

## General Information

Almaty is the largest city and the former capital of the Republic of Kazakhstan. The Almaty region (literally "Father of Apples"), alluding to the many apple trees in the locality, is not only one of the most spectacular natural landscapes on earth, with deep river gorges, babbling streams, lakes and hills crowned with apple, cherry and apricot orchards, but also a site of ancient history, a major industrial, educational and business centre.

The city is situated at the foothills of the Trans-Ili Alatau Mountains. The climate in the city is markedly continental, with considerable fluctuations in temperature not only between different seasons but also between day and night. The average temperature of Almaty in November is  $-1\text{C}^{\circ}$ , and average precipitations are 45 mm.



## Contacts

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### Workshop venue:

Hotel "Kargalynskiy", Almaty city,  
Republic of Kazakhstan



## Regional Workshop on Assessment of Snow-Glacier and Water Resources in Asia



### Organized by

The International Hydrological Programme (IHP)  
Man and the Biosphere (MAB)  
UNESCO Cluster Office in Almaty  
The Regional Environmental Centre for Central Asia (CAREC)  
The European Commission  
The Institute of Geography, Republic of Kazakhstan

### In close cooperation with

UNESCO Beijing, Jakarta, Moscow, New Delhi, and Tashkent Offices



28-30 November 2006  
Almaty, Kazakhstan

# Regional Workshop on Assessment of Snow-Glacier and Water Resources in Asia

## Introduction

One of the anticipated outcomes of global warming is the reduction of mountain snow cover, glaciation and permafrost now underway in almost all mountain regions. Changes in snowiness and glaciers in the world's largest and highest mountain system may have most immediate effects on nearly half the world's population. The shrinking and anticipated disappearance of many of the world's glaciers has potentially catastrophic consequences for communities that rely on ice melt for water for irrigation, drinking, hydropower and industry. As with other glaciers worldwide, the glaciers of Asia are experiencing a rapid decline in mass. The loss of these glaciers would have a tremendous impact on water resources and the ecosystem of the region.

In Central Asia, glaciers and ice-rich permafrost serve as water towers by providing a continuous supply of fresh water to the lowlands, thereby allowing economic activity to take place. Their recession over the past few decades in response to global climate change is striking. Central Asia is included in water-stressed areas where projected climate change could further decrease stream flow and ground water recharge. Several studies show that glaciers in the region are melting very rapidly, losing about 1.0% of their volume per year between 1955-2000. Over this time the glaciers' total surface area declined from 70,000 to 45,000 square kilometers.

A recent study shows that 67% of all Himalayan glaciers are retreating rapidly (WWF, 2005). These glaciers provide vital water supplies to Asian countries. In this regard the knowledge of contemporary snowiness and glaciation dynamics and prognosis in the region become very important.

The necessity for glaciological monitoring in Asia is guided by two principle understandings. The first is that mountain glaciation is one of the most vivid indicators of climate change. All changes in the thermal balance of the earth surface and total moisture of mountain areas are directly reflected in the characteristics of glacier mass balance and its changes. This statement is supported by the fact that an increase of average annual temperature by less than 1°C during the last century was sufficient to cause reduction of glaciation of the Asian mountains by more than one third of its original extent. The second understanding hinges on the fact that around 75-80% of river runoff in the region is derived from glaciers and permafrost. Glacier recession directly leads to reduction in the water supply for various socioeconomic and environmental functions of downstream areas. This situation potentially threatens the region's national security. Glacier and water resources assessment has the potential to facilitate climate change detection and planning for adaptation to climate and its extremes.

In this respect, the IHP and MAB Programmes, the UNESCO Cluster Office in Almaty, CAREC, the European Commission and the Institute of Geography, Republic of Kazakhstan, in close cooperation with UNESCO offices in Beijing, Jakarta, Moscow, New Delhi, and Tashkent are organizing a regional workshop on "Assessment of Snow, Glacier and Water Resources in Asia" in Almaty, Kazakhstan, from 28-30 November 2006

## The main objectives of the workshop are to:

1. review ongoing research within the Asian region on the hydrological impacts of glaciers, snow and permafrost;
2. assess snow and glacier resources of mountainous areas and their role in runoff formation;
3. assess possibilities for the development of a

regional network of research basins to investigate the impacts of glaciers and snow cover on the hydrologic cycle as well as on the associated socio-economic system;

4. identify the most pressing research needs and develop a plan of regional activities including strong linkages with donors.

## Workshop Topics

Invited talk(s), keynote speeches, contributed papers and open discussion will be organized during the workshop. Emphasis will be put on the following broad topics:

- Snow-glaciers in the zone of runoff formation and global change;
- Snow-glacial and runoff monitoring;
- Receding glaciers, melting permafrost, and changes in temperature and precipitation and extremes;
- Climate models and scenarios;
- Regional models and policy implications;
- Progress in snow and glacier hydrology, and remote sensing technology;
- Research needs and future studies;
- Link to any global/regional/ national initiatives-programmes;
- National/regional assessment of snow-ice and water resources system case studies.

The programme will contribute toward national, sub-regional and regional requirements for systematic climatic observation to support national planning for adaptation to climate variability, and climate-driven changes in the water resources system. The workshop will aim to identify an organizational structure of a regional research network on the hydrological impacts of glaciers and snow cover.