



**ЗАПОВЕДНАЯ  
РОССИЯ**

# Global Change and Katunskiy BR (Altai Mountains, Russia)

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*4<sup>th</sup> World Congress of Biosphere Reserves, Lima, March, 14-17, 2016*

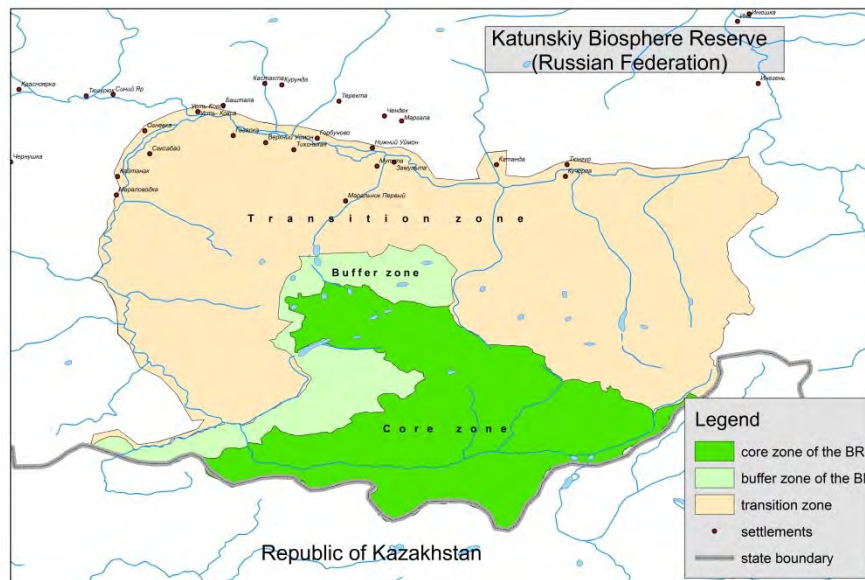




# Katunskiy BR



- Designated in 2000
- 695 000 ha of highlands with glaciers and upstreams of key rivers
- Core: 21%
- Buffer: 6%
- Transition: 73%
- Population 5 400





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КАТУНСКИЙ

## Katunskiy BR: Natural Values

Altitudes: 800 – 4500  
masl

Diversity of ecosystems  
includes steppes,  
coniferous taiga, alpine  
meadows and nival  
complexes

The largest center of  
modern glaciation in  
Siberia

Water tower for great  
Siberian and Asian  
rivers

Habitat for 1300 spp of  
higher vascular plants,  
56 mammal spp,  
including endangered  
Snow leopard.





## Katunskiy BR: Cultural Values

Traditional land use practices (deer farming and apiculture)

Sacred Mt. Belukha

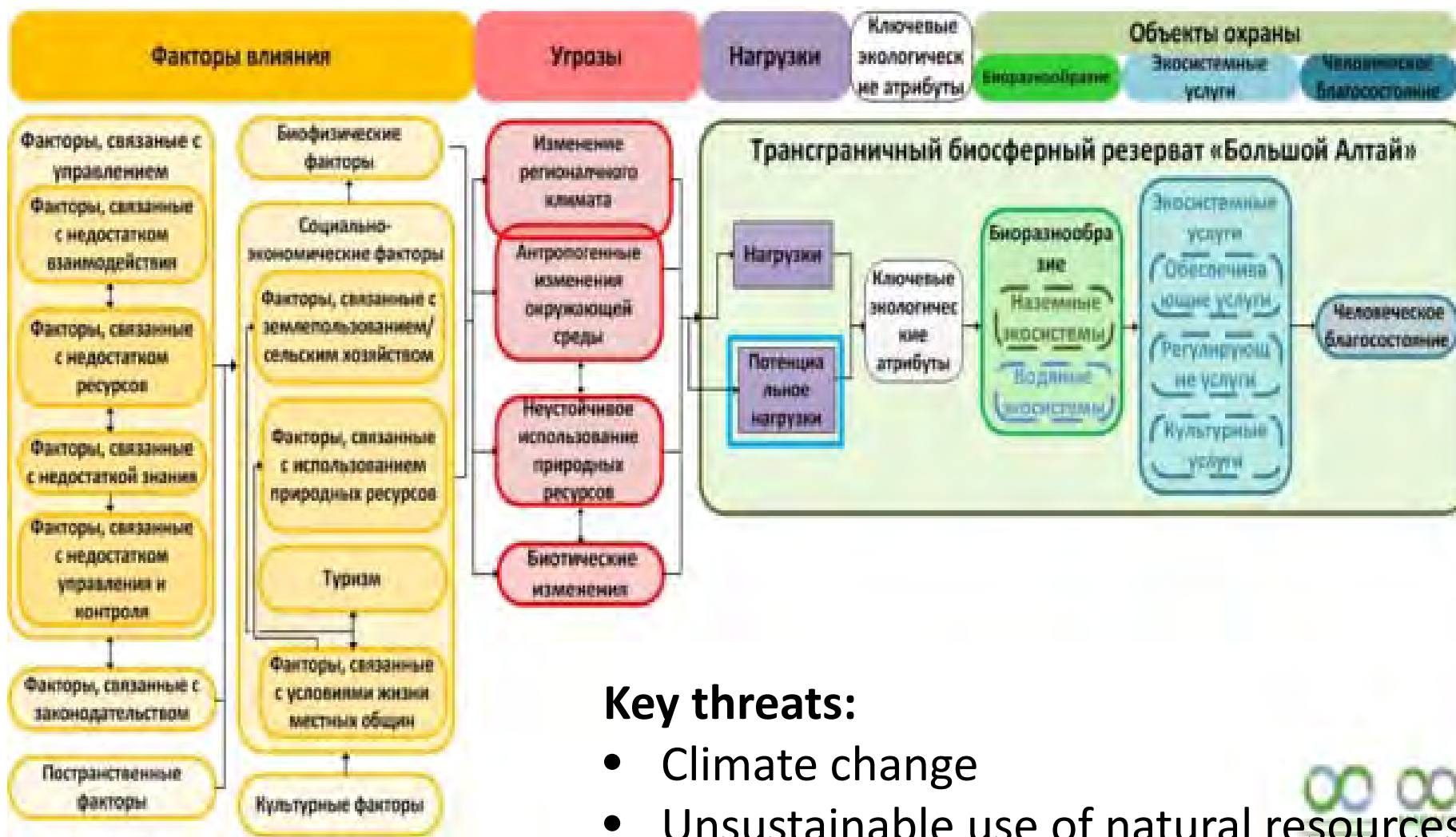
Historic monuments of different epochs

Alive traditional culture of Altaians (shamanism) and Russian Old-Believers



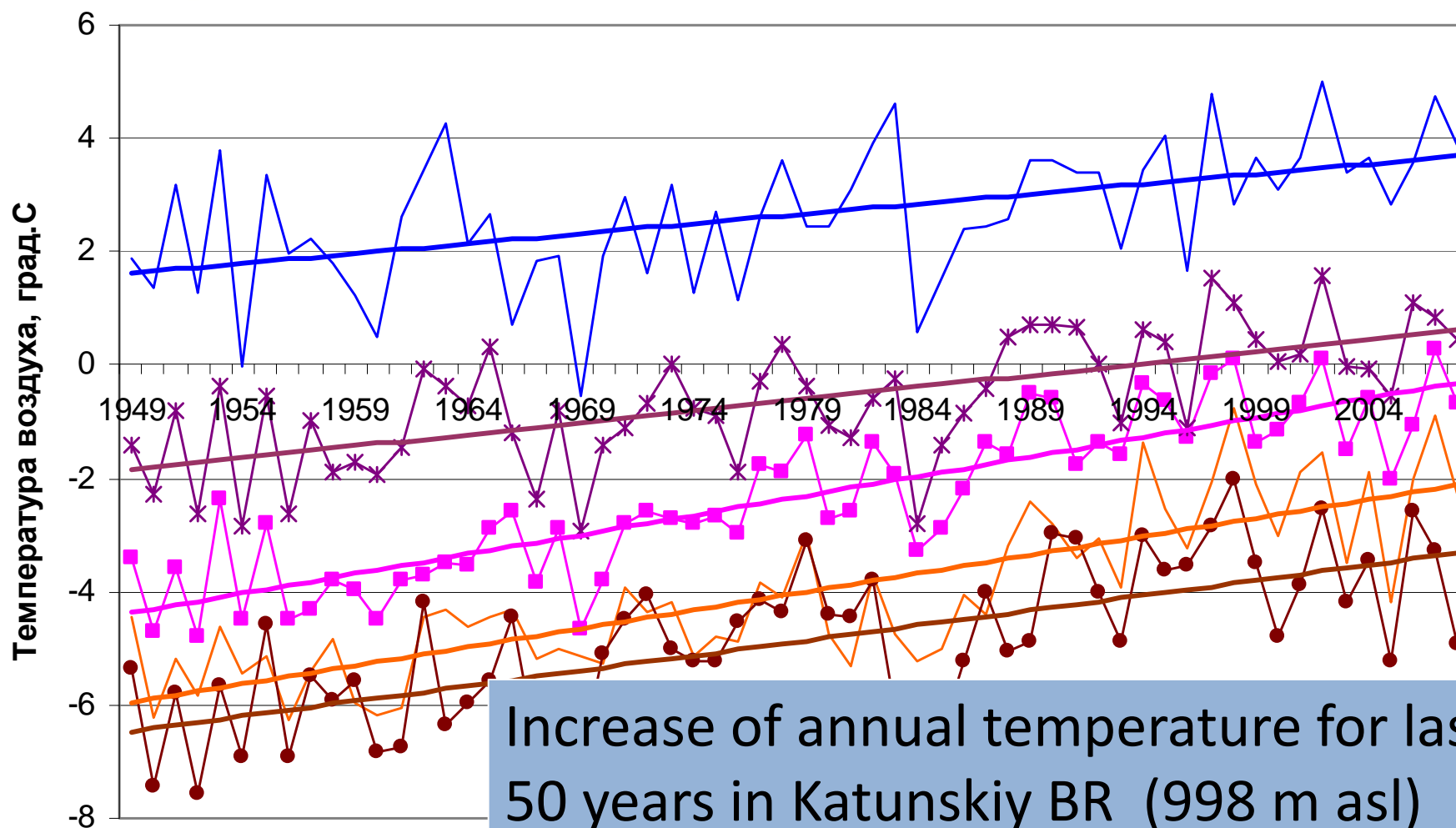


# Pressures and Threats to BR environment





# Trends of mean annual temperature, 1949-2008 in different parts of Altai Mountains



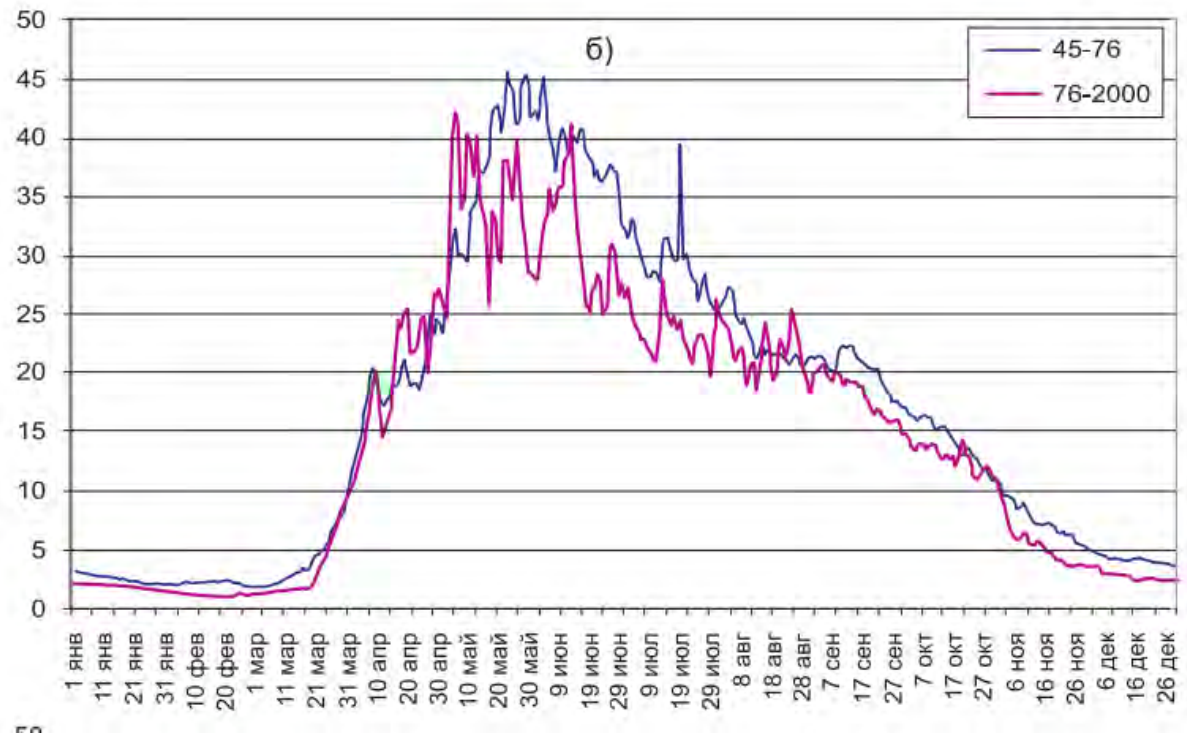
Источник: Харламова, 2010

— змеиногоorsk      —■— кызыл      — эрзин      \*— усть-кокка      —●— кош-ага



# Changes In Water And Hydrology

- 60-65% of total water influx is caused by melting of ice and snow.
- Glaciers retreated by 19,7% during 1952-2004 (Nosenko, Khromova, 2010)



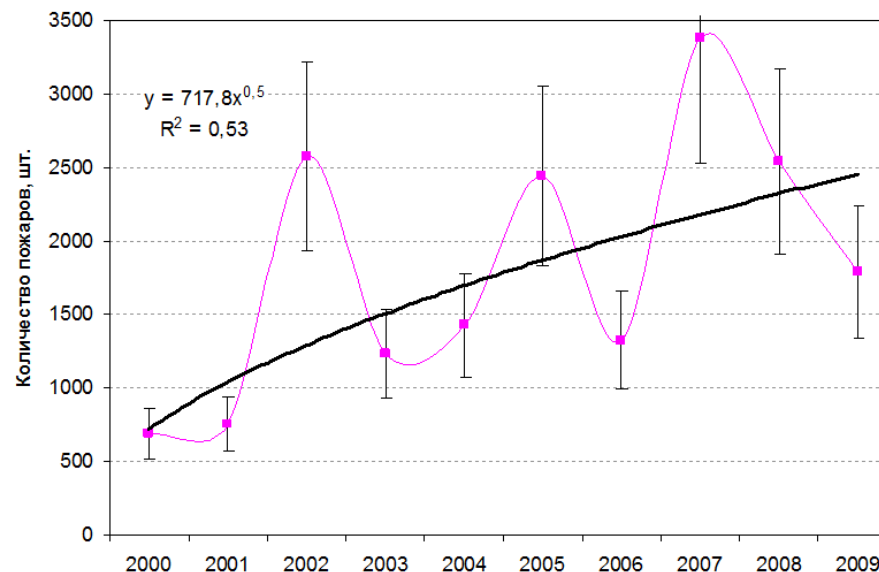
Changes in discharge of Katun river during 1945 – 2000 (Semenov, 2011)





# Effects of climate change: Fires

Over the past decade a consistent growth trend has been observed in fire frequency and areas effected by fire. The interval between extreme risk fire seasons has not exceeded 2-3 years.



Source: Fire Hazard Mitigation: A Strategy for protected Areas of the Altai-Sayan Ecoregion. 2011.

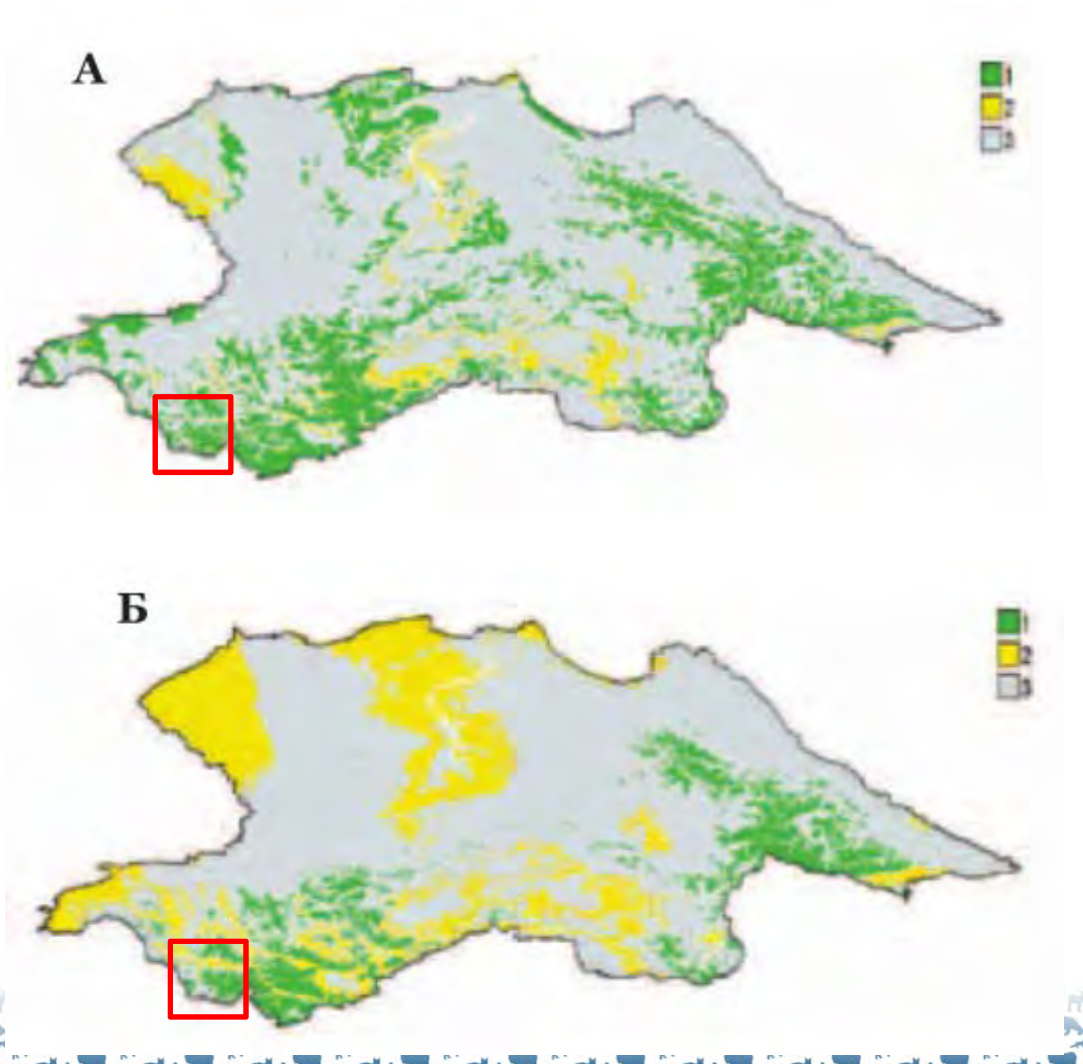






# Changes in ecosystem cover

- Projected changes of ecosystem cover under different climate scenarios:
- Soft (A1) – above
- Hard (B) - below
  
- Yellow – extension of dry steppes and semi-deserts
- Green – extension of forest zone



Source: Parfenova, Chebakova, 2011



## Ecosystem Response: Upper Treeline



- upward shift of the treeline (by 50-100 m for 2090) and subalpine shrubs (by 100-200 m) (Mikhailov et al., 1992)
- fragmentation of alpine ecosystems.



# Climate Actions in Katunskiy BR

Monitoring

Research and Modeling

Education

Implementation of mitigation measures

Development and implementation of adaptation options

## Guided by:

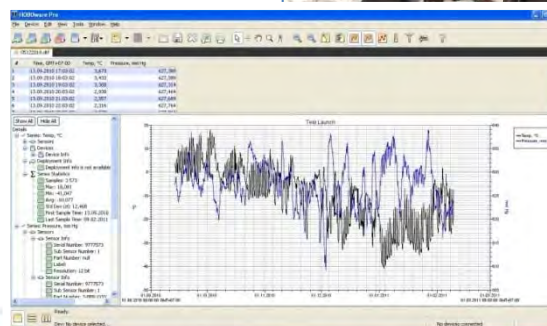
- Climate Change Adaptation Strategy For Altai-Sayan Ecoregion
- Outlines of Climate Change Adaptation strategy for Katunskiy BR, developed under UNESCO-MAB GLOCHAMOST Project
- GLOCHAMORE Research Strategy





# Monitoring Climate

- Basic hydrometeorological monitoring (including snow cover) using automated weather stations (4 in 2 BRs)
- Licensed by Federal Hydrometeorological Service





# Associated Monitoring of Biodiversity

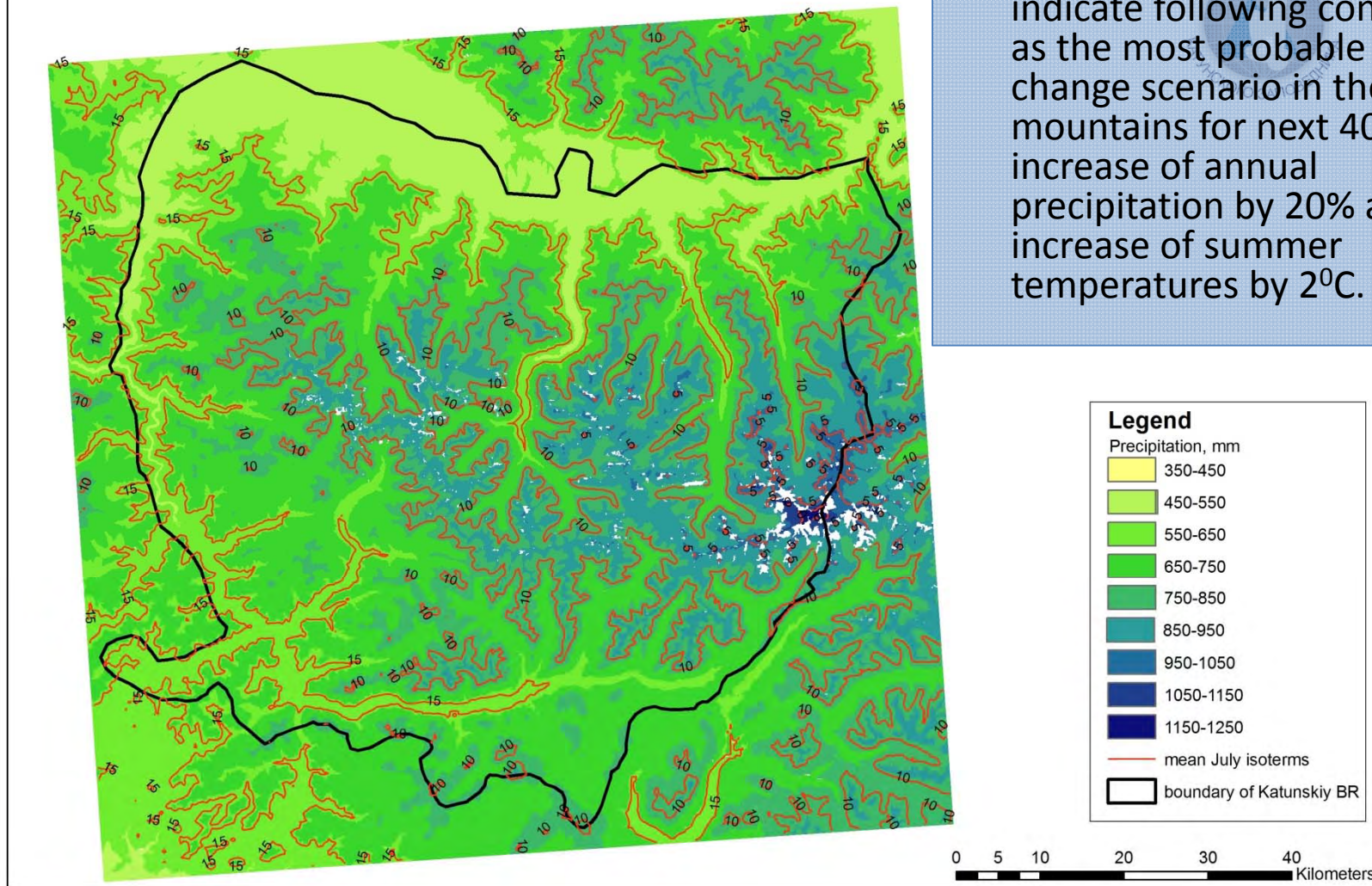
- Combined observations of water regime, glaciers and biodiversity at vulnerable ecosystems
- Katunskiy BR is member of Global Research and Observation Network of Alpine Environments





# Modeling

Projected climate of Katunskiy Biosphere Reserve



- Researches (*Parfenova et al, 2000, Mikhaylov et al, 1992*) indicate following conditions as the most probable climate change scenario in the Altai mountains for next 40 years: increase of annual precipitation by 20% and increase of summer temperatures by 2<sup>0</sup>C.



# Education in Climate Change

- Target group: school teachers
- Trainings conducted by the BR staff
- Guidelines on incorporation climate change issues into educational programs





# Education in Climate Change

- Target group: protected areas staff and journalists
- Training workshop and guidelines *“How and to whom communicate climate change issues?”*







# Education in Climate Change

- Target group: wide public
- Photo exhibition of historic and modern photos showing natural climate-caused dynamics



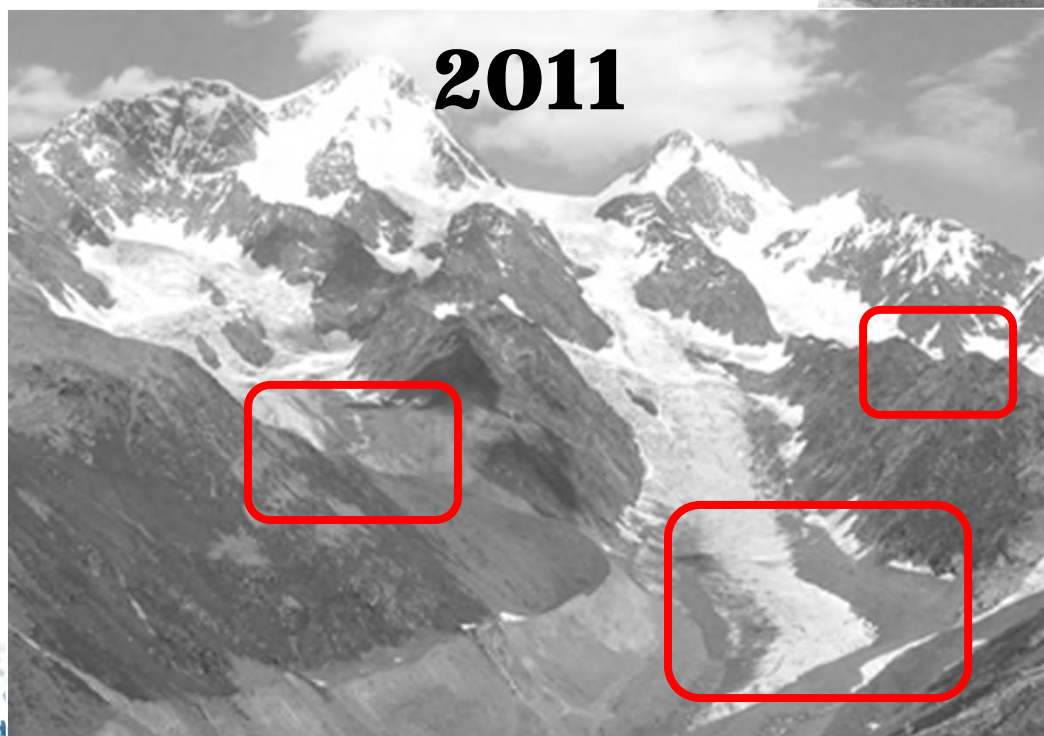


# Gebler Glacier, Katunskiy BR



**1897**

Photo by T. Yashina, © Katunskiy BR



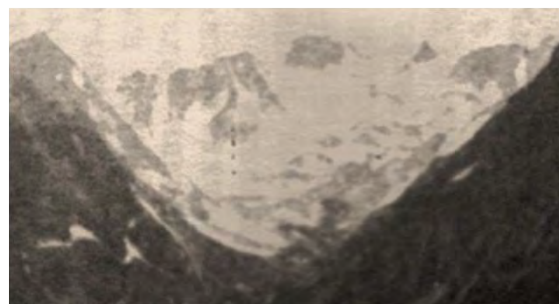
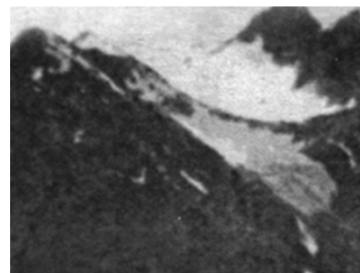
**2011**

Photo by V. Sapozhnikov,  
© Altai Museum of Natural History





# Small glaciers, Katunskiy BR

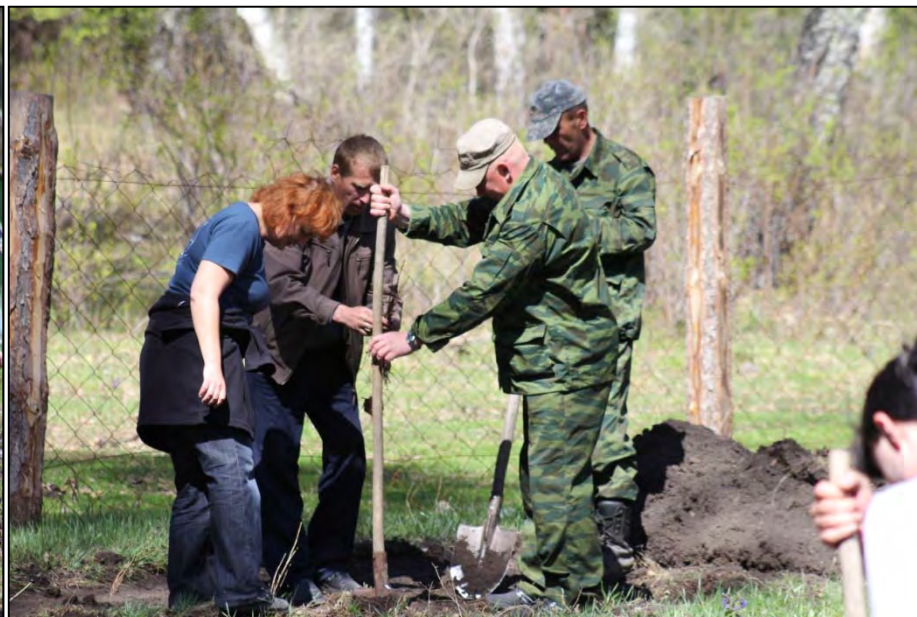






# Mitigation Measures:

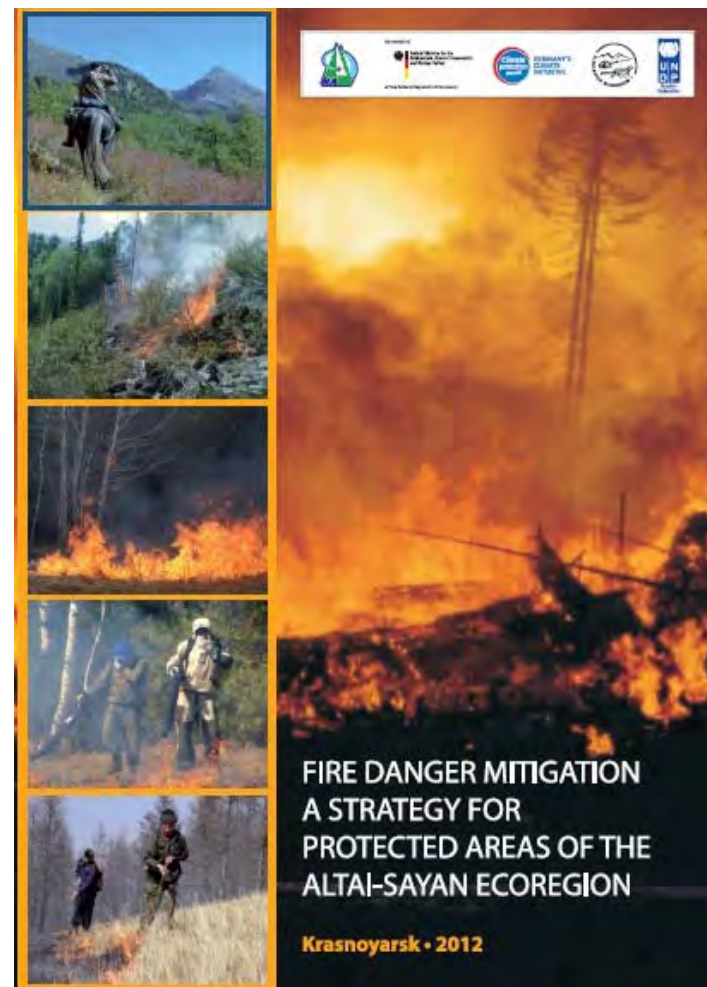
- *“Plant Your Tree – Protect Our Climate”* annual action in Katunskiy BR





# Mitigation: Improving preparedness to adverse effects of climate change

- Increasing capacities of the BR for fire prevention and mitigation (fire fighting equipment)



<http://www.altai-sayan.com/about/publications.php>



# Promotion of renewable energy

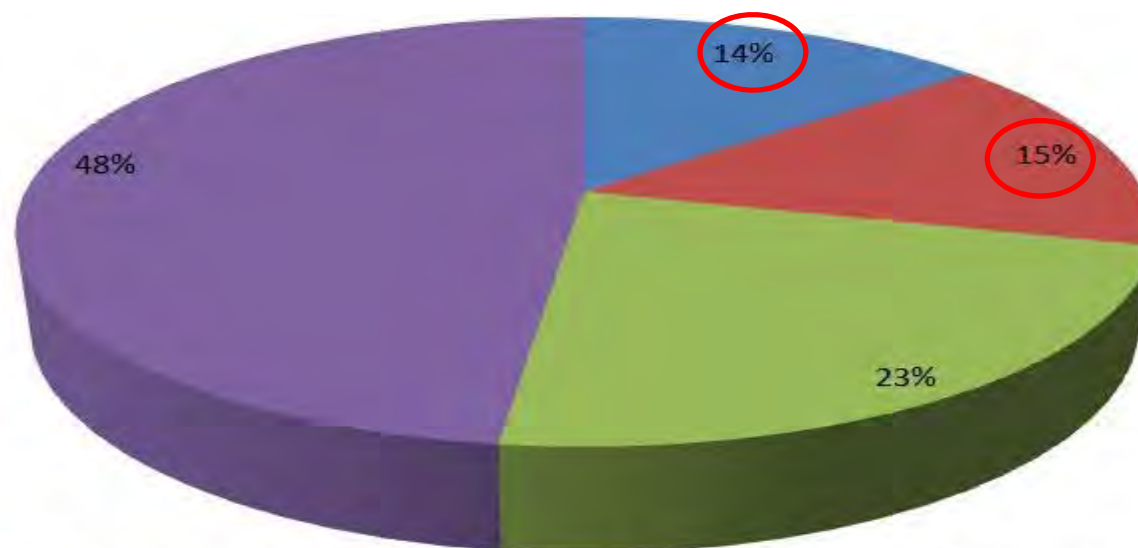
- Trainings on RES for local communities in Katunskiy BR





# Adaptation of local communities to global change

- Share of income raised from direct use of natural resources in Katunskiy BR



- fully dependent (more than 90% of income comes from the use of natural resources)
- highly dependent (50-90% of income comes from the use of natural resources)
- moderately dependent (25-50% of income comes from the use of natural resources)
- less dependent (less than 25% of income comes from the use of natural resources)







## Diversification of livelihoods by involving local communities into ecotourism development

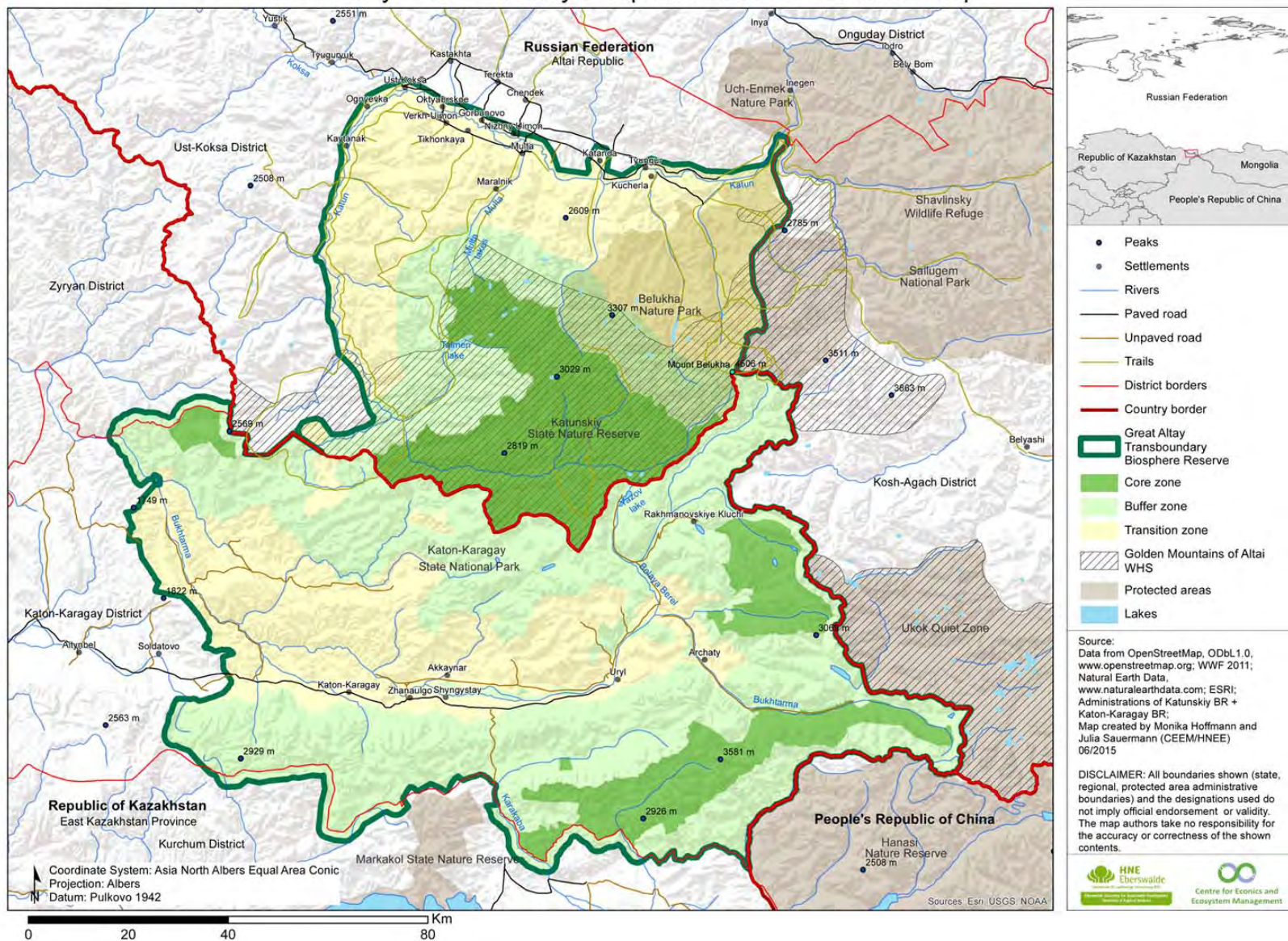
- Micro-credits for communities living within BR (EUR 70 000 invested in 2013-2015)
- 30 microenterprises were supported, including 11 guest houses, 3 campings, 2 museums, 2 handicraft productions.
- Trainings and consultation on business-running and different aspects of ecotourism development were provided for 200 people
- 40 microenterprises are being assisted with promotion of their goods and services





# Improving Connectivity through transboundary cooperation with Kazakhstan

Great Altay Transboundary Biosphere Reserve - zonation map





# Conclusion

- UNESCO-MAB GLOCHAMORE and GLOCHAMOST projects served as key impetus inspiring global change-related activities in Katunskiy BR
- There is a need of such kind of projects on global change in MBR, targeted to harmonization of monitoring techniques, creation of data sharing mechanism, networking etc.
- Many MBRs have experience in climate change adaptation => toolbox or best practice set is needed
- MAB thematic network on mountains!



A scenic landscape photograph of a mountain valley. In the foreground, there are rocky terrain and sparse, dry vegetation. The middle ground features a large, calm lake with a blue-green hue, surrounded by dense forests of trees with yellow and orange autumn foliage. The background consists of a range of rugged, brownish mountains under a bright blue sky with scattered white clouds.

Thank you for your attention!

Katunskiy BR [www.katunskiy.ru](http://www.katunskiy.ru)