パネリスト発表資料

中国环境监测总站

CNEMC

Sand Storm Monitoring in China

CHINA NATIONAL ENVIRONMENTAL MONITORING CENTER (CNEMC)

Jing xin

Nov. 23. 2003

中国环境监测总站

CNEMC

Sand Storm Monitoring in China

---- Sand Storm Monitoring network

---- Sand source and transportation routes

---- Monitoring results

---- Two typical sand storm

中国环境监测总站

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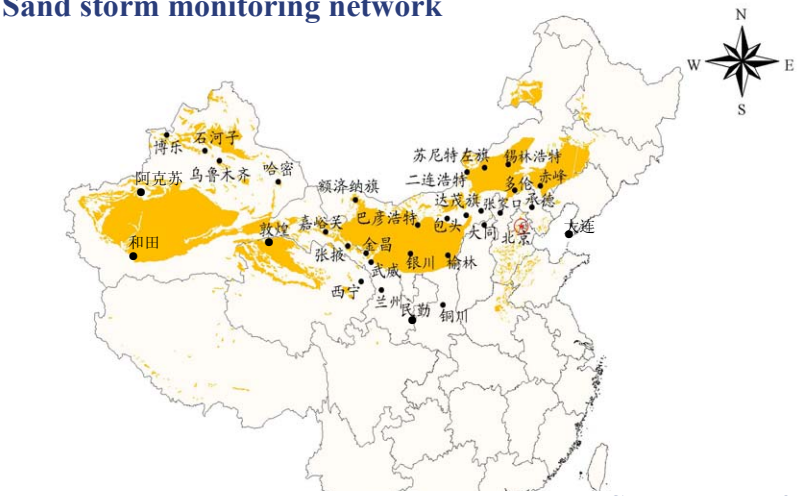
1. Sand storm monitoring network



- Network member
- Desert

Forty members totally. Covers most of the sand source district and transportation routes.

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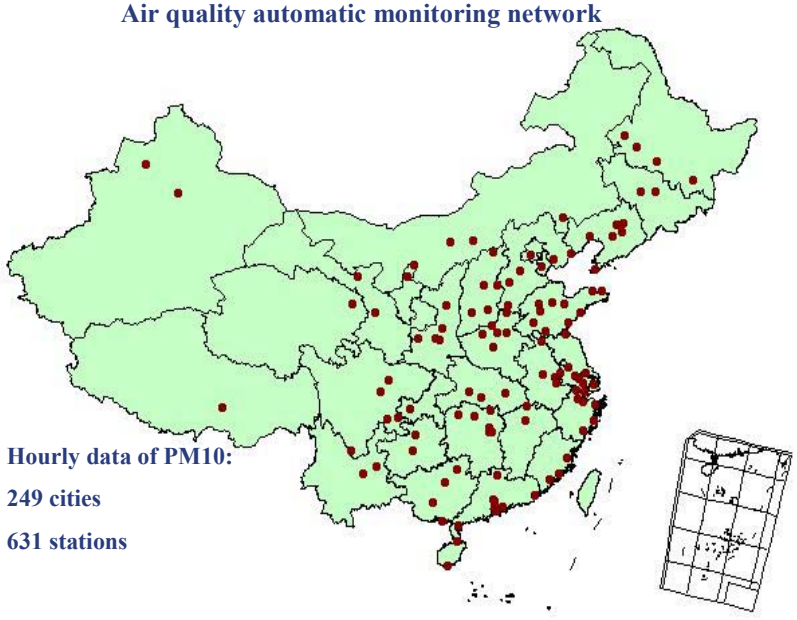
Air quality automatic monitoring network



Hourly data of PM10:

249 cities

631 stations

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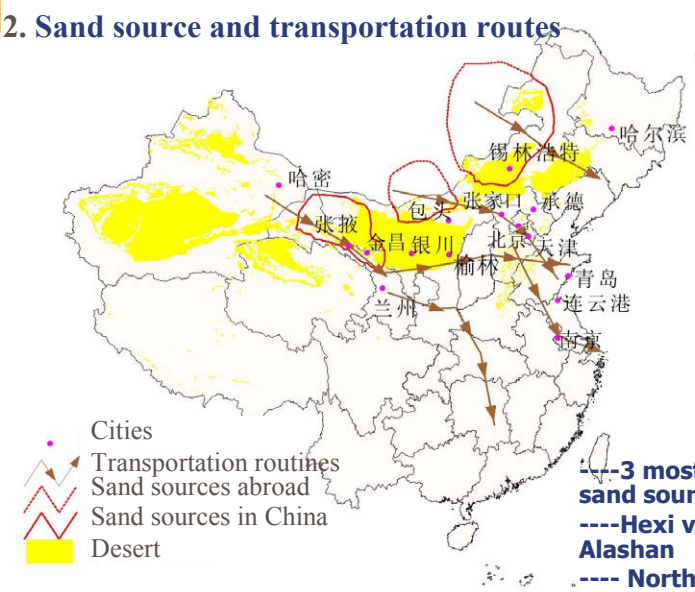
2. Sand source and transportation routes



----3 most important sand sources
----Hexi valley and Alashan
---- North part of middle Mongolia
---- Hunshadake desert

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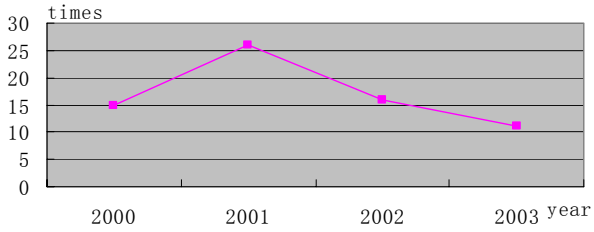
3. Monitoring results （2000～2003）



----2000～2002, compared to 90's last century, 3 more times occurred.
----2003, decreased in times and influence.

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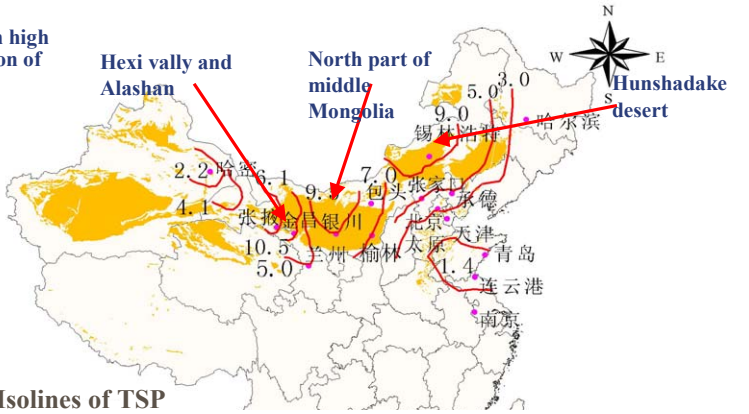
Monitoring results of sand storm 3.19～22, 2002

centers with high concentration of TSP.

Hexi vally and Alashan

North part of middle Mongolia

Hunshadake desert



Isolines of TSP

Cities

----Most of sand come from the boundary of desert and farming-pasture band.

----Sand raised from local fields is also an important contribution by the analysis of hourly PM10 concentration.

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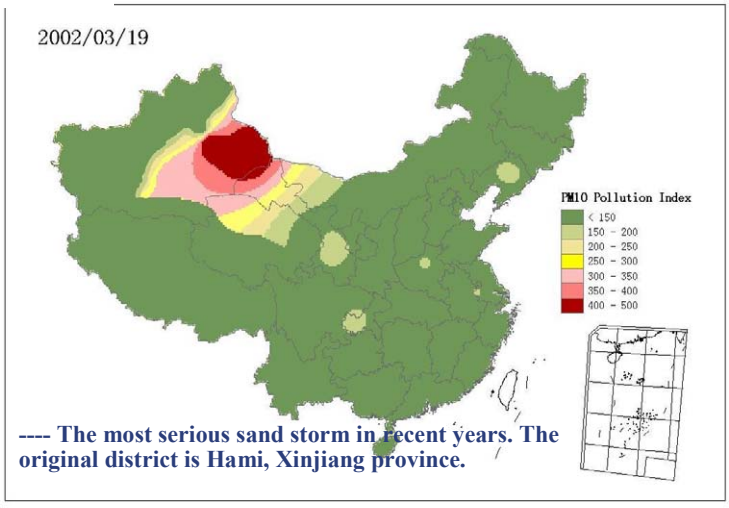
4． Two typical sand storm

3.4.1 2002/03/19



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

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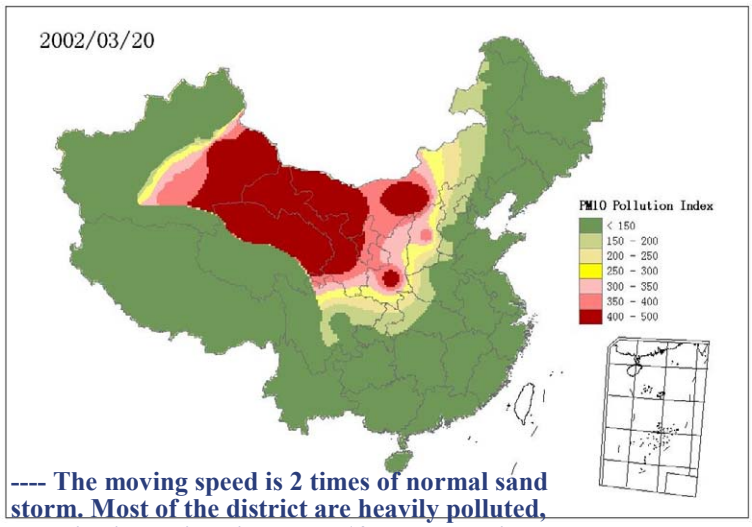

---- The moving speed is 2 times of normal sand storm. Most of the district are heavily polluted, two district s with higher PM10 concentration.

中国环境监测总站

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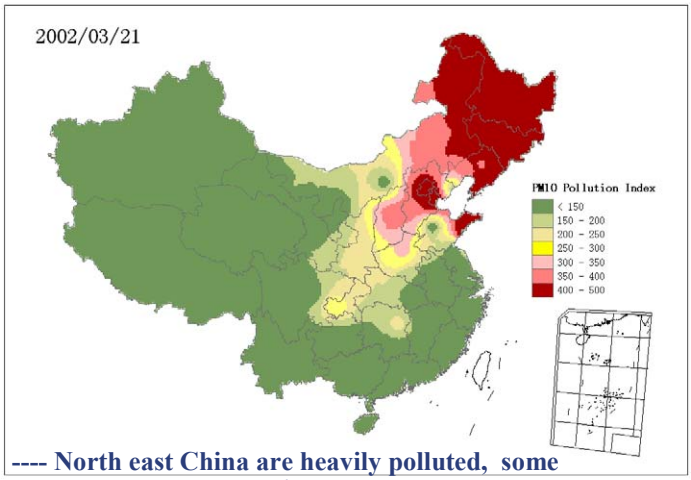

---- North east China are heavily polluted, some sand source was determined upwards.

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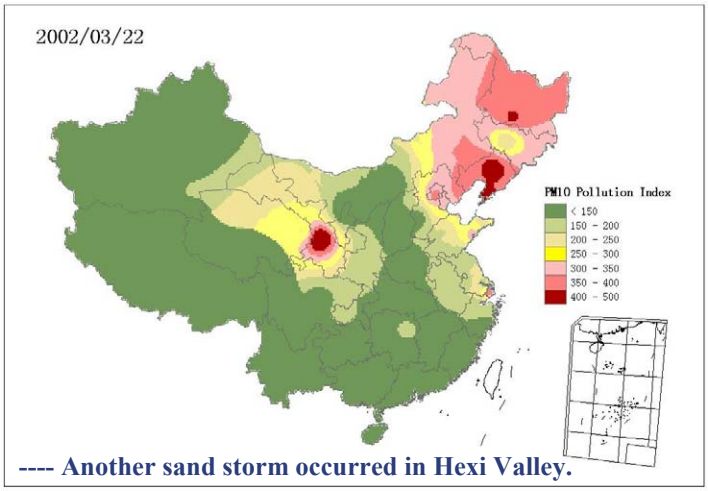

---- Another sand storm occurred in Hexi Valley.

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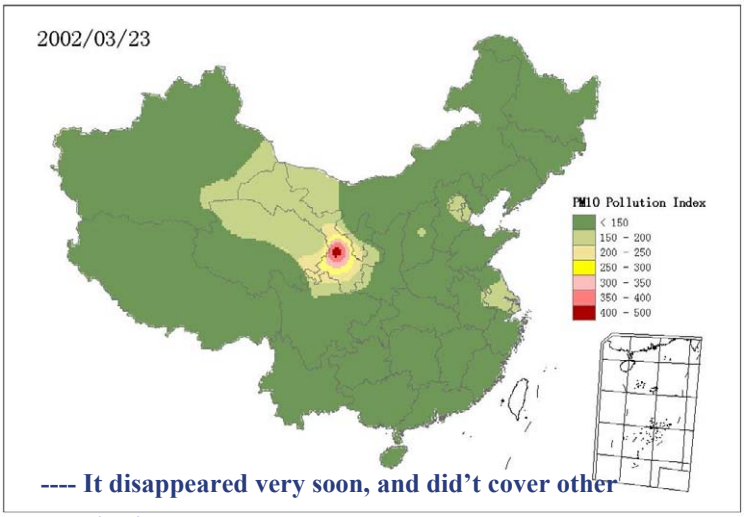

---- It disappeared very soon, and did't cover other district.

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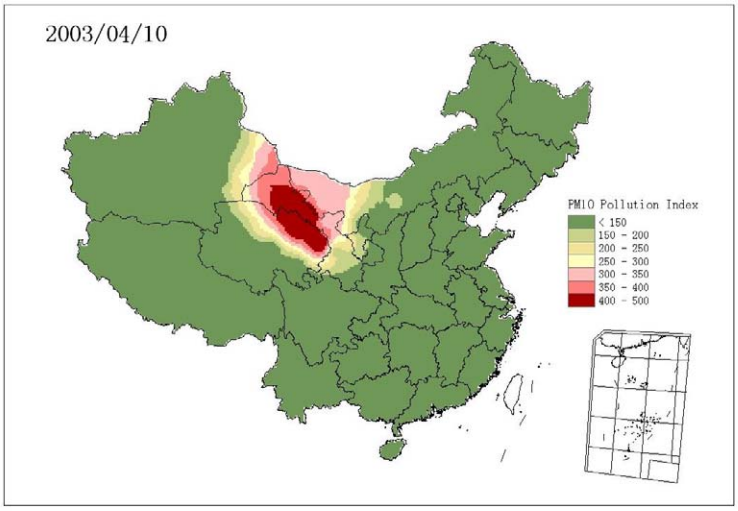

----Hexi Valley is the district with highest PM10 value.

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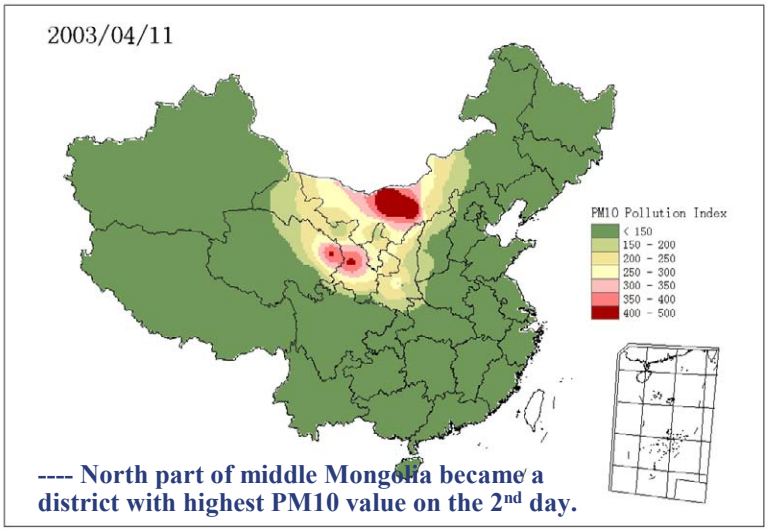

---- North part of middle Mongolia became a district with highest PM10 value on the 2nd day.

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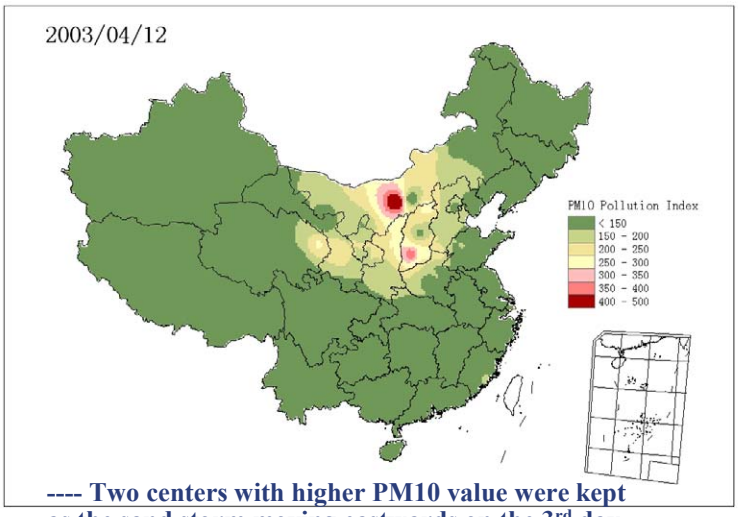

---- Two centers with higher PM10 value were kept as the sand storm moving eastwards on the 3rd day.

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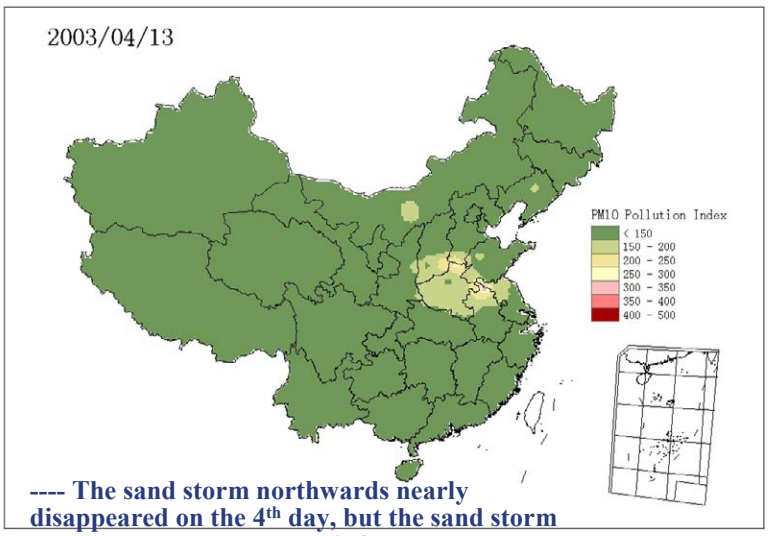

---- The sand storm northwards nearly disappeared on the 4th day, but the sand storm southwards also had some influence.

中国环境监测总站

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Thank you!


富山県の黄砂の現況
2003.11.24
富山県環境科学センター
鳥山　成一
富山県高岡市の雨晴海岸から望む立山連峰（標高3,000m）


１　黄砂飛来の状況
（１）　富山県での黄砂飛来
富山　2002. 11. 12
出典：KNB放送
©KNB

（1990. 5. 13　撮影）

立山アルペンルート開通
時の「雪の大谷」付近

←　（出典：チューリップ 倶楽部）

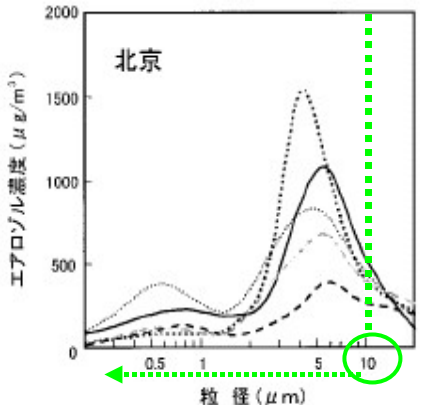
立山室堂から望む
雪の大谷付近

黄砂の飛来した雪
（1990. 5. 13　撮影）

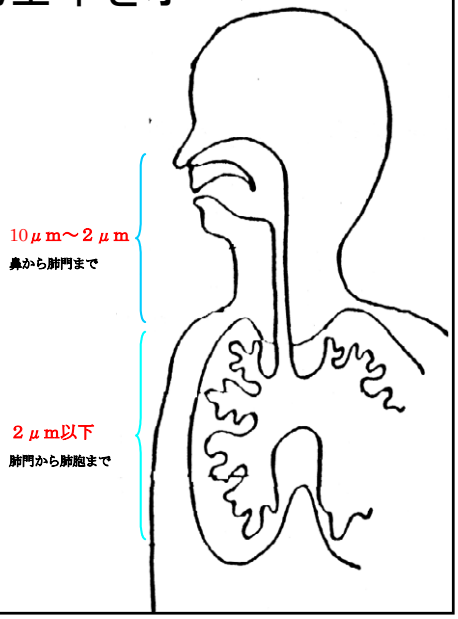
新雪
（2003. 10. 30　撮影）

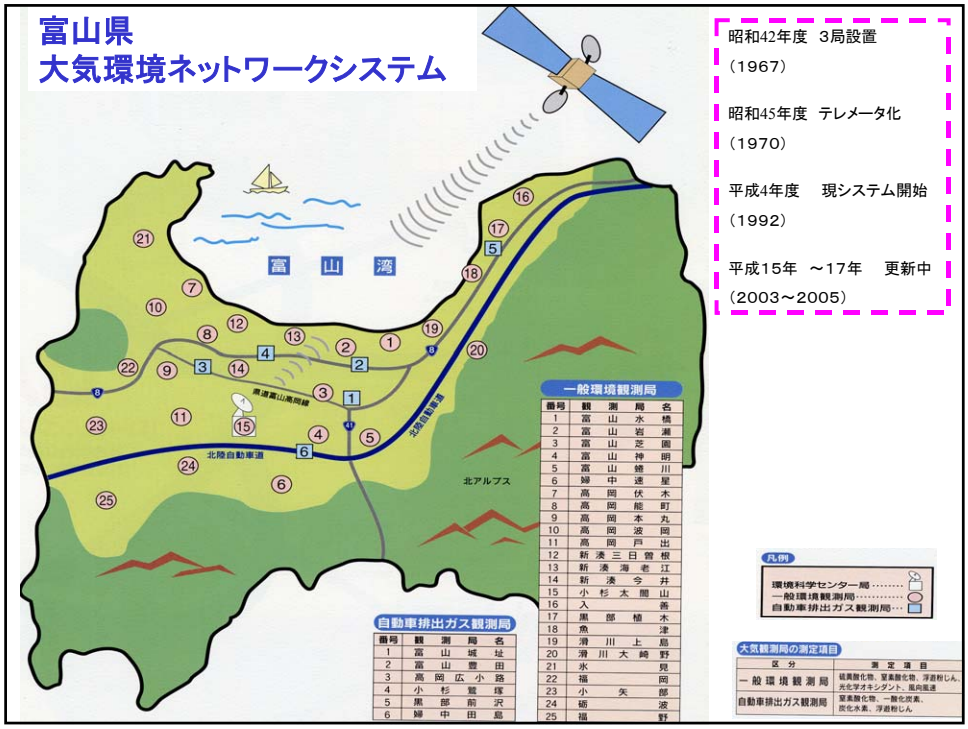
2　富山県では大気の浮遊粒子状物質（10μm以下）が環境基準をオーバー

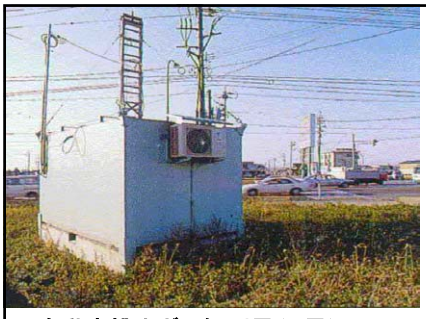
病気 → 「珪肺」、「塵肺」等



黄砂粒子の粒径分布







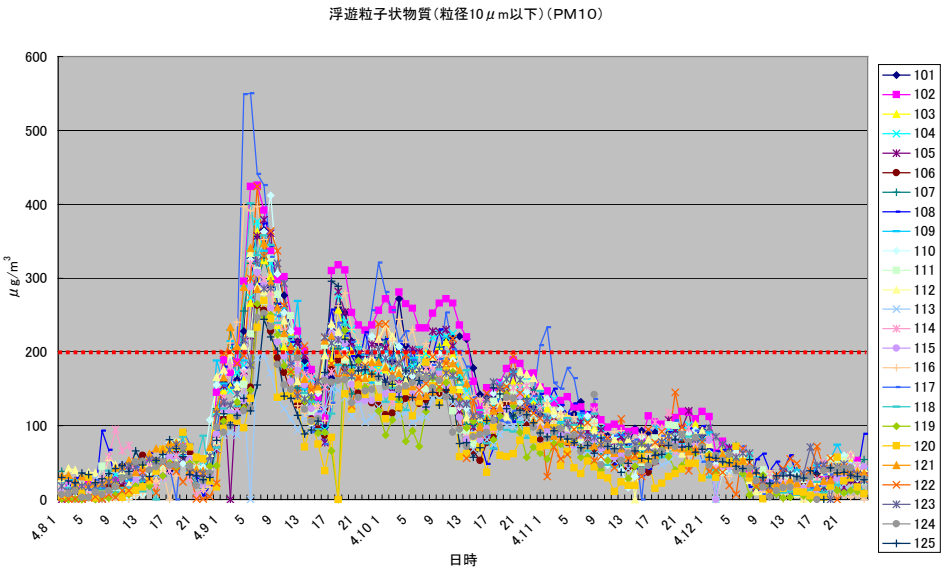
自動車排出ガス観測局（6局）

一般環境観測局（25局）

局内の各種自動測定装置

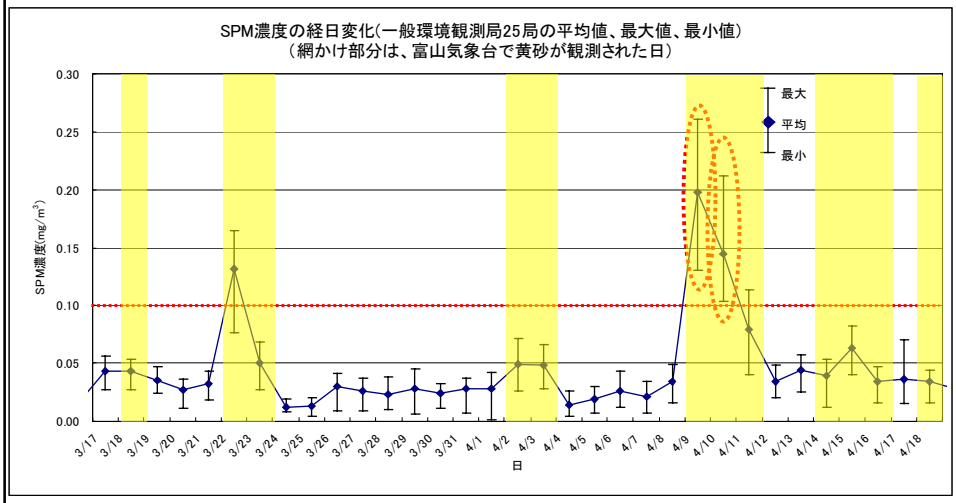

通信衛星
(スーパーバード)
富山県
●衛星通信送受信装置(環境科学センター局)
●中継局(13)
●市町村環境情報受信システム
●ネットワーク
中央室
県全域の大気観測局の管理や観測データの収集、集積、統計処理等を行います。


富山県環境科学センター
ホームページ
エコとやま
富山県大気汚染状況(速報)
大気汚染緊急時対策について(富山県環境保全課)
平成15年09月08日 19時の速報値
目次
最新値
緊急時情報
OX最大値
速報値(AM08)
速報値(AM09)
一般局
観測局名
富山水橋
富山岩瀬
富山芝園
富山神明
富山婦川
婦中速星
高岡伏木
携帯電話でも公開中
富山県大気汚染速報
メニュー
・OX最新地
・OX最大値
・SPM最新値
・全項目速値
注: 都合により最新のデータに更新されない場合もございますが御了承ください。
ようこそ！！富山
OX濃度(ppm)
(速報値)
観測16日16時
[15時][1時]「昨]
三日曽根 0.066
氷見 0.062



富山県内25局の浮遊粒子状物質（2002．4．8～4．12）

（短期評価環境基準 ..... ）



富山県内25局の浮遊粒子状物質（日平均値、最大値、最小値）

（2002．3．17～4．18）

（長期評価環境基準 ..... ）

○主な大気汚染物質の環境基準達成率の推移（一般環境観測局）

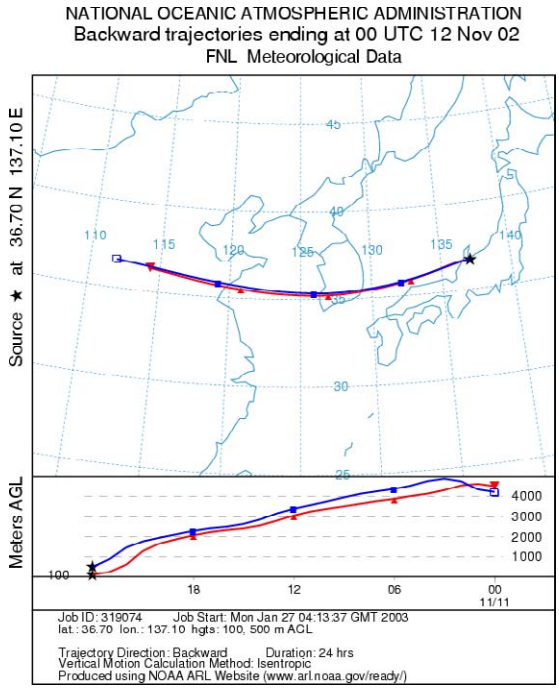
物　質　名	達成率（%）（環境基準達成観測局数／全観測局数×100）					
	48年度	10年度	11年度	12年度	13年度	14年度
二酸化硫黄	50	100	100	100	100	100
二酸化窒素	100	100	100	100	100	100
浮遊粒子状物質	45	100	100	96	96	100*1(0*2)

「富山県環境白書」より

3　黄砂か否かの判断（区別）？

霧か、大気汚染によるスモッグか、黄砂か？

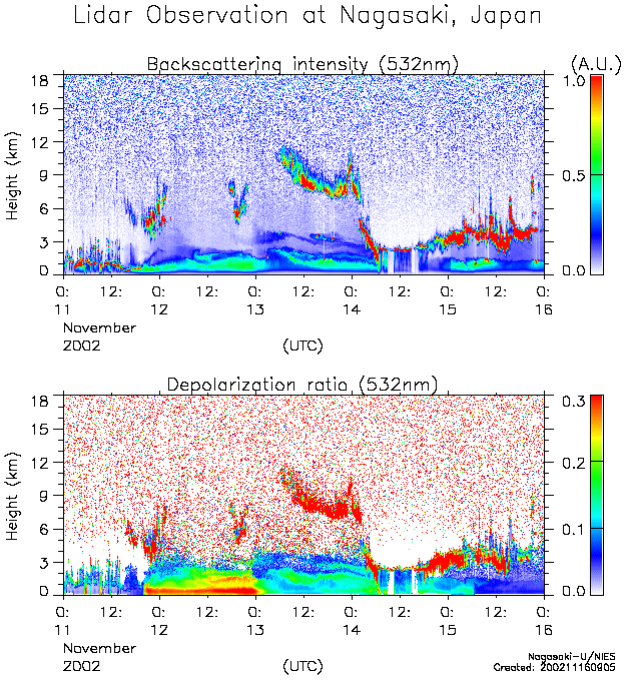
① 気象台の予報
② 後方流跡線解析
③ ライダー（レーザーレーダー）
④ NOAAなど各種衛星画像
⑤ 各種シミュレーションの予報



後方流跡線解析

（2002. 4. 12 富山着）

（NOAA ARL 流跡線解析システム「HYSPLIT」より）



光散乱係数

偏光解消度

ライダー（LIDAR）（レーザーレーダー）

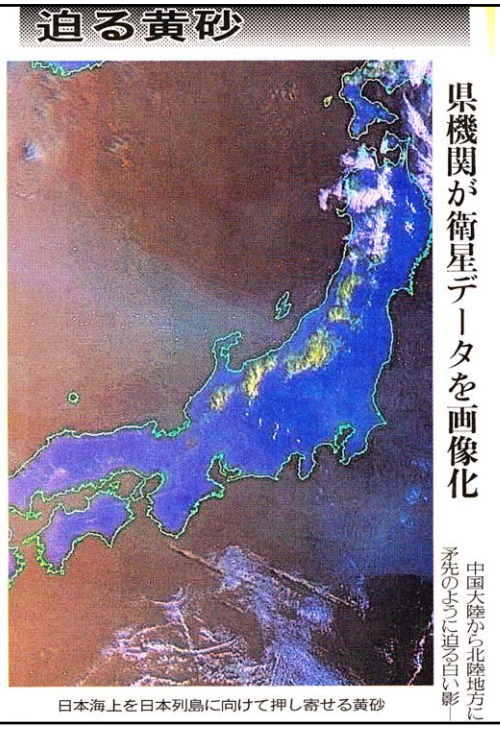
（2002. 4. 11～15 長崎）

（国立環境研究所ライダーのホームページより）

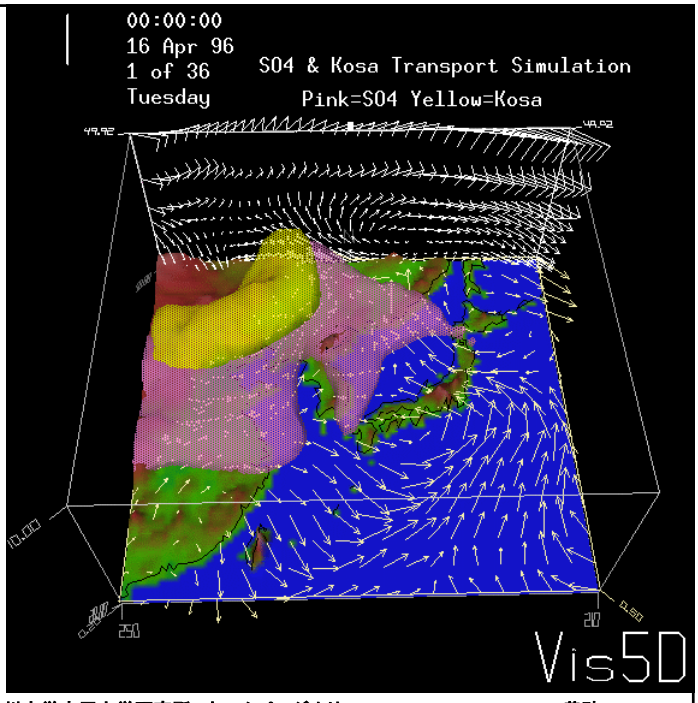
読売新聞　2002. 4. 13

FY-1C（中国）衛星写真

（NPEC（環日本海環境協力センター）より）

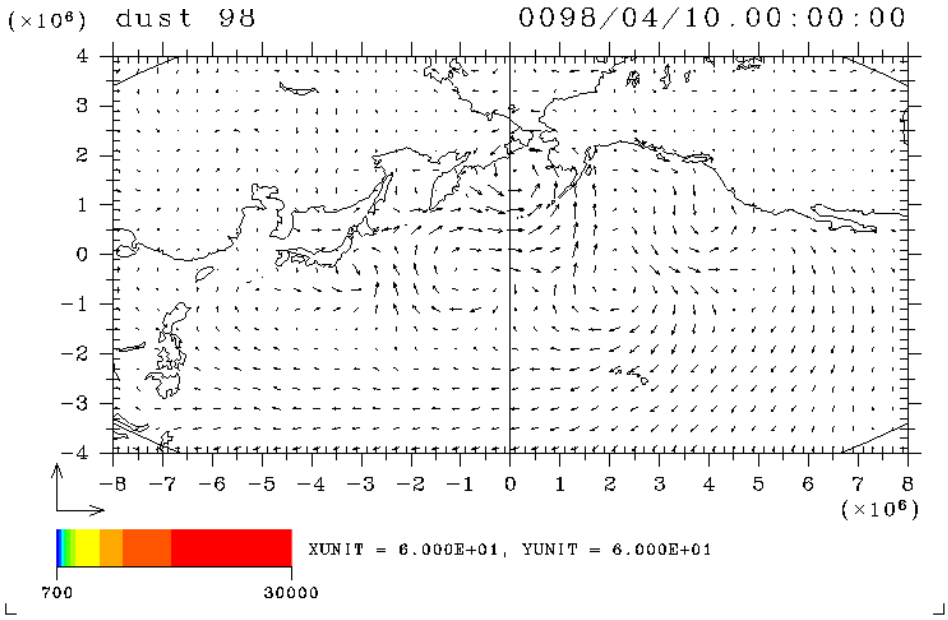


黄砂の飛来シミュレーション



九州大学応用力学研究所　ホームページより　　1996. 4. 16～18　黄砂

黄砂の飛来シミュレーション

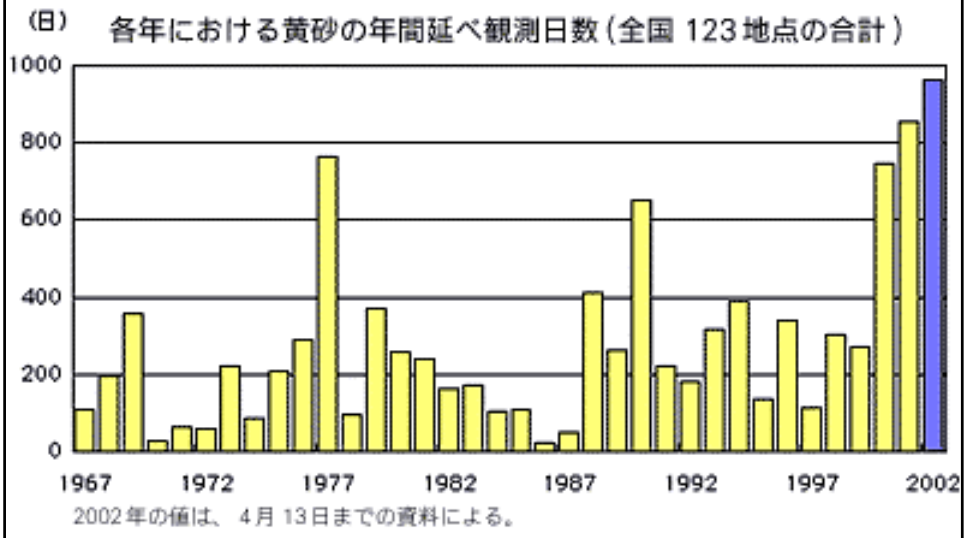


黄砂シアトルまで飛来　1998. 4. 10～25　　九州大学応用力学研究所　ホームページより

4　日本人が黄砂について知りたいこと

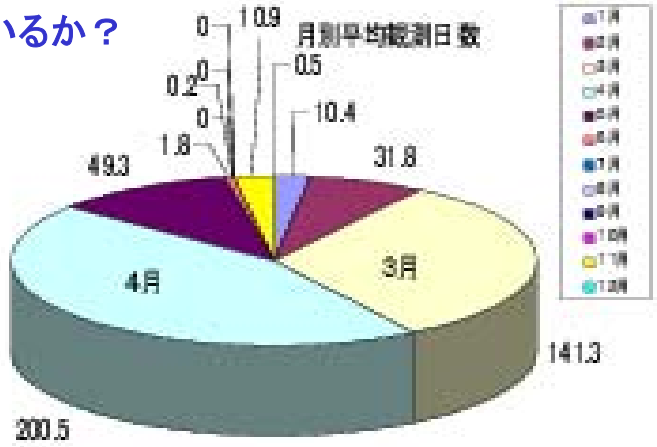
① 黄砂は何時来ているか？
② 中国の黄砂・砂嵐（浮塵・揚塵・沙塵暴）の歴史？
③ 黄砂粒子の粒径分布？
④ 黄砂粒子の主な組成？
⑤ 大気汚染物質は含まれていないか？
⑥ 海洋生物の栄養塩？
⑦ 農薬や化学物質は含まれていないか？
⑧ 微生物、細菌は含まれていないか？

黄砂は何時来ているか？



出典：気象庁ホームページ

黄砂は何時来ているか？



一般的に春（３月、４月）に多い

（７月から９月は0，１１月は10.9）

出典：気象庁ホームページ

中国の黄砂・砂嵐の歴史？

表1.3-1　中国の歴史時代における雨土年表（張，1982）

世紀	雨土発生年											
20世紀前期	1933	1930	1928	1925	1923	1920	1914	1906				
19世紀	1899	1896	1895	1879	1878	1876	1875	1872	1869	1868	1865	1864
	1863	1862	1861	1860	1859	1858	1857	1856	1855	1853	1852	1851
	1850	1847	1842	1840	1826	1825	1824	1813	1810	1807		
18世紀	1794	1786	1785	1783	1774	1773	1769	1768	1759	1751	1745	1742
	1739	1732	1727	1721	1720	1712	1709	1706	1705	1701		
17世紀	1698	1696	1693	1692	1691	1690	1687	1686	1680	1672	1671	1670
	1668	1667	1662	1660	1658	1656	1649	1647	1644	1643	1642	1641
	1640	1639	1637	1635	1634	1633	1625	1624	1622	1621	1620	1619
	1618	1613	1611	1605								
16世紀	1597	1596	1590	1586	1580	1573	1568	1567	1565	1561	1551	1550
	1549	1542	1538	1535	1534	1529	1524	1523	1522	1518	1513	1504
15世紀	1498	1497	1493	1489	1485	1473	1471	1470				
14世紀	1366	1364	1345	1333	1331	1329	1324	1321	1306			
13世紀	1296	1287	1275	1274	1268	1264	1259	1258	1255	1251	1250	1245
	1239	1238	1230	1228	1227	1223	1220	1219	1217	1216	1215	1210
	1205	1201	1200									
12世紀	1197	1195	1194	1193	1186	1184	1183	1179	1178	1177	1169	1168
	1141	1138	1135	1127	1119							
11世紀	1092	1083	1082	1079	1075	1074	1072	1064	1020	1007		
10世紀	987	957	904	903								
9世紀	882	881	873	836	834	822						
8世紀	794	792	786	772	754	717	709	708	707	706		
7世紀	692	652	633	619								
6世紀	582	580	550	537	536	535	509	508	503			
5世紀	488	486	452	439	402							
3世紀以前	300	−32	−35	−78	−86	−125	−284	−1150				

出典:「大気水圏の科学　黄砂」

5　富山県での黄砂調査及び研究

(1)　環境省黄砂実態解明調査

日本での黄砂飛来の実態を統一した方法で行う。

- 黄砂成分、粒径分布の解明
- 黄砂飛来量の把握
- 黄砂飛来予測シミュレーションの確立

(2)　富山県での黄砂研究

- 富山県に飛来する黄砂の標高別の実態解明
  - ①立山室堂（2，450m）
  - ②立山黄砂・酸性雨観測局（1，180m）
    （ライチョウバレースキー場山頂）
  - ③富山県環境科学センター（10m）
- 農薬等化学物質の解明

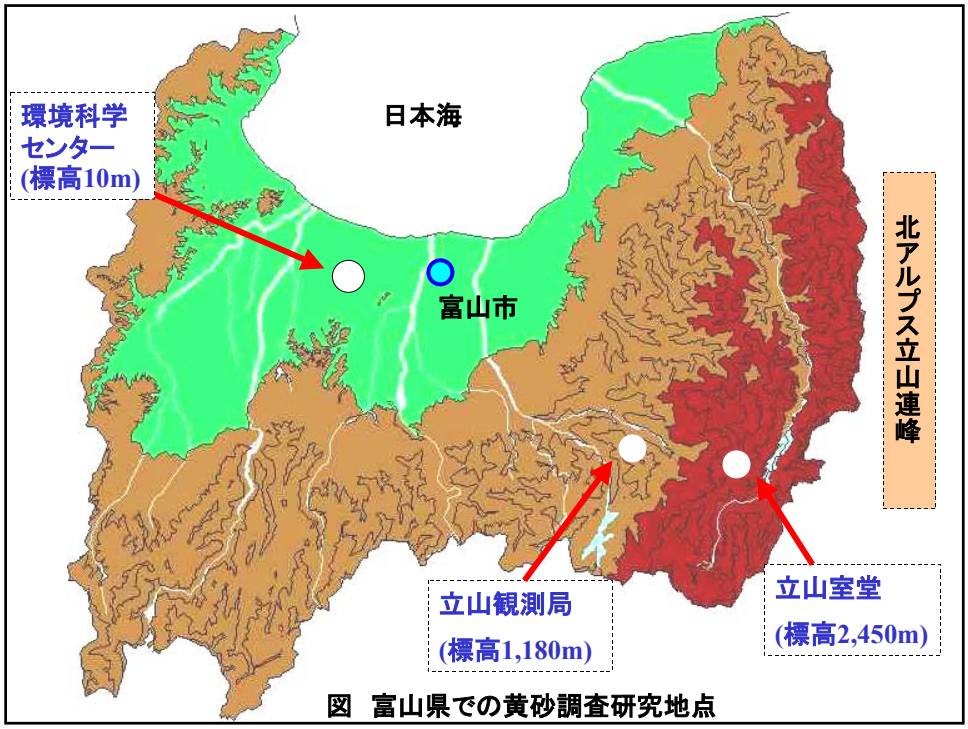


図　富山県での黄砂調査研究地点

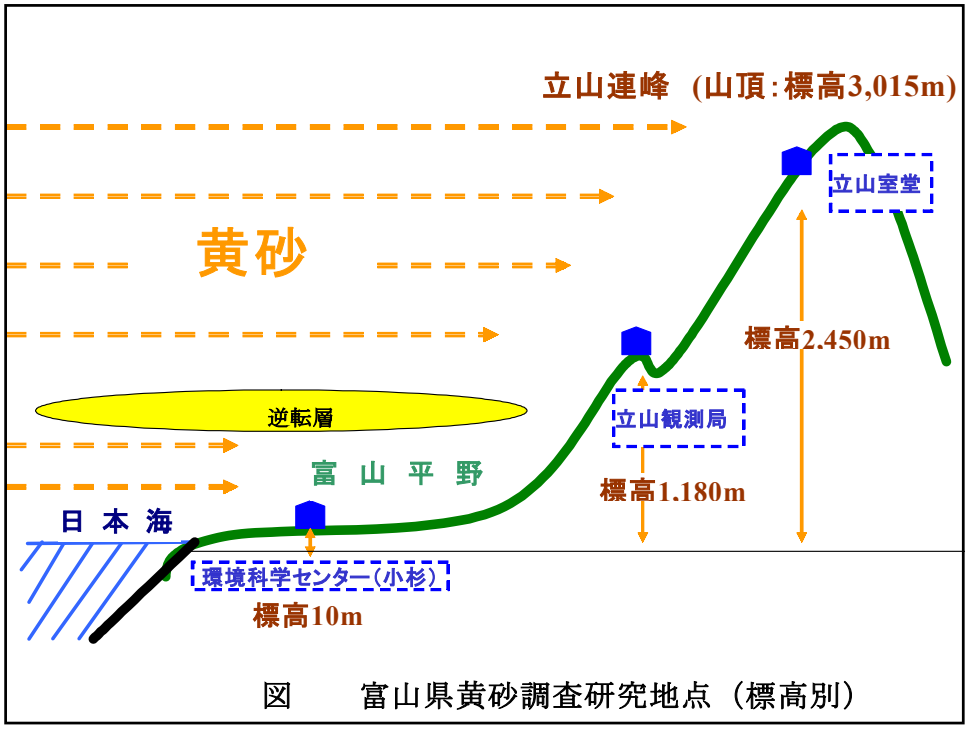
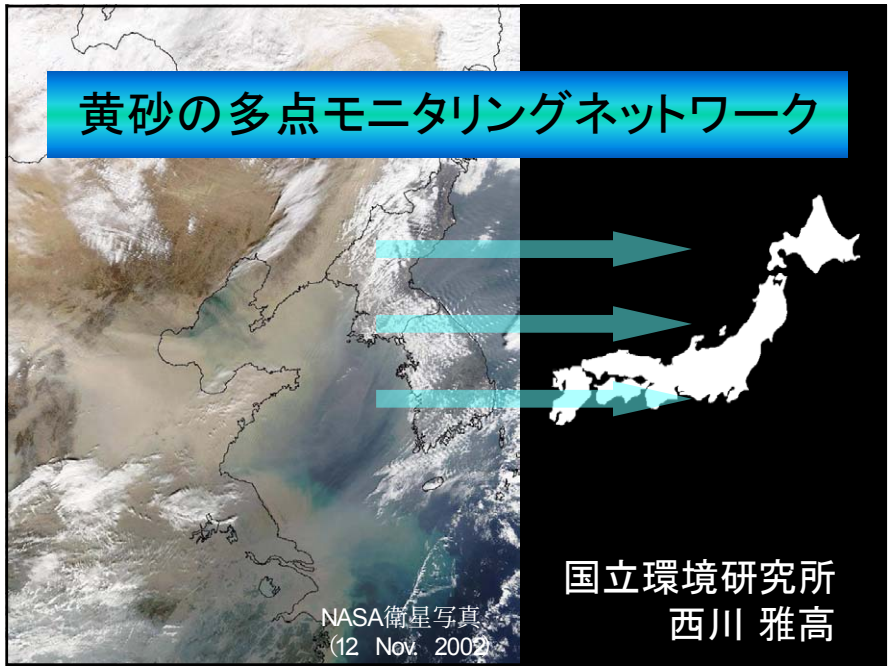


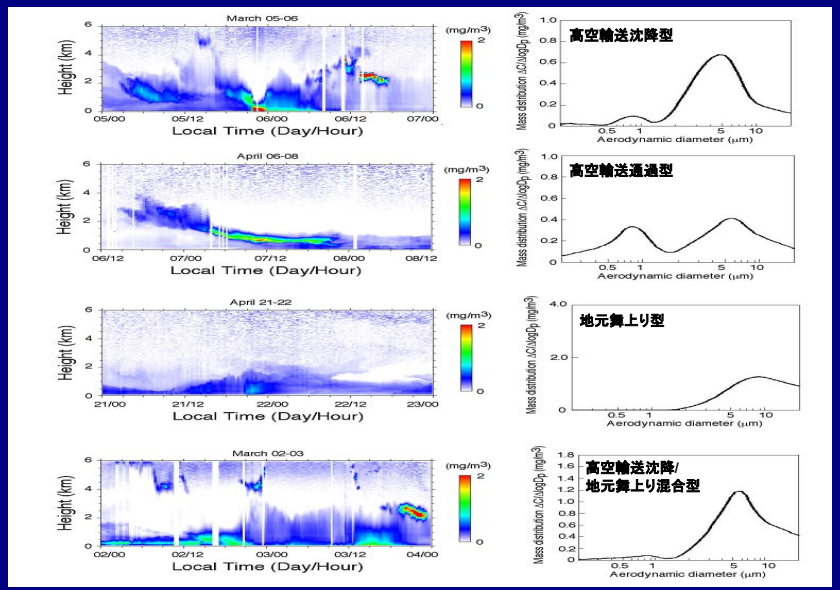
図　　富山県黄砂調査研究地点（標高別）

新　立山黄砂・酸性雨観測局（ゴンドラスキー場山頂駅付近）

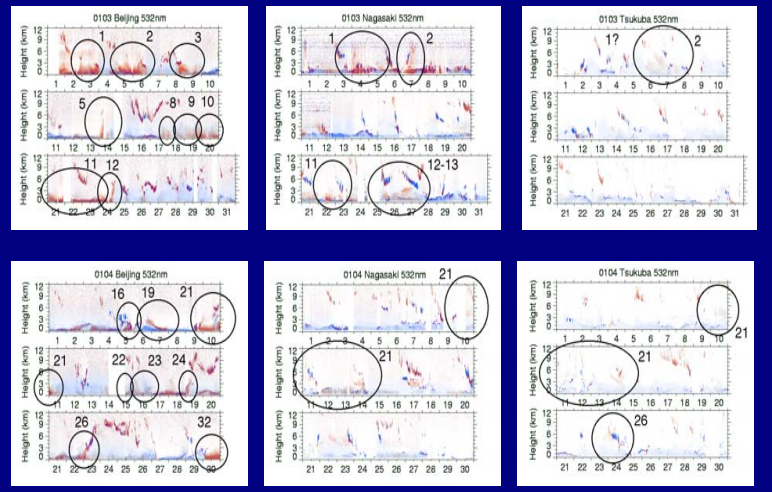

終
富山県高岡市二上山から望む立山連峰


黄砂の多点モニタリングネットワーク
NASA衛星写真
(12 Nov. 2002)
国立環境研究所
西川 雅高


つくば
（国立環境研究所）
北京
（日中友好環境保全センター）
国立環境研究所 西川 雅高

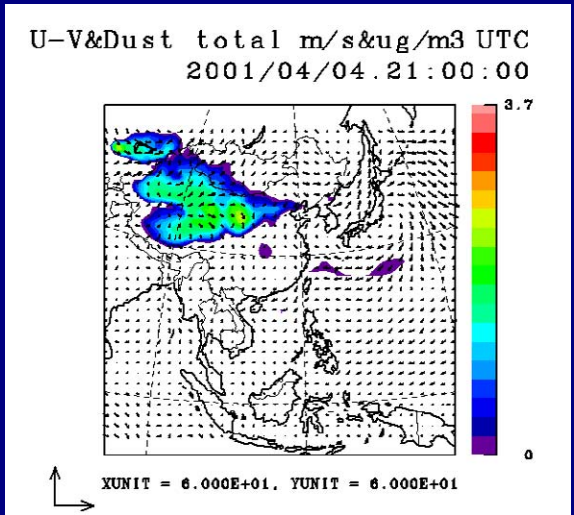


北京の黄砂の四つの類型の例　国立環境研究所　西川 雅高



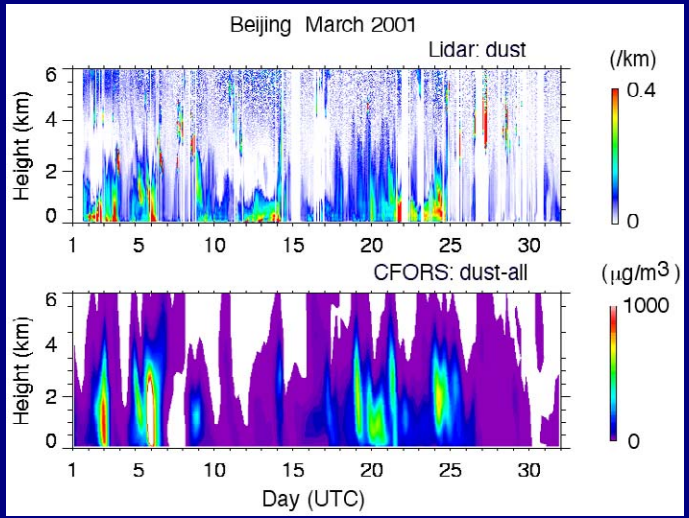
2001年3月、4月に北京、長崎、つくばで観測された黄砂
（丸で囲んだ赤く表示された事象が黄砂）

国立環境研究所　西川 雅高



CFORSで再現された黄砂発生と輸送の一例

国立環境研究所　西川 雅高

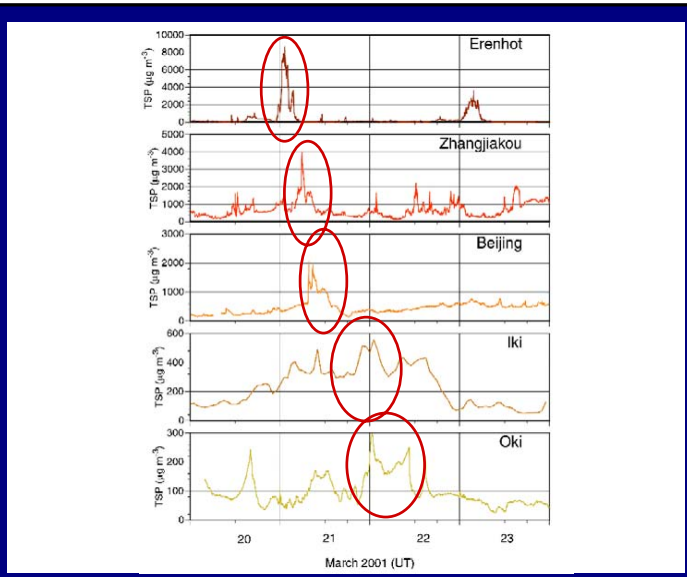


ライダーで観測した2001年3月の北京の黄砂の消散係数の
時間高度表示と化学輸送モデルCFORSによる計算結果

国立環境研究所　西川 雅高

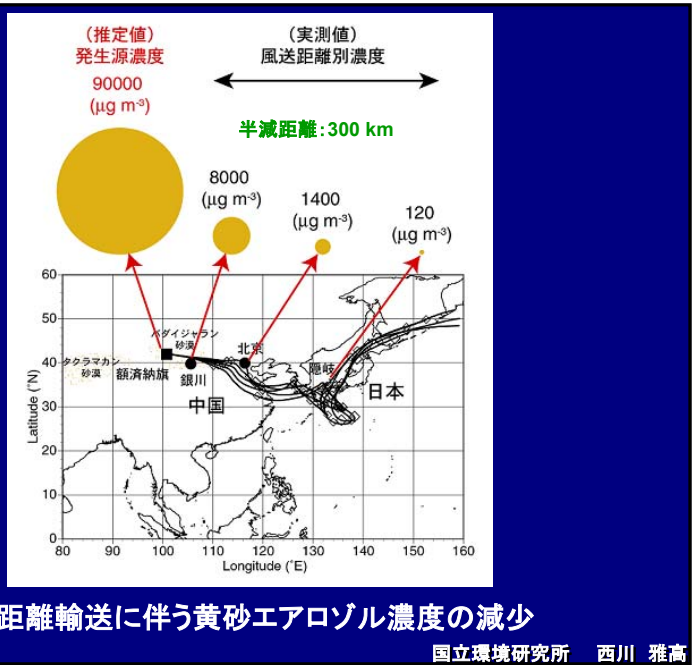
黄砂地上モニタリングに使用する機器

国立環境研究所　西川 雅高



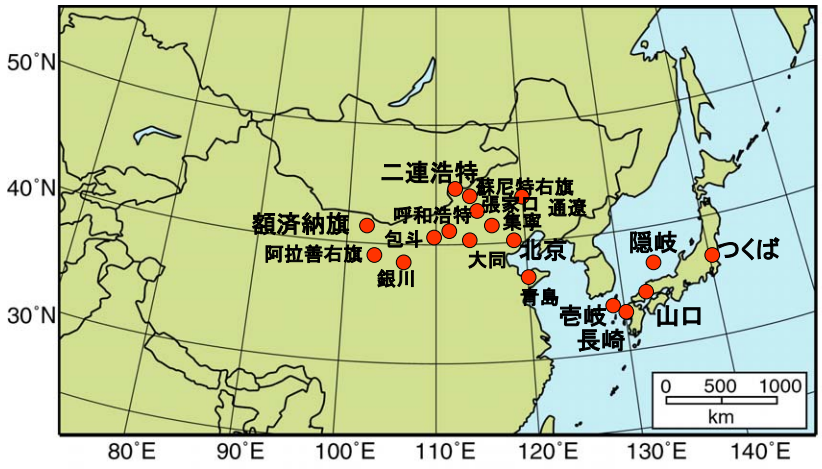
LD-3Kによる多点連続モニタリング

国立環境研究所　西川 雅高



長距離輸送に伴う黄砂エアロゾル濃度の減少

国立環境研究所　西川 雅高



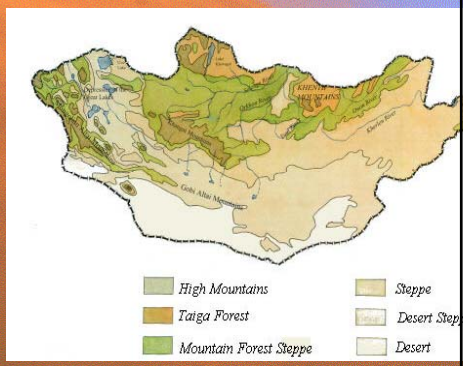
黄砂モニタリングのための地上観測地点（中国・日本）

国立環境研究所　西川 雅高

DUST STORMS IN MONGOLIA

Mongolia is divided into 6 natural zones

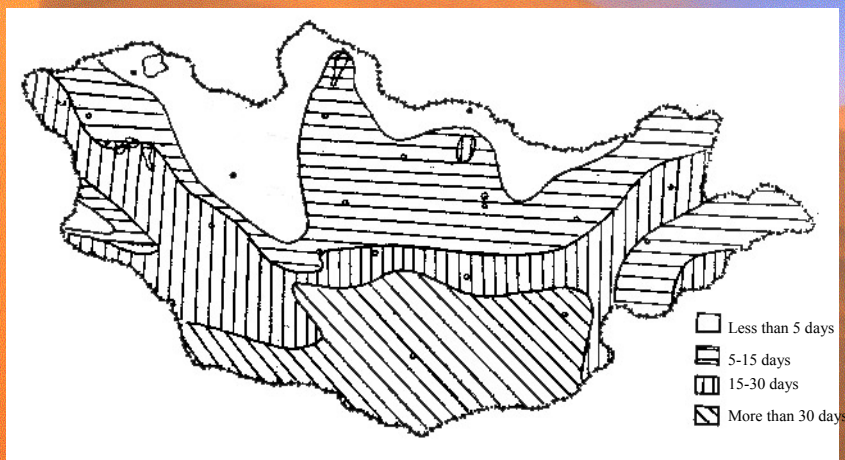
- High Mountains
- Taiga Forest
- Mountain Forest Steppe
- Steppe
- Desert Step
- Desert



Dust and Sand Storm

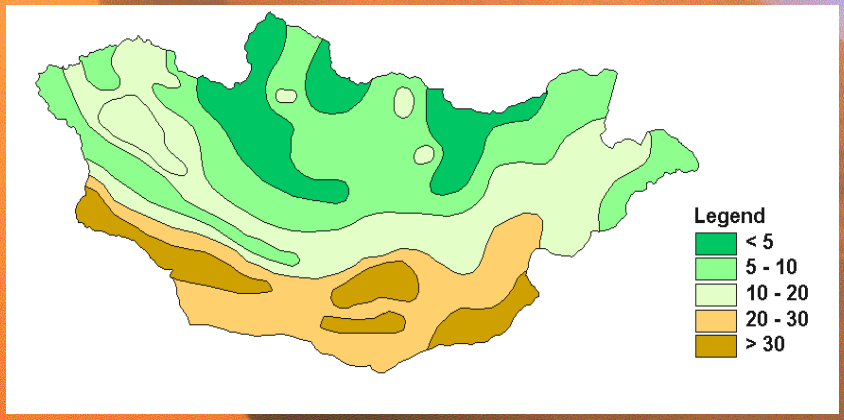
- The number of dust-storm days has been increasing
- The increasing frequency of DSS have taken away the most valuable fertile soil
- The social and economic costs caused by DSS are affecting our goals for sustainable development

Number of days with severe wind

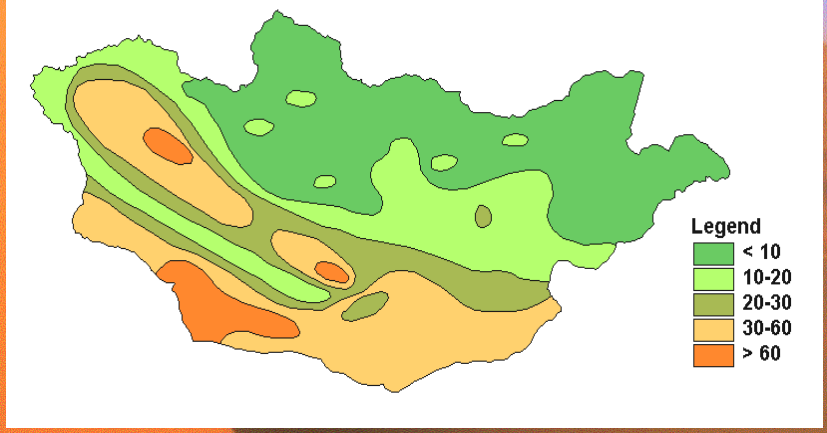


Frequency of drought

Number of days with dust storms

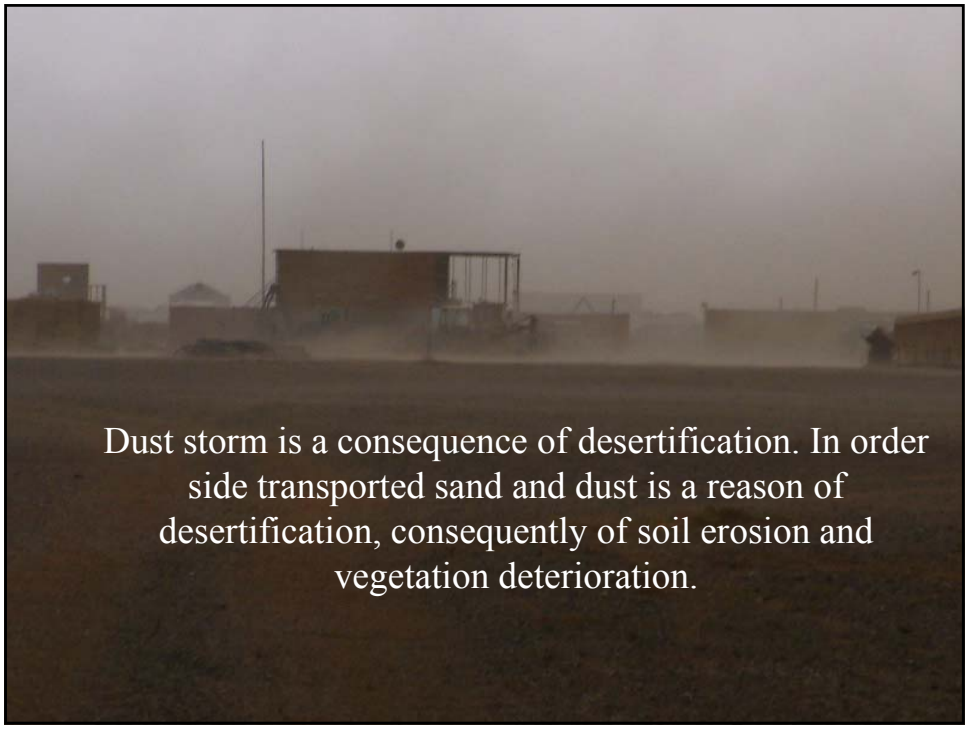


Number of days with drifting dust

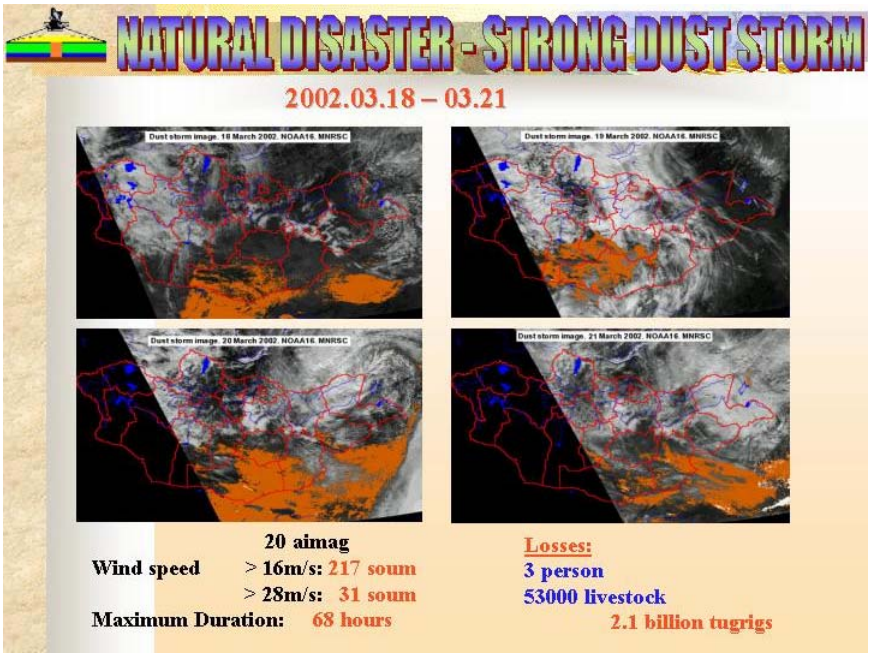


Main objectives of Ministry of Nature and Environment of Mongolia

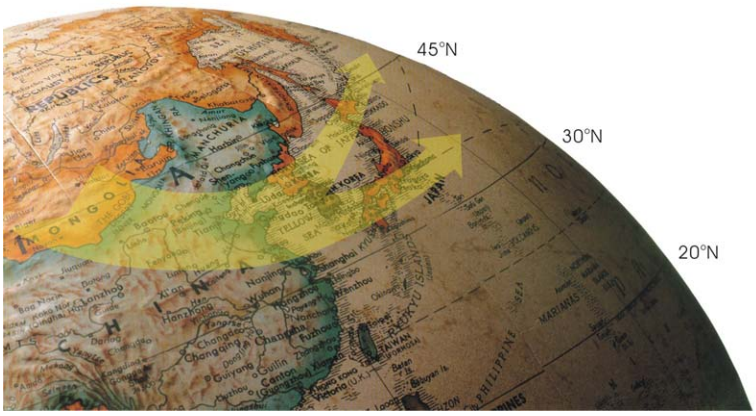
To identify and study dust source places in Mongolia. Especially, in the main direction of the dust storms of to make a source monitoring of dust and information system in Mongolia.



Dust storm is a consequence of desertification. In order side transported sand and dust is a reason of desertification, consequently of soil erosion and vegetation deterioration.



Researchers for last years have shown that dust storm has started in Mongolia reaches to China, Korea and Japan, and negatively affects.



Proposed activities

- **Arrange needed actions to combat desertification in dust storm source areas**
- **Set up monitoring system for sandy movement and transported dust and sandy contents measurements**
- **Estimate and assess dust storm distribution, clarify relation desertification and dust storm**
- **Develop dust storm forecasting methodology to aware, support dust storm disaster management system, reduce consequences**
- **Formulate legal management and urgently needed practical actions, suitable for Mongolian features such as large territory, low population**

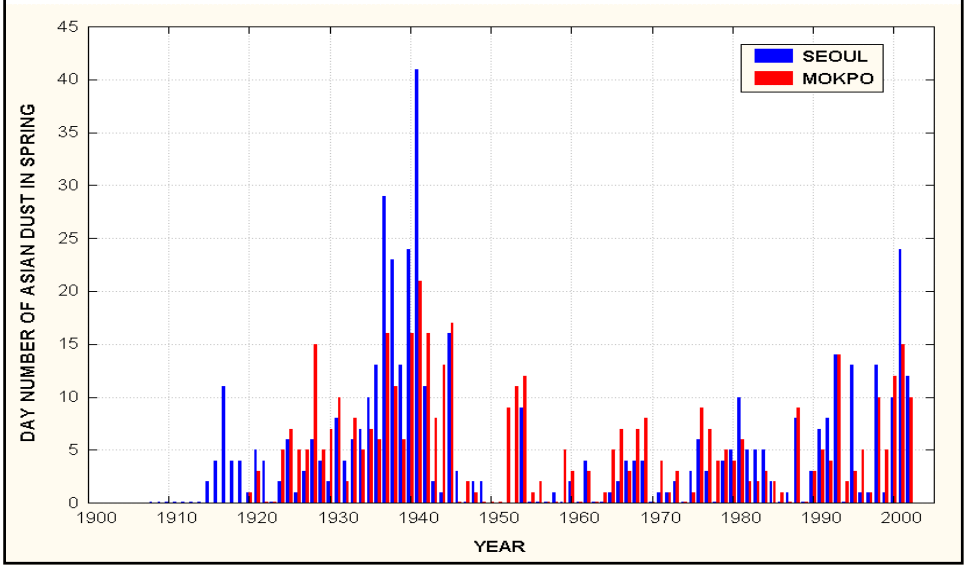

THANK YOU FOR YOUR
ATTENTION.

Status Quo and Control of Asian Dust in Korea

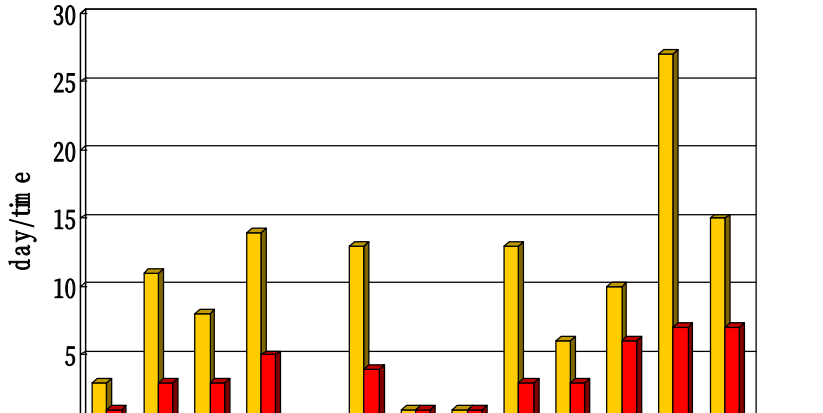
November 24, Toyama

CHU, Jang Min
Korea Environment Institute

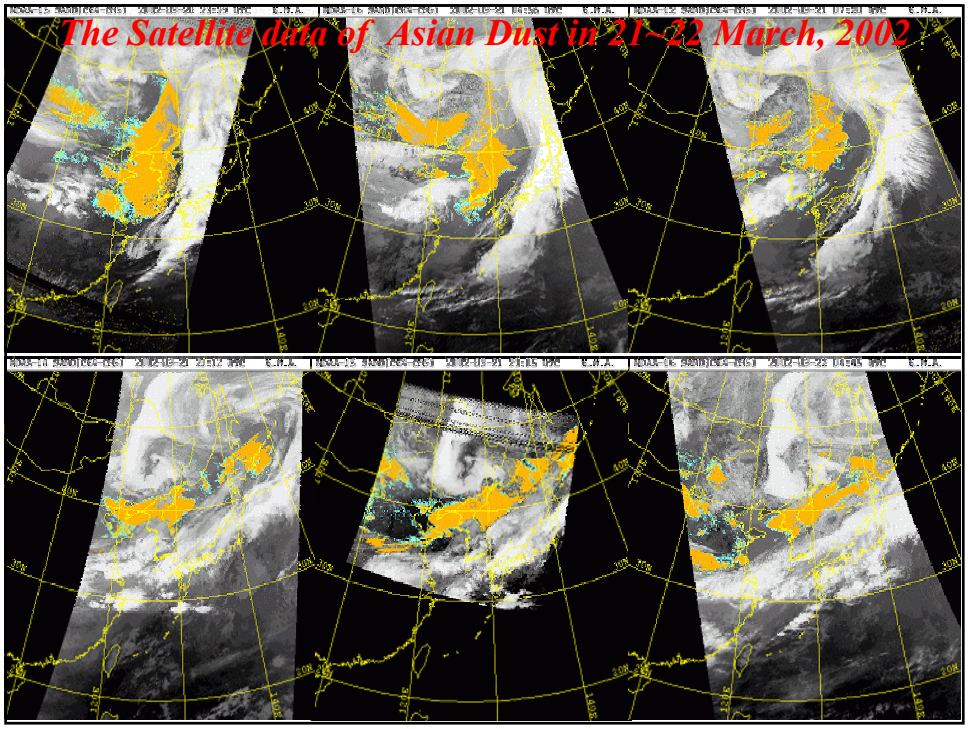
Day Number of Asian Dust of 20th Century in Korea

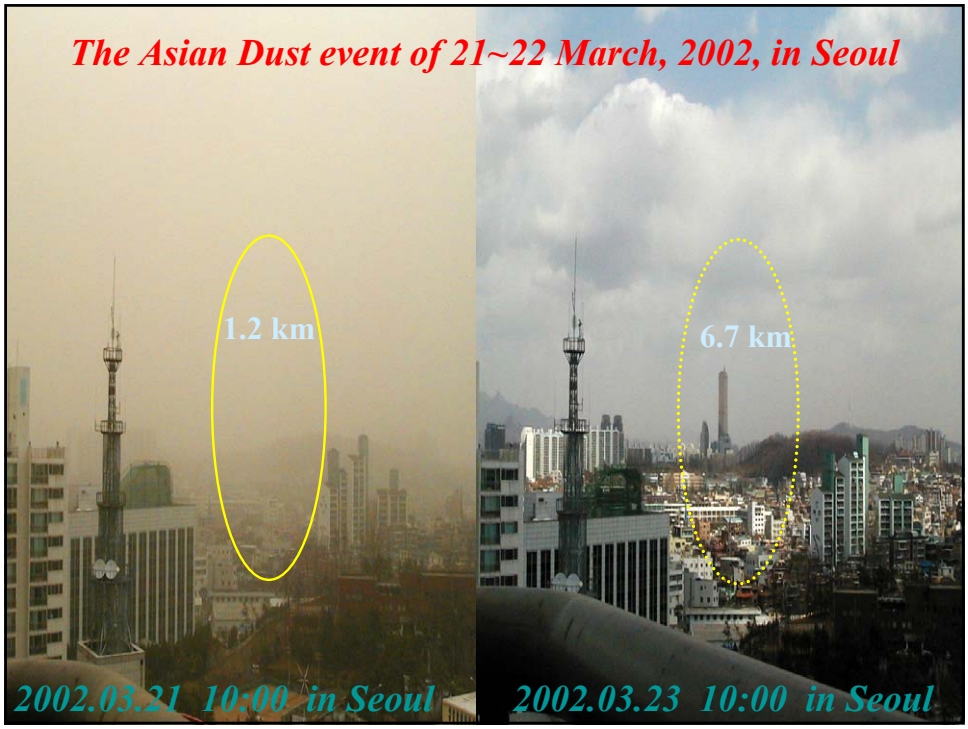


Day/Time Number of Asian dust in Seoul(1990-2002)



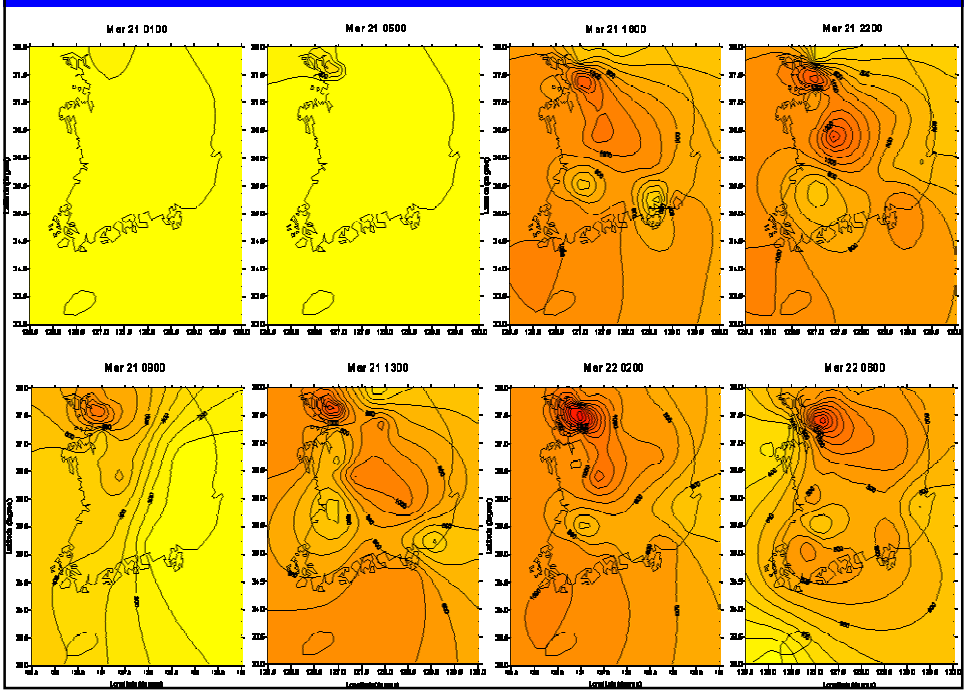
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Day	3	11	8	14	0	13	1	1	13	6	10	27	15
Time	1	3	3	5	0	4	1	1	3	3	6	7	7




The Asian Dust event of 21~22 March, 2002, in Seoul
1.2 km
6.7 km
2002.03.21 10:00 in Seoul
2002.03.23 10:00 in Seoul


The Asian Dust event of 21~22 March, 2002, in Seoul
Enterprise
서울32
다 1619
2002.03.21 15:30 in front of Seoul Tower Hotel

PM10 Concentration *of Asian Dust event of Korea in 21~22 March, 2002*



Impacts and Damages of Asian Dust in Korea

- PM10 concentration increased about 2-10times in Asian dust events than Non-Asian dust period;
- People were received harmful impacts to their hearth;
- 102 scheduled flights were cancelled by decline of visibility in 2002;
- 4949 education bodies (kindergartens, primary and high schools) were stopped in 2002;
- High - tech industries were received damage by dust;
- Agriculture production was reduced

Countermeasures for Control Asian Dust in Korea

- ☞ Establishment of Asian Dust phenomena data base
- ☞ Set up cooperation system between Minister of Environment (MOE) and Korea Metrological Agency (KMA)
- ☞ Strength monitoring and early warning of Asian Dust
- ☞ Implementation integrated forecasting and early warning system
- ☞ Establishment 5 monitoring sites in China through cooperation between Korea and China, and exchange monitoring data in real time from next spring
- ☞ Implementation afforestation projects of MOE in China
- ☞ Attendance ADB-GEF program to establish a regional monitoring and early warning system for DSS in NEA

Asian Dust Early Warning System in Korea

Watch

300 $\mu g/m^3$

Advisory

500 $\mu g/m^3$

Warning

1,000 $\mu g/m^3$

Changchun
Jilin
Siping
Liaoyuan
Fuxin
Shenyang
Fushun
Chaoyang
Beipiao
L I A O N I N G
Benxi
Jinzhou
Anshan
Yingkou
Dandong
NORTH KOREA
Hohhot
Jining
Zhangjiakou
Xuanhua
Chengde
Datong
Mentougou
Beijing
Tangshan
Qinhuangdao
TAIHANG SHAN
Tianjin
Hangu
Baoding
TIANJIN
Dalian
Shijiazhuang
Handan
Jinan
Weifang
Yantai
Y E L L O W   S E A
P A C I F I C   O C E A N
E A S T   C H I N A   S E A
Kaesŏng
Liao He

Dear Sirs

The Russian delegation along with the previous speakers shares the common concern over the DSS problems in the NEA region and considers it a crucial issue for all the countries of the region with similar climatic conditions.

The Russian Federation this year joined the International Convention on Desertification Control and participated in the recent Conference of the Parties in Havana as the party to the Convention.

Desertification and degradation of land is a vital problem for the Russian Federation either.

On its territory there are 40 administrative units – Subjects of Federation (out of 89 in total)- with the arid and semiarid ecosystems threatened with the desertification processes.

The most critical situation is in the Kalmykyia (close to the Caspian Sea) where the dust storms result in a catastrophic degradation of land every year. There are also vast territories vulnerable to soil degradation in the Altai and Buryatiya.

The Russian Far East regions are located close to disaster regions of China and Mongolia. So it is important to prevent the possible damage to ecosystems and health of the inhabitants from the transboundary transfer of sands as it occurred last year in the vicinity of Vladivostok city

On this reason the Russian Federation has a commitment to undertake measures to meet obligations of the Convention to a full extent. Now Russia is engaged in development of the National Plan of Actions addressed to the issues covered with the aforementioned Convention.

The discussed problem is highly relevant to the Convention objectives and its activities.

The Russian Federation is interested in the implementation and results of the ABD-GEF project for monitoring and control of dust and sandstorms in NEA and would like to express its commitment to contribute to this project with account of its scientific and technical potential.

UNEP Approach to Dust and Sandstorm (DSS) Issue in Northeast Asia

C. Konda
UNEP/ROAP

24/11/03 1

ADB-GEF Project - I

- Objective
  - to promote establishment of a **regional cooperation mechanism** for prevention and control of dust and sandstorms (DSS) in Northeast Asia
- Two Major Components of the Master Plan
  - Phased program to establish a regional monitoring and early warning network of DSS
  - Investment strategy to strengthen mitigation measures to address root course of DSS

24/11/03 2

ADB-GEF Project - II

- Participating Parties
  - China, Mongolia, Korea and Japan
  - ADB, UNEP, UNESCAP and UNCCD
- Budget
  - ADB: US$ 0.5 million (RTA)
  - GEF: US$ 0.5 million (MSP)
- Period
  - 18 months from January 2003

24/11/03 3

UNEP Role in the Project

- Implementing agency for GEF part
- Chair of Technical Committee for the component on regional monitoring and early warning network
- Prepare a report on the phased program to establish regional monitoring and early warning network

24/11/03 4

Time Frame

- 1st Joint SC/TC Meeting (Mar. 03, Manila)
  - Selection of consultants and experts
  - 1st Workshop (Aug. 03, Beijing)
  - Missions to four countries
  - 2nd Workshop (Nov. 03, Seoul)
  - Review of the draft by small group
- 2nd Joint SC/TC Meeting (Feb. 04, Bangkok)

24/11/03 5

Major Findings

- Perception, definition, monitoring item and method, current capacity, needs and expectation, etc. are all different from country to country.
- Although a few bilateral cooperation projects are being partially undertaken, there is no multi-lateral/regional cooperation mechanism.
- Helping Mongolia develop its national capacity is one of key points from the regional context.

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Expected Outputs - I

- Proposal for regional network for early warning - Indicators for monitoring
  - Level 1 sites: Visibility (*instrumented*)
  - Level 2 sites: Visibility + TSP or PM_{10}
  - Level 3 sites: Visibility + TSP or PM_{10} + Lidar
- Note:
  - at the designated stations for data sharing
  - with a common measuring method and a common operational manual

24/11/03 7

Expected Outputs - II

- Proposal for regional network for early warning - Phased regional networks
  - Phase 1:
    - by minimal designated stations
  - Phase 2:
    - by expanded designated stations
    - with special focus on Mongolia
  - Phase 3:
    - refining of forecasting methods
    - long-term forecasting using ground surface monitoring data

24/11/03 8


The Way Forward
Implementation of the Regional Master Plan to be formulated
Possible institutional integration in the future for various transboundary air pollution issues:
Acid deposition (EANET)
Atmospheric Brown Cloud (ABC)
Haze Pollution
Dust and sandstorms (DSS)
24/11/03
9