The User and the GEOSS Architecture XXI: Air Quality and Human Health

Beijing, China

29 July 2008

Air Quality & Human Health

- Sponsors: ISPRS, IEEE, GEO, OGC
- Organized by
  - Bill Sprigg (UA)
  - Amy Budge (UNM)
  - Stan Morain (UNM)
- A pre-Congress workshop of ISPRS Congress
- 25 attendees
- Representing 6 countries
  - China, Mongolia, Japan, Korea, India, USA

Workshop Objectives

- Focus on environmental and human health
- Discover needs of user community (public health officials, dust modelers, decision makers)
- Introduce and demonstrate GEOSS architecture
- Foster interactions between data & information providers and GEO ADC architecture approach

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Workshop Format

- One-day workshop with two main parts
  - Introduction & overview
  - Part 1: Identifying Health & Dust Issues
  - Part 2: Introducing Programs & Strategies
  - Discussion Session
- GEOSS demonstration by OGC
- No breakout sessions
  - Rooms & registration issue

Part 1: Identifying Health & Dust Issues

Dust modeling & forecasting	Dr. Masao Mikami – Meteorological Res. Inst. Japan
Control of dust sources	Dr. Zhibao Dong – Chinese Academy of Science
PM10 concentrations in ambient air of Ulaanbaatar City, Mongolia	Dr. Dulam Jugder – Inst. of Meteorology & Hydrology, Mongolia
Mineralogy & possible sources of spring dust particles over Beijing	Dr. SHAO Longyi – China Univ. of Mining & Technology
OGC demonstration via video	

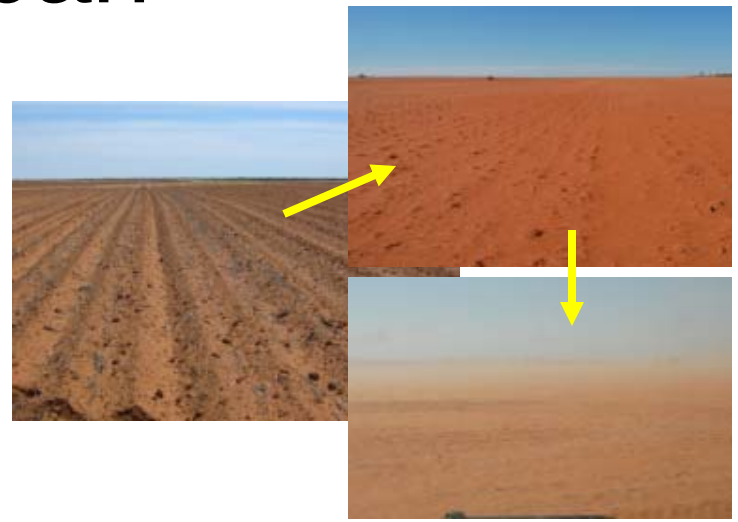
Part 2: Introducing Programs and Strategies

Science for health & well-being: an ICSU trans-union initiative	Dr. Dov Jaron – Drexel Univ. USA
International sand & dust storm warning advisory & assessment system	Dr. William Sprigg – Univ of AZ USA
Establishment & application of web-based infectious disease reporting system in China	Dr. LP Wang – China CDC
Asian dust aerosol modeling	Dr. Soon-Ung Park – Center for Atmospheric & Environmental Modeling, Korea

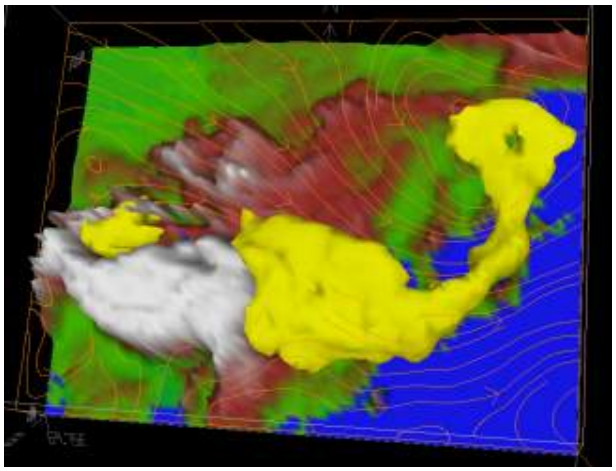
Part 2: Introducing Programs and Strategies (continued)

Regional centre for Asia/Central Pacific & SDS Operational Numerical Forecasting System	Dr. Yaqiang Wang – CAMS, China Meteorological Admin.
GEONETCast: Delivering environmental data to users worldwide	Dr. Xingying Zhang – China Meteorological Admin.
Environmental factors contributing to the spread of H5N1 avian influenza in mainland China	Dr. Wuchun Cao – Beijing Inst. of Microbiology & Epidemiology

Issues - Japan



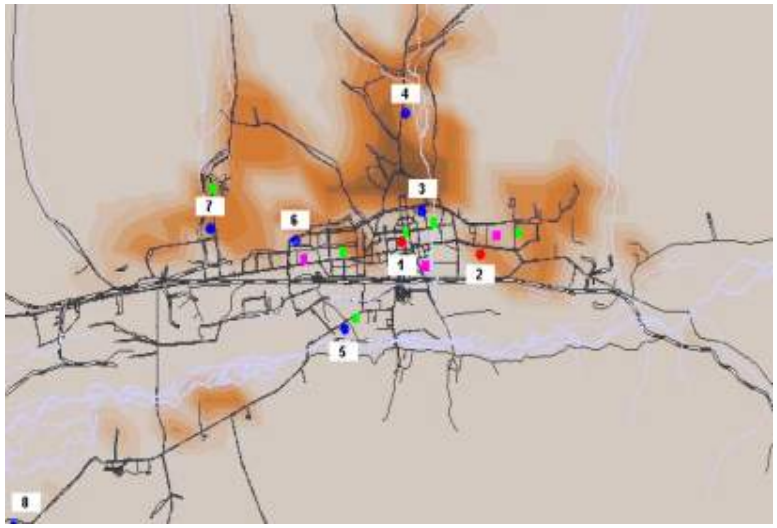
- Dust entrainment due to inappropriate management of agricultural fields
- Dust forecast model
  - MASINGAR
    (Model of Aerosol Species IN the Global AtmospheRe)



- Needs and directions
  - Real-time information of dust distribution
  - More *in-situ* observations for verification/validation

Issues - Mongolia

- Air pollution (PM10) in Ulaanbaatar City
  - Anthropogenic sources
  - Mineral dust
  - Forest fires
- AQ master plan initiated
- Needs
  - Dust forecast system
  - AQ monitoring for PM10



Issues - Korea

- Frequency & concentrations of dust events increased over past 5-6 years
- Economic consequences est. at a billion USD per year

- Asian Dust Aerosol Model (ADAM) - forecasting

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Programs and Initiatives

- ISCU: Science for Health & Well-being
- WMO: International Sand and Dust Storm Warning Advisory and Assessment System
  - East Asia/Central Pacific Centre (Regional)
- CDC China: Infectious Disease Reporting System
- GEONETCast
- GEO -GEOSS

Recommendations

- Field campaign for comparing model results with *in-situ* observations
- ICSU should consult with the International Union of Soil Scientists (IUSS) to more accurately and frequently identify and characterize dust source regions
- More environmental information needs to be integrated with reports form doctors in the field to better anticipate outbreaks such as the avian flu
- Distinction between modeling objectives must be clear when more than one model covers a geographic region
- Inter-comparisons of models should be implemented in the near future

Recommendations (continued)

- SDS WAS should expand to include India
- Indian scientists working on dust prediction should be recognized and included in scientific meetings and workshops
- GEONETCast and WMO SDS WAS should cooperate in disseminating information
- Studies should be undertaken to examine potential for avian flu to be spread in the airborne dust

Who were the users at the workshop?

- Dust forecast modelers
- Research scientists
- Information system developers
- Medical doctors

What data do they use?

- LiDAR
- MODIS vegetation product
- SPOT vegetation NDVI
- Meteorological data (wind, temperature, precipitation, relative humidity)
- Air quality monitoring station data for PM10
- Elevation data
- GIS data – distribution of transportation networks, water bodies, wetlands, populated areas, migratory bird flyways, poultry density

How do they use these data?

- Verification and validation of model output
- Input parameters for improving model performance
- Analysis
- Establishing boundary conditions for forecast models

What types of data do they need to do their work better?

- More AQ ground station data
- Speciation of particulate matter
- Environmental data
- Frequently refreshed data such as land cover
- Real-time data as input parameters to models