



ABCC Program: Status and Progress

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ABCC Program Team

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Outline



①

Global Change Challenge

②

Why ABCC?

③

Research Framework

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Current Progress

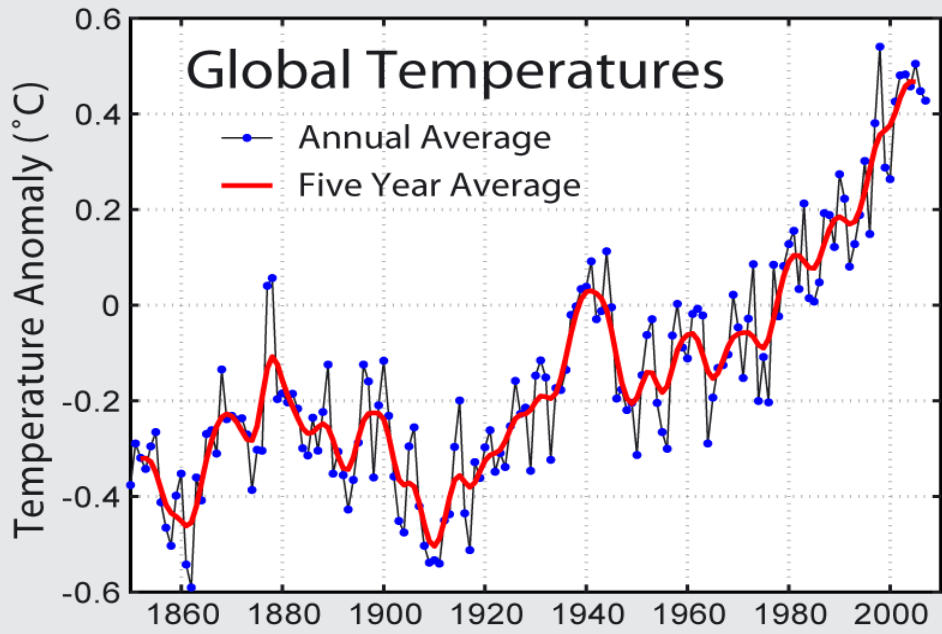
⑤

Future Perspective

1. Global Change Challenge

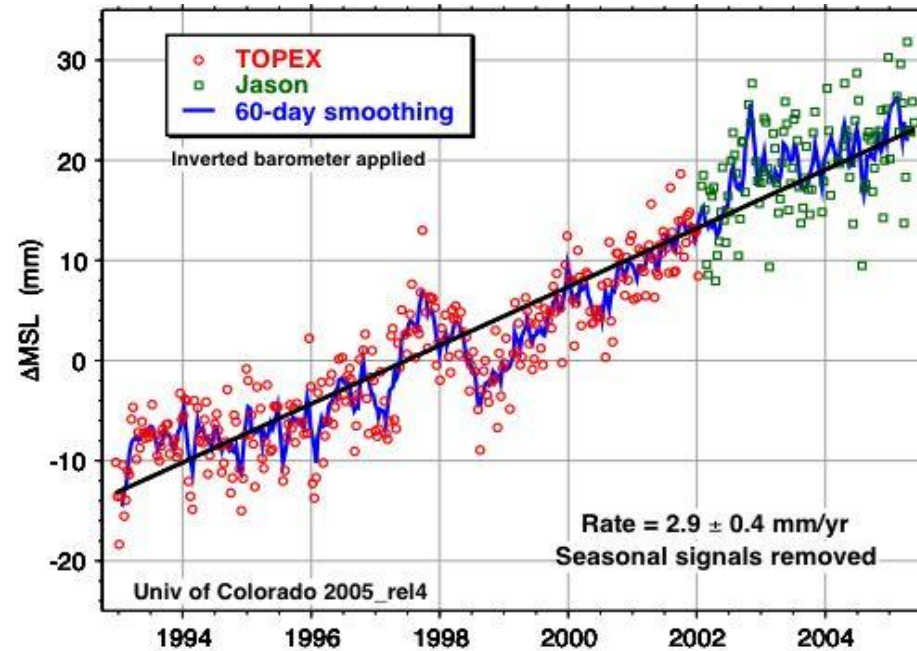


Global Climate Changing



IPCC: “Global Warming is an unarguable fact and the globe will continue to warm.”

Sea level is rising



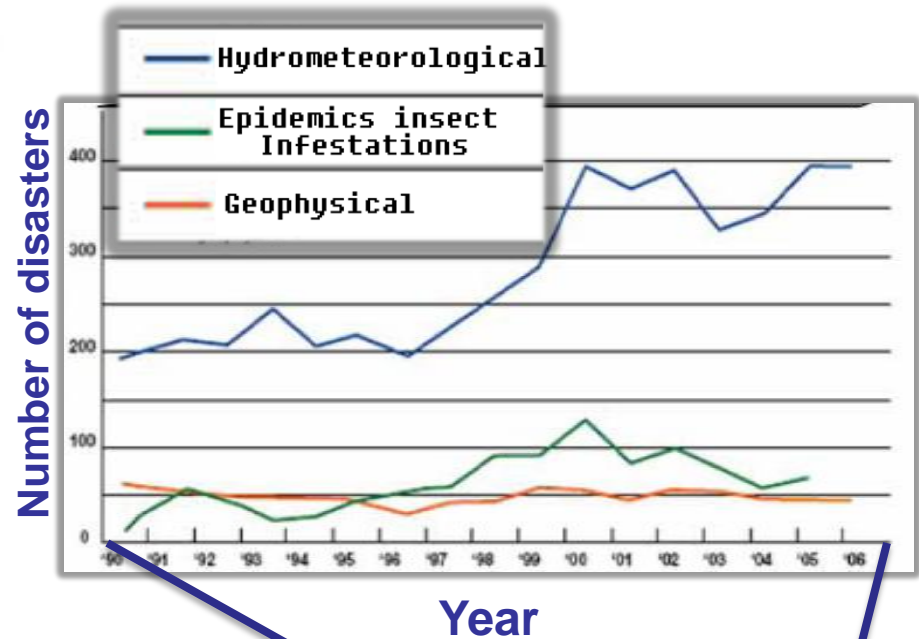
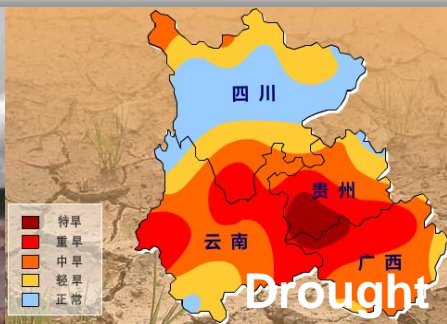
- **Since 1993 Global sea level has risen 37 mm**
- **60% from expansion as ocean temperatures rise**
- **40% from melting glaciers**

Steve Nerem

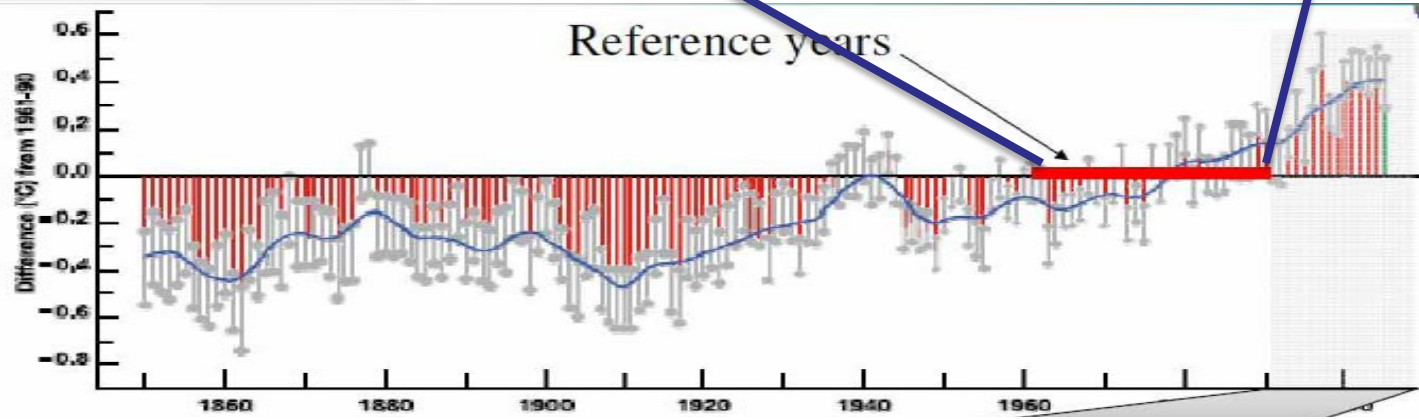
1. Global Change Challenge



Global Change Challenge – Frequency Disaster



Hazards and Climate Change



1. Global Change Challenge



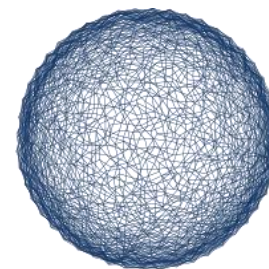
Global change now attract most interest of **scientific groups** and **governments**



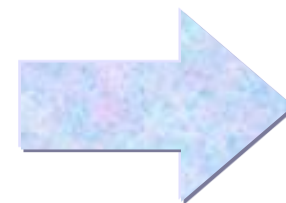
Kyoto Protocol, 1997



Bali island road map, 2007



COP15 COPENHAGEN
UN CLIMATE CHANGE CONFERENCE 2009



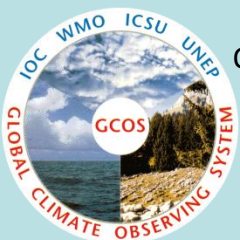
Recognizing that nations are facing major **environmental, social and economic challenges** as a consequence of rapidly increasing world population, industrial development, **changing weather and climate patterns and globalization**

—GEOSS 2010



Global Climate Observing System (GCOS)

GCOS



United Nations Framework Convention on Climate Change (UNFCCC)



Committee on Earth Observation Satellites (CEOS)



IPCC AR4

Toward IPCC AR5...

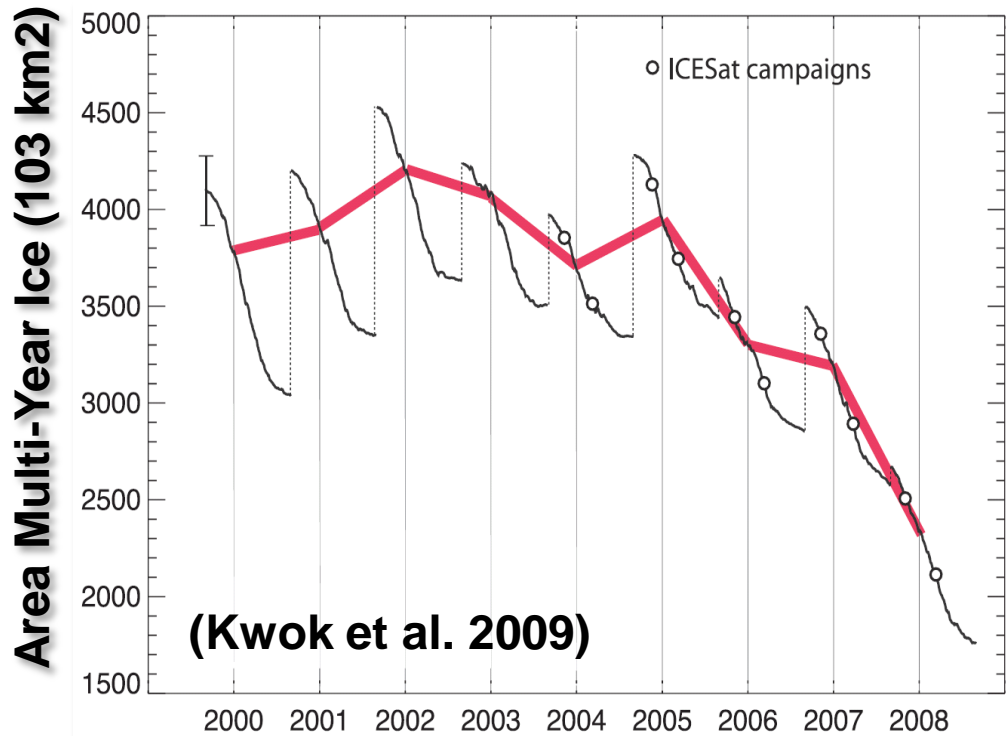


2. Why ABCC?



Remote Sensing Ability

Decadal trends: increasing in sea ice



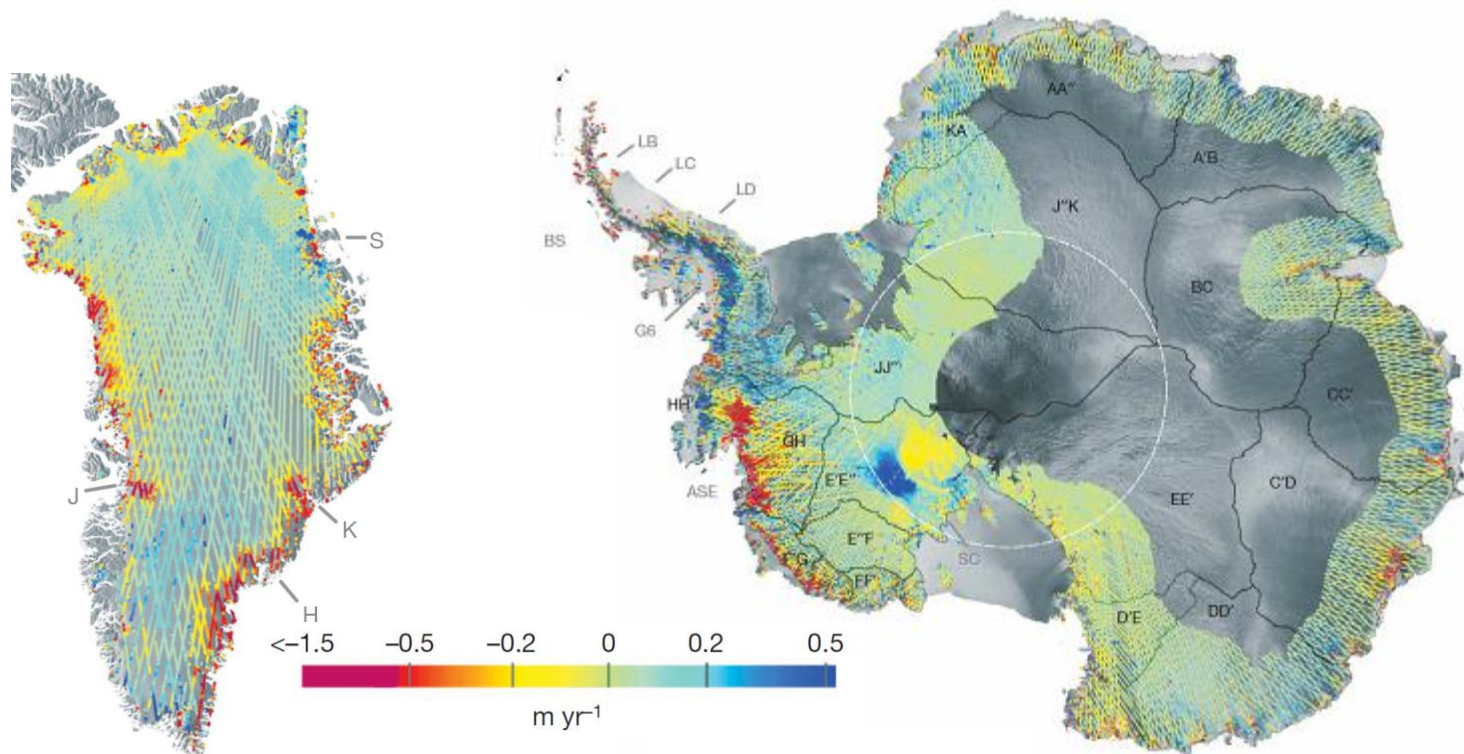
ICESat Data

2. Why ABCC?



Remote Sensing Ability

Extensive dynamic thinning on the margins of Greenland and Antarctica



(Pritchard et al. 2009)

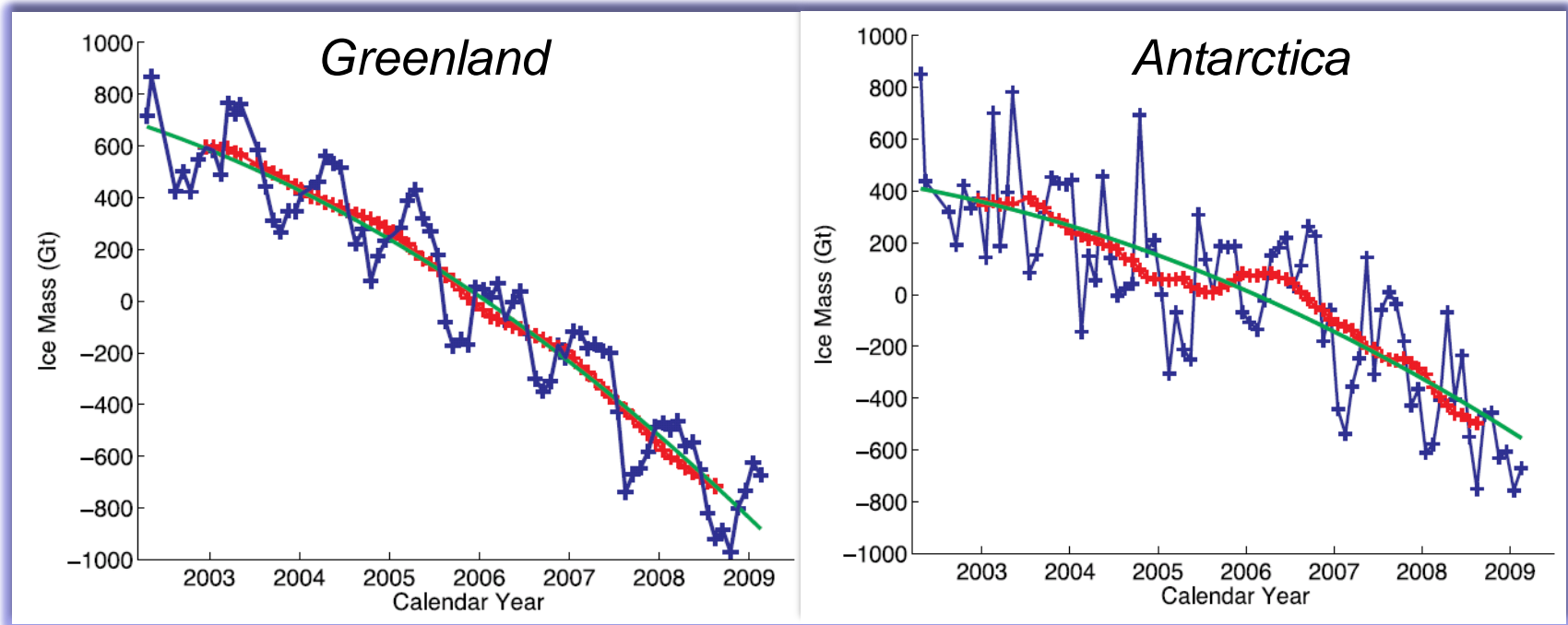
Data from the **laser altimetry** 2003-2007

2. Why ABCC?



Remote Sensing Ability

Mass loss of both polar ice sheets identified by **GRACE**



(Velicogna, 2009)

Data from **GRACE**

2. Why ABCC?



Remote Sensing Ability

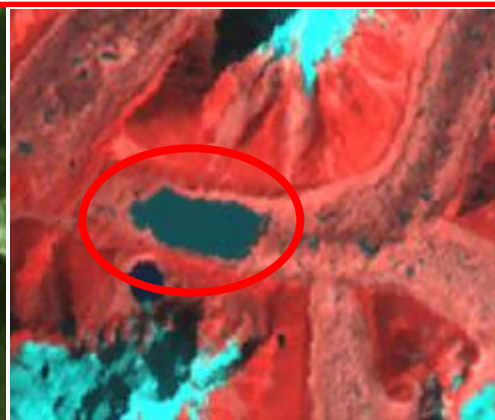
Imja Glacier Retreat and Growing Lake



•CORONA 15 DEC 1962



•SPACE SHUTTLE DEC 1983



•LANDSAT TM 1992



•IRS ID PAN 19 MAR 2001



•ENVISAT, ASAR, 18 October 2007



•Quickbird Jan 2006



•IRS LISS3 2005

2. Why ABCC?



Remote Sensing Ability -- Parameters in Global Change

Remote Sensing plays a major role in the parameters retrieval globally

About 42 of the 50 GCOS Essential Climate Variables can be accessed via space remote sensing technique, among these, about 26 ECVs mainly depend on the remote sensing techniques.

Atmosphere	Surface	<i>Air Temperature; Precipitation ; Air pressure; Water vapour; Surface radiation budget; Wind Speed & direction;</i>
	Upper air	<i>Cloud properties, Wind speed & direction Earth radiation budget; Upper-air temperature; Water vapour;</i>
	Composition	<i>Carbon dioxide Methane & other GHGs; Ozone; Aerosol properties</i>
Ocean	Surface	<i>Sea-surface Temp; Sea-level; Sea-ice; Ocean colour; Sea state; Sea-surface salinity Carbon dioxide partial pressure</i>
	Sub-surface	<i>Temperature; Salinity; Current; Nutrients; Carbon; Ocean tracers; Phytoplankton</i>
Terrestrial	<i>Glaciers & ice caps; Land Cover; Fire disturbance Fraction of absorbed photo-synthetically active radiation; LAI , Albedo Biomass, Lake levels, Snow cover, Soil moisture Water use, Ground water, River discharge Permafrost and seasonally-frozen ground</i>	

2. Why ABCC?



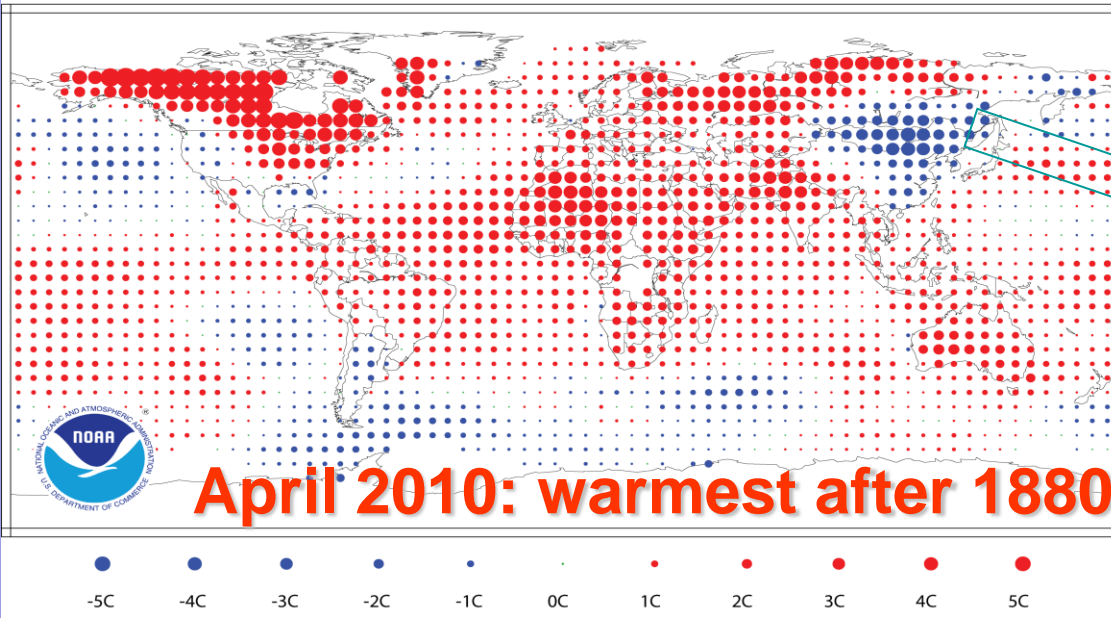
Different Regional Impacts

Eg. Temperature Anomalies

Temperature Anomalies April 2010

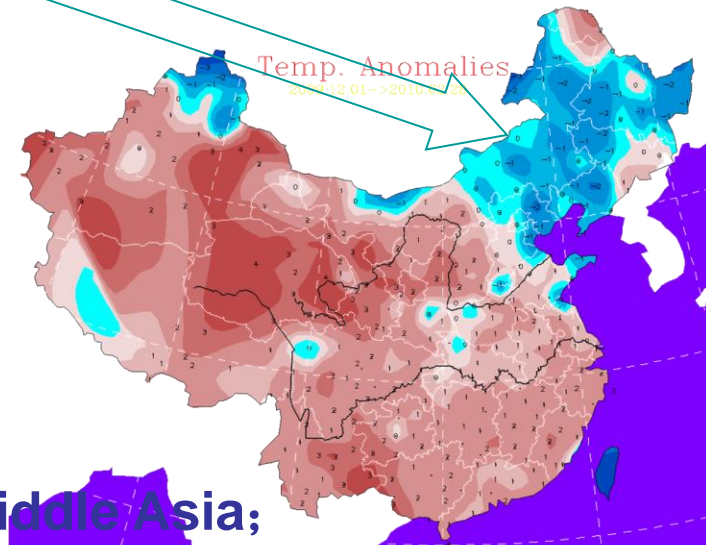
(with respect to a 1971-2000 base period)

National Climatic Data Center/NESDIS/NOAA



Latest WMO Monitoring Bulletin

Only Northern part of Xinjiang, North China and most parts of Northeast China were colder than normal. (2010.4)



- ✓ **2009** was the 5th warmest year since 1880;
- ✓ **2009** was the warmest year for Africa and Middle Asia;

Global averaged surface temperature in April 2010 was 0.76°C higher than 20 century, BUT air temperature over China was 1.2°C lower than normal.

2. Why ABCC?



Initiation of a **Earth Observation Comparison Research Program** on environment change to deal with the regional impact.



The four typical countries in the program: **China, Australia, Brazil and Canada** are largest countries in **Asia, Oceania, South America and North America**, respectively, cover **1/4 of total continental lands** in the world.

2. Why ABCC?






















Earth Observation Capability

Research Ability - Publication

(Rank top 20 worldly)

	Australia	Brazil	Canada	China
Publication	419	170	784	723
Rank	9	16	3	6
Growth Rate	11.1%	221.4%	59.5%	150.6%

Capability of Remote Sensing

	Australia	Brazil	Canada	China
Satellite 				
Station 				
RS Airplane 				
Data Archive 				

2. Why ABCC?



This program is conducted by Australia, Brazil, Canada and China, “ABCC Program” for short

ABCC



Full Name: Earth Observation for Global Change: ABCC Program



2. Why ABCC?



Nature of ABCC

An **international program** of **Earth Observation** organizations

Aimed at studying, monitoring, recording, and assessing the impacts of **Global Change**.



Mission Statement – Scientific Perspective

To develop and use earth observation to examine the **interaction between changing climate and both anthropogenic and natural surface processes over time**.

2. Why ABCC?



Objectives



To maximize use and **development of space-based** and other **EO** applications to document and assess the effects of **Global Change** and its actual or potential impacts.



To improve overall **capacity and methodologies** for monitoring the impacts of Global Change and provide accurate baseline information to decision-makers.

2. Why ABCC?



Objectives



To provide **near-shore, oceanic, land-cover, forests, river/lake mapping**, and derived **environmental assessments** and indicators to document the impact of Global Change at a regional scale.

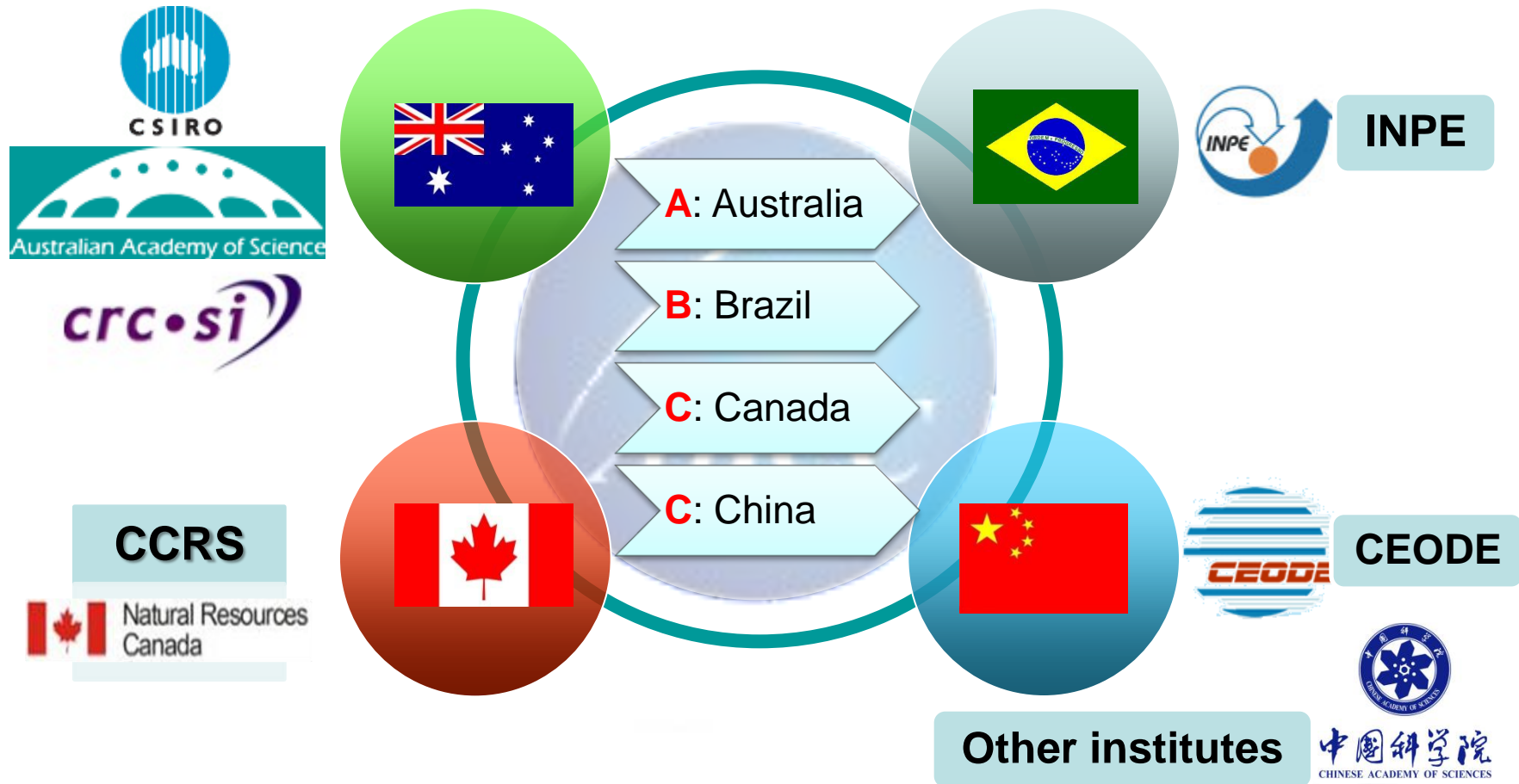


To **expand the basic knowledge base** and stimulate exchanges of scientific and/or technical information on these and other associated collaborative projects.

3. Research Framework



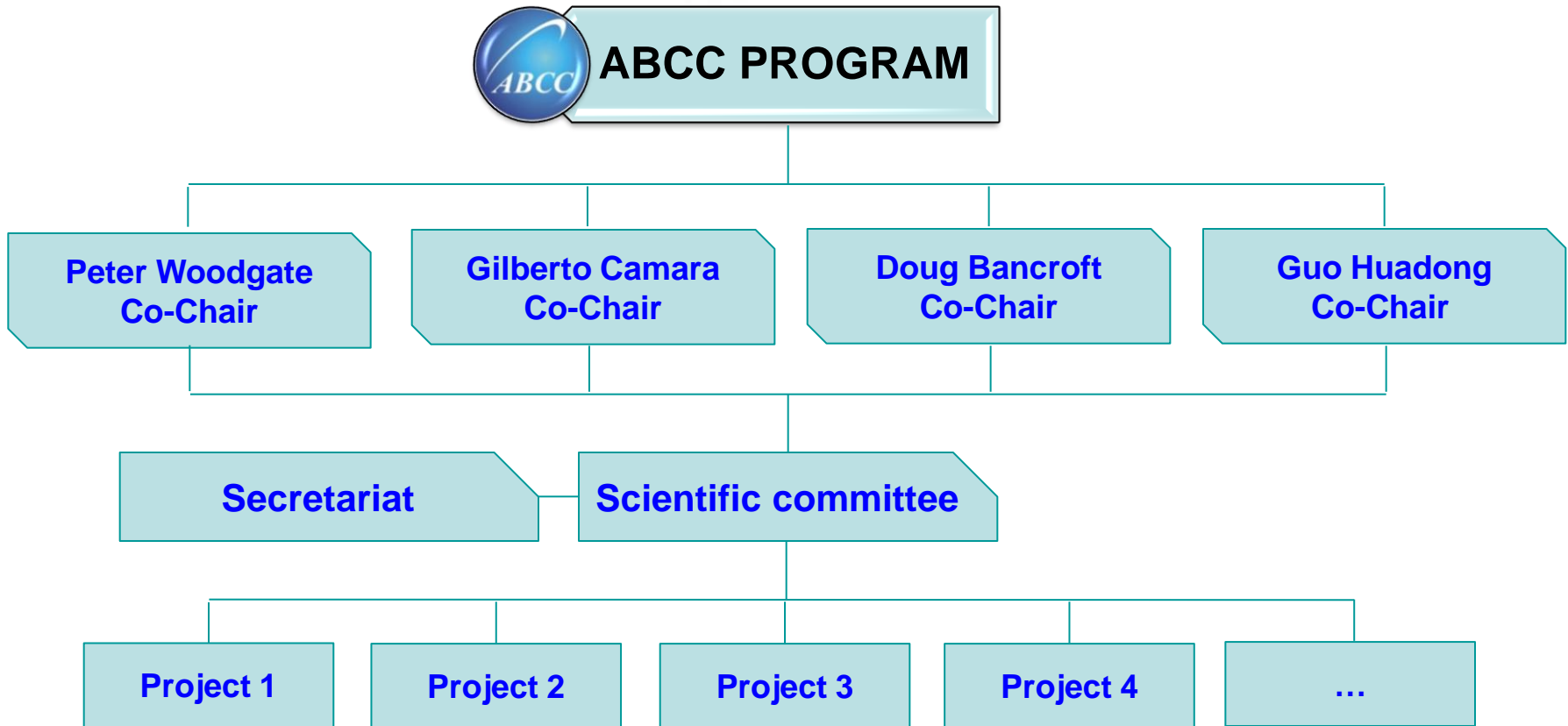
Organization involved in ABCC program



3. Research Framework



Program Research Framework



3. Research Framework



ABCC Program Co-Chair



**Peter Woodgate, CEO,
Cooperative Research Centre for
Spatial Information (CRC·SI)**



**Gilberto Câmara, Director
General, Brazil's National Institute
for Space Research (INPE)**



CCRS

**Douglas Bancroft, Director General,
CCRS, Natural Resources Canada**



**Huadong Guo, Director General,
Center for Earth Observation and
Digital Earth (CEODE)**

3. Research Framework



Scientific Committee

Suggestion

Each country: 2-3 scientists?



ABCC Secretariat

Fred Campbell, fred-kadri.campbell@sympatico.ca, Executive Director

Jie Liu, LiuJ@ceode.ac.cn, Executive Secretary

3. Research Framework



Cooperation Research

At this stage, the majority of countries' research is predominantly being directed to the following areas

Carbon cycle

Disaster

Water and energy cycles

Land use and Land cover

Maritime ecosystems

Environmental Monitoring



The ABCC participants are looking to focus their efforts and together **develop** new and innovative **methods, mechanisms, technologies, platforms** and **systems** to expand their collective knowledge base to address mutual Problems.

3. Research Framework



Scientific issue - Toward the Global Change

A set of Essential Environmental Variables (ECV) have been identified, and those of particular interest to the ABCC project include,

Oceanic ECVs

Sea Ice

Sea Level

Sea Surface Temperature

Ocean Salinity

Atmospheric ECVs

Water Vapour

Cloud Properties

Precipitation

Radiation "Budget" of the Earth

Terrestrial ECVs

Lake Levels

Glaciers and Ice Caps and Ice Sheets

Snow Cover and Albedo

Land Cover

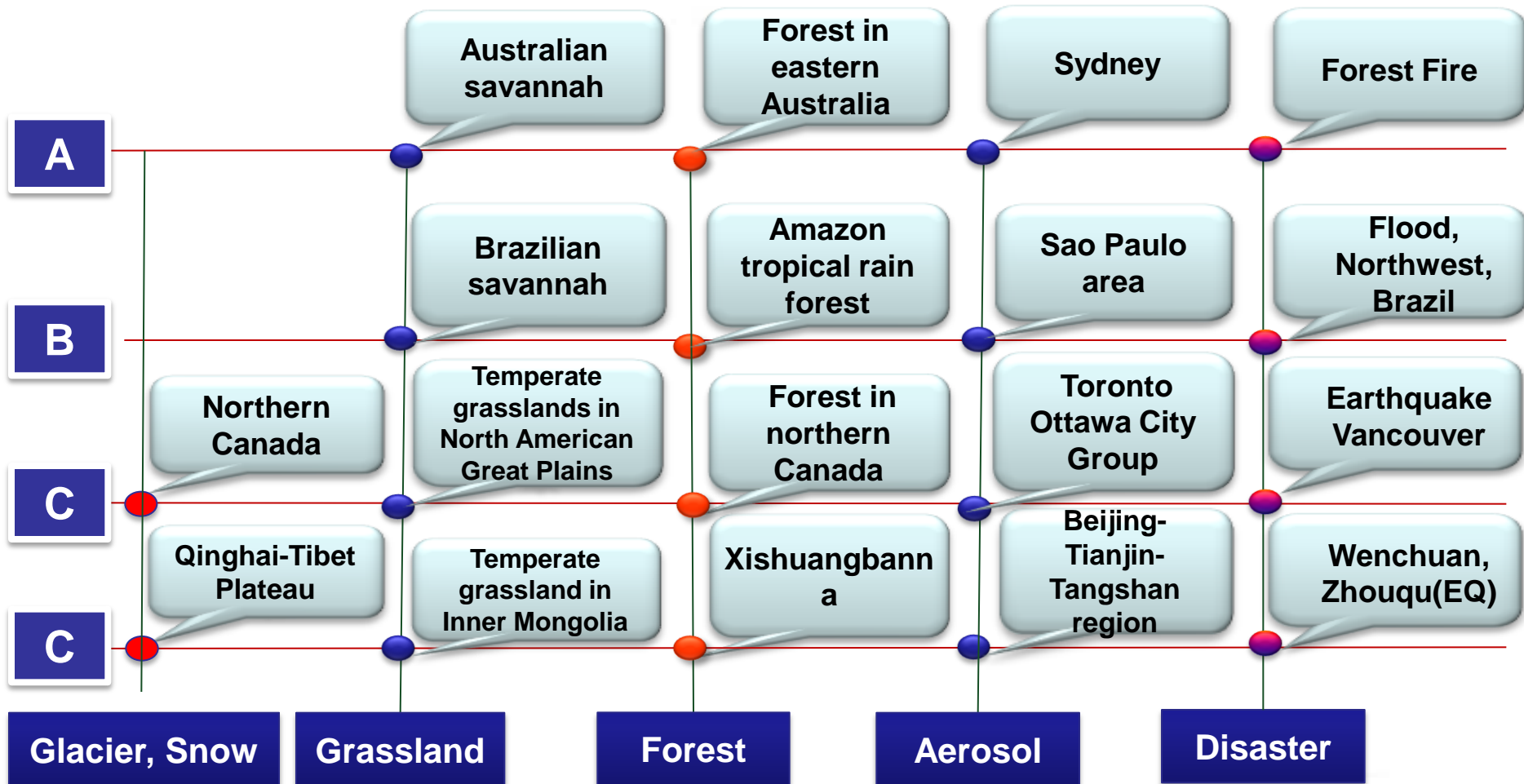
Fires

Soil Moisture

4. Current Progress



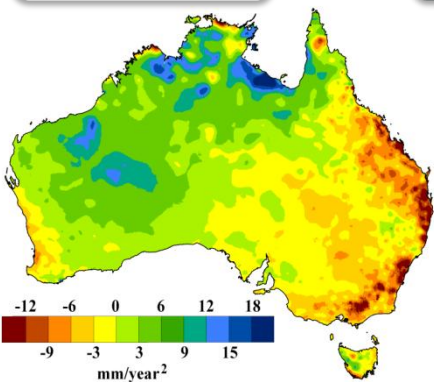
Research areas selection



4. Current Progress

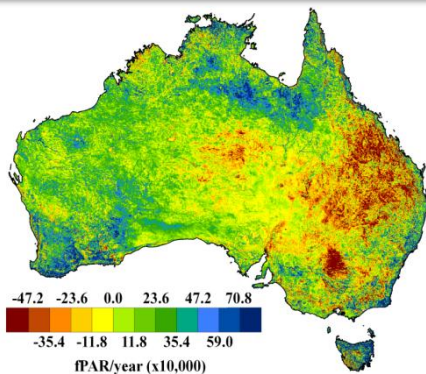
Australia

Australia-wide trends in P and AVHRR fPAR 1981-2006



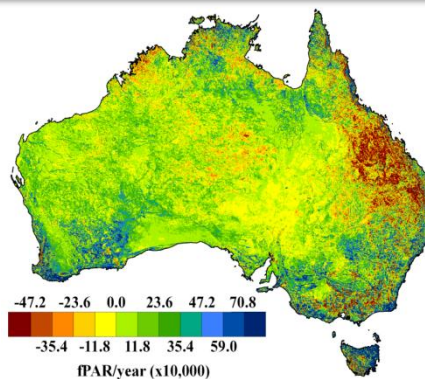
Precipitation trend

+7%



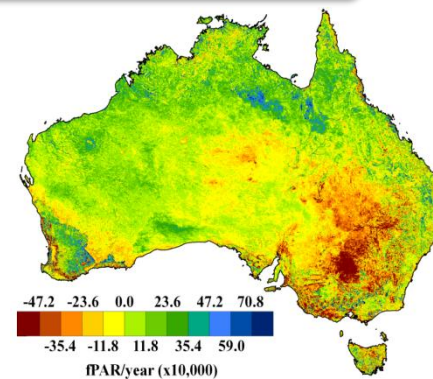
Trend in total fPAR

+8%



Trend in persistent fPAR

+21%



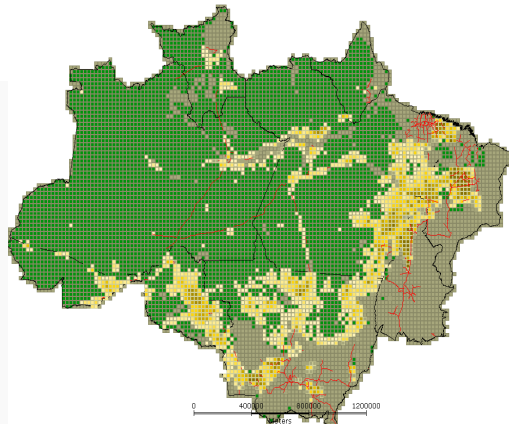
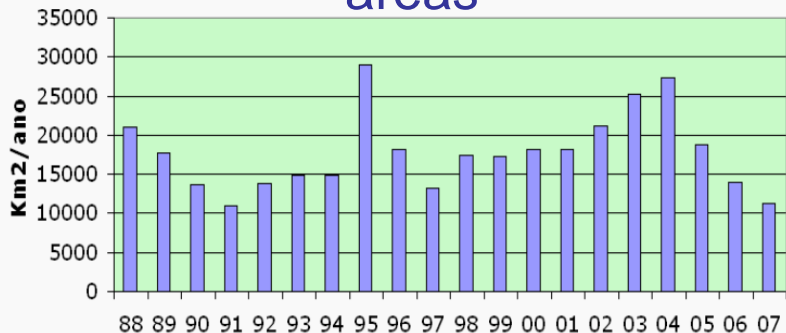
Trend in recurrent fPAR

-7%

Brazil

Monitoring Deforestation in Amazonia

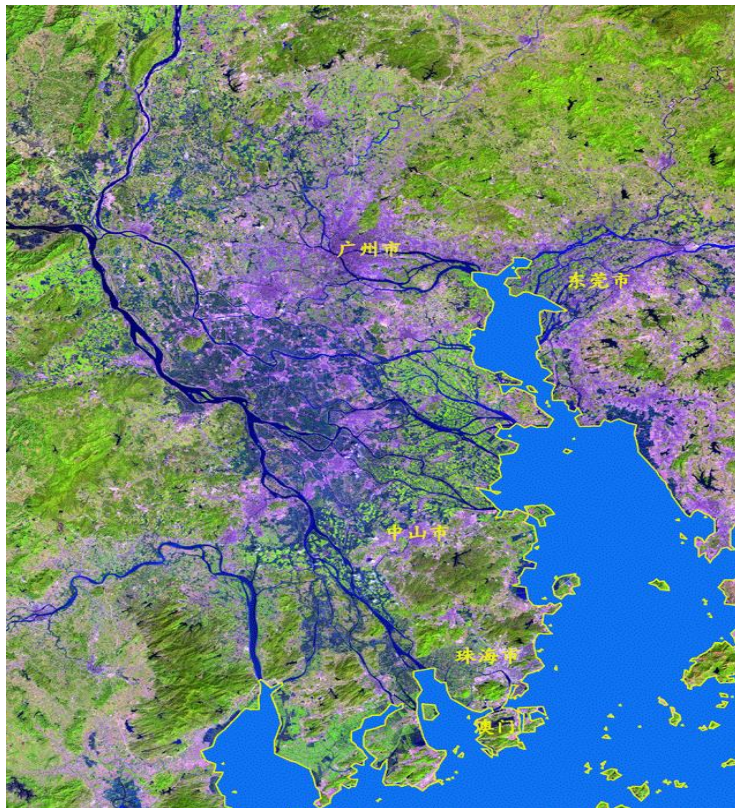
Yearly estimates of clear-cut areas



4. Current Progress



Sea Level Rising



Global Sea level rising will effect the coast cities

4. Current Progress



The 1st Workshop – 25-26/5/2009

More than 10 reports

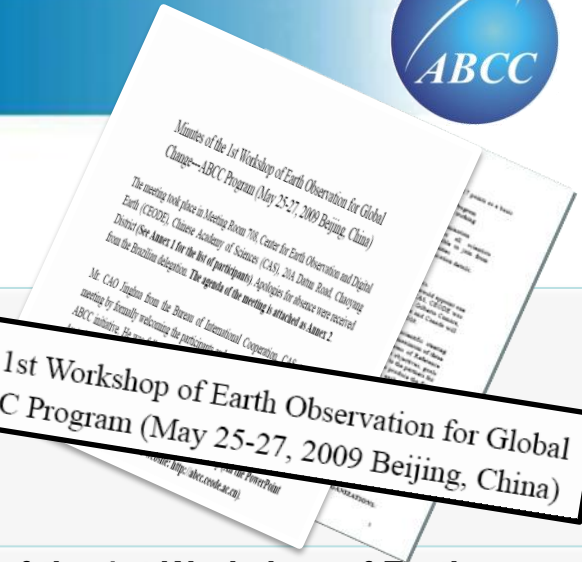
Roundtable Meetings Discussion

Outcome

Establish

Minutes of the 1st Workshop of Earth Observation for Global Change---ABCC Program (May 25-27, 2009 Beijing, China)

- Minutes of the 1st Workshop of Earth Observation for Global Change---ABCC Program (May 25-27, 2009 Beijing, China)
- Co-Chair, Data policy, Test Sites selection, Scientific Issues, Scientific Committee, Secretariat and etc.



4. Current Progress



The 2nd Workshop - 10/9/2009

Represent the development, and plan the comparison of bilateral and multilateral research

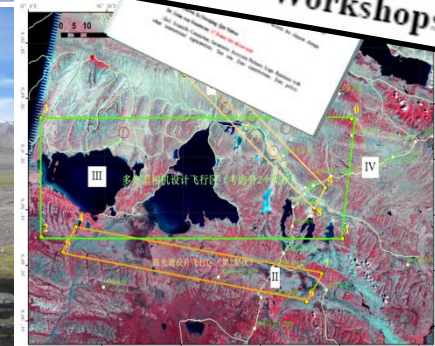
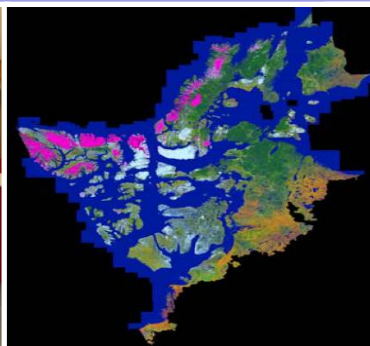
Enhance Program Outline

Main research areas

Next ABCC Meetings

- ABCC Objectives
- ABCC Project Status and Outline
- ABCC Project(s) Timeframe
- 1-3 year, 3-5 year and 5-10 year program
- Indirect drivers of change
- Direct drivers of change
- Essential Environmental Variables (ECV) have been identified
- 2010, Ottawa, Canadian
- 2011, Perth, Australia

Minutes on the ABCC Workshops



4. Current Progress



Workshop

The **1st** Workshop of Earth Observation for Global Change (May 25-27, **2009 Beijing, China**)

The **2nd** Workshop of Earth Observation for Global Change (Sept. 10, **2009, Beijing, China**)

The **3rd** Workshop of Earth Observation for Global Change (**Now**, Sept. 22, 2010, **Ottawa, Canada**)

The coming...

The **4th** Workshop Earth Observation for Global Change (2011, Perth, Australia)

The **5th** Workshop Earth Observation for Global Change (2012, Brazil)

5. Future Perspective



Near-term Plan

Enhance the ABCC international cooperation framework.

The ISDE (International Society for Digital Earth) intend to propose ABCC to be one of the task in GEOSS in near future.

Conduct the comparison research work over the core four countries – ABCC.

Make a detailed plan for the second and third phase of ABCC (i.e a 10 year plan)

5. Future Perspective



Long-term Strategy

A program of comparison research on global environment change and regional impacts

Extent the mechanism of member countries in other Continents

Update the ABCC to be a International Program on the Earth Observation and Global Change after more than 10 years' executive term.



Thank you!

