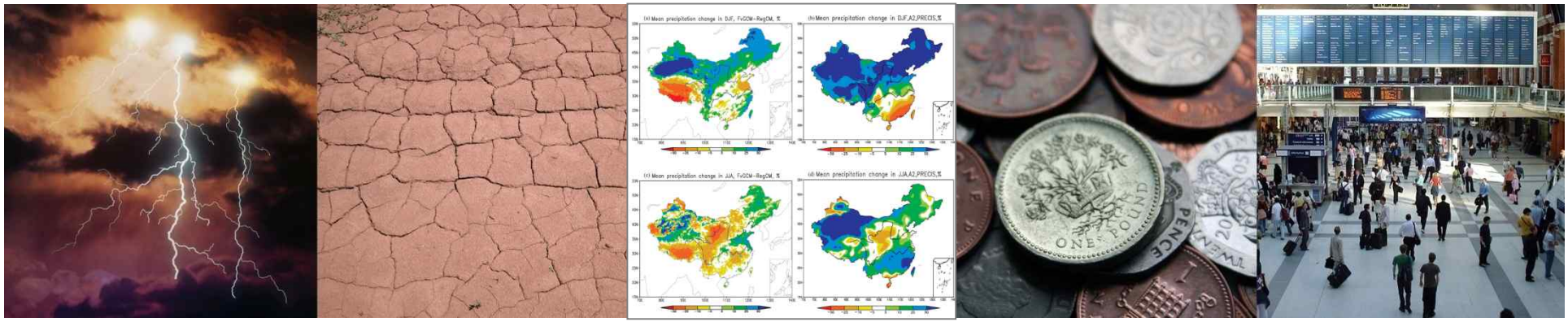
APEC Climate Symposium 2012

Use and Communication of Climate Data： Lessons Learned based on ACCC program

Monday, 08th October 2012,



Hongmei Xu[1], Roger B. Street[2]

[1] *National Climate Center, China Meteorological Administration*
[2] *UK Climate Impacts Programme, Oxford University Centre for the Environment*

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The Adapting to Climate Change in China project is an innovative policy research project. ACCC brings together for the first time Chinese policymakers, research and policy institutions, policy analysis and decision-making to:

- support evidence-based adaptation planning through access to relevant data, tools and information on climate impacts and risks for decision-makers.
- mainstream climate change adaptation policies into development planning.
- produce comprehensive risk assessments on the national and subnational level.
- build capacity and provide technical support on adaptive planning at the subnational level.
- share China's experience with other developing countries to enhance their own resilience to the impacts of climate change.

ACCC Activities

1. Better climate science for China
2. Impacts and risk assessments – national and provincial
3. Identify and integrate adaptation options into planning
4. Training, capacity-building, public awareness
5. Knowledge sharing

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The role of climate data in VIA and Risk assessments

- Climate data and information is traditionally targeted to describe the past, present and, in the case of scenarios and projections, the future climates. These are essential, but in the case of supporting adaptation decision-making, these descriptions can fall short of meeting the requirements and lead to inaction.

- The challenge is to develop and deliver this decision-relevant data and information based on sound science and an understanding of user needs and capacities.

- Addressing this challenge is easier said than done, but is increasingly being recognised as necessary for 'successful' adaptation. Descriptions of climate have been developed based on an understanding of the needs of the climate community, however, there is not a similar understanding of the needs of the adaptation community which in itself continues to grow and its needs continue to evolve.

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Challenges

How are decisions / policies being made?

- Limited understanding of these processes, especially when faced with the associated uncertainties and complexities – vulnerabilities and responses

What information is needed (and can be used)?

- Limited understanding as to the nature and scope of the decision and policy making processes and what is needed to support these
- Limited understanding of how to use information provided

What is needed to support use of the information?

- Limited understanding of the nature and capacities of the user community
- Limited understanding of the needs of the user community (diversity)

What have we learnt?

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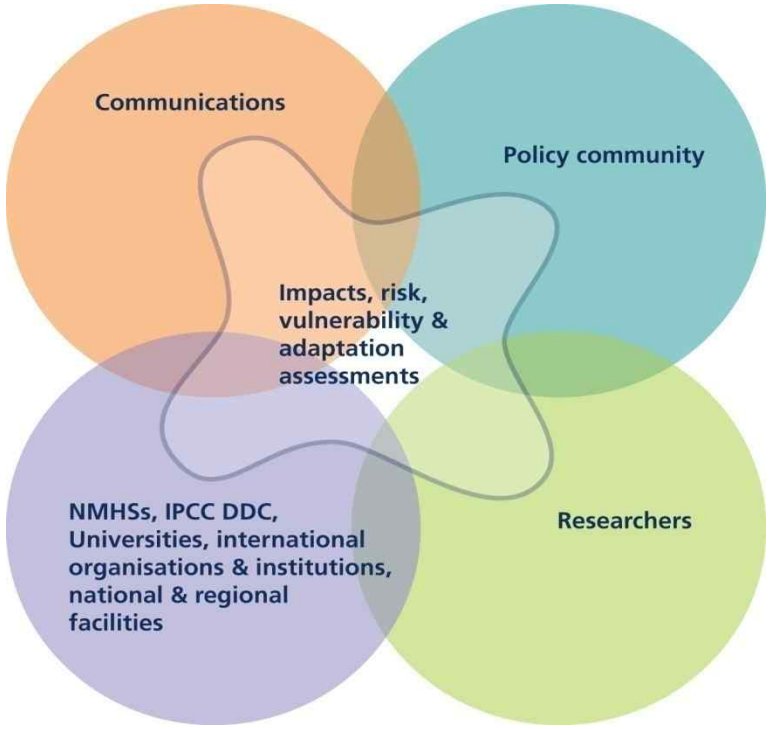
Who are the Providers?

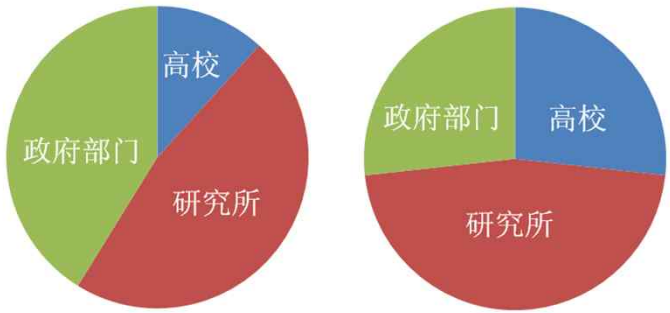
- NMHSs, IPCC DDC , Universities, International Organisation and Institutions, and National / Regional Facilities



Need for informed and sustained engagement involving both users and providers throughout the process – development, dissemination, evolution, etc.

Who are the Users? Why are they using?

- National Climate Center publish Climate Projection dataset for China Version1.0 and Version2.0 in October 2008 and November 2009.
- Dataset has been effectively applied in many organizations



Relative usage of Climate Projection Dataset for China (Version 1.0 and Version 2.0)

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What information is provide now?

Dataset		Variables	Spatial Resolution	Temporal Resolution	Emission Scenarios	Time Period
Gridded Observation dataset		Temperature, precipitation	0.5°×0.5°	daily		1961-2007
GCMs	ME	Temperature, precipitation	1°×1°	monthly	A1B, A2, B1	1901-2100
	REA					
RCMs	FvGCM-RegCM	Temperature, precipitation	0.25°×0.25°	daily	A2	1961-1990; 2071-2100
	MIROC-RegCM	Temperature, precipitation, Relative humid, wind speed	0.25°×0.25°	daily	A1B	1951-2100
	HadAM3P-PRECIS	Temperature, precipitation	0.5°×0.5°	daily	A2, B2	1961-1990; 2071-2100
	HadCM3Q0-PRECIS	Temperature, precipitation	0.5°×0.5°	daily	A1B	1961-2100
	……to be update					

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Understanding the ACCC Audiences

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What Constitutes User Friendly Scenarios?

Characteristics	Number Identifying this Characteristic
Reliability	5
Easy to Understand	7
Easy to Read	14
Easy to get	8
Compatible	3
Update in time	3
User guidance, user manual	3
Visual representation	6
In clear/clean language	2
Variables	4
User and providers working together	6

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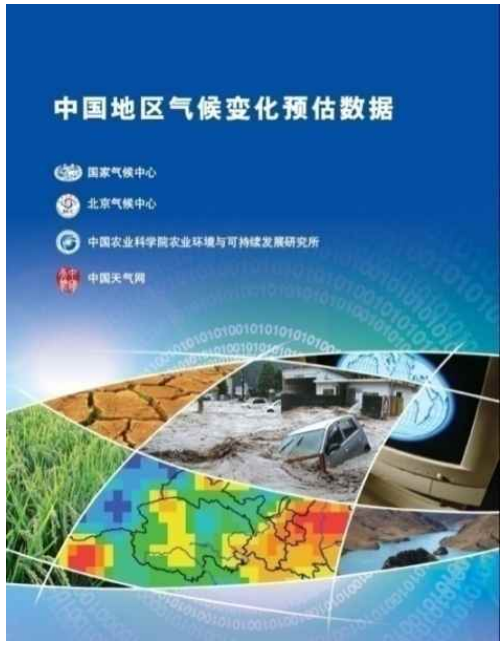
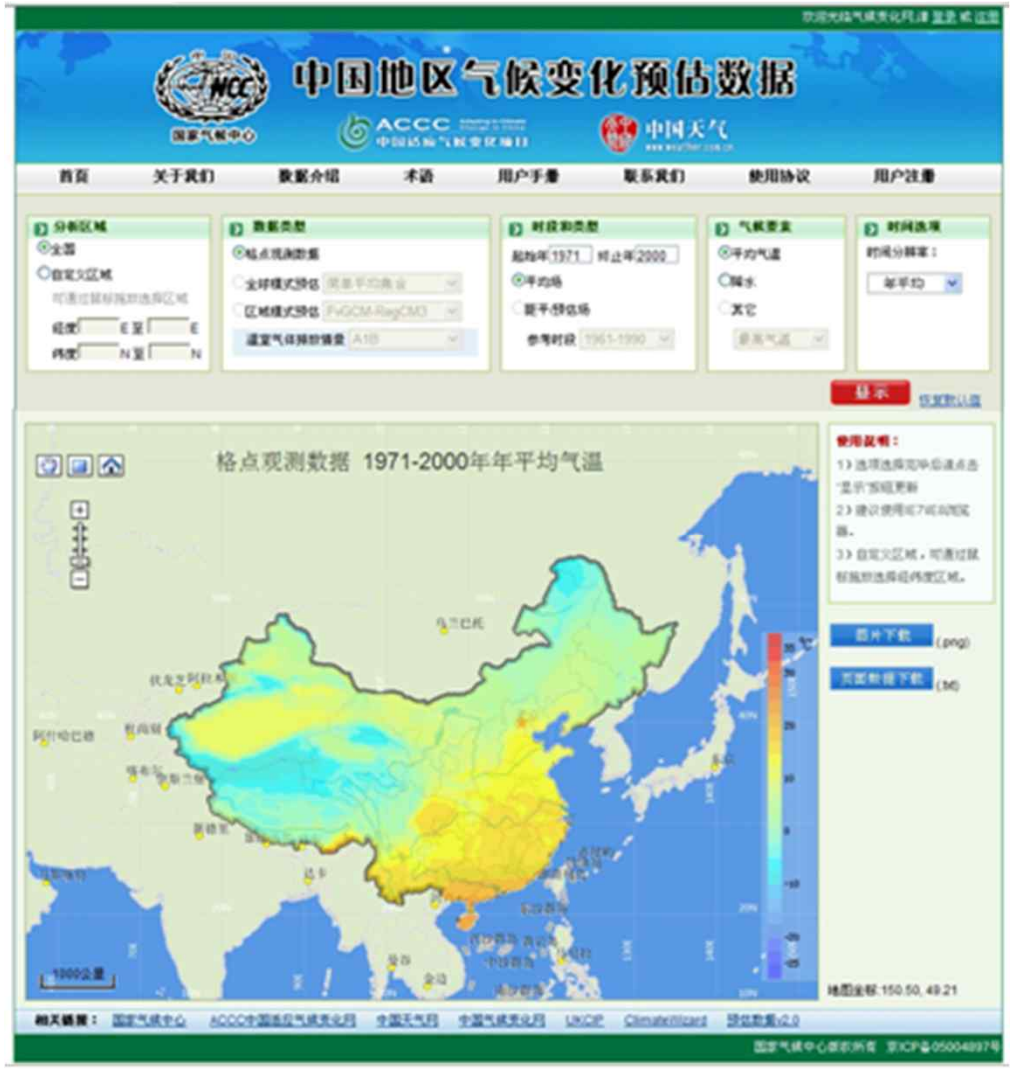
How information is accessed?

Brochure





Scenarios website

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Key features necessary for a successful web portal

User interaction √

Content √

Function

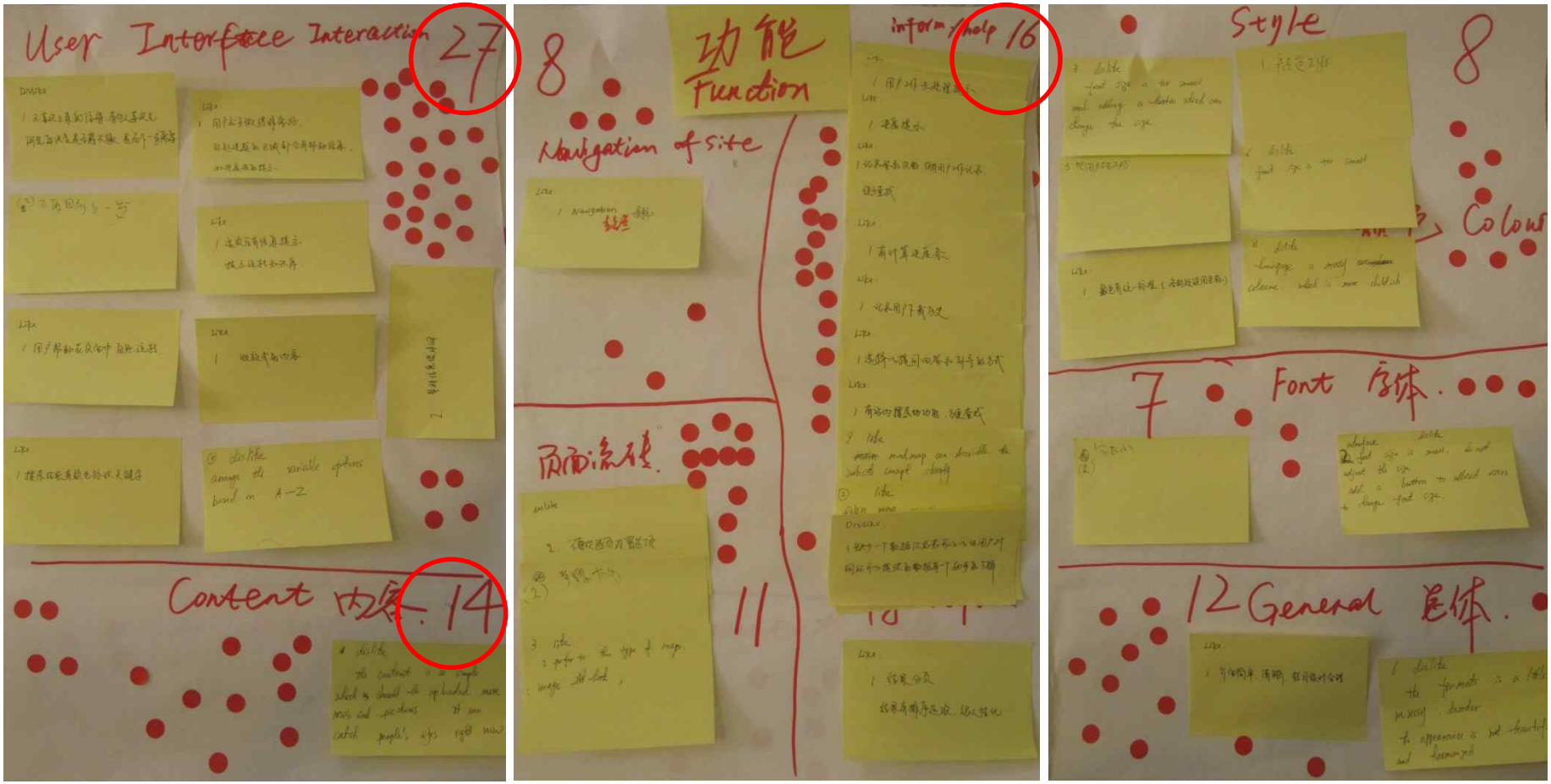
Page location

Help √

Style

Font

General



Aims - Website evaluation

To critically review a range of websites to decide the key features necessary for a successful web portal.

1. Climate Projection in China
http://www.climatechange-data.cn

2. The nature conservancy
http://www.climatewizard.org/

3. UK Climate projections user interface
http://ukclimateprojections-ui.defra.gov.uk

4. National Climatic Data center, USA
http://www.ncdc.noaa.gov/oa/ncdc.html

Climate scenarios website—users

users levels：

- General users
- Registered users
- Project users

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Climate scenarios website—user selection

- Area： national scale， provincial scale， user definition；
- Dataset： observed grided data， GCMs projection， RCMs projection；
- Emission scenarios： A1B, a1,b2
- Period： user definition；
- Output： absolute value or anomaly， anomaly with baseline 1961-90， 1971-2000， 1980-99
- variables： mean temperature, precipitation; maximum, minimum T et al for ACCC project user
- Temporal resolution： annual mean, seasonal mean， monthly, daily

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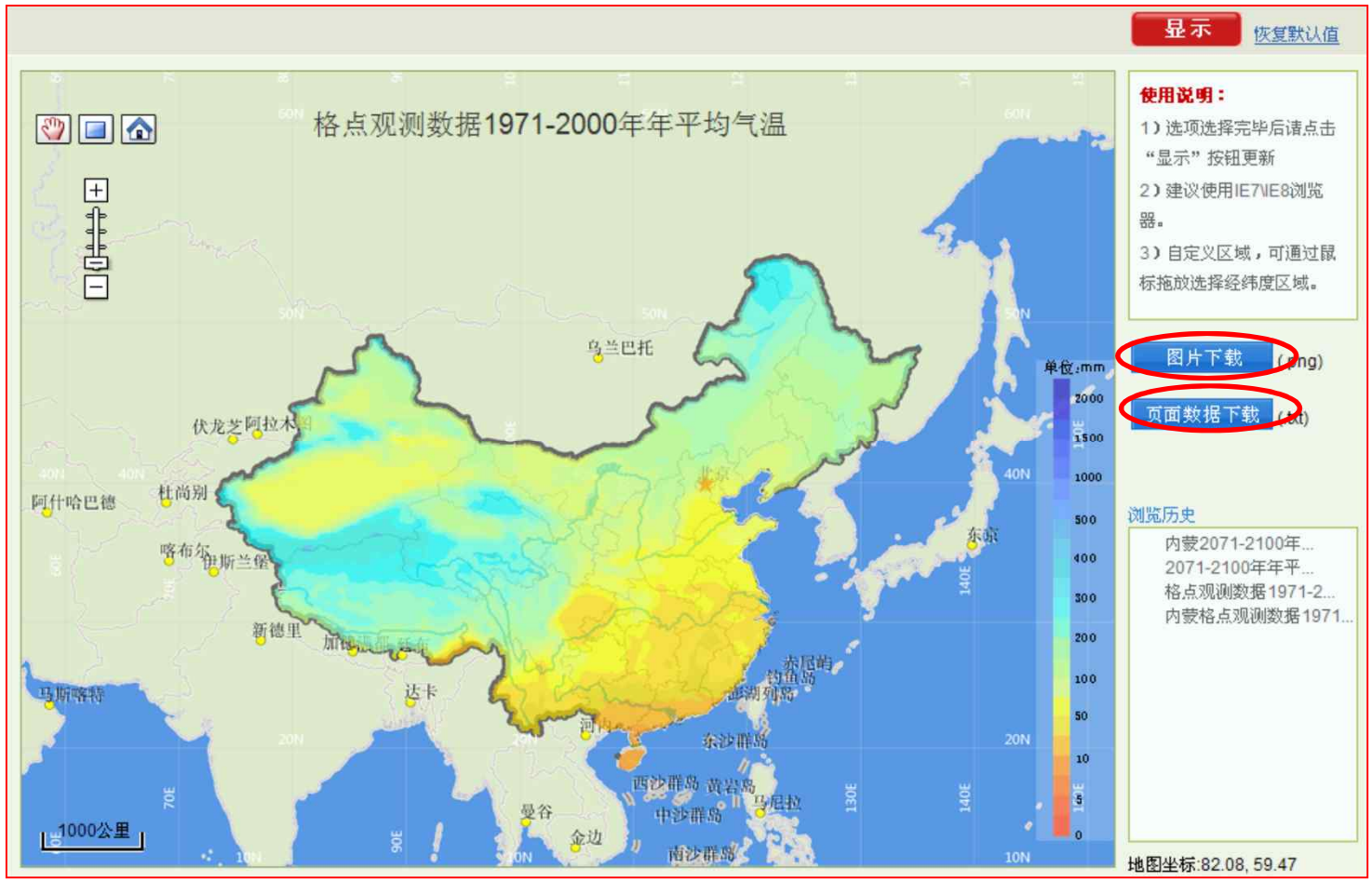
Climate scenarios website－download



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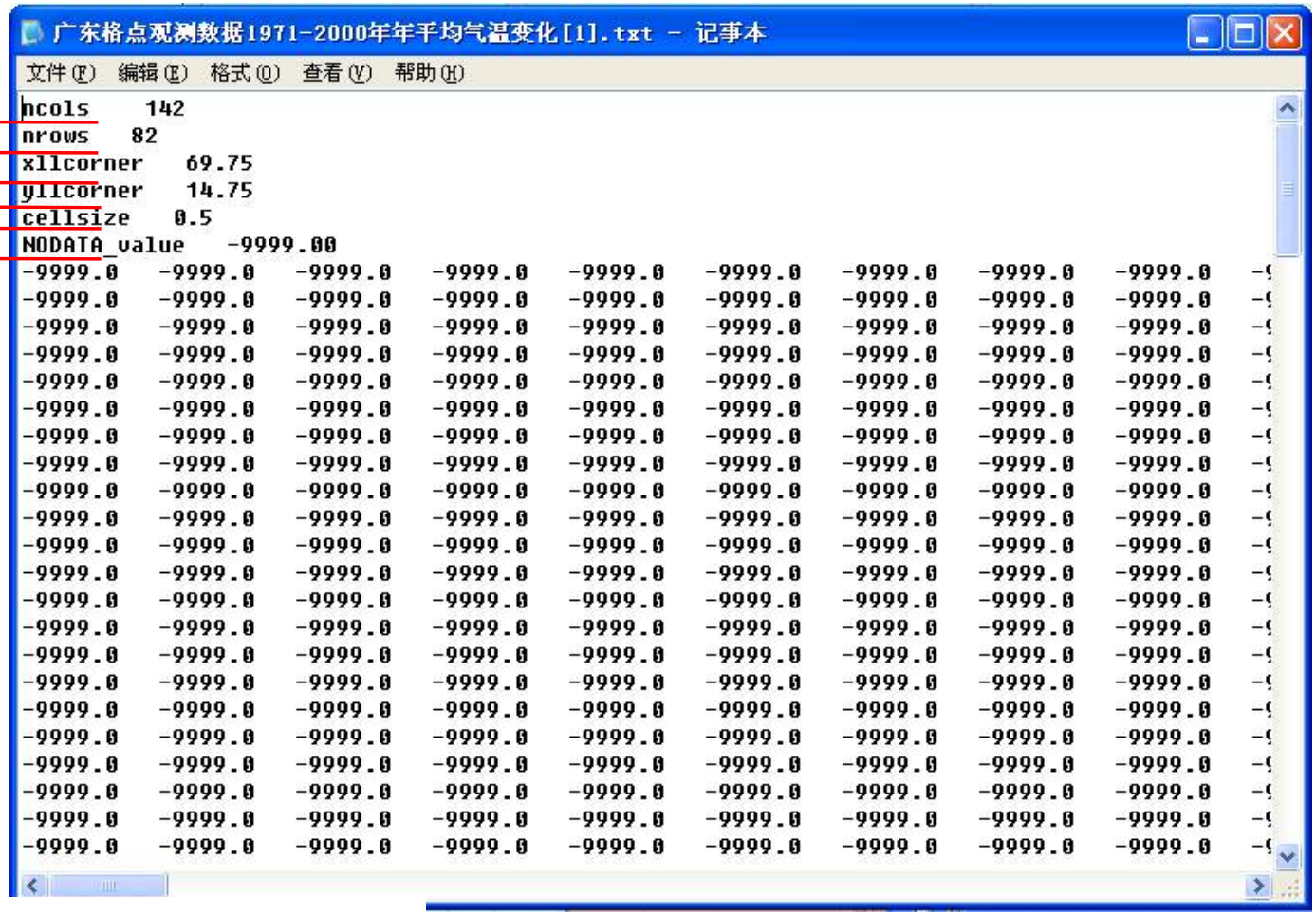
Climate scenarios website—data format

Column
Arrow
Longitude
Latitude
resolution
Nodata



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Preparation of the User Guidance

Outline -- Questionnaire Feedback：7/24　　Reasonable/Unreasonable：6 /1

Outline	Contents	Reasonable	Unreasonable	Improvement
summary	Purposes of the "China Climate Data", its project support, data overview, data providers, and composition purposes and contents of the user guidance	6	1	included target users in this part
1. Data Introduction	Observed grid climate data, GCM and RCM primary estimates, including data's temporal series, temporal resolution, spatial resolution, emission scenarios, climate variables, and data and information generation methods	7		
2. Production	Introduce products derived from the existing dataset. Products' spatial scale; products' temporal resolution, Products' format; how to get access to the products, etc.	6	1	included the method to obtain products and update, maintenance information
3. Uncertainty	Explain uncertainties caused by climate variability, GCM, emission scenarios, etc.	5	2	give more information about uncertainty
4. Evaluation and key result	Comparisons between observed grid data and CRU grid data, GCM and RCM data and observed results, etc.; China climate change trend derived from global model and regional models	7		add introduction about CRU dataset
5. Data Usage Notes	Data Authorization, data inapplicable fields, etc.	5	2	include how to select scenarios to be used in assessment here
6. Worked Example	Analysis of extreme events, water resources, agriculture, flood and draught based on the dataset itself	6	1	contact with data provider and some previous users
7.Case Study	Application in in fields of agriculture, water resources, ecosystems, animal husbandry, forestry, and human health	6	1	give information according case studies questionnaires
8.Glossary	Terminologies in the Guidance	7		

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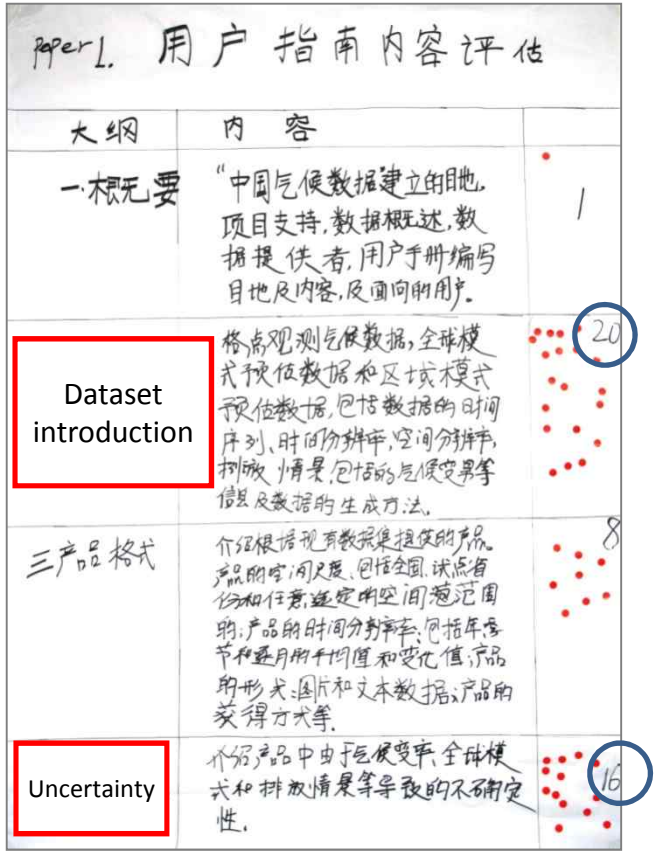
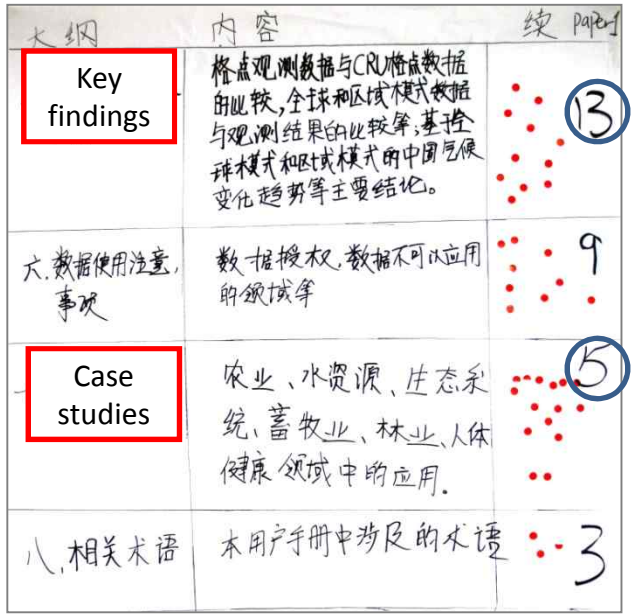
How guidance support users?

√ User Guidance


中国地区气候变化预估数据
用户手册

国家气候中心
2010 年 12 月　北京





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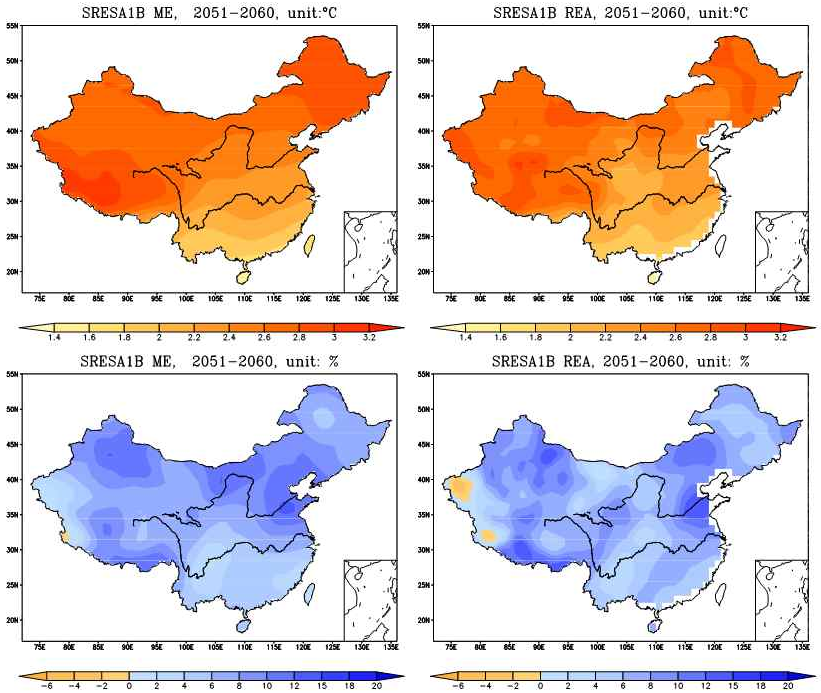
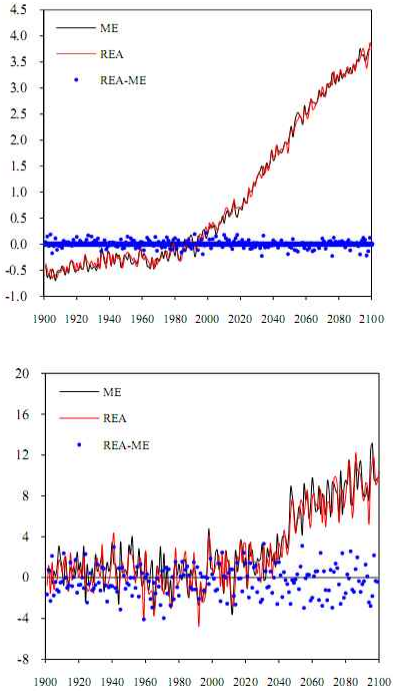
How uncertainties are presented?

—Uncertainty revealed by ensemble method of multi GCMs



Climate Change Projection in China under SRES A1B
（upper: temperature; bottom: precipitation



SRES A1B排放情景下21世纪中国地区温度、降水的年平均变化 （上：温度；下：降水）

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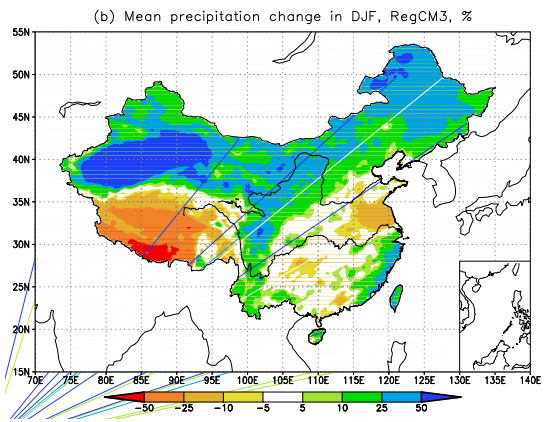
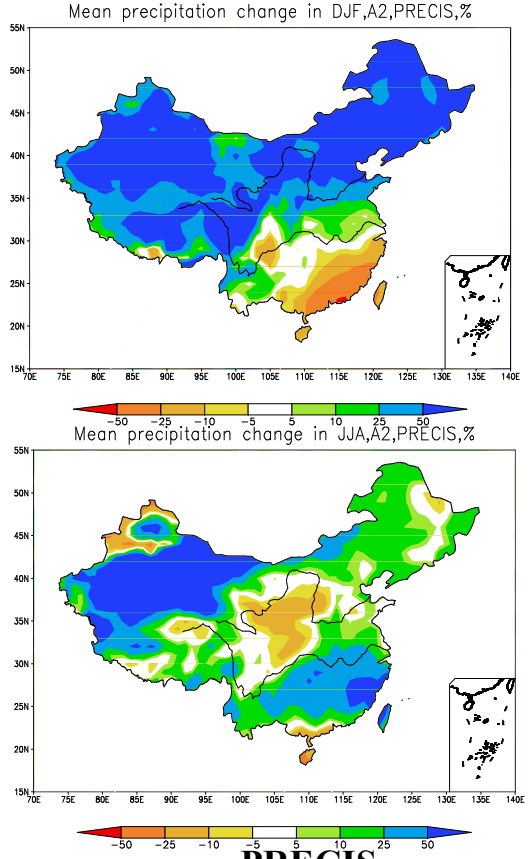
How uncertainties are presented?

- Uncertainties within RCMs result from differences in model structure and the different GCM boundary forcing



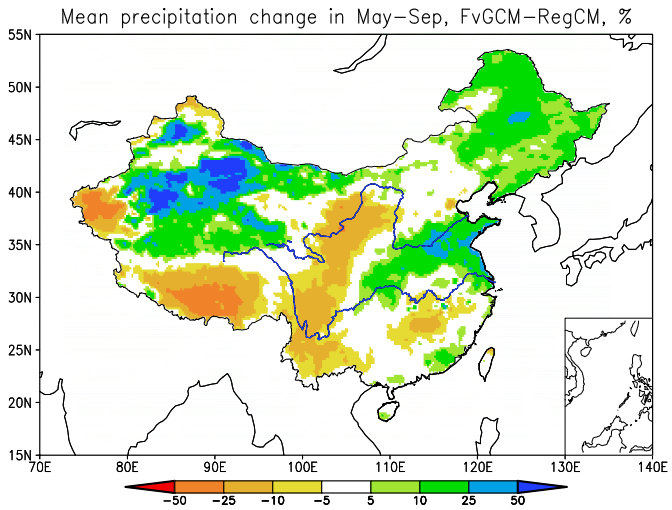
FvGCM-RegCM3



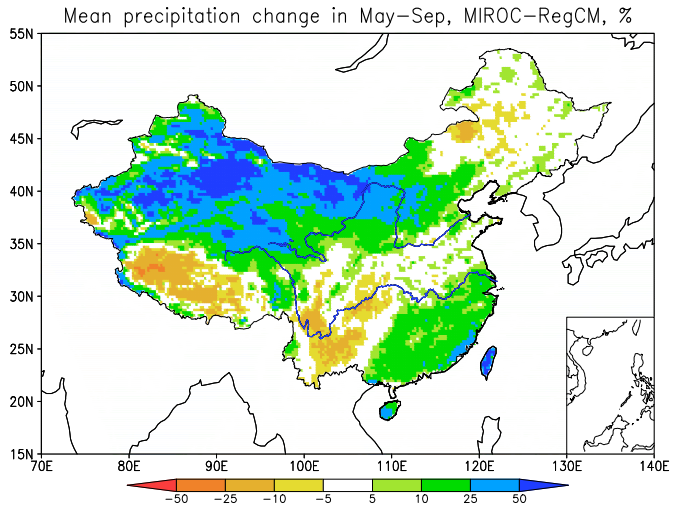
PRECIS

How uncertainties are presented?

-Uncertainties with boundary forcing RegCM3



FvGCM-RegCM3



MICRO-RegCM3

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Key Findings

Observed climate change in China during 1961-2000 based on gridded observation data

Temperature and precipitation change in China

Distribution of temperature and precipitation in China

Tendency of temperature and precipitation change in China

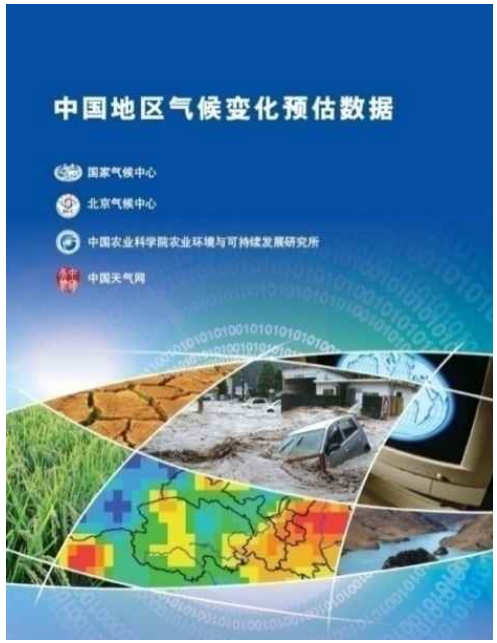
Climate projection in China based on GCMs and RCMs

Climate projection in China using AR4 GCMs on the CMIP3 subset

Climate projection in China using RegCM3

Climate projection in China using PRECIS

Brochure



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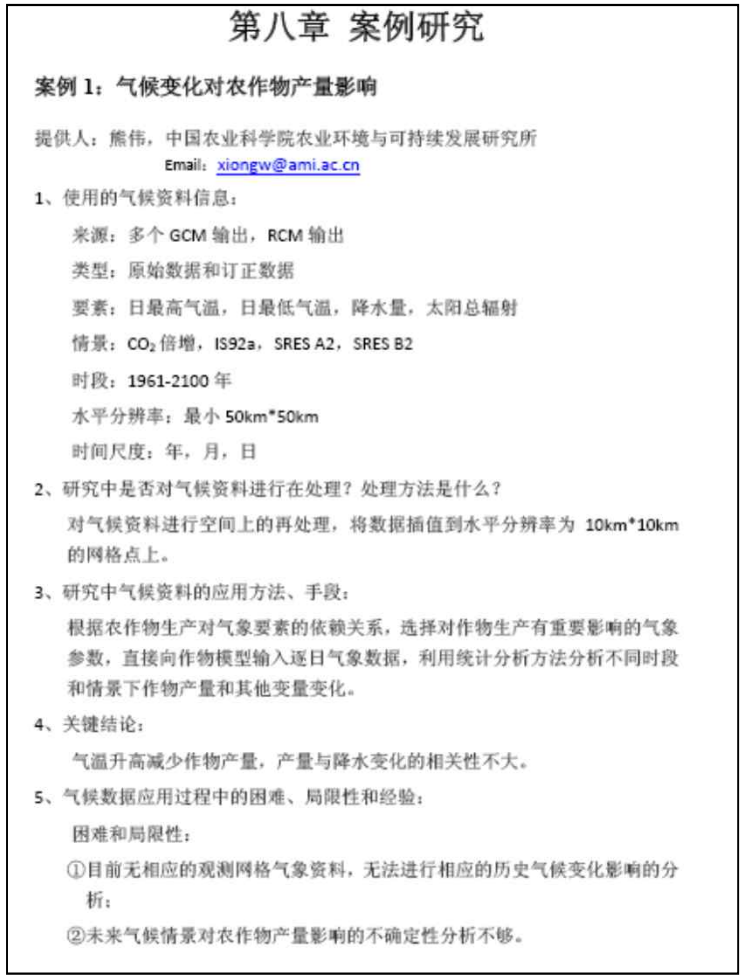
Case Studies

Previous Case Studies

- Agriculture (national scale）
- Water resource (Catchment scale)
- Ecosystem –vegetation
- Ecosystem –Rare and endangered species
- Grassland husbandry
- Human Health



第八章 案例研究

案例 1：气候变化对农作物产量影响

提供人：熊伟，中国农业科学院农业环境与可持续发展研究所

Email：xiongw@ami.ac.cn

1、使用的气候资料信息：

来源：多个 GCM 输出，RCM 输出

类型：原始数据和订正数据

要素：日最高气温，日最低气温，降水量，太阳总辐射

情景：CO_2 倍增，IS92a，SRES A2，SRES B2

时段：1961-2100 年

水平分辨率：最小 50km*50km

时间尺度：年，月，日

2、研究中是否对气候资料进行在处理？处理方法是什么？

对气候资料进行空间上的再处理，将数据插值到水平分辨率为 10km*10km 的网格点上。

3、研究中气候资料的应用方法、手段：

根据农作物生产对气象要素的依赖关系，选择对作物生产有重要影响的气象参数，直接向作物模型输入逐日气象数据，利用统计分析方法分析不同时段和情景下作物产量和其他变量变化。

4、关键结论：

气温升高减少作物产量，产量与降水变化的相关性不大。

5、气候数据应用过程中的困难、局限性和经验：

困难和局限性：

①目前无相应的观测网格气象资料，无法进行相应的历史气候变化影响的分析；

②未来气候情景对农作物产量影响的不确定性分析不够。

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Lessons learned based on ACCC project

- Experience has shown that climate data and information needed is that to inform decision and policy making.
- Descriptions of the current and future climate and impacts are necessary, but often insufficient.
- The data and information need to be relevant, interpreted in the context of the decision required and able to be integrated with other relevant information within the decision or policy making processes.
- Both the access to the data and information and user-provider support are necessary.
- Experience has also shown that sustained engagement of users and providers, supporting continuous learning and sharing, offers the potential for effectively addressing the knowledge gaps and limitations.

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Challenges and Gaps

Climate information must be accessible and useable by the target users

- Challenge is that users (and providers) can become mesmerised by the numbers
  - Going straight to the climate data without understanding what is needed (understanding sensitivities and thresholds of system)

Accessibility should consider:

- Capacity, time available and motivation / inclination to use the provided data
- Capacity to access information (Internet, publications, etc.)
- Evolving historical data and climate science – new information and multiple sources
- Support for access

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Challenges and Gaps

Evolving user and provider communities

- Need for informed and sustained engagement (more than just consultations)
  - Sustaining this engagement is a challenge
  - Evolving user communities (and providers)
- Embrace this diversity and evolution / revolution that develops
- Need to build capacity – users and providers
- Information provided should be influenced by needs of users and the capabilities of the science (credible and informative)

- Encouraging sharing of experience and partnership working
- Broadening the community of users and providers engaged

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Challenges and Gaps

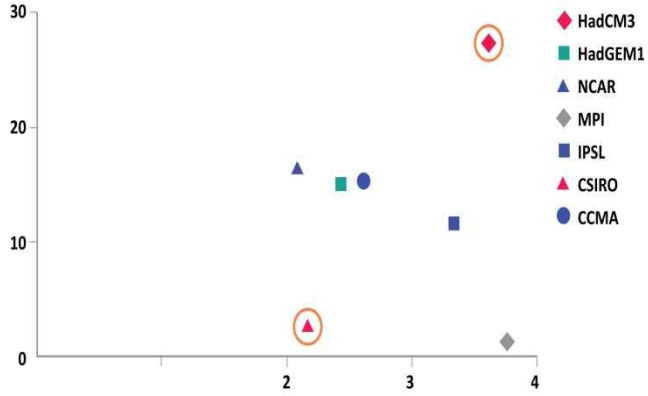
Dealing with uncertainty – will always exist in observations and future

- Deterministic information – brittle adaptation
- Is optimal adaptation appropriate considering uncertainties?
- Desire for single set of information
  - Costs in terms of time and capacity
  - Interpretation of outputs?
  - Easier to use

Does this result in an 'valid ' decision

Who owns the risk?

North China is projected to on average to be wetter and hotter.



Might select coolest & driest and hottest & wettest to capture the range

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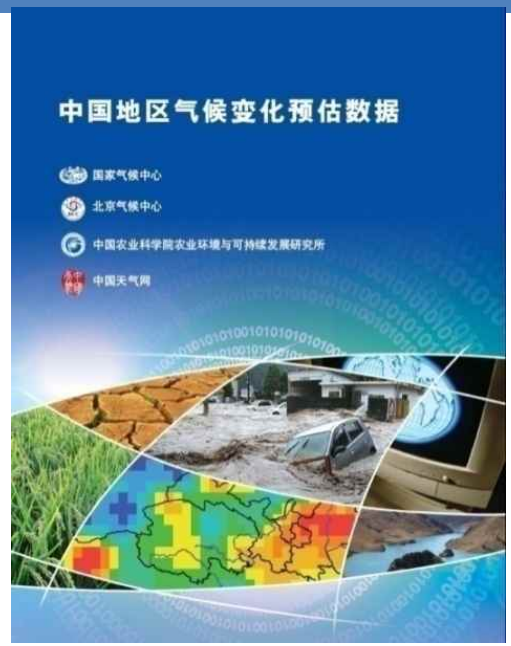
Challenges and Gaps

Evolving climate science and users' needs

- Need for guidance that is credible and understandable by the targeted user community
- Need for access to guidance (and support) on understanding and using
- Need to update the guidance consistent with the evolving science and needs of the user community



Challenges

- Users going straight to the outputs without considering the guidance – enhancing the likelihood of ineffective or misuse
- User-friendly guidance – appropriate language and information
  - Case studies
  - Post-processing tools, visualisations (maps and graphs), data formats (GIS)

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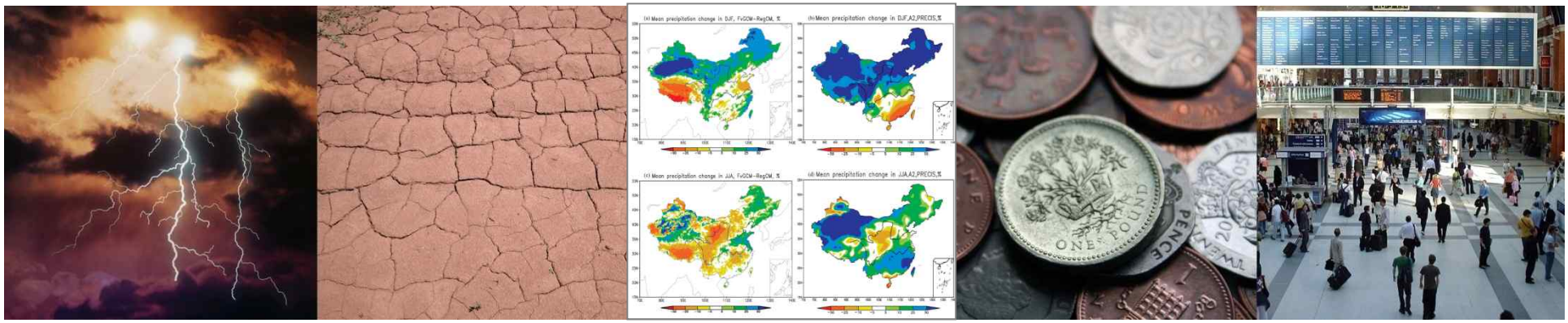
Climate Information to Support Decisions

Information needed is that to support decision and policy making

Sustained and informed engagement of users and providers

Access and support are necessary

Continuous learning and sharing practice and theory



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http://www.climatechange-data.cn