Systematic Observation in Asian Developing Countries

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Outline

➢ Importance of systematic observations
➢ Problems and gaps
➢ Needs and concerns
➢ Measures to improve observations
➢ Experiences and lessons from China
Importance of systematic observations

- Monitoring climate variability and climate extremes
- Detecting climate change and its impact on social and natural systems
- Feeding into and testing climate models and impact assessment models
- Assessing impacts and vulnerability of climate change, inc. by downscaling climate model outputs
Problems and gaps in systematic observations

1. Insufficiency of observations
   • Sparseness of observational stations
   • Difficulties in maintaining observations
   • Lack of observations of some variables

2. Lowering representation of observations
   • In-homogeneities in surface climate data series
   • Lack of meta-data for key climate variables
   • Effects of urbanization and land use change

3. Weakness of capacity
   • Difficulties to raise funds
   • Failure of coordination among agencies
   • Lack of professionals
Needs and concerns

1. Construction of observational systems
   • A denser in situ observation network
   • Maintaining of observations
   • Development and application of satellite products
   • Construction of integrated observational stations
   • Reconstruction of proxy data series

2. Improvement of observational settings
   • More homogenous and un-biased data series
   • Development of meta-data for key climate variables

3. Strengthening of capacity
   • Improved storage and management of data
   • Strengthened coordination among agencies
   • Training of young professionals
Measures to improve observations

1. Encouraging regional cooperative observations - e.g. Asia-Pacific GEOSS, APN, MAHASRI, MAIRS, AIPO
2. Increasing the roles of UNFCCC, WMO, UNEP, WCRP, GCOS and GEOSS
3. Maximizing the roles of the GEF, SCCF and the Kyoto Protocol Adaptation Fund
4. Strengthening the roles of regional climate centers - e.g. Beijing Climate Center and Tokyo Climate Center
5. Raising the awareness of publics and policy-makers
Experiences and lessons from China: Experiences

1. A good observation network exists, and China is upgrading the network under the framework of the China-GCOS program
2. Operational monitoring of atmospheric compositions, energy balance, water and carbon cycles, ecosystem and land use, ice and snow, and so on
3. Submissions of real-time observation data of China-GCOS stations and historical data records from national stations to the WDC-Meteorology
4. An operational system of short-term climatic monitoring, prediction and assessment established in BCC
5. Cooperative climate programs between China and other Asian developing countries implemented
National Basic Weather Stations (A), National Reference Stations (B), China-GCOS surface stations (C) and China-GCOS upper air stations (D)

A radar tower in China

Radar imagine of Typhoon Shangmei in 2006

Distribution of radar stations in China
Monitoring of weather extremes by the CMA

- Cold wave
- Tropical cyclones
- Dust storm
- Droughts

[Images of weather phenomena]
Annual mean surface air temperature anomalies of 1951-2001 over China

Trends of annual mean surface air temperature of China during 1951-2001

Trends of annual precipitation during 1956-2002 in China
Experiences and lessons from China: Lessons

1. Lack of observations in western China
2. Fewer variables measured in integrated terrestrial observation network
3. Some historical data still kept on papers
4. Observational settings worsened due to the rapid urbanization and land use change
5. Gaps in the proxy records and satellite climate products
6. Difficulties in data access and data application
Discontinuous point induced by move of Xining Station from city to suburb in 1995.

Location of Bailingmiao Station (53352)

Location of Shijiazhuang Station
Location of Beijing Station (54511)
The station underwent 10 times of relocations in the past 100 years, but unfortunately it is still surrounded by the buildings
Experiences and lessons from China: Needs

1. Observational stations in a few areas of western China
2. Technologies and facilities for monitoring the variables of ecosystem and environment
3. Technologies for developing satellite climate products
4. Training of young and local experts