Cold region/CliC

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Cold region studies in the Asia Monsoon Region

1. WCRP-CliC, Asia CliC

   Asia CliC Activities (held Symposium in April, 2006)

   IPA(Interntaional Permafrost Association) on permafrost
   (Making effort to grasp the conditions during IPY)

   GLIMS: Glacier inventory

   CABIN (Northern Eurasia study under CliC, under planning)

   IHACYs (High Asia Cryosphere Project, under planning)

2. Recent national and group activities within Monsoon Asia

   Glacier researches initiated

   Snow cover changes

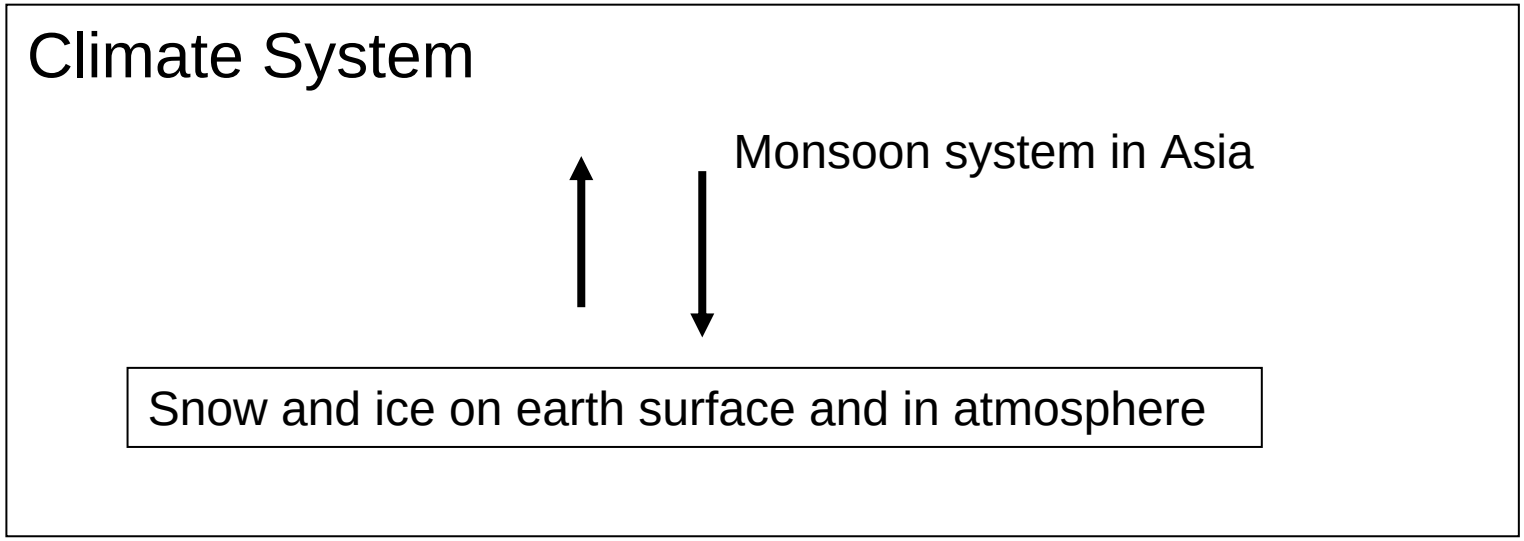
3. Other international programs: NEESPI

1 st Asia CliC Symposium at Yokohama, Japan.

April 20-22, 2006.

Date: April 20-22, 2006
Place: Yokohama Institute, JAMSTEC
Participants: 107 from 11 countries. Canada 1, China 15, India 1, Japan 70, Kazakhstan 1, Mongolia 2, Nepal 1, Pakistan 2, Russia 6, USA 7, Uzbekistan 1
Presentation: 49Oral, 42Poster.

WMO Informal Report, Proceedings published



Topics discussed at Asia CliC Symposium, 2006

(1) Glacier distribution/changes

(2) Frozen ground/Permafrost condition and changes

(3) Snow cover, cold region hydrology and water resources

(4) Land surface and atmosphere processes in cold region and mountains

(5) Large-scale cryosphere-atmosphere interactions

(6) Cryospheric database

(7) Satellite and ground base observations of cryosphere

(8) Modeling of cryosphere

(9) Strategy for future cryospheric research

Asian Cryospshere and Monsoon System

Snow cover

Permafrost

Glaciers

River,lake ice

All are product of present climate, but forced to be changed due to the present climate change especially global warming

(1) Indicator of climate system (monsoon) change

(2) Indicator of mountain climate change.

(3) One important component for climate(monsoon) formation

(4) Water resource, disaster related

URGENT ISSUES

Shrinkage, Degradation,

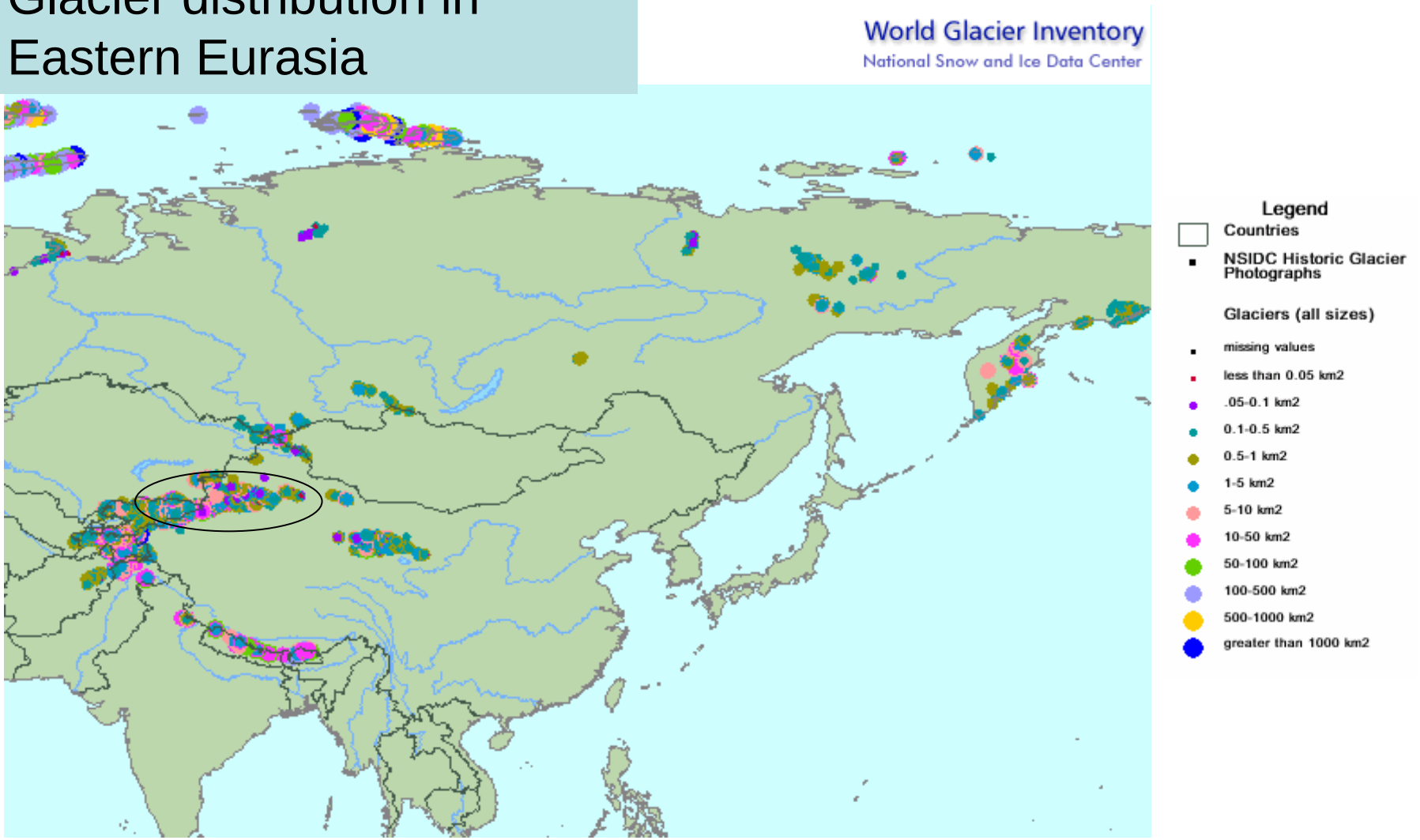
Hydrological and energetic Change

Land surface structure change

Societal Influence

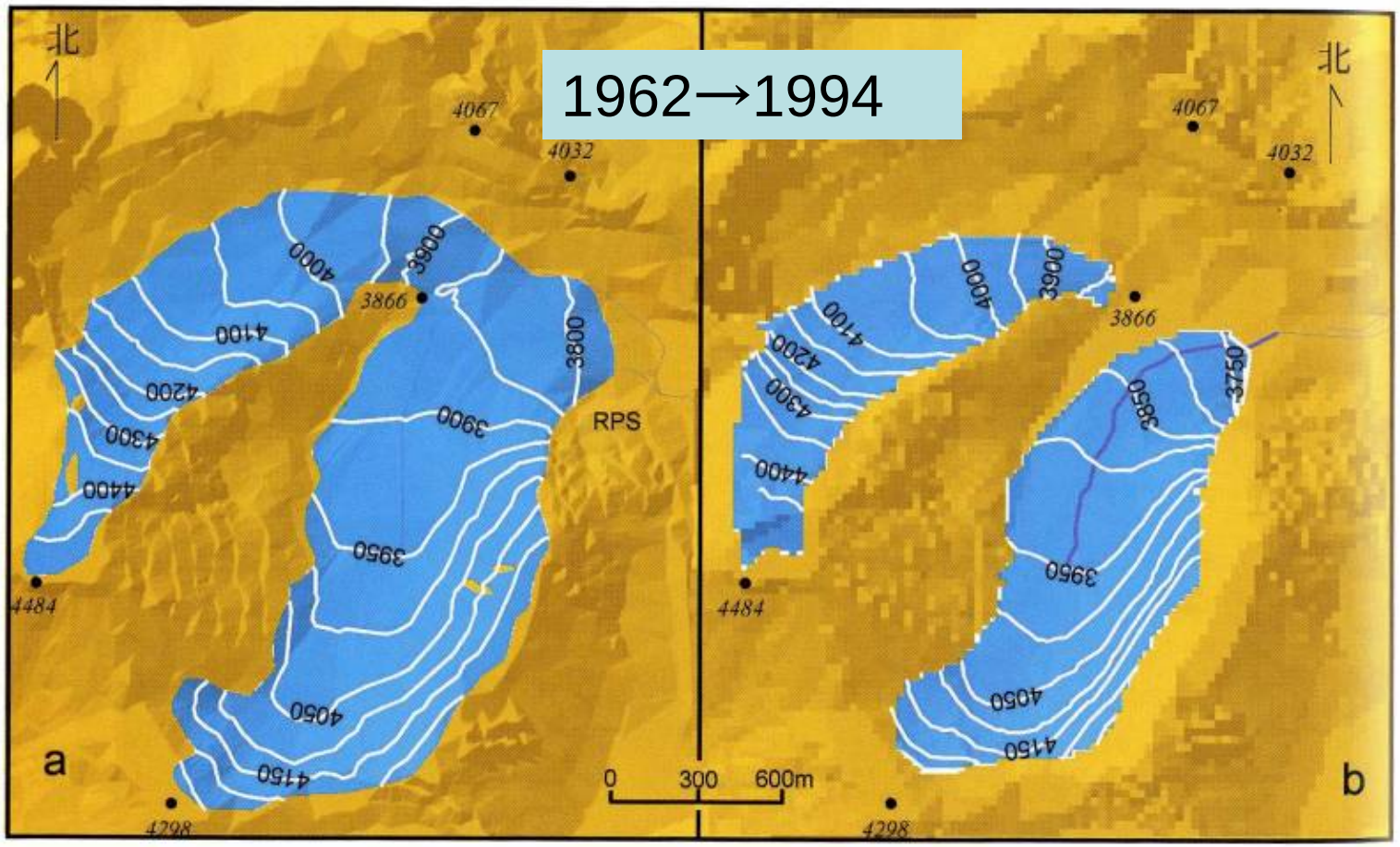
(Water resource, Disaster)

Glacier distribution in Eastern Eurasia



ユーラシア大陸の氷河分布

Urumqi No. 1 Glacier Change



a.1962 年的冰川形态　　b.1994 年的冰川形态

图 5—18　乌鲁木齐河源 1 号冰川变化图

Few tens of thousand glacier in high Asia

Variation of runoff below glacier No. 1 and climate change

Annual precip Runoff from glacier Summer temp

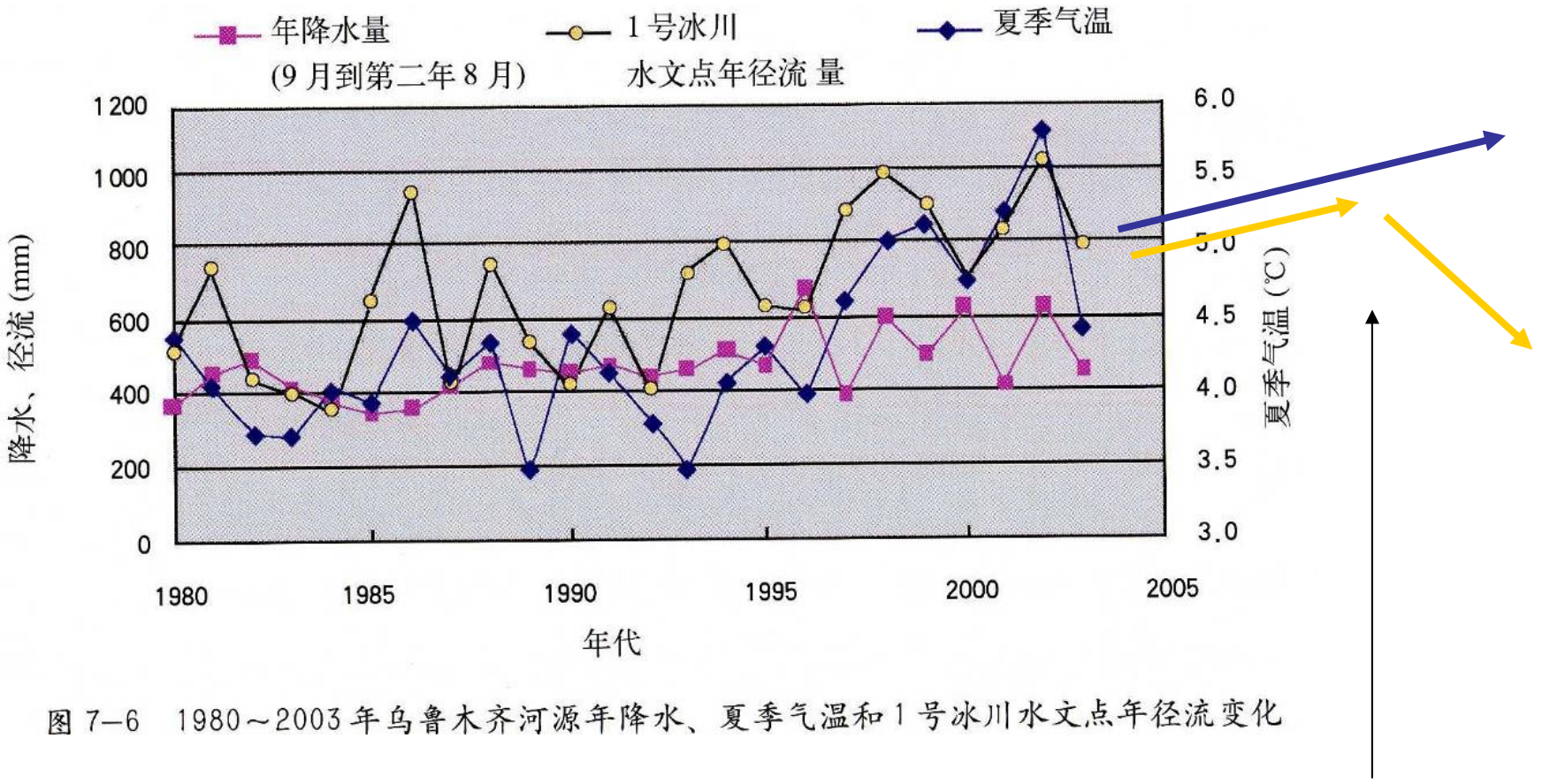


图 7–6　1980～2003 年乌鲁木齐河源年降水、夏季气温和 1 号冰川水文点年径流变化

Shrinkage of Glacier

From General China Glaciology (2004?)

ENN FULL STORY
Indian, Chinese Team to Map Glacier Melt

December 22, 2006 — By Gavin Rabionwitz, Associated Press

NEW DELHI — A joint Indian-Chinese team plans to chart remote Himalayan glaciers that scientists fear are rapidly melting because of global warming, threatening the great rivers that give life to one of South Asia's most fertile regions.

The two expeditions, announced Thursday, will take scientists into some of the most remote areas of Tibet to explore the sources of two rivers that provide water for vast agriculture regions that feed nearly a sixth of the world's population.

(skip)

Scientists believe that increasing global temperatures are causing glaciers -- the planet's largest source of fresh water after polar ice -- to melt.

The short-term result has been flooding, but some fear that over the long term the glaciers will melt entirely and the rivers will run dry for months at a time, fed only by annual rains like the monsoon that sweeps across the subcontinent every summer.

"In three to four decades these rivers that feed more than a billion people in our society and adjoining countries will become seasonal rivers," Ahluwalia said.

Scientists will study the sources of the Sutlej and the Brahmaputra, two rivers which -- like the better known Indus and the Ganges rivers -- flow from the Himalayas into northern India where the fertile plains they feed form the backbone of a society that is still largely agricultural.

(skip)

Beginning in September 2007, expedition teams will explore the glaciers around Mount Gang Rinpoche, which is 21,778 feet high, and Mount Loinbo Kangri, at an elevation of 23,277 feet. Neither mountain has been scientifically surveyed in nearly a century.

Source: Associated Press

On-going group projects in the Asian Monsoon Region

(1) India is cooperating with China to clarify the glacier changes

(2) Tajikistan has started survey on glaciers for updating information through their photographing and analysis (glaciers were not studied for a long time). Asking cooperation with specialists in area of glaciology studies. (A letter to WMO from head of Agency on Hydrometeorology, Mahmadakiev)

Urgent issues related to glacier

(1)The accurate glacier inventory is not established: We do not know how much ice and snow exists. Not only Ice volume (thickness) but also area.

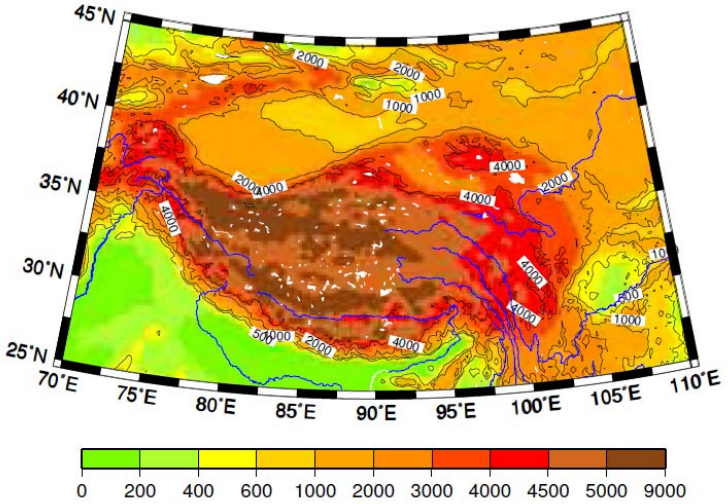
(2) Enhance modeling studies to predict future change. Very little done in Asia.

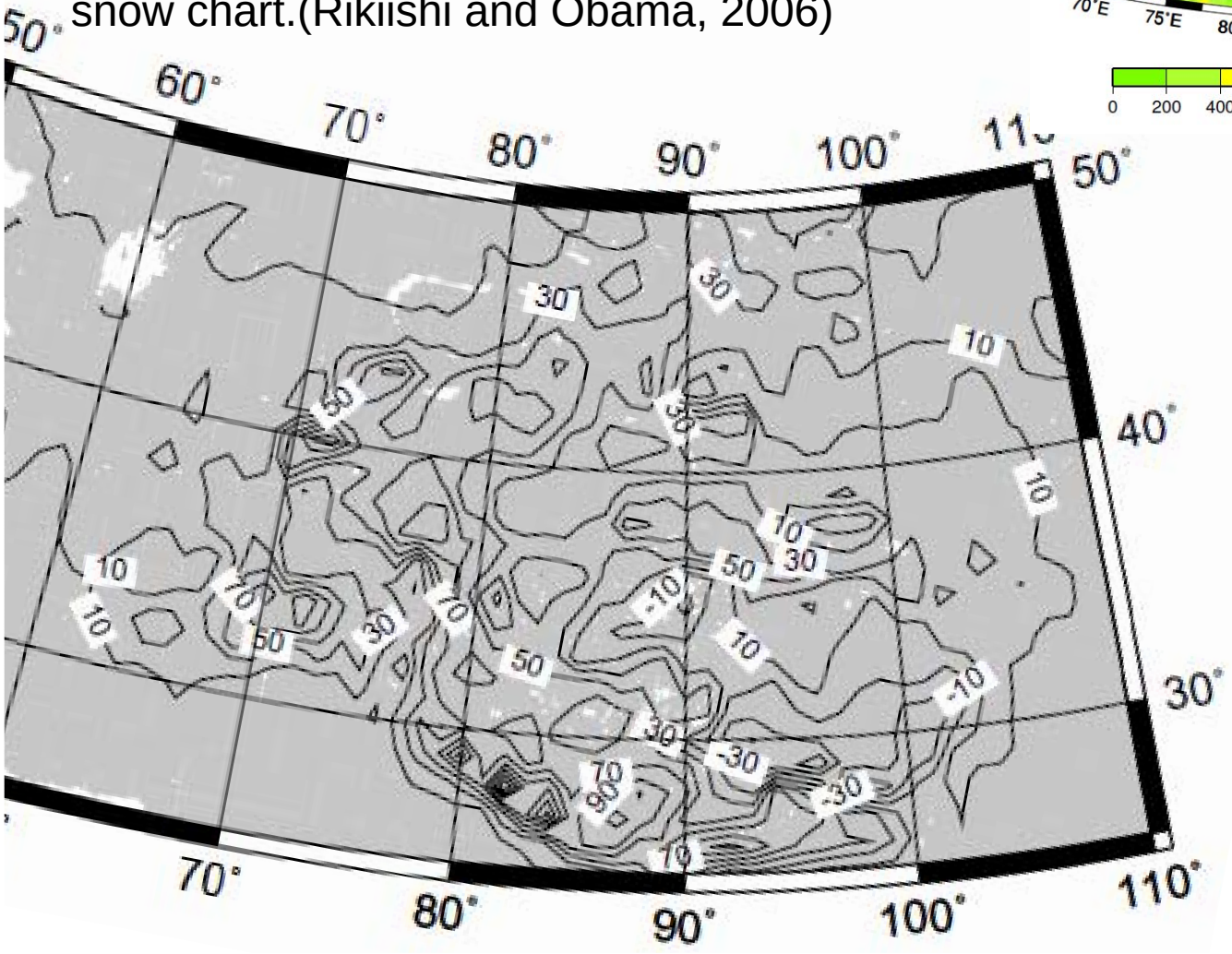
(3) Maintain monitoring and observation system in glaciated areas and moutains

(4) Understanding of possible change in the monsoon climate system (especially air temperature, precipitation and cloudiness).

Mountain snow cover are disappearing(melting) early

The number below shows the difference of mean snowmelt ending date between 1997-2005 and 1967-1976, based on NESDIS weekly snow chart.(Rikiishi and Obama, 2006)





Asian snow/ice and Monsoon system – needs-

(1)Snow and ice itself is being focused well in the recent years due to CliC etc., although the basic data (area, thickness, etc.) has not been yet deduced. Need to implement the observation and research issues.

(2) In addition to the snow/ice itself, the linkage with atmosphere need to be investigated. Processes and changes of climatological/meteorological conditions in the high mountain areas need more attention!

(3) Monsoon study groups, not only pay attention to the climate/meteorological conditions (precip, cloud, -----) in the low altitude areas, but also locally on mountainous area that is essentially important from water resources.

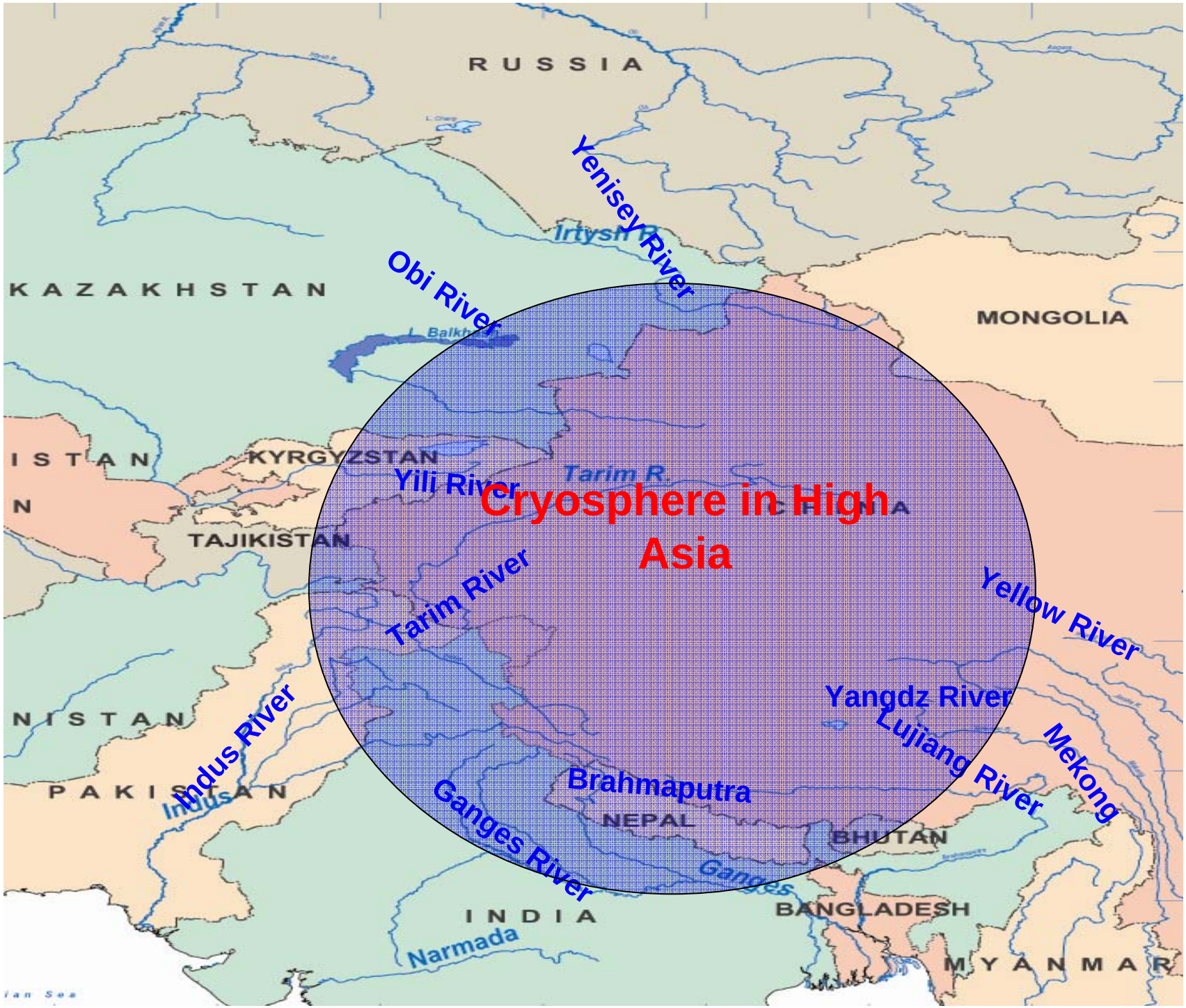
One initiating project under the framework of CliC and Asia CliC

International High Asia Cryospheric Years (IHACYs)

—— a suggested program during IPY and beyond

CNC-WCRP/CliC

WCRP/CliC SSG, Dec.5, 2006, Boulder, Colorado, USA


RUSSIA
KAZAKHSTAN
MONGOLIA
KYRGYZSTAN
TAJIKISTAN
PAKISTAN
INDIA
NEPAL
BHUTAN
BANGLADESH
MYANMAR
Irtysh R.
Yenisey River
Obi River
Balkhash
Yili River
Tarim R.
Tarim River
Cryosphere in High Asia
Yellow River
Yangdz River
Lujiang River
Mekong
Indus River
Brahmaputra
Ganges River
Ganges
Narmada

The outcomes of IHACYs could be

- Enhanced observations, including an uniformed usage of RS data, satellite design (e.g., snapshots of cryospheric components)
- Data exchange, data sets of observations and (re-) analyses
- Improved knowledge of related processes and ability to model, Higher predictability of changes in cryosphere and climate
- Assessment on cryospheric constrains for socio-economic activities (Information for water management/adaptation between mountain /plateau areas and the arid lowlands.
- More informative indicators of climate change


Thank you