



Climate Information Applied in China

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Beijing Climate Center, CMA





History



- Beijing Climate Centre (BCC) was established in 2003
- BCC simply based on the National Climate Centre (NCC), China Meteorological Administration (CMA)



Academician Qin Dahe (left), Administrator of the China Meteorological Administration (CMA), unveiled the tablet of the Beijing Climate Center, March 31, 2005.

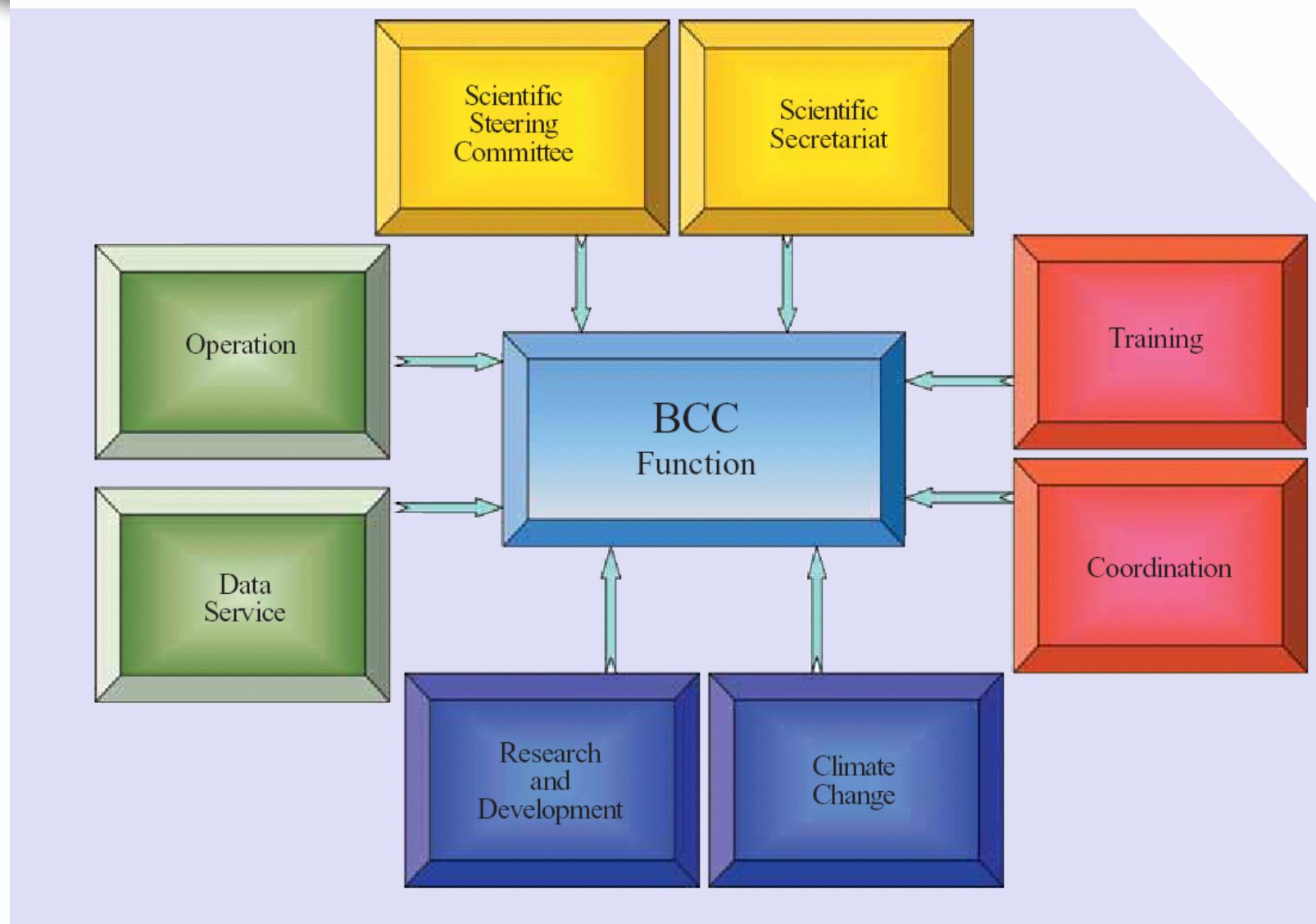


Prof. Obasi, former Secretary-General of the World Meteorological Organization, participated in the inauguration ceremony of the Beijing Climate Center.





Structure and Responsibilities





Structure and Responsibilities



- To monitor and diagnose global atmospheric and oceanic conditions, especially in East Asia, as well as significant climate events (e.g. ENSO)

- **Products:**

Climate System Monitoring Bulletins

ENSO Report

East Asian Monsoon Monitoring Report

Snow cover monitoring (digital)

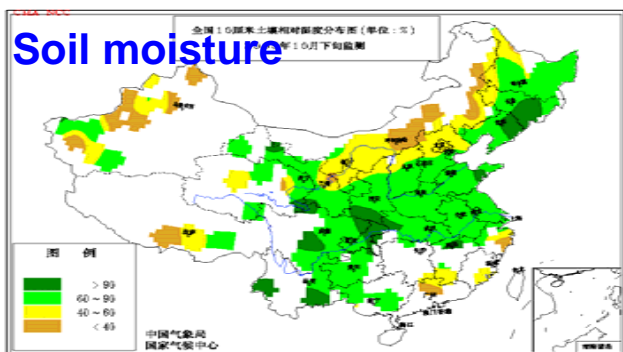
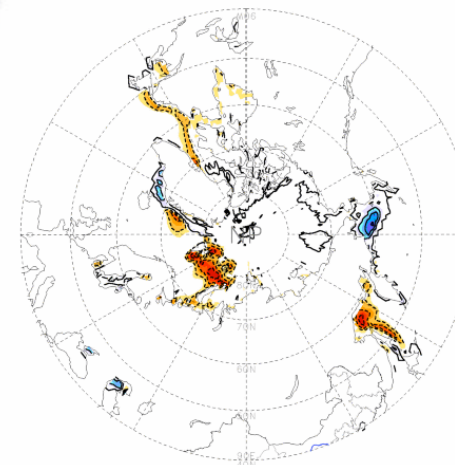




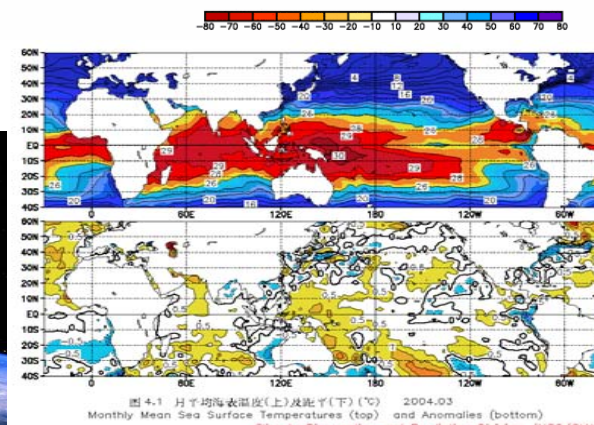
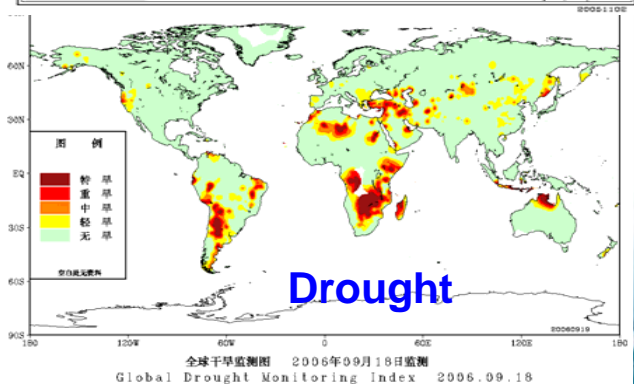
Climate system monitoring



Sea ice cover

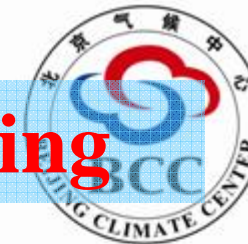


Sea-land surface-air monitoring network

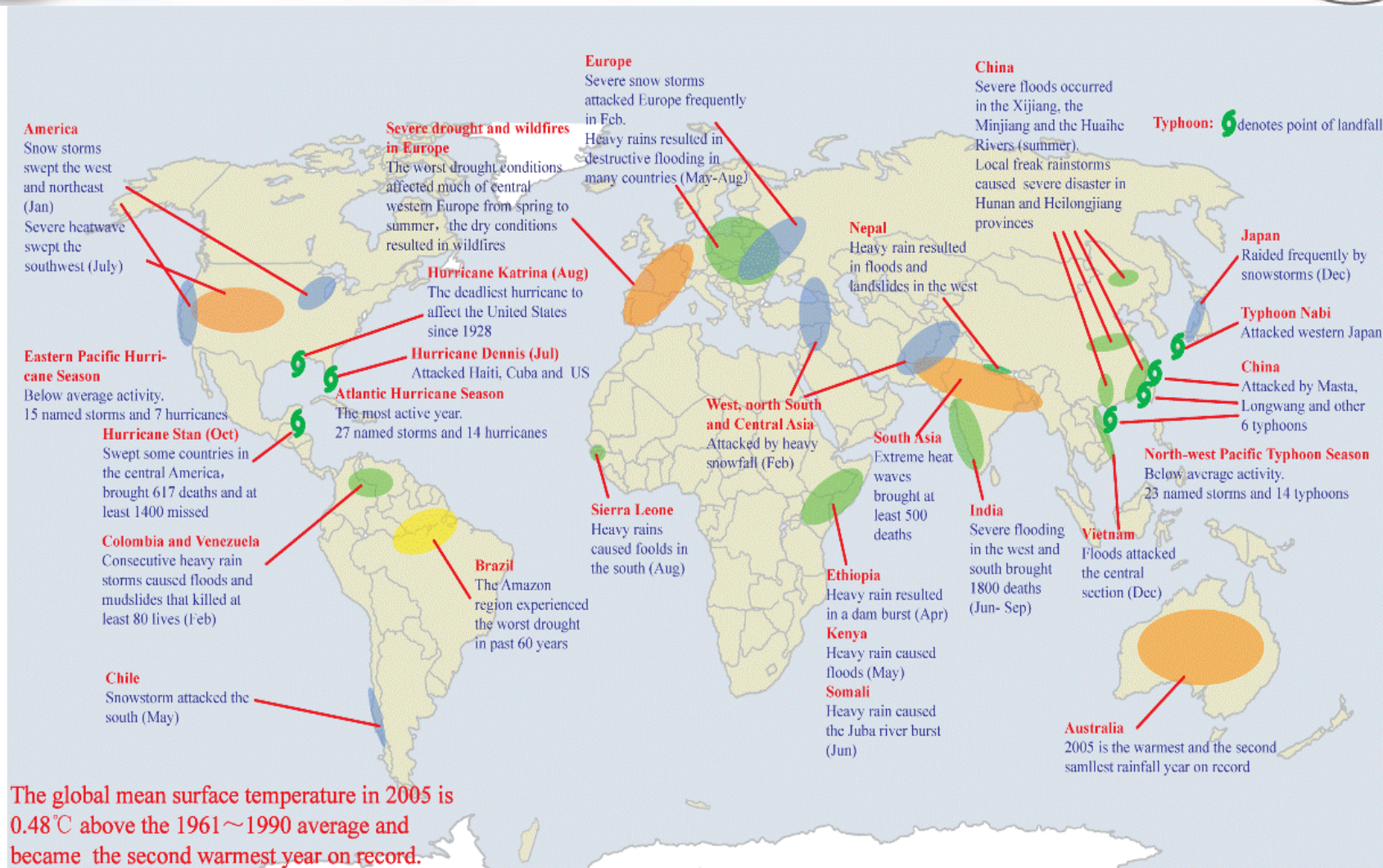


Sea-surface temperature





Global Climate Extreme Events Monitoring



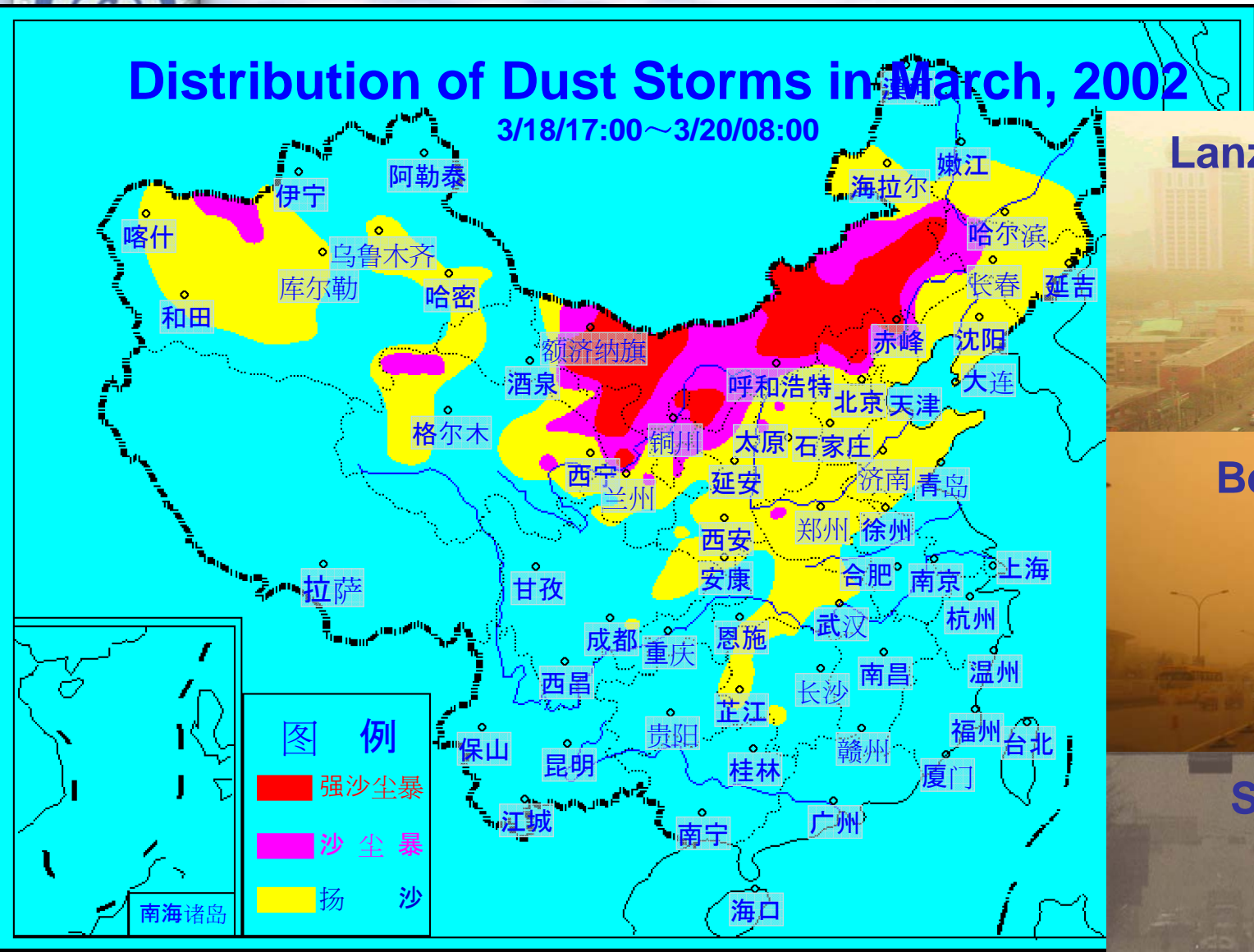
Global Major Weather and Climate Events in 2005





Distribution of Dust Storms in March, 2002

3/18/17:00 ~ 3/20/08:00



Lanzhou 2002/3/19



Beijing 2002/3/20



Seoul 2002/3/22





Structure and Responsibilities



- To provide global climate predictions and impact assessments at monthly, seasonal and inter-annual time scales, particularly in East Asia

Products:

BCC Climate Model Products

Drought Watch

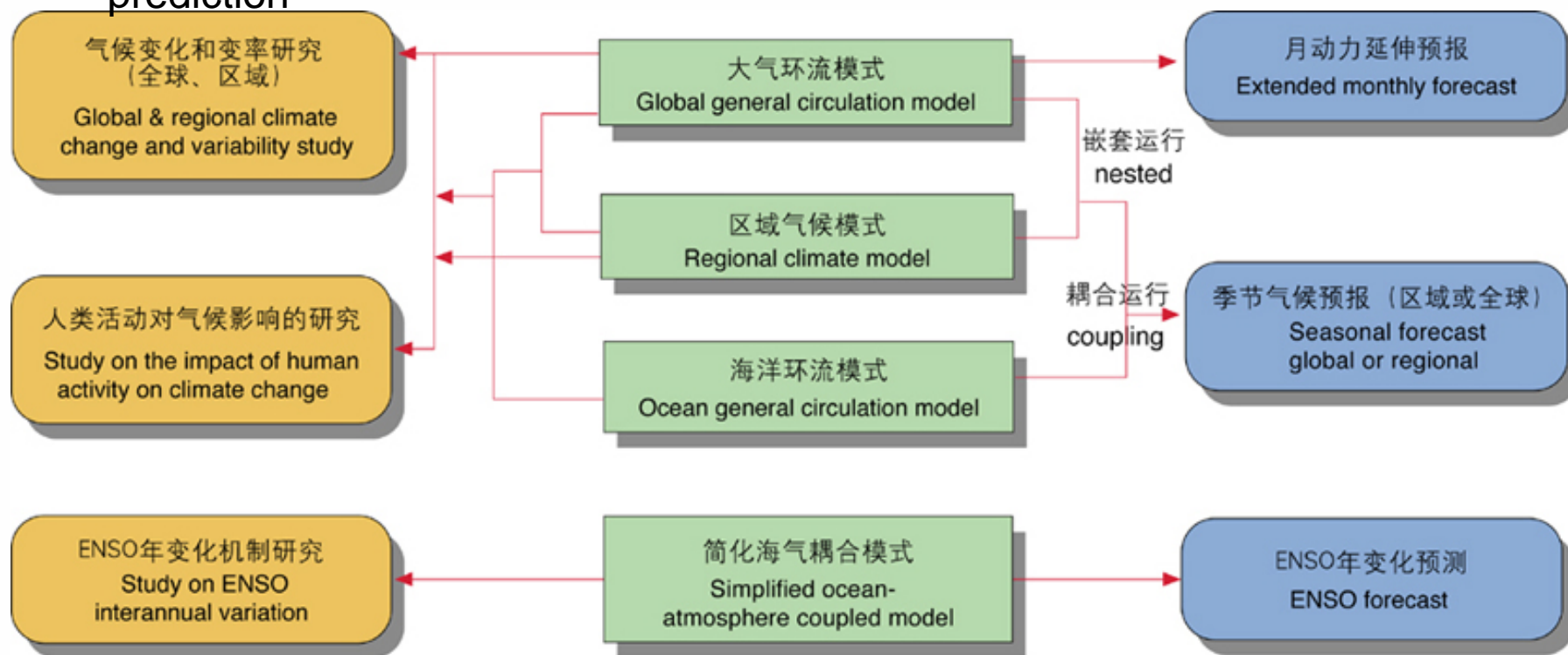




BCC Dynamic Model System for short-term Climate Prediction



- Monthly Dynamic Extended Regional Forecast Model (DERF)
- CGCM and RegCM
- produce 10 day, monthly, seasonal, annual and inter-annual climate prediction



短期气候预测动力模式系统功能

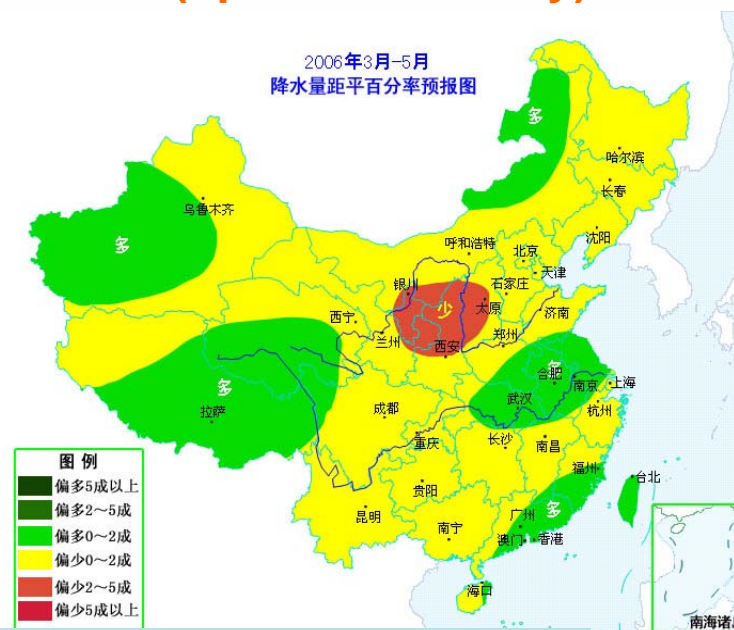
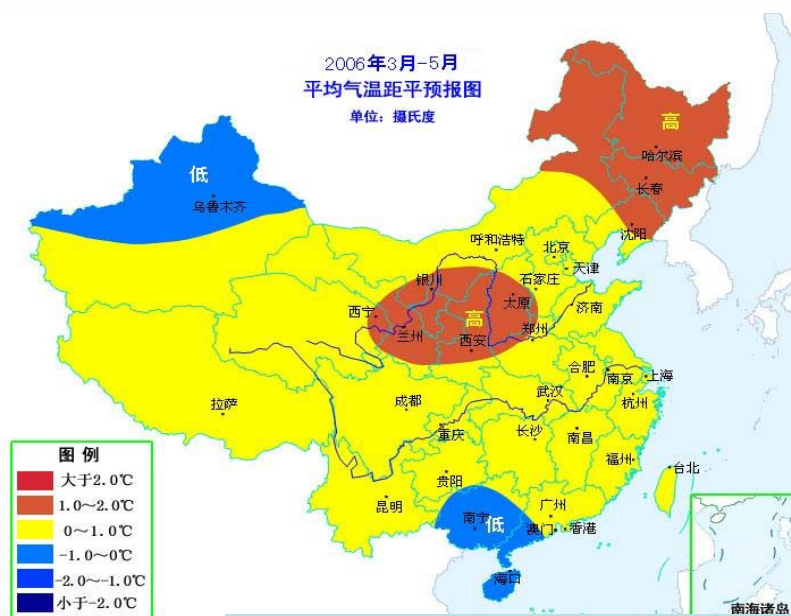
The function of the dynamic model system for short-term climate prediction





PredPeriod	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	
Jan		[Blue bar]																								
Feb			[Blue bar]																							
Mar				[Blue bar]																						
Apr					[Blue bar]																					
May						[Blue bar]																				
Jun							[Blue bar]																			
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Aug									[Blue bar]																	
Sep										[Blue bar]																
Oct											[Blue bar]															
Nov												[Blue bar]														
Dec													[Blue bar]													

Seasonal to inter-annual prediction (updated monthly)

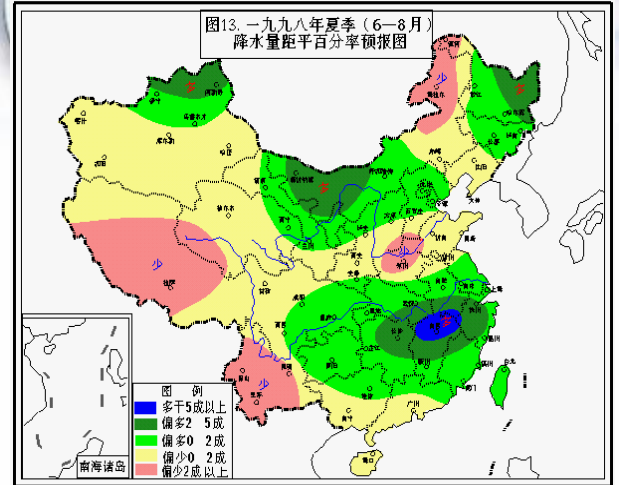


Anomaly Percentage Prediction of average temperature and precipitation

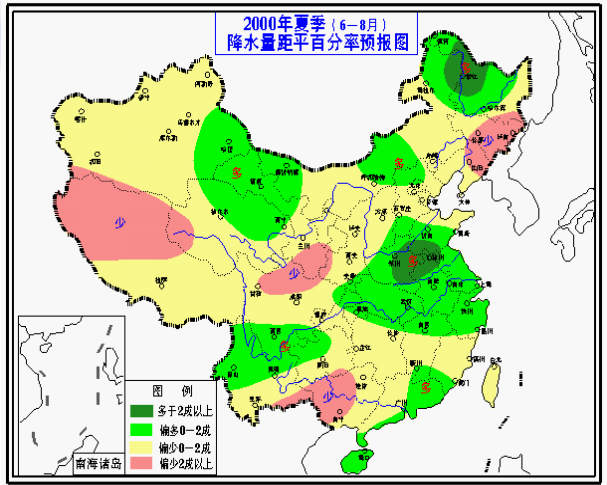




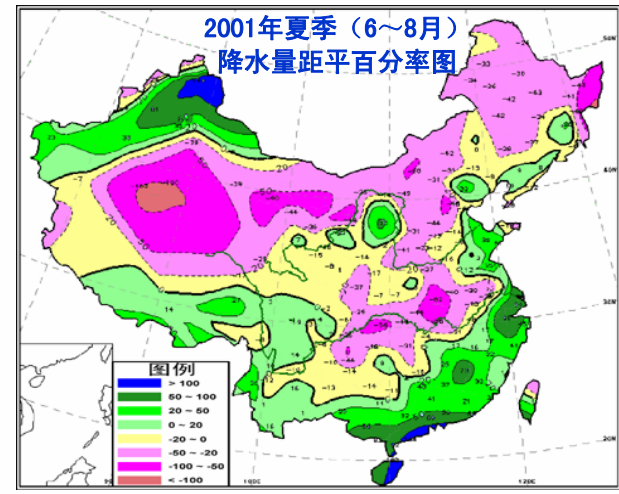
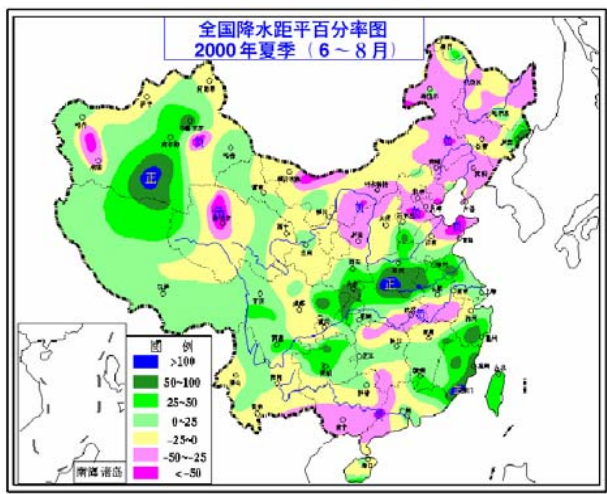
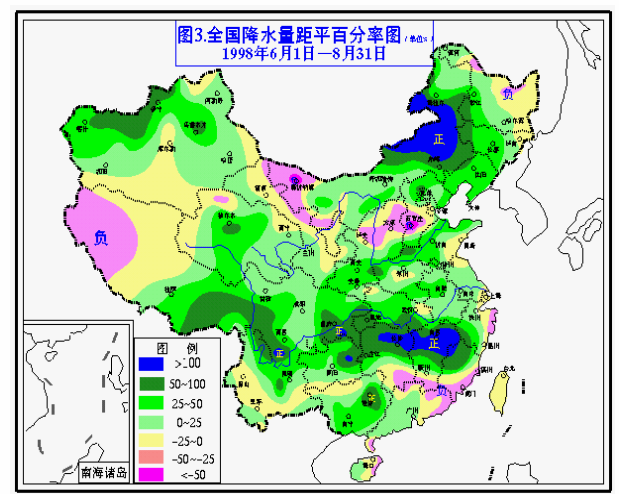
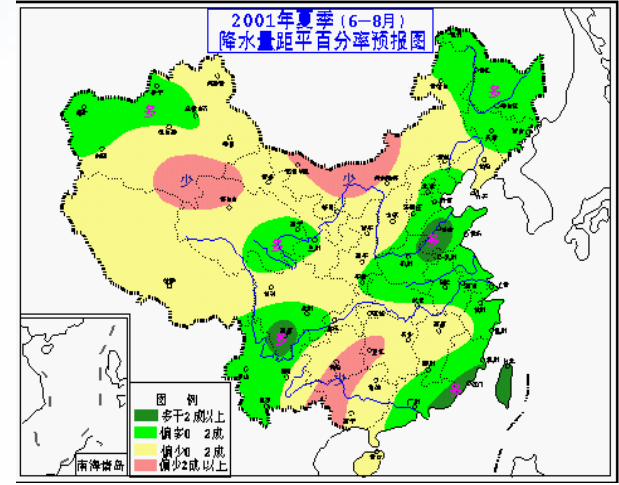
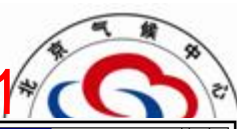
1999



2000



2001



Prediction (up) and observation (bottom) of the summer precipitation anomaly percentage in 1999, 2000 and 2001 over China





Structure and Responsibilities



- To carry out research on **global and regional climate change**, detection development of regional climate scenarios and response strategy options
- **To provide climate data base and archiving services**
- **To strengthen collaborations between NMHSs** on related observation, communication and computing networks for data collection and exchange
- **To provide relevant climate product services** such as interpretation, evaluation, processing, detection and issue etc.
- **To provide training of end-users and NMHS staff** on the application and import forecasting products and methods in different time scales.





Climate Information Application



- Drought/Flood Early warning and impact assessment
- Water Resource Management
- Agriculture
- Human Health
- Energy consumption and demand
- Transportation
- Atmospheric Environment
- Climate resource (esp. Wind Energy Resource) Exploitations
- National Construction Project





Drought/Flood early warning and impact assessment

Daily distribution of drought and flood index

逐日干旱监测/Ci指数/Z指数旱涝分布/降水预报/降水量/蒸散量实况分布图

- 干旱监测5级
- ci综合旱涝指数9级
- Pi指数旱涝9级
- Z指数旱涝9级
- zpi旱涝指数9级
- 未来7天降水
- 蒸散量
- 降水量
- 蒸散量距平
- 降水距平百分率

Monthly distribution of PDSI and Palmer Indices and variation of drought area

各月及全年干旱面积百分比变化/Palmer指数

- 全国干旱面积百分比变化
- 全国干旱面积变化曲线
- PDSI指数分布图
- Palmer_Z指数分布图

Relative soil moisture in 10cm and 20cm depth

各旬土壤相对湿度分布图
(图中空白处为无测值区域)

- 20厘米土壤相对湿度
- 10厘米土壤相对湿度

2005 年 06月 上旬 确定 TXT

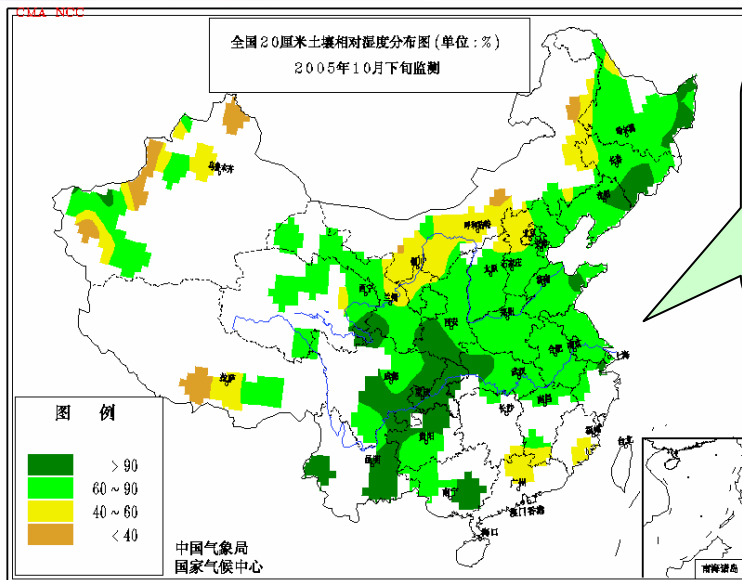
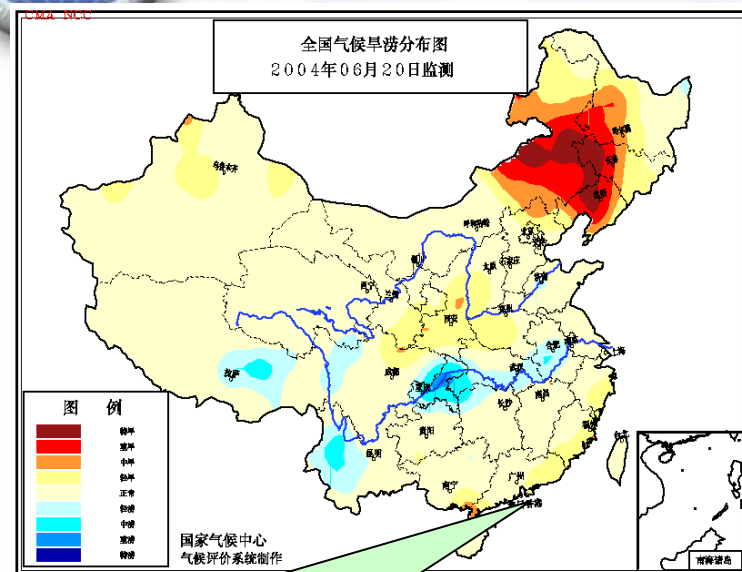
[运行日志](#)

上次修改日期: 2004/12/10



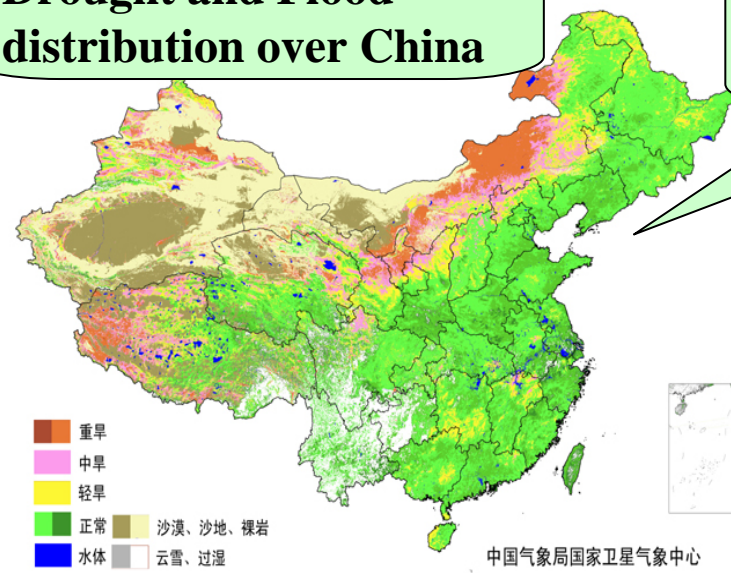


Drought/Flood distribution in China



20cm soil relative moisture over China

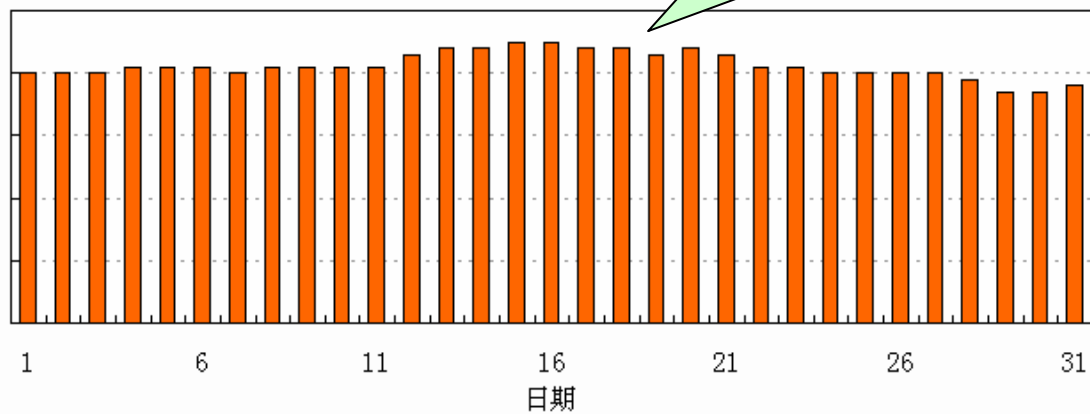
Drought and Flood distribution over China

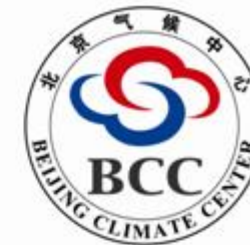


Drought monitoring by satellite over China

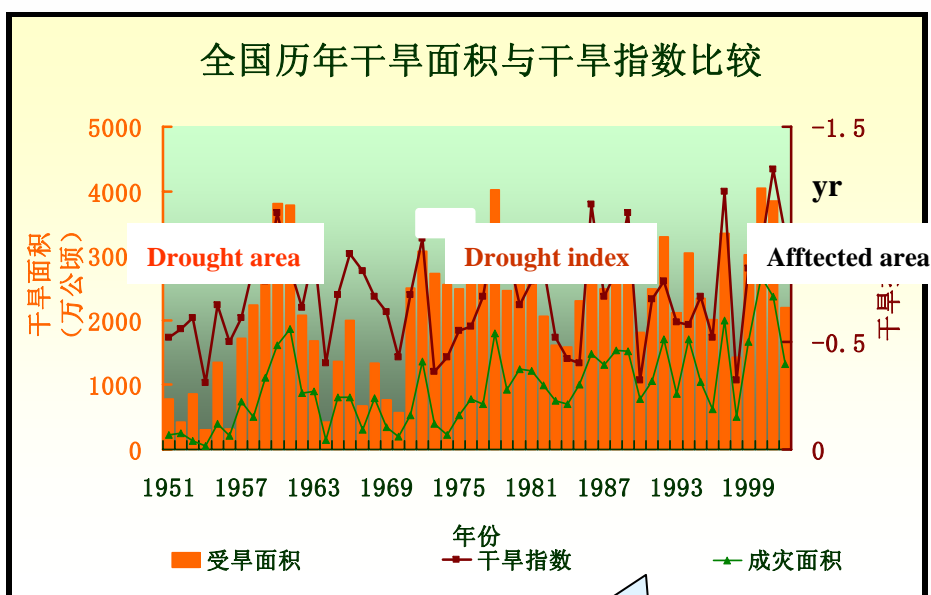
Daily drought area monitoring over China

2005年10月全国干旱面积百分比

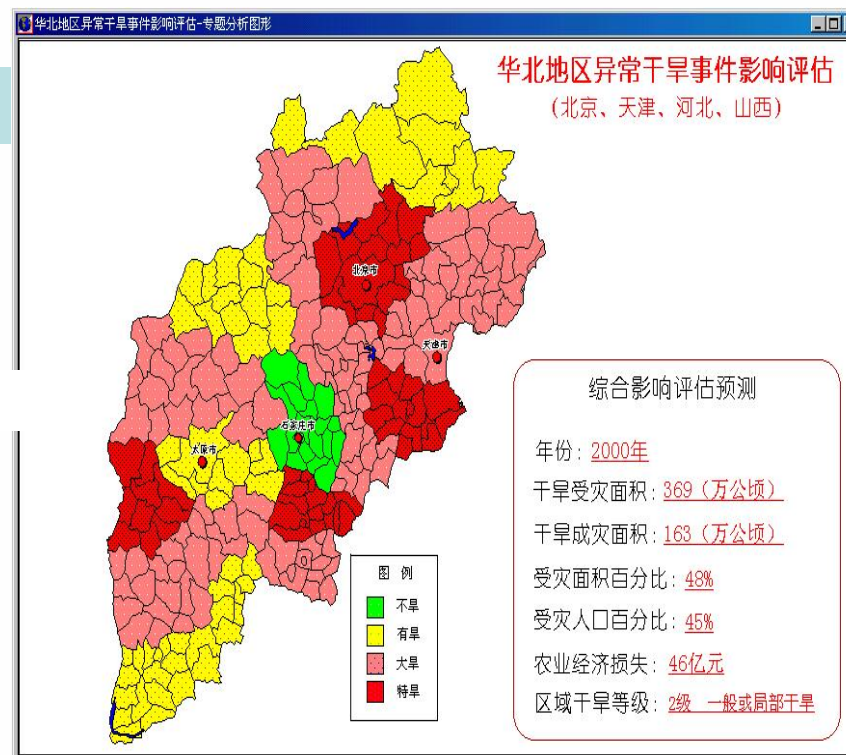




Comparison of drought area and drought index

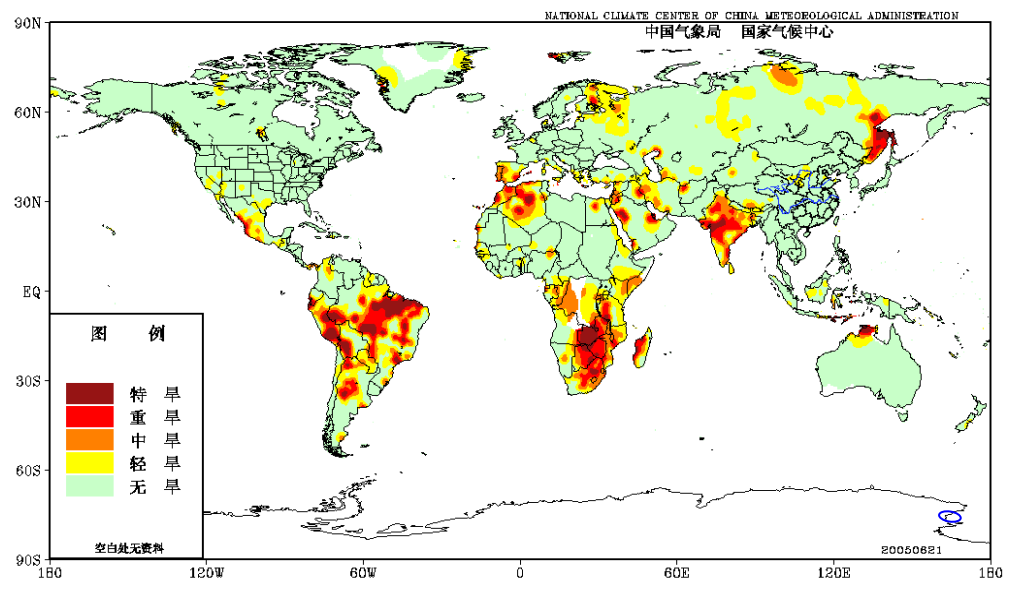


Drought area assessed by drought Index



Impact assessment of extreme drought event on North of China

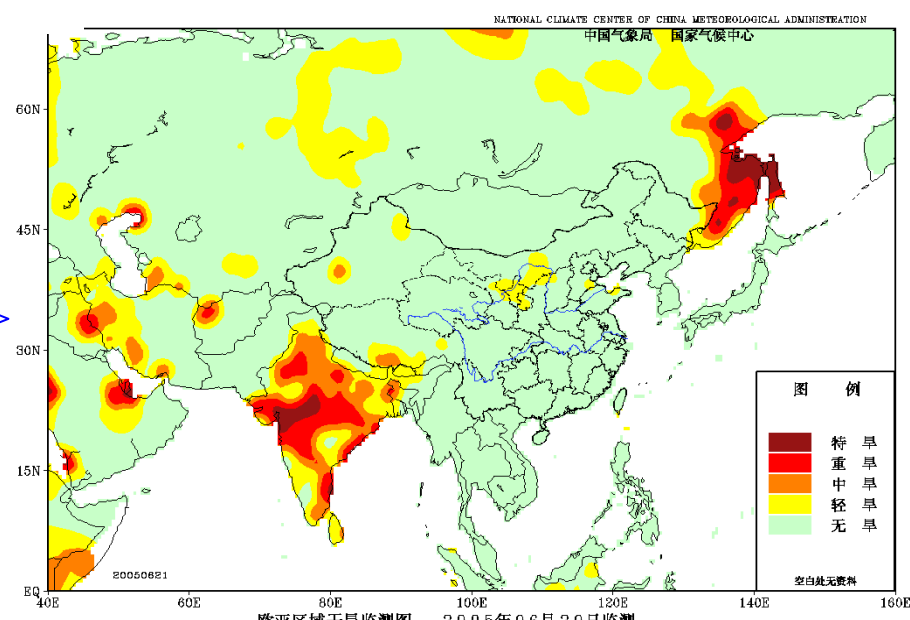




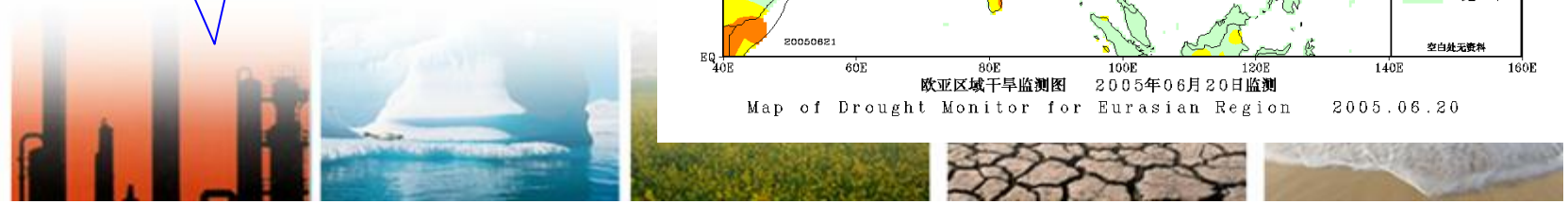
全球干旱监测图 2005年06月20日监测
Map of Global Drought Monitor 2005.06.20

Global drought monitor

Drought monitor in Eurasian region



欧亚区域干旱监测图 2005年06月20日监测
Map of Drought Monitor for Eurasian Region 2005.06.20





Products: China Droughts and Floods Bulletin Report of abnormal climate event analysis Drought Watch

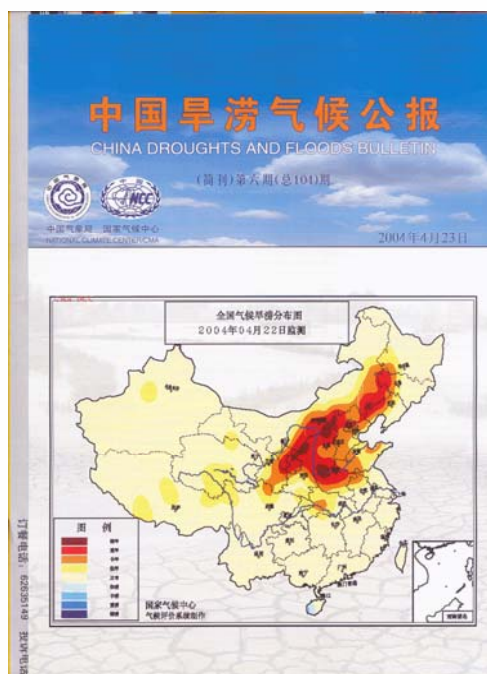


重大气象信息专报

第 90 期

中国气象局

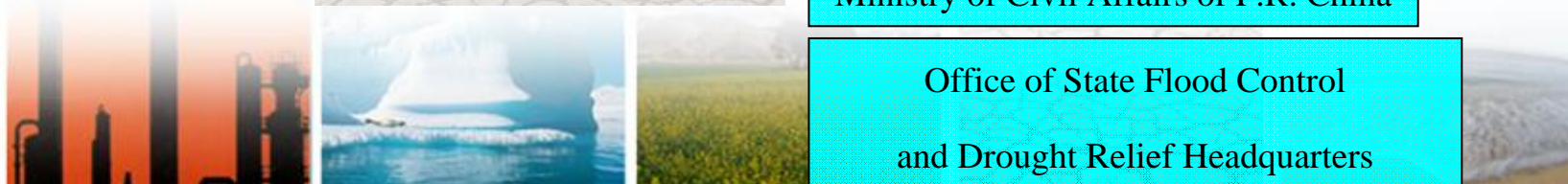
2005年7月1日



6月以来我国高温、干旱特征分析和未来旱情发展趋势预测

要: 6月1日以来,我国出现了三次范围较大的高温过程。黄淮大部、江淮大部、江汉、江西北部及陕西东部、西部、新疆东南部等地高温日数比常年同期偏多4~7天,部、山西南部、山东西部、河南、安徽北部、湖北北部等达7~10天。北京、石家庄、济南等城市高温持续时间之961年以来同期之最或第二位。入夏以来,西北地区东部、部和黄淮等地出现初夏旱;长江中下游沿江地区出现较为初夏旱。预计未来十天江南地区将持续晴热高温天气,长游沿江地区和江南东北部旱情加剧。

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- Government, P.R. China
- Ministry of Water Resources, P.R. China
- Ministry of Agriculture, P.R. China
- Ministry of Civil Affairs of P.R. China
- Office of State Flood Control and Drought Relief Headquarters



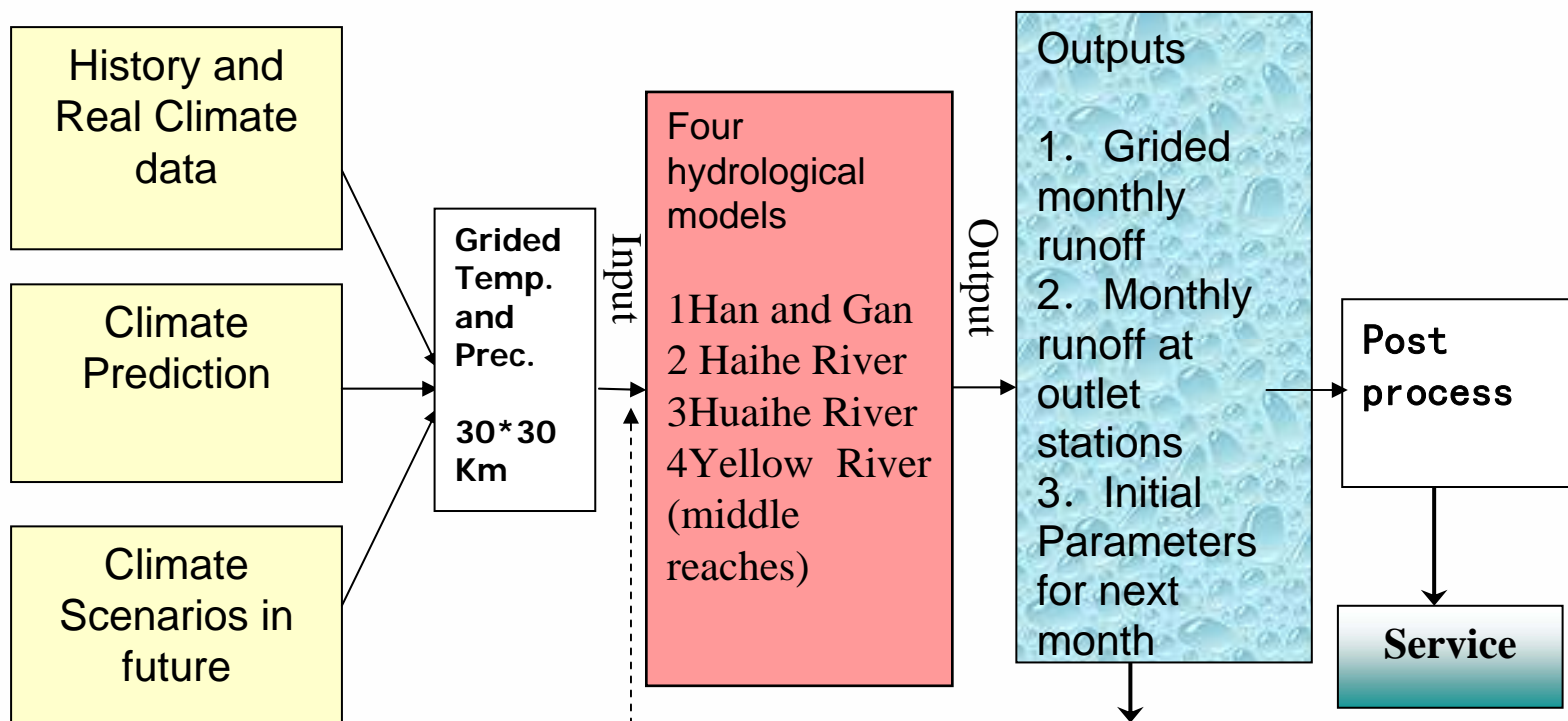


Drought Monitoring and Warning program was shown on CCTV since July of 2004.





Water Resource Management

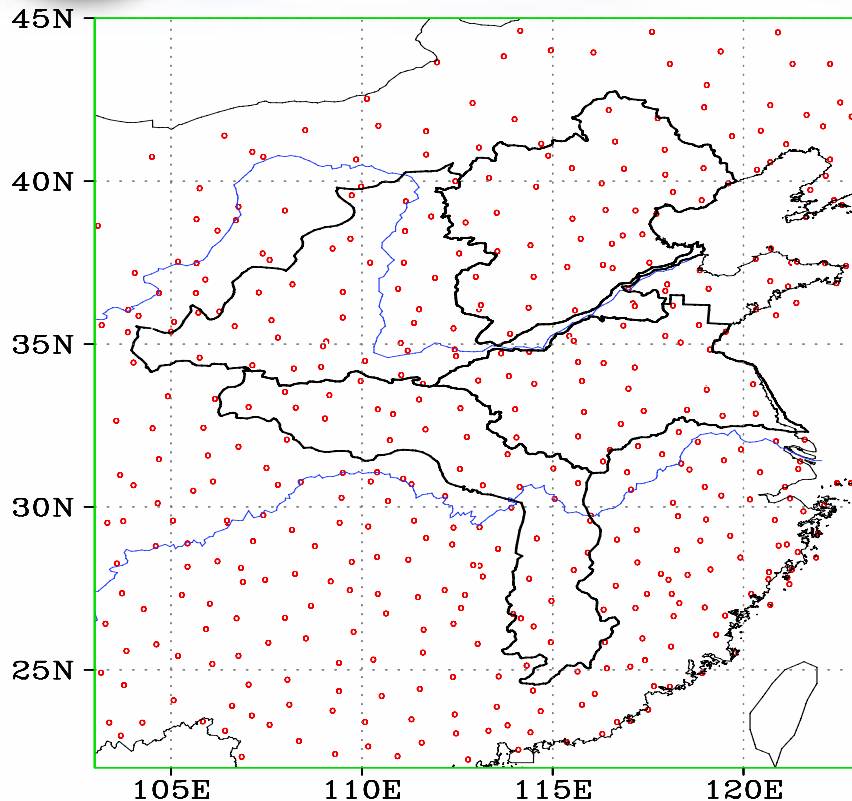


Framework of hydrological model assessment system



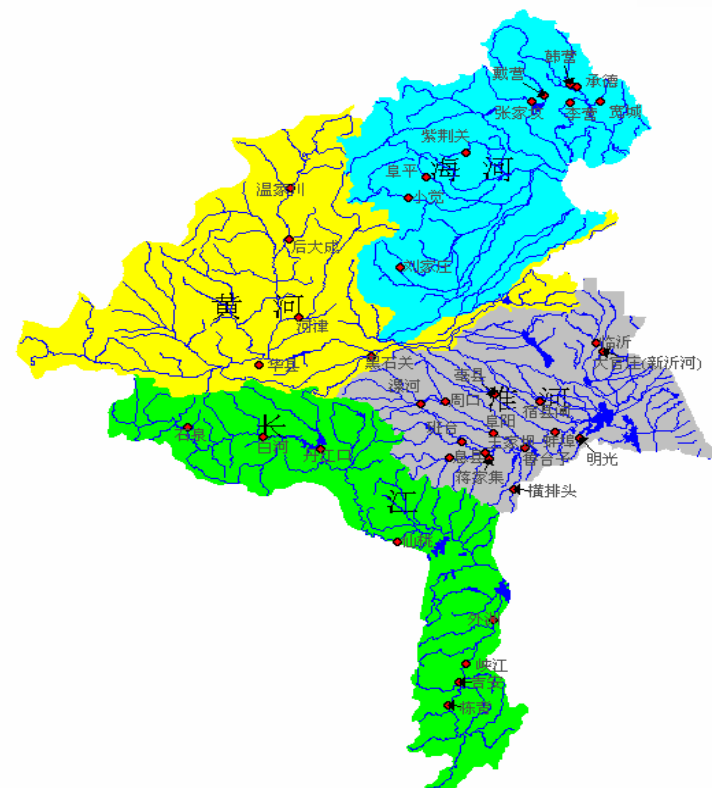


Study areas



730 meteorological stations in China

Monthly mean temperature and precipitation
of history, real time and prediction



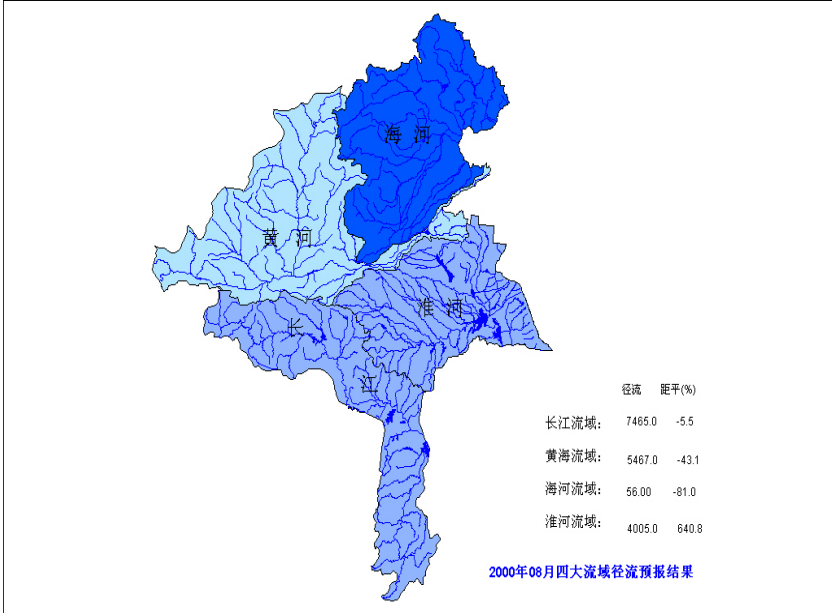
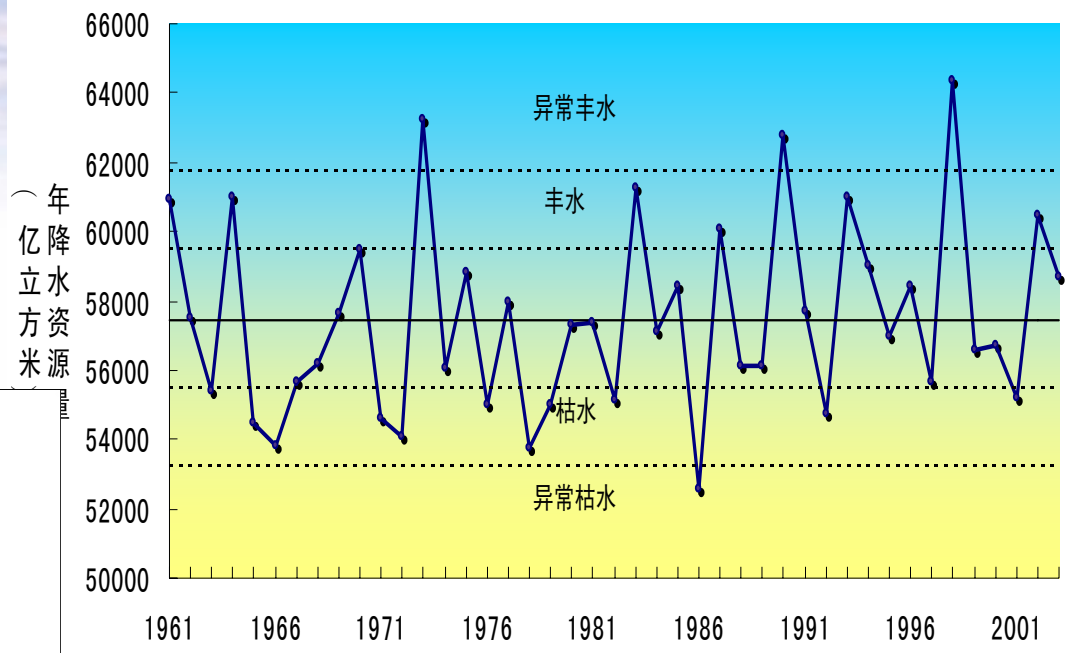
Hydrological stations

Monthly runoff

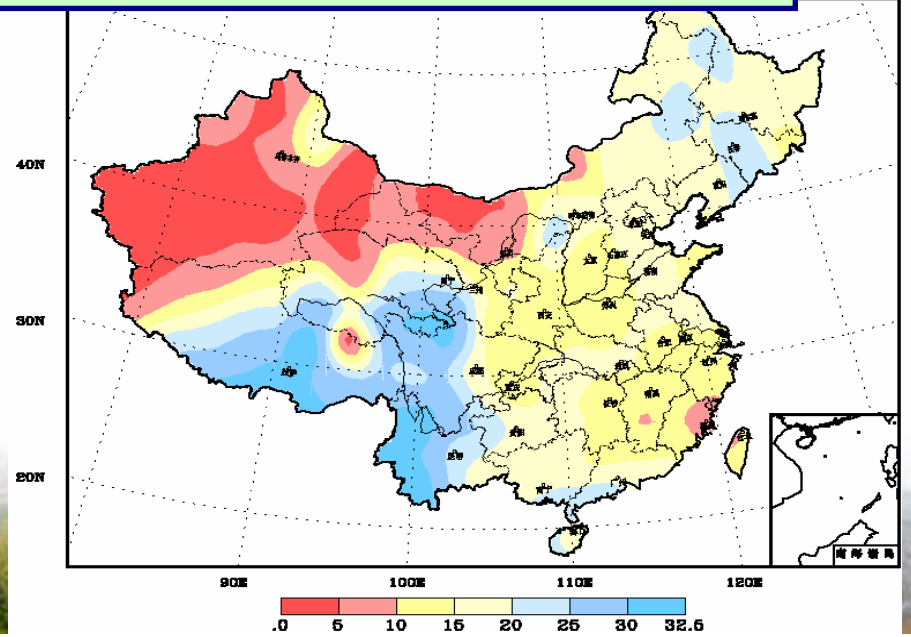




Estimation of annual precipitation resources by statistics method

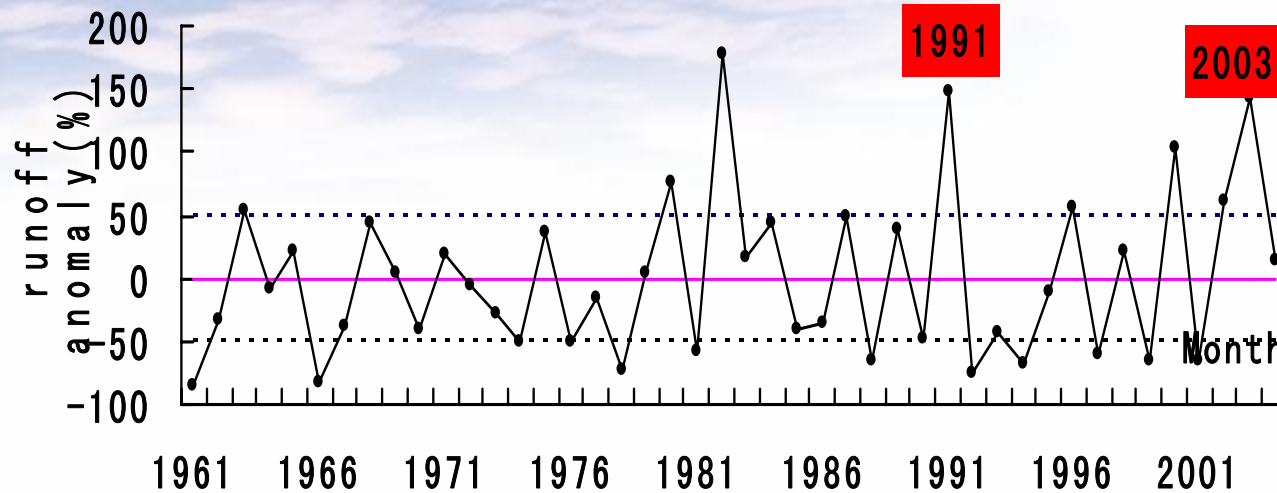


Average of availability of air water resources in July over China

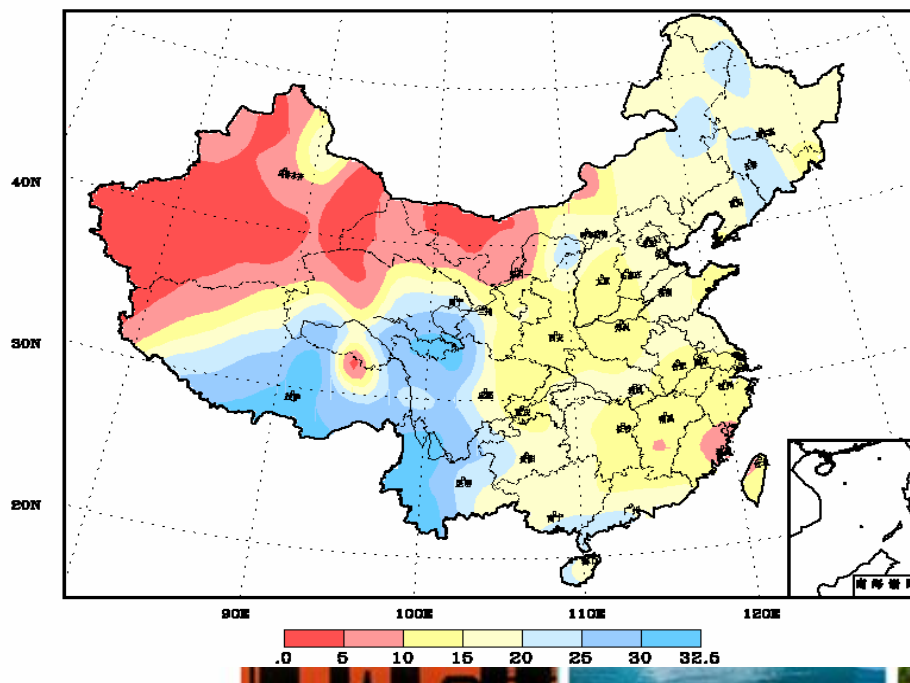


Prediction of monthly runoff anomalies in the four river basins of China by model



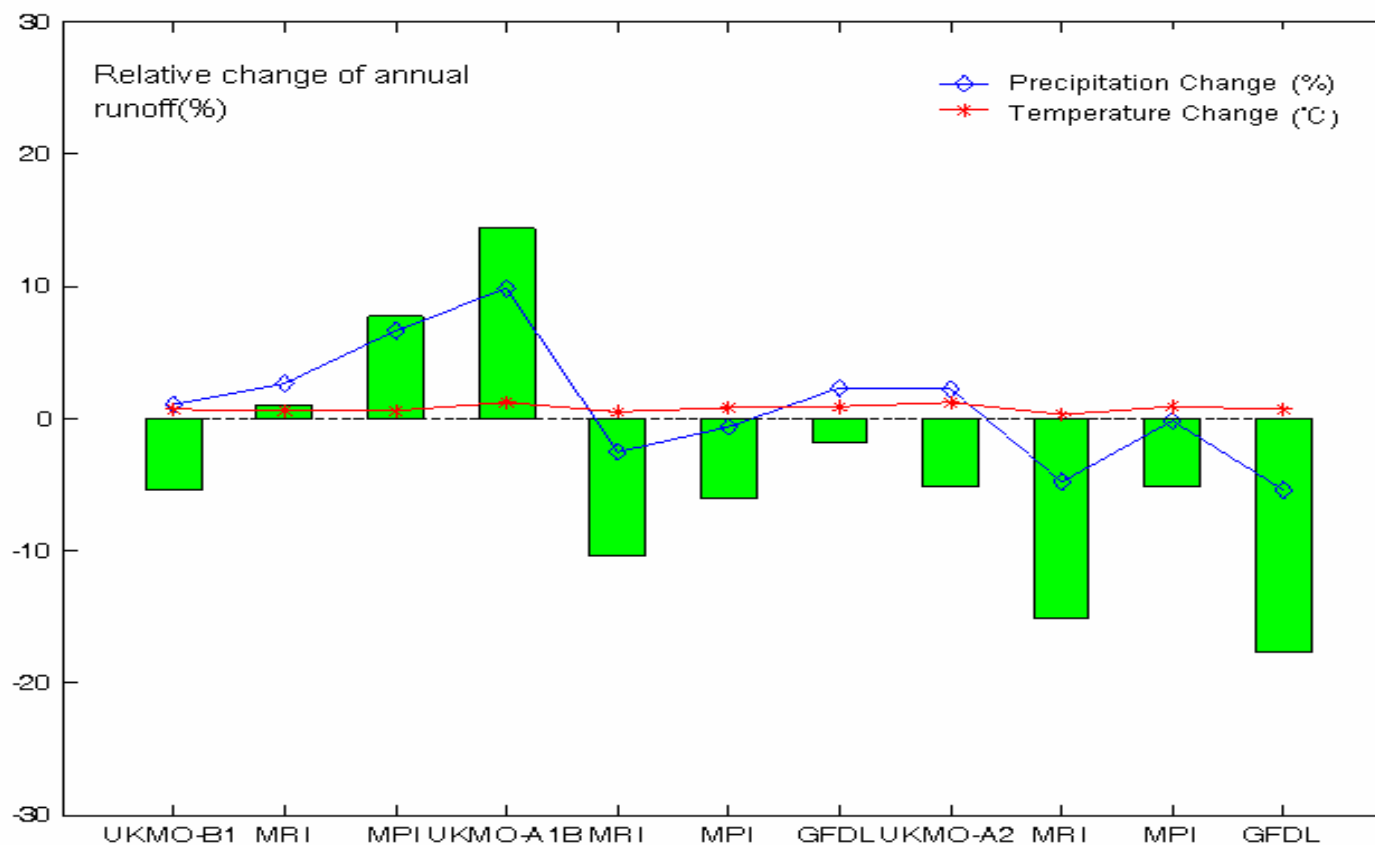


Simulated summer runoff anomaly (%) in Huaihe River basin during 1961-2004 (Serious flood occurred in 1991 and 2003)



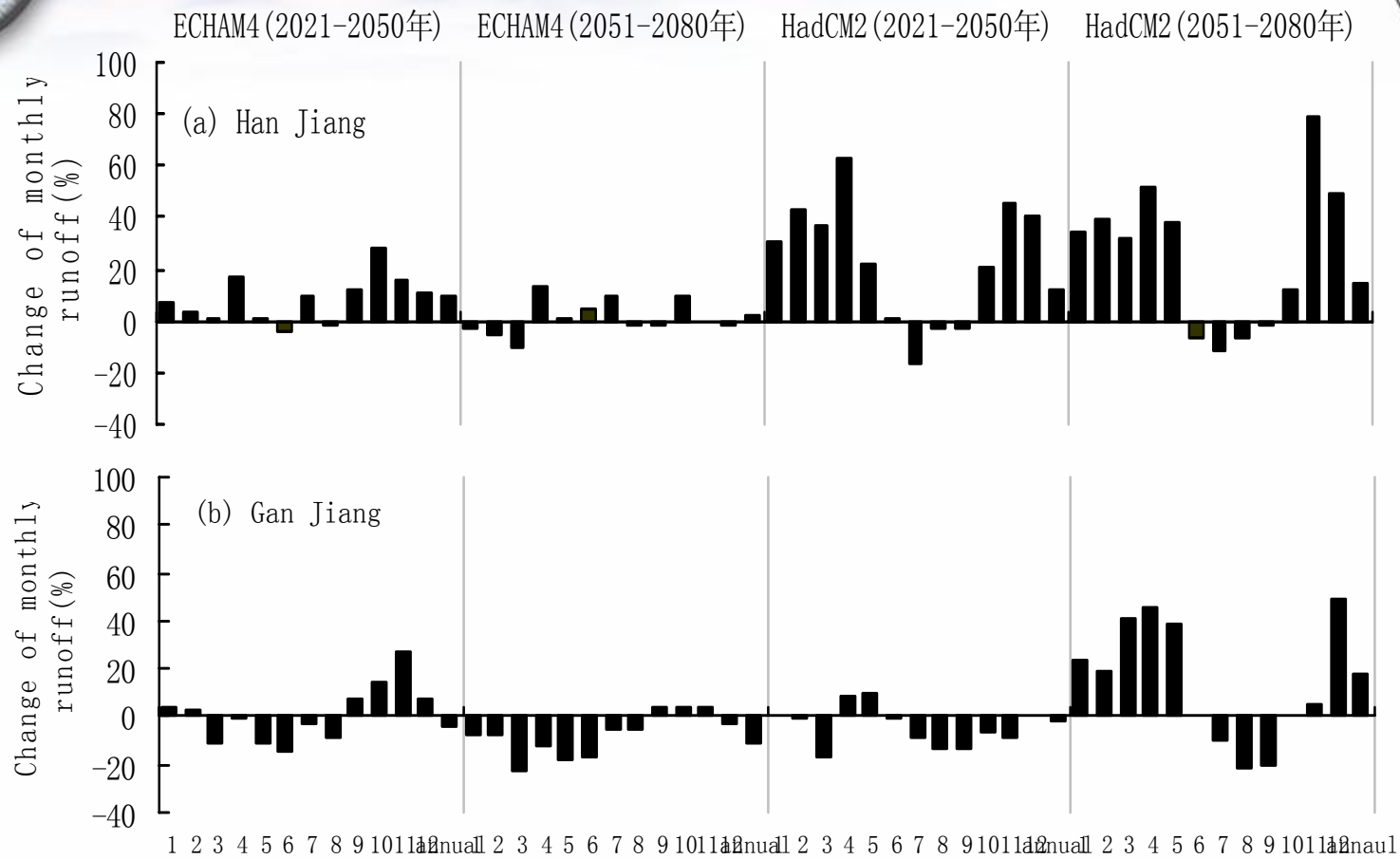
Average of availability of air water resources in July over China





Climate change impact on annual runoff of Huaihe River during 2011-2040



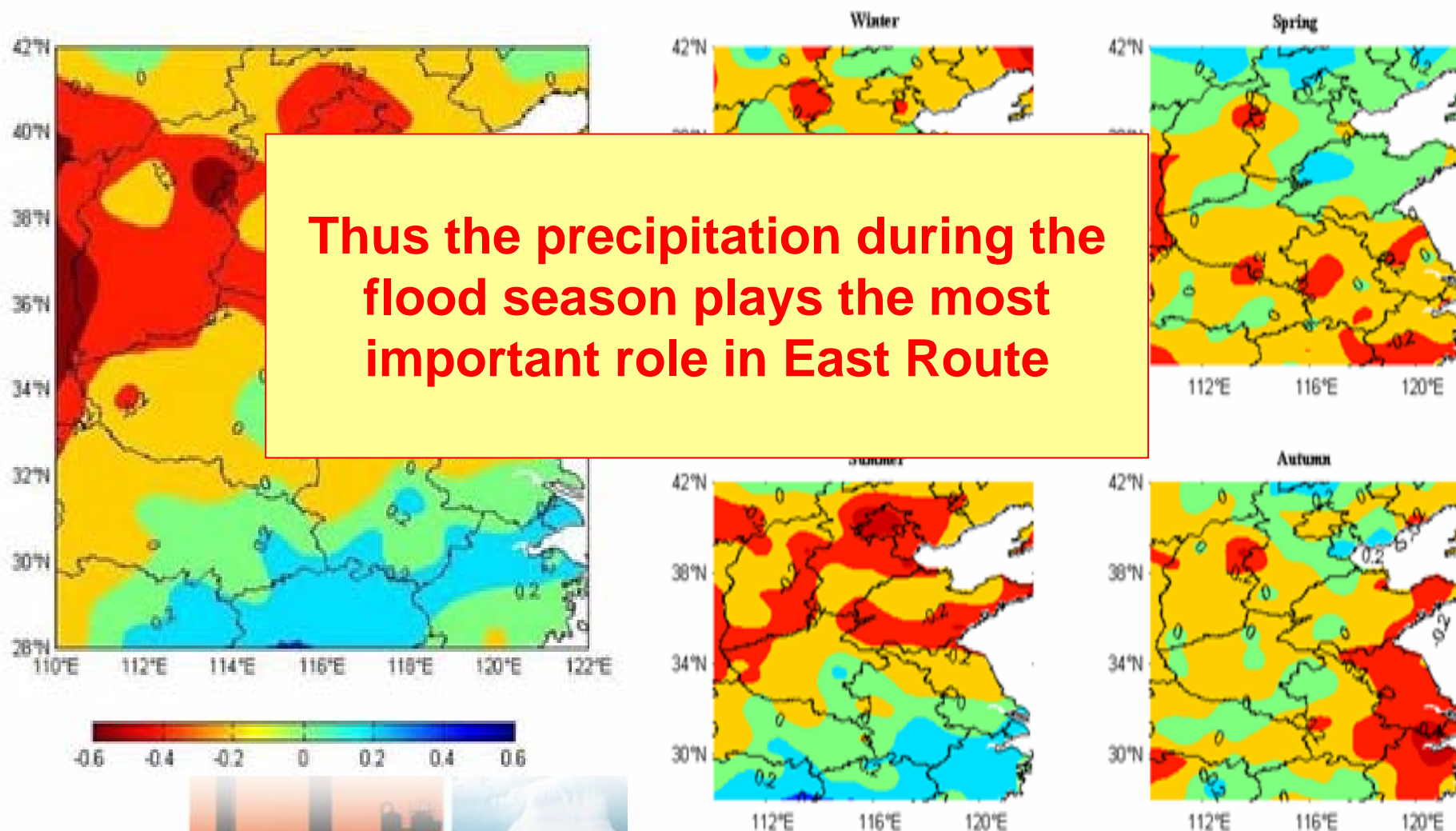


Change percentage of monthly and annual runoff under climate change scenarios of ECHAM4 and HadCM2 during 2021-2050 and 2051-2080 in Han Jiang (a) and Gan Jiang basins (b).





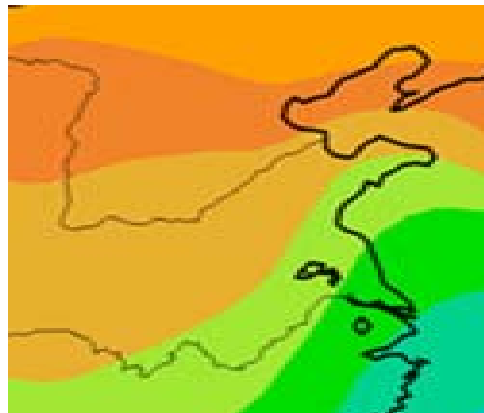
Spatial distribution of annual and seasonal precipitation changes from 1956 to 2004 over East Route of S-N Water Transfer Project



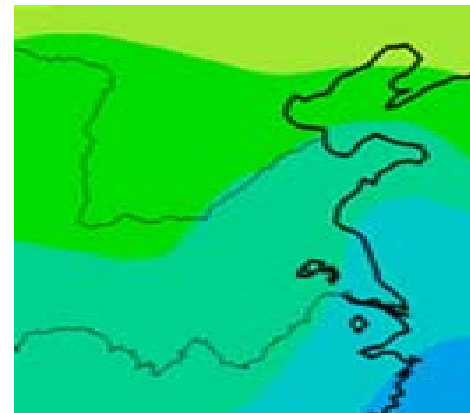
Annual mean temperature (top) and precipitation (bottom) changes over East Route in year 2015 as projected by AOGCM7 with SRES A2

(left) and B2 (right) (unit: °C, %) (relative to 1961~1990)

A2 DTs AOGCM7



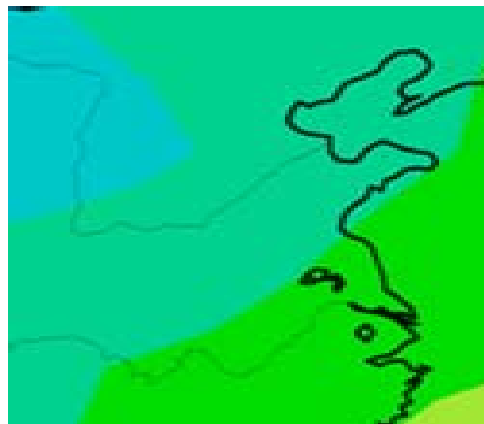
B2 DTs AOGCM7



0.3

0.9

A2 DPr AOGCM7



B2 DPr AOGCM7



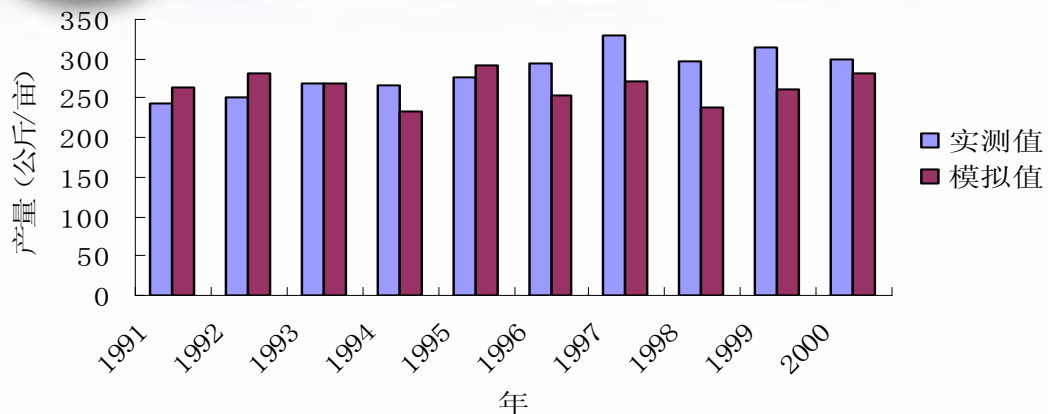
-3%

6%



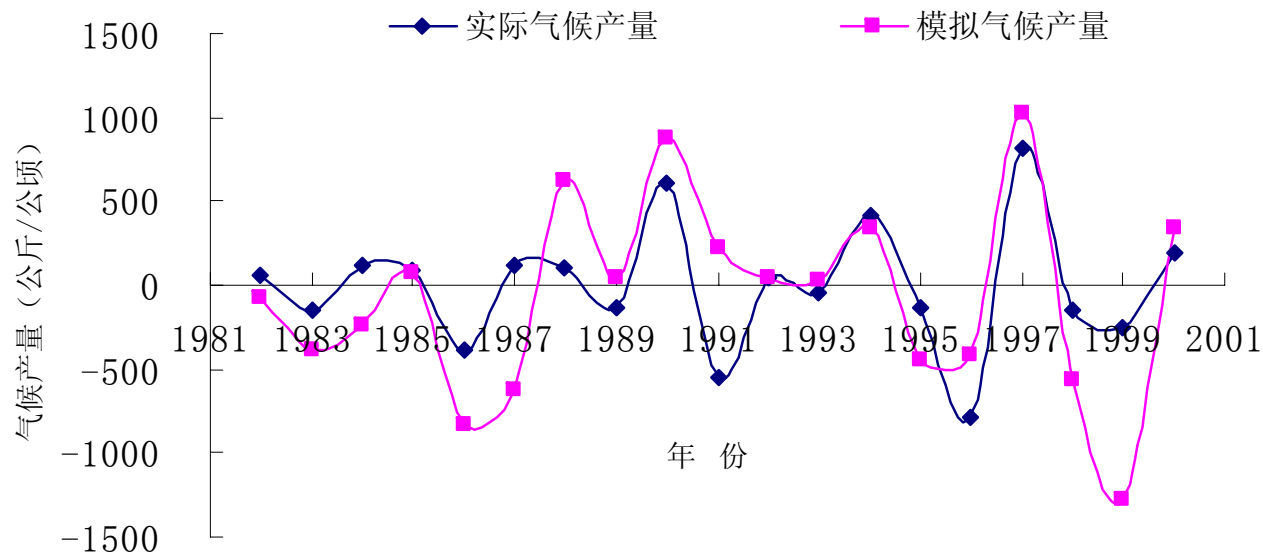


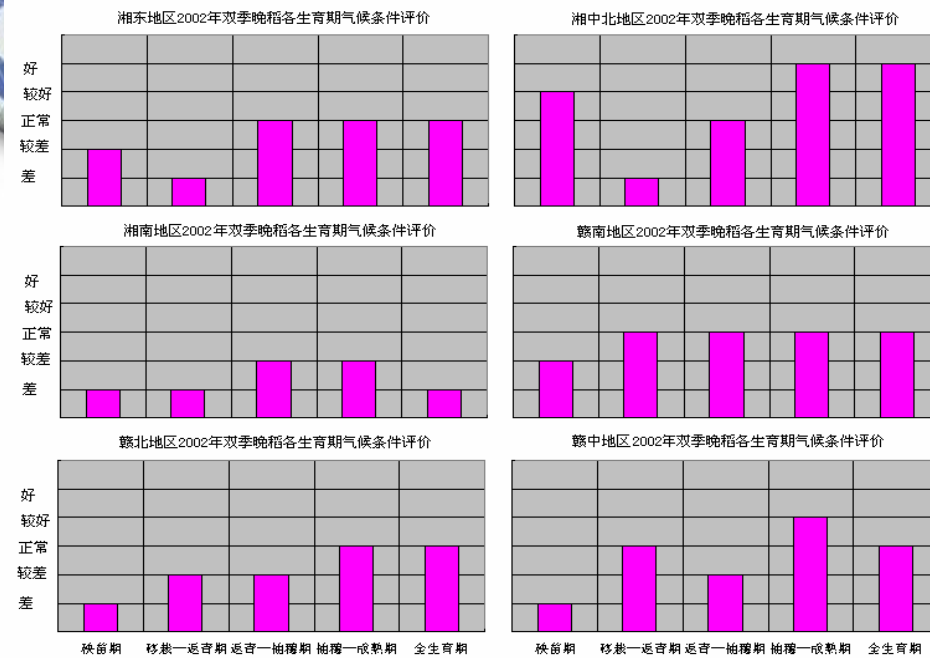
Agriculture



Comparison of simulated yield to real yield of winter wheat over North of China

Comparison of simulated yield to real yield of double cropping rice over Changde area

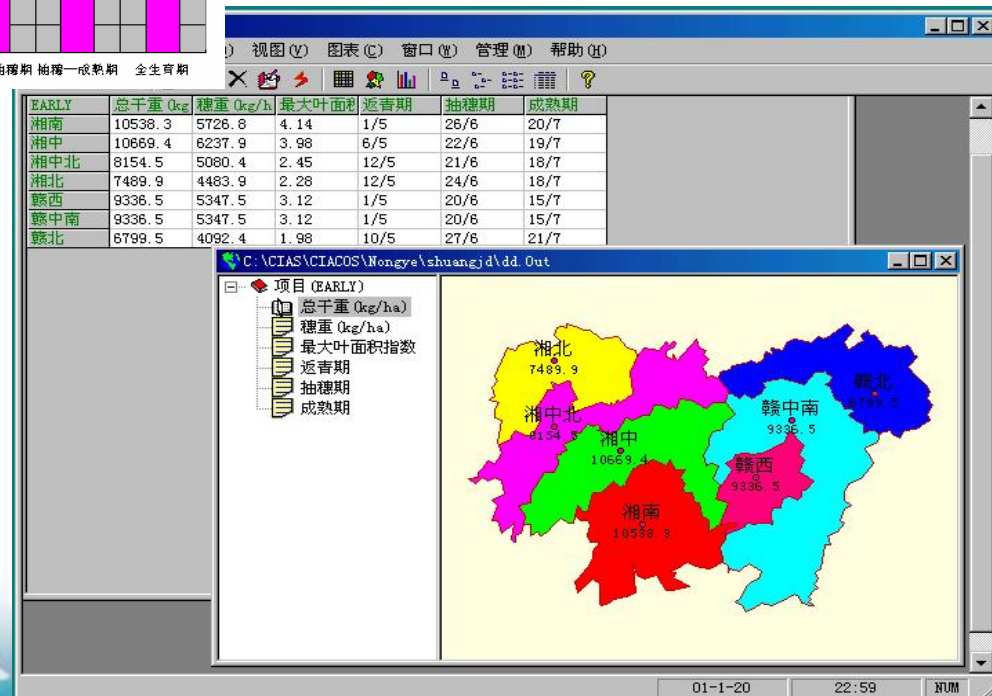


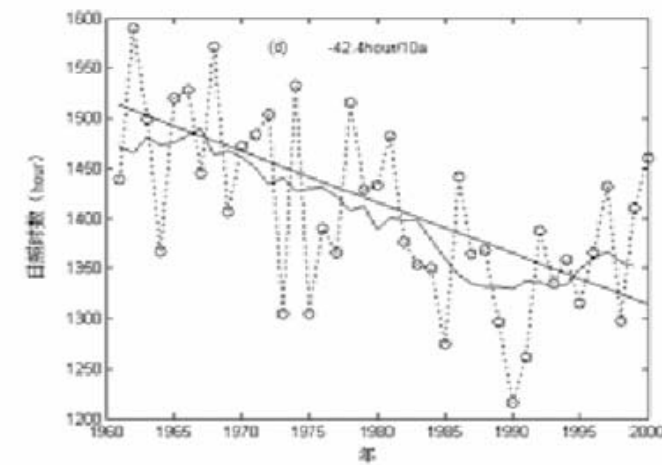
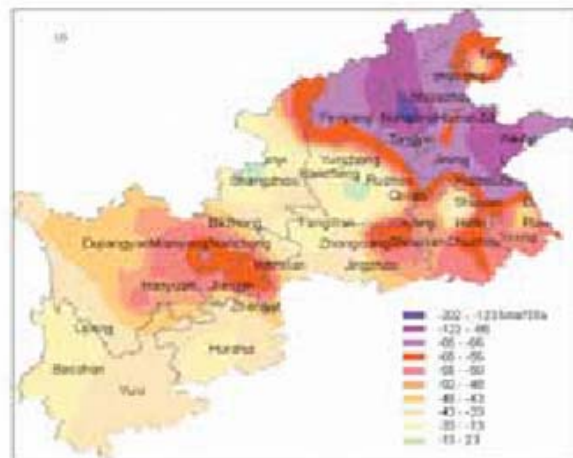
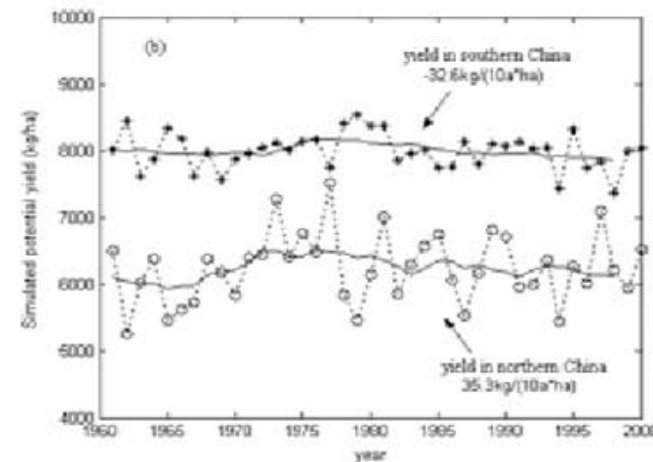


Assessment to growth status of double cropping rice during different growth development period in 2002 compare with normal situation.

Example of interface of crop growth Assessment Model system

double cropping rice



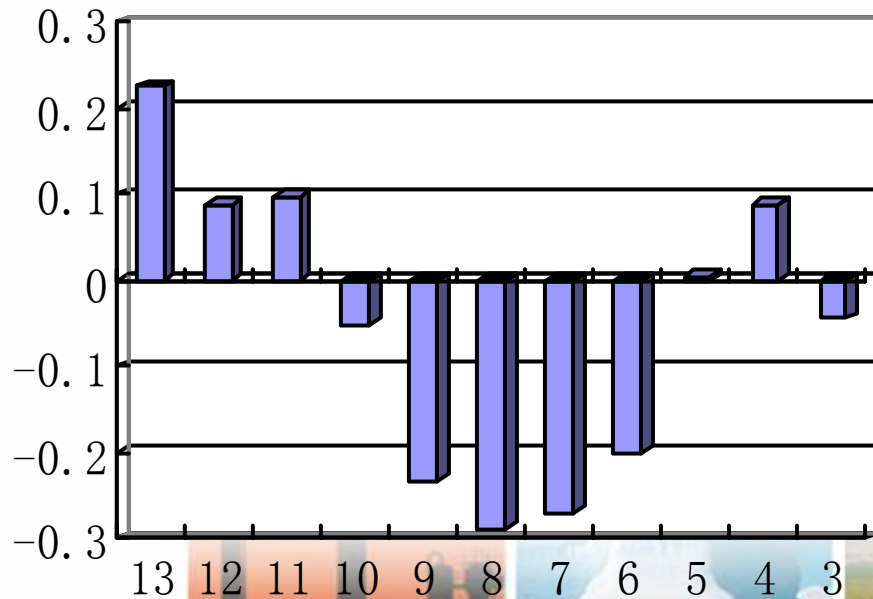
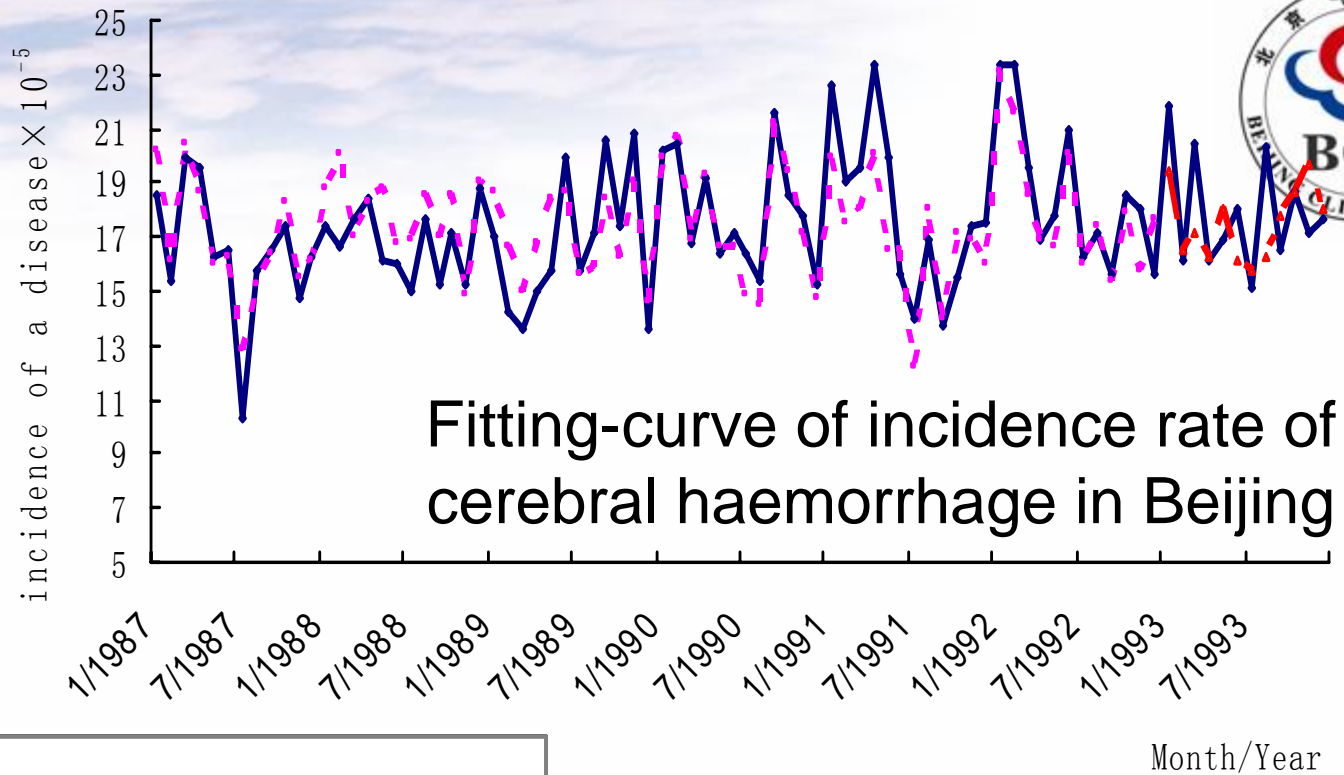


Regional and temporal distribution of temperature (a, b respectively) and sunshine hours (c, d respectively) during the growing season (October-June in the north and October (or November)-May in the south) of winter wheat in China from 1961 to 2000. (The dashed line shows the interannual variability while the solid line displays the 10 year moving average.)



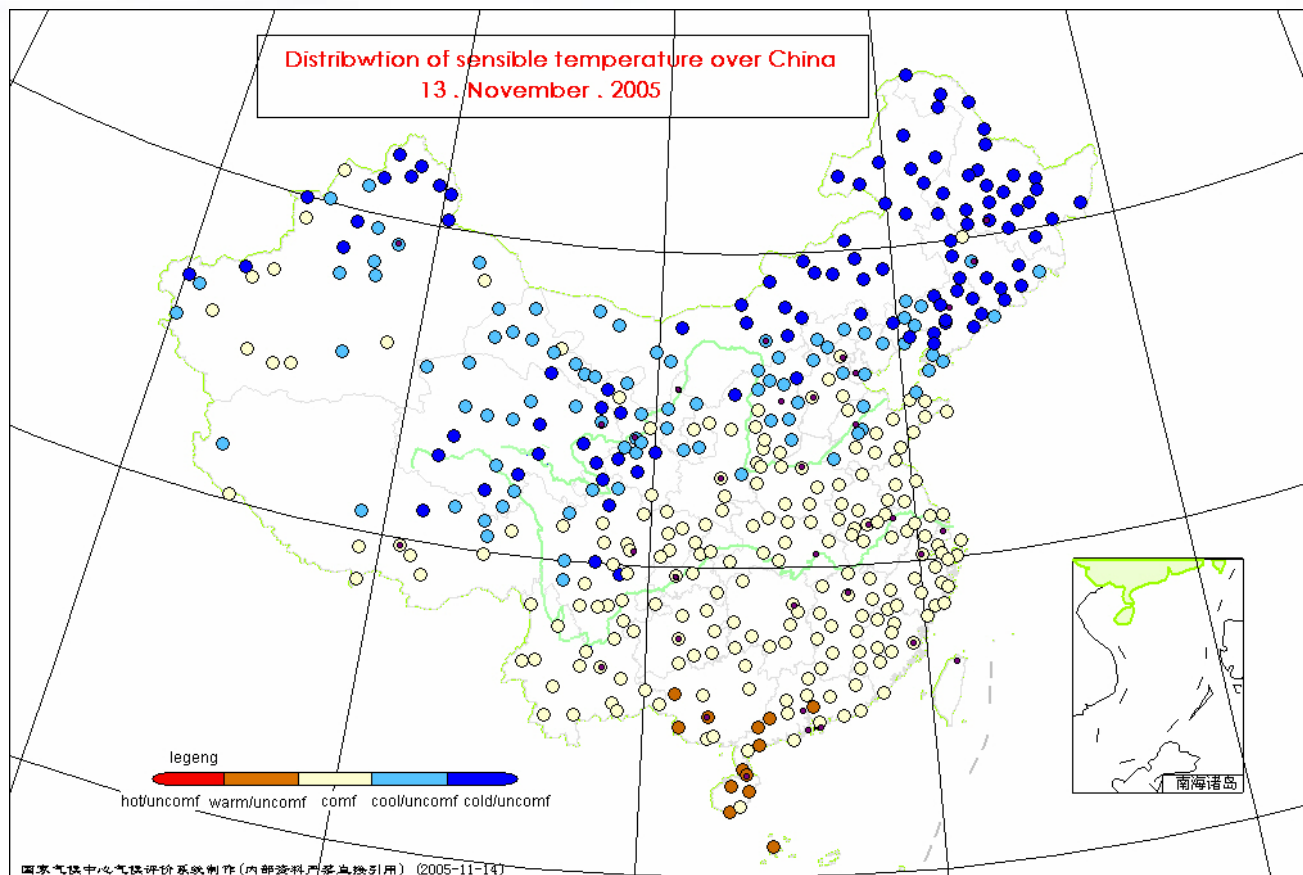
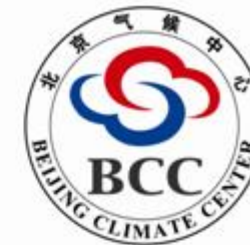


Human Health



The correlation coefficient of **SARS** cases and last 3-13 day highest air temperature in Hong Kong



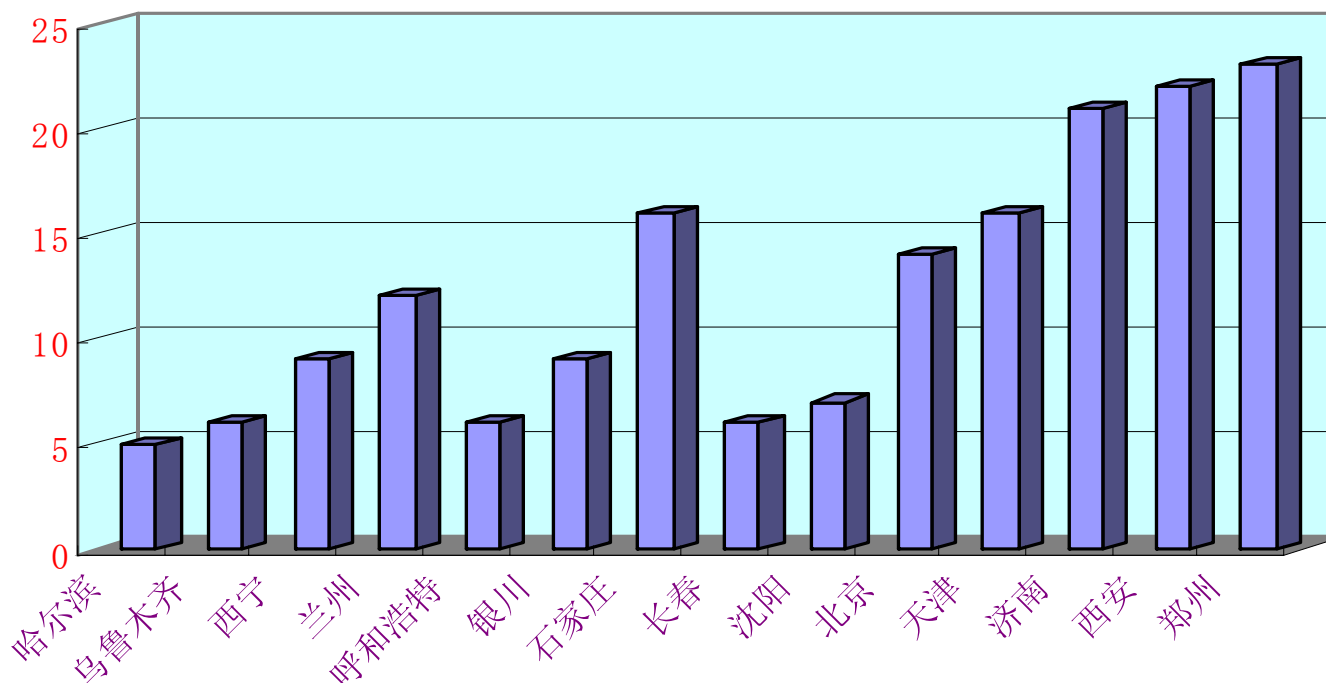


Comfort Indices in China



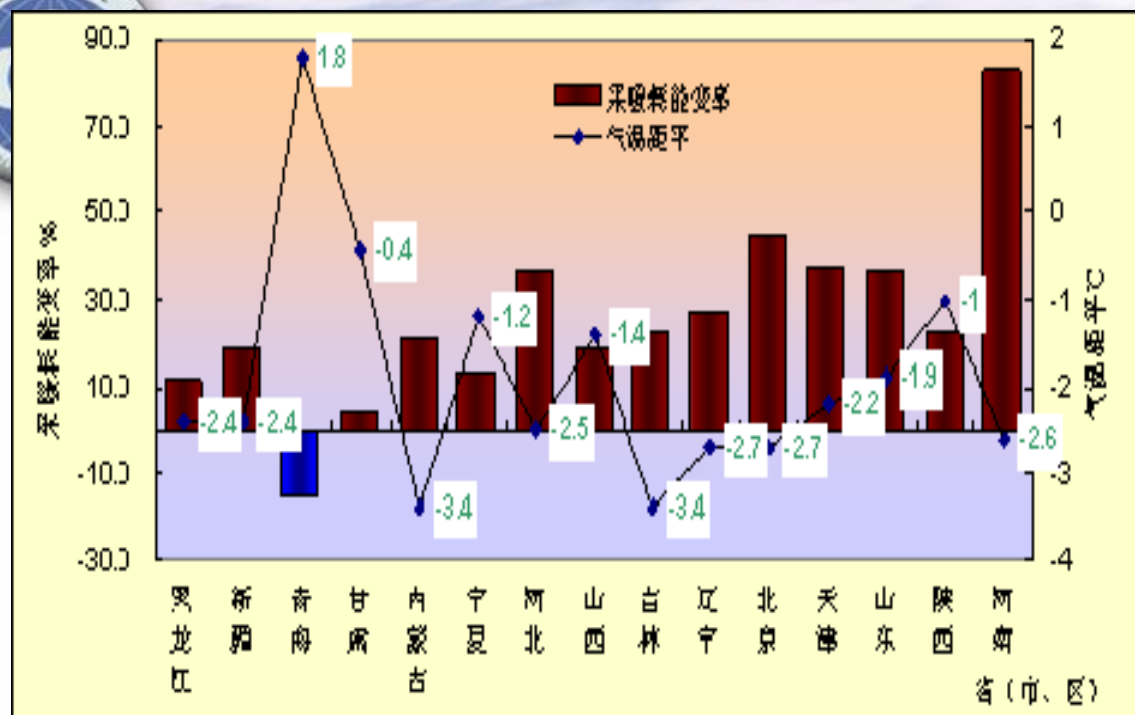
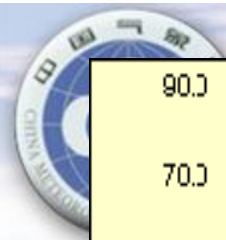


Energy Consumption and Demand



The change of heating energy consumption under 1°C change in temperature (%)





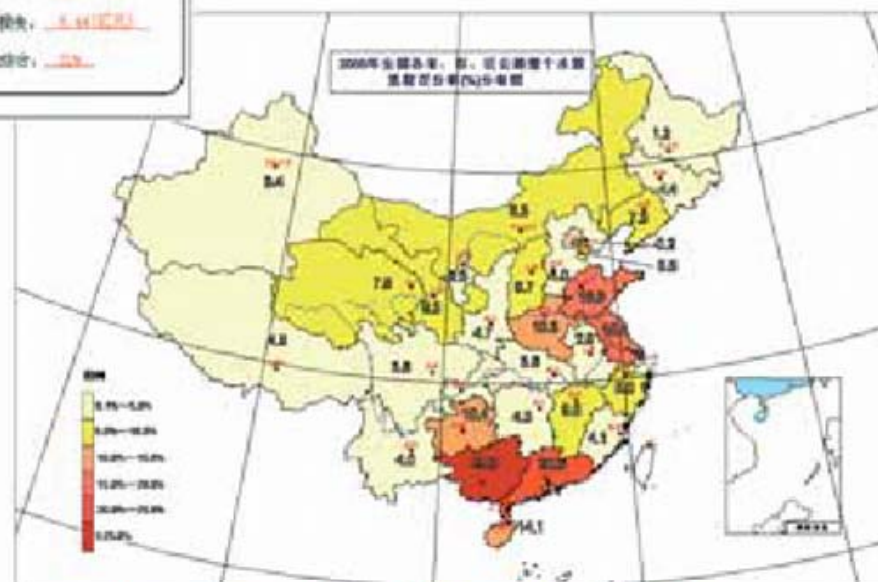
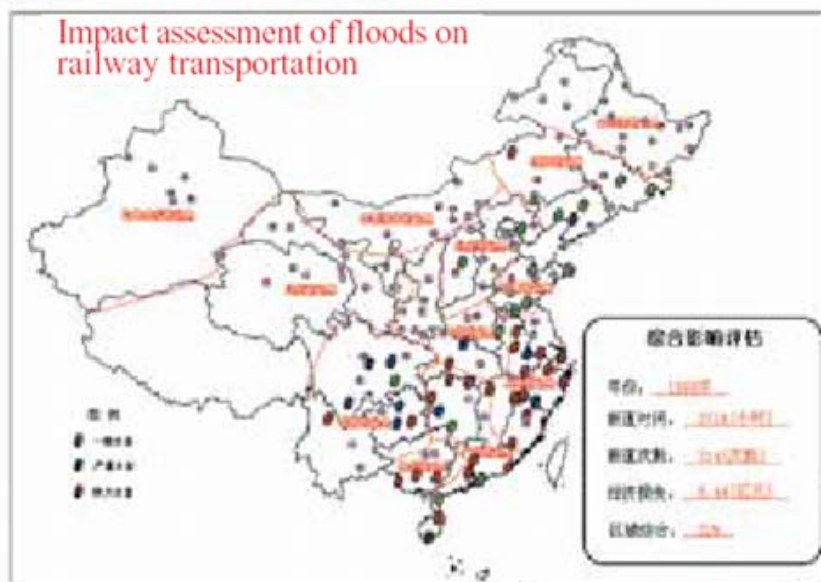
heating energy consumption ~ temperature anomaly

Blue ~ more energy demand
Red ~ less energy demand





Transportation

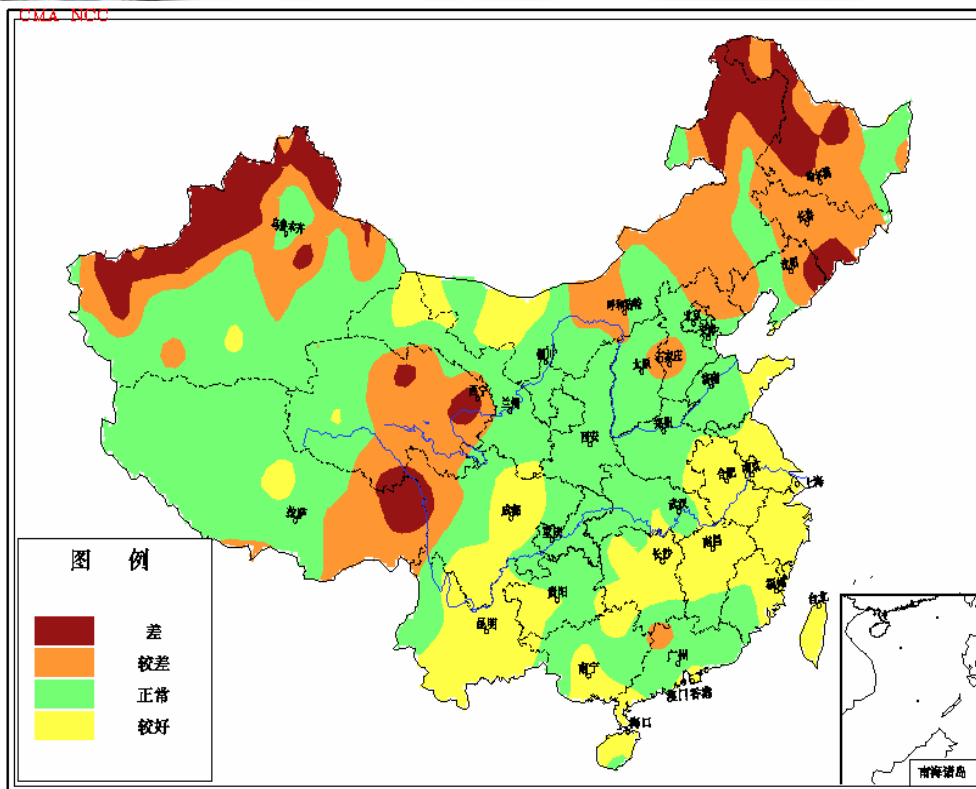


Percentage of road destroyed by flood (%)



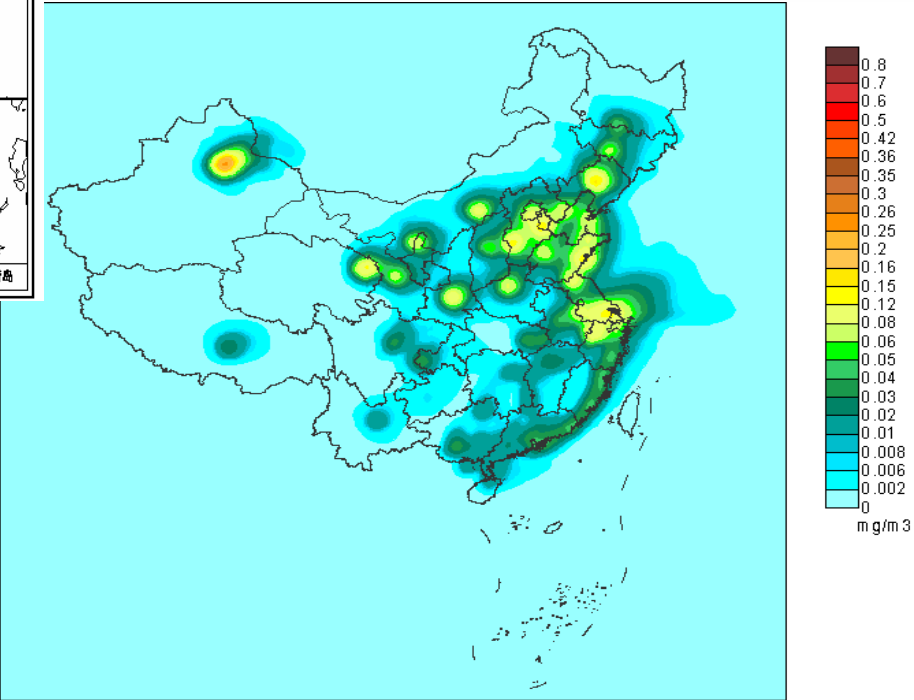


Atmospheric and eco- Environment



Distribution of Air Pollution Potential Indices (API) in China

Concentration of MP10 over China mainland by Air Quality Numerical Prediction Model



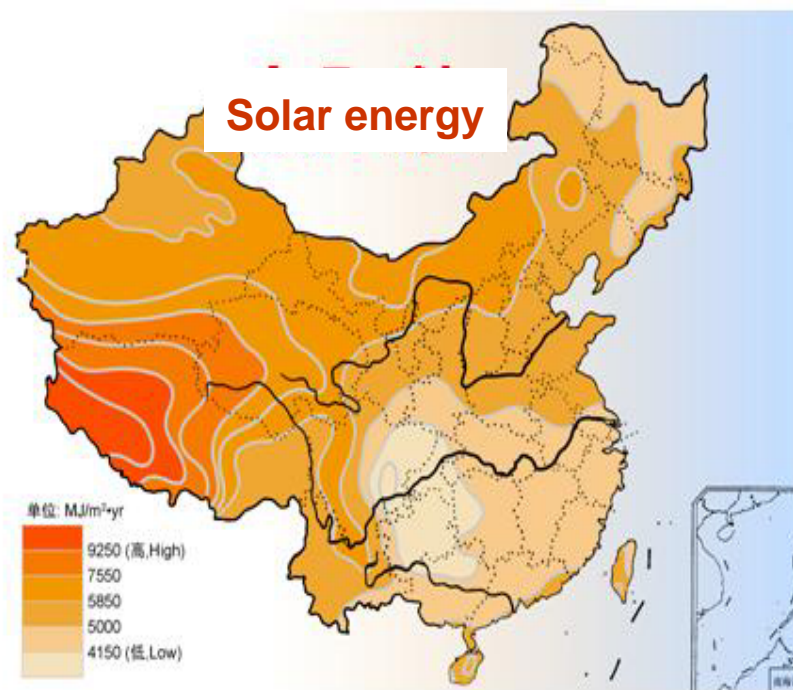
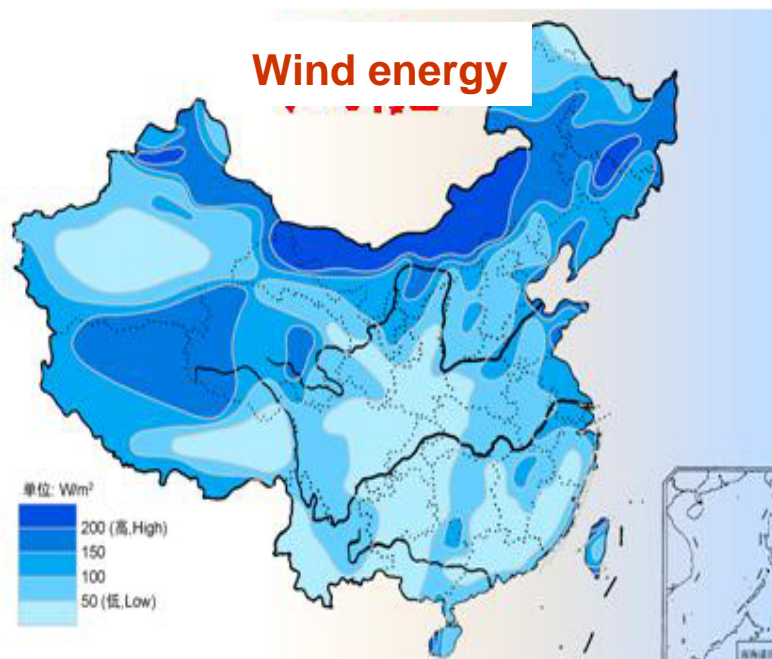


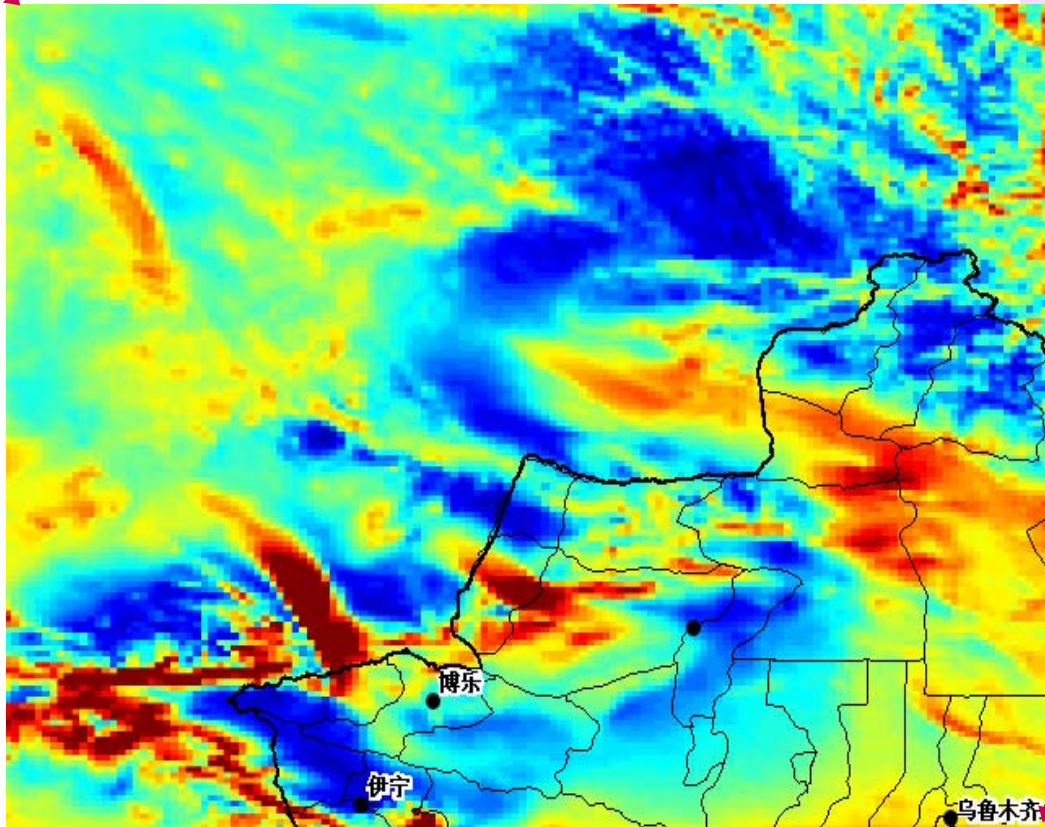
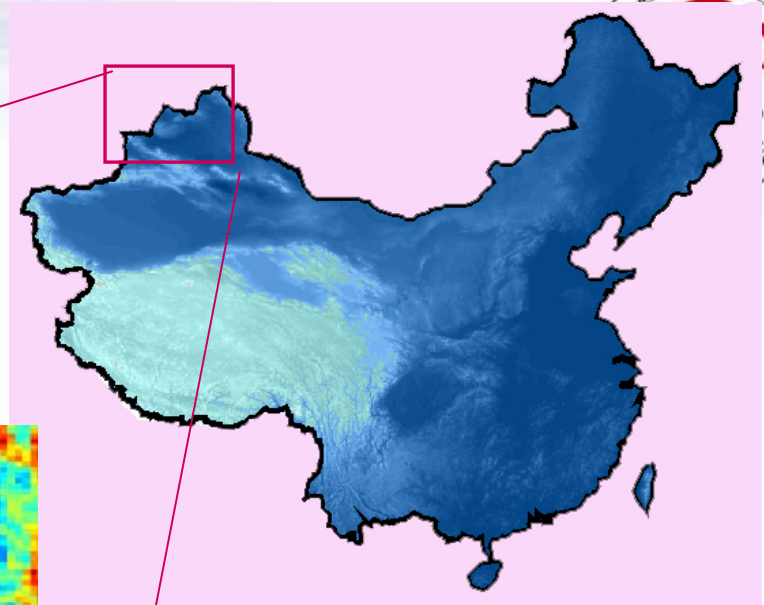
A specialized center, **the Center for Wind and Solar Energy Resources Assessment** has been set up to lead CMA's activities related to climate resources, with the focus on wind energy.





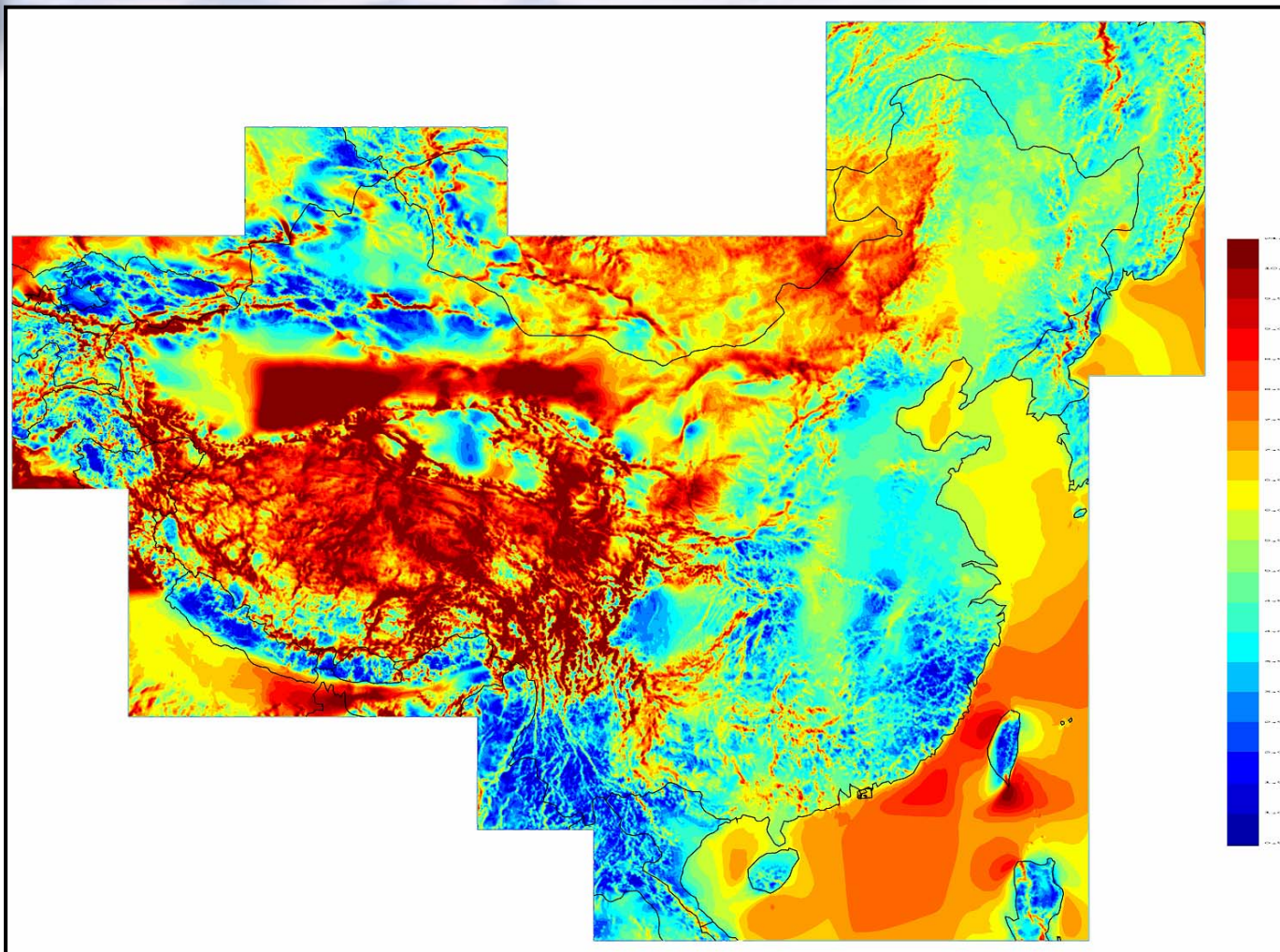
Climate Resource Exploitations





The distribution of wind averaged from 1958 to 2003 at 50m above the ground level with 5km resolution in the part of Xinjiang in China.





China wind map at 80m above the ground level with 5km resolution.



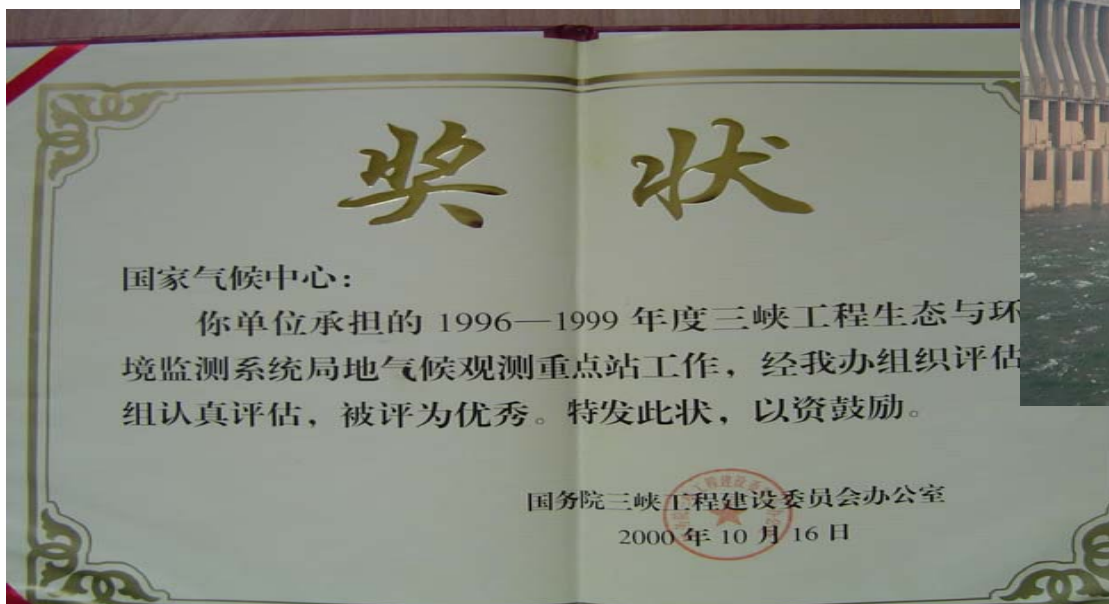


National Construction Project





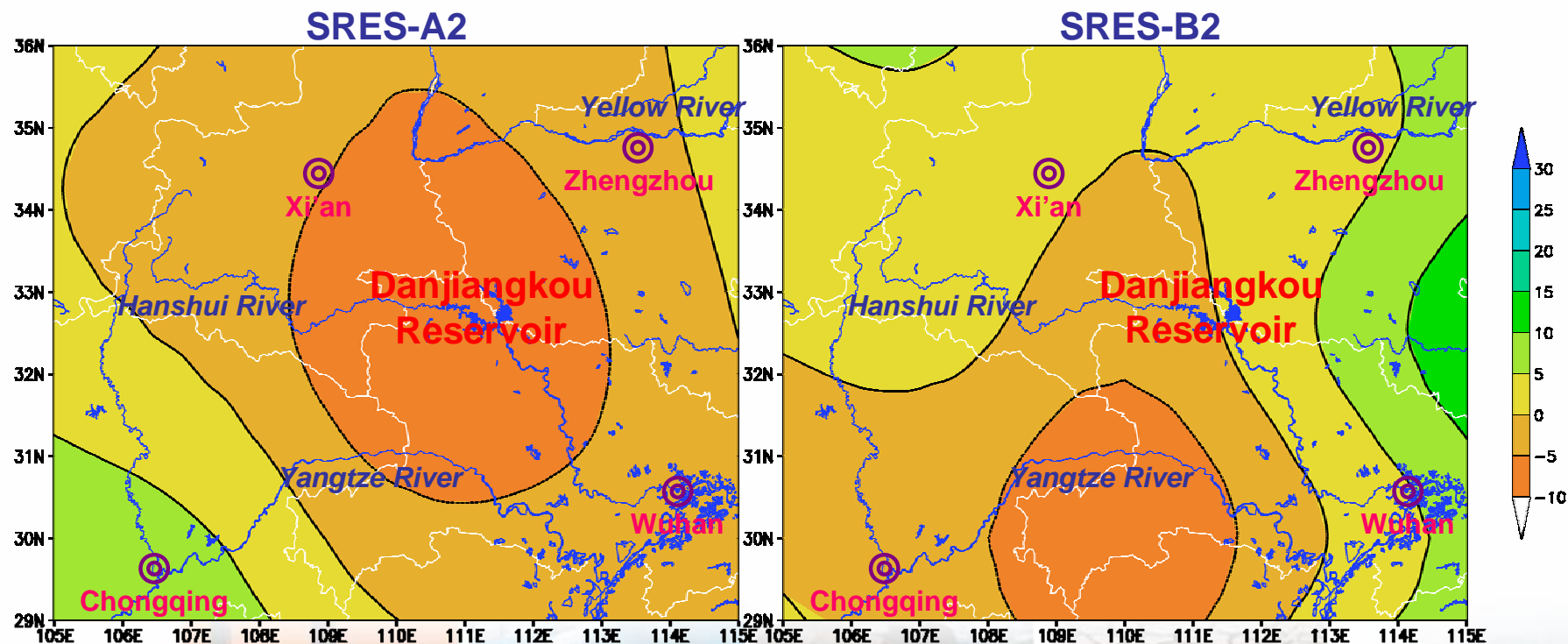
Three Gorge





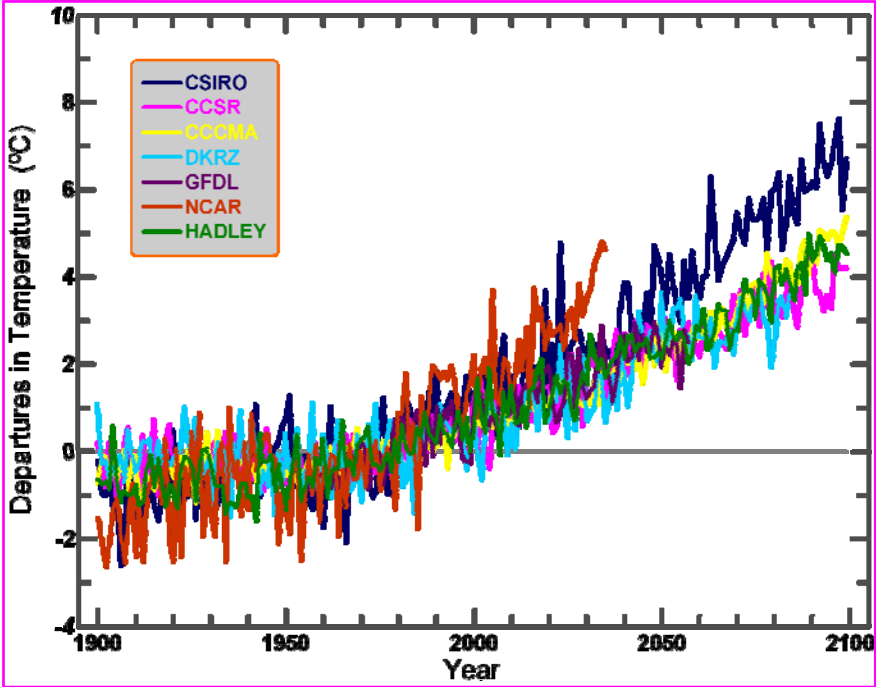
South-North Diversion Project

The distribution of summer precipitation in Danjiangkou Reservoir and its higher reaches during 2050~2059



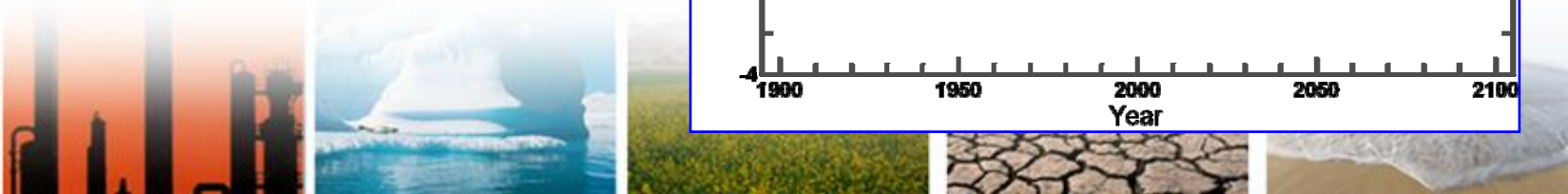
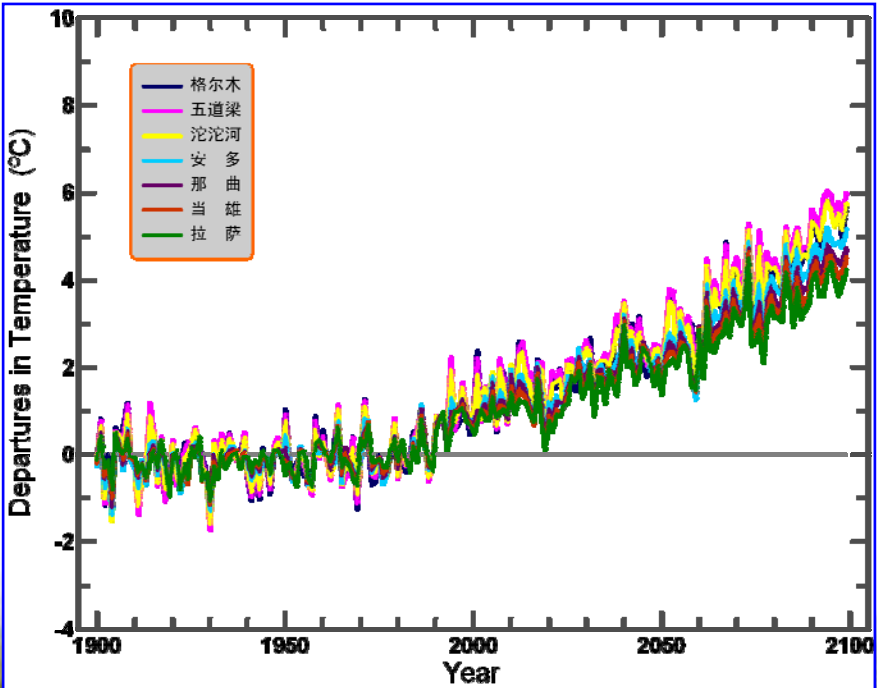


Tibet Railway



Annual mean Temperature changes over Tibet in 21st century (unit: °C)

The changes of maximum temperature in summer for each stations along the Tibet railway in 21st century (unit: °C)





Thanks

