The present state of glaciers in Tajikistan

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Этот отчет основан на исследованиях проводимых по ледникам Таджикистана, также как и материалы по Национальному Плану Действий по изменению климата, Первого, Второго и Третьего Национального Сообщения РКООН по ИК.

• Национальный План Действий РТ по смягчению последствий изменения климата
• Первое Национальное Сообщение по изменению климата
• Второе Национальное Сообщение по изменению климата.
Фаза 2. Усиление потенциала в приоритетных областях экономики
• Третье Национальное Сообщение по изменению климата.
Tajikistan is a mountainous and landlocked country. Mountains occupy 93% of the terrain, while about ½ of the territory is located on the altitude of above 3,000 masl.
Global temperature anomalies

Abstract surface and ocean observation data

Temperature deviation as of long-term norm, °C

Source: National Aeronautics and Space Administration (NASA)
Warming trends in high-altitude areas of Tajikistan, namely in the Pamirs and Zeravshan Mountains, correspond to the regional and global warming patterns and trigger observable changes in the climate sensitive environments such as glaciers.
Glacier Tajikistan
Fedchenko Glacier – the largest glacier in the CA regio

- Total retreat in the past 100 years have accumulated more 1 km
The surface of the Fedchenko Glacier in its lower part thinned by 50 m in the past 25 years and now covered by multiple glacial lakes and debris.
2nd international polar and Tajik-Pamir expedition 1932-1933 y.y.

Usual monitoring of the Glaciers of Tajikistan by Hydromet-service

From 1980 to 2006 the Glacier reduced for 50 m.
In 1979 its terminus’ thickness fell to 40-50 m, and in 1998 to 20-25 m.
Оседание боковой части и поверхности ледника Федченко

Линия прошлого оледенения

Современная линия оледенения

Подвижка ледник Бивачный
RGO- Glacier

- Glacier RGO, named after the Russian Geographical Society
- Field research in 2005 made clear evidence that in comparison with the year 1989, RGO Glacier moved forward for 200-500 m.
RGO Glacier terminus
Aero survey, as of 14 May, 2007, showed that the RGO Glacier moved forward for 300-350 m compared with the year 2005, reaching, therefore, ABDUKAGOR river mouth.

Intensive ice-falling, which downsides on the Glacier terminus, causes the river channel to change its flow and form glacial lakes.
On July 25, 2011 a working group, consisting of the representatives of relevant organizations organized a site visit to the area of the glacier “Medvejiy” to determine the condition of the glacier and assess the potential threats to downstream communities in the Vanj valley, due to the extremely hot weather on July 11-15, 2011.
Since the first observation in 1932 to 2007 Garmo Glacier retreated for more than 7 km (!), which makes it the most significant retreat among the large glaciers of Central Asia over the same period of time.
Degradation of the glaciers in Zeravshan and Gisar-Alay Mountains
Change in surface area of Central Asian glaciers in the last half of the 20th century

- melted area as % of the initial glacier area

<table>
<thead>
<tr>
<th>Region</th>
<th>Melted Area as % of Initial Glacier Area</th>
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<tbody>
<tr>
<td>Tien Shan</td>
<td>20%</td>
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<tr>
<td>Gissar Alai</td>
<td>20%</td>
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<tr>
<td>Snow-glacier area in the basin of Fedchenko</td>
<td>40%</td>
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<tr>
<td>AFGHANISTAN Pyanj River’s left bank</td>
<td>60%</td>
</tr>
</tbody>
</table>

Compilation of data from V. Dikih, U. Pilgui, A. Yablokov
Change in glacier volume in Tajikistan

Source: Tajik Agency on Hydrometeorology and Environmental Research

Impacts of climate change on river flow in Central Asia

Average annual river flow, cub.km

- Amu Darya
- Syr Darya

Significant warming
Mild warming
Now

Source: Tajik Agency on Hydrometeorology
Expeditions to Pamir mountains
Estimation of modern changes in regional climate, water resources and ecology (comparative analysis of the first (1928-1933) and the second (1958-1963) international Pamir Expedition and aerosol experiment USA / USSR in 1989.

Estimation of surface water resources of Tajikistan.

Identify the various sources of water flowing to Pamirs and identify climatic variations and variability of synoptic processes over the past hundreds and thousands of years. Estimate, simulate and prepare the forecast for effects of climate change and water resources on ecology and population of Central Asia in the 21st century. Identify the necessary adaptation strategies and possible mitigating these effects.

Assist the training of young Tajik scientists for academic institutions of Tajikistan and in the selection of the necessary modern equipment, for the climatic, meteorological and glaciological studies.
members of the expedition
Previous natural disaster related to climate change

June 2005, flooding in river Pyandj
According to the State Program Study and Conservation of the glaciers in the 2010-2030 period, survey was conducted glacier Mazar May 2015.
Thank you for the attention

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