预报预警的立法工作和国际合作研究

---- Laws/regulation for sand storm forecast and international cooperation project

◇ 针对不同地区进行专业预报

---- Special forecast for different regions

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Thank you!