GÉANT
global collaboration

Tracking Kyrgyzstan's melting glaciers

EU-Central Asian collaboration relies on high-speed GÉANT and CAREN research networks to monitor climate change and provide early flood warning

In July 2012, Lake Tez-Tor in Kyrgyzstan, swollen with water from melting glaciers, burst and flooded the inhabited Ala Archa Valley. This was not an isolated incident - climate change is having a major impact on Central Asia, with retreating glaciers leading to large scale flooding, avalanches and mudslides, with often disastrous results.

Understanding how the environment is altering through ongoing monitoring is key to coping with the effects of climate change. Only then is it possible to devise mitigation and adaptation strategies and create early warning systems to protect lives and livelihoods.

Various monitoring initiatives have begun, involving glaciologists and geohazard experts across Central Asia and Europe. This international collaborative research generates large amounts of data which needs to be shared, often in short timescales from remote locations. Consequently, the fight to mitigate climate change relies on high-speed research networks, such as CAREN (in Central Asia) and GÉANT (in Europe) to underpin these vital activities.

The Global Change Observatory

The Gottfried Merzbacher Global Change Observatory, situated at an altitude of over 3000m in the Tien Shan glacier range in Kyrgyzstan, is at the forefront of monitoring and mitigating the impact of climate change. A joint venture between Kyrgyzstan's Central Asian Institute of Applied Geosciences (CAIAG) in Bishkek and the German Research Centre for Geosciences (GFZ) in Potsdam, it is an ideal platform for international monitoring projects, such as the EU-funded EURAS-CLIMPACT project, led by the University of Vienna, Austria, which studies the effects of climate change on glaciers in Austria, Sweden and Kyrgyzstan.

Photo: The Merzbacher monitoring station: a watchful eye on the Tien Shan glaciers

The Challenge
Enable international monitoring of melting glaciers and provide early warning of potential flooding

The Solution
Monitoring data is shared between Europe and Central Asia through the high-speed CAREN and GÉANT research networks, building a comprehensive picture of the impact of climate change

Key Benefits
Working with European partners, the Central Asian Institute of Applied Geosciences (CAIAG) in Kyrgyzstan is now able to monitor melting glaciers and mitigate the risks to the local population

CAREN   aconet   KRENA   DFN Deutsches Forschungsnetz   CAIAG   GFZ Helmholtz Centre POTSDAM   universität wien

Information sharing between Europe and Central Asia

The Observatory measures and monitors local environmental conditions, including meteorological and hydrological data, ice thickness, glacier speed and seismic activities. Transmitted to CAIAG via satellite, this data is subsequently being exchanged and jointly processed by CAIAG and European partners. By combining it with high-resolution satellite images, scientists benefit from a comprehensive view of changing environmental conditions.

The Kyrgyz academic network (KRENA), CAREN, GÉANT and national European networks combine to share the data and scientific results amongst geographically dispersed researchers and allow international access to CAIAG's growing Geo Database of Central Asia (GDB).

The GDB is the central reference source on climate change in Central Asia. It combines digitised maps, satellite and aerial images along with geophysical data into a single, searchable and accessible location.
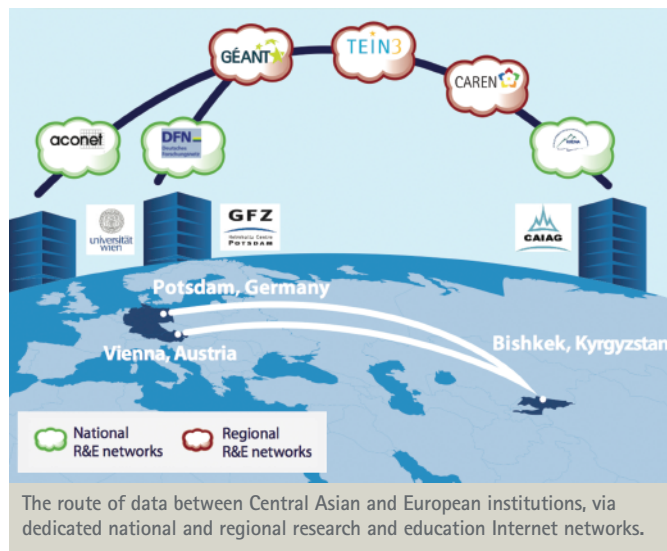
Capacity building through e-learning

Building local skills in understanding climate change is at the heart of creating a sustainable response to the problem. To train a new generation of local scientists, CAIAG is embracing e-learning through a powerful new platform relying on high-speed networks that allow researchers to collaborate in real time via a virtual lecture theatre.

Collaborating: a win–win situation

Climate change is a growing threat to the ecosystems of Central Asia, but through close international collaboration, scientists now understand much more about the changing conditions in the Tien Shan region. This information is being used by the Kyrgyz authorities for risk management, and to help safely plan new developments, such as the construction of hydroelectric power plants.

The route of data between Central Asian and European institutions, via dedicated national and regional research and education Internet networks.

> **The aim of our research project is to create a global model for glacial behaviour as climate change causes them to melt. Global models need local input. CAIAG's monitoring information delivered through the high-capacity CAREN and GÉANT networks is vital to our work.**
>
> *Professor Hermann Häusler, University of Vienna, EURAS– CLIMPACT project leader*

> **Research networks are central to all of our work at CAIAG. Thanks to CAREN we can quickly share information with our European partners, speeding up the processing of monitoring data and enabling us to work together to predict the impact of climate change and protect our local environment.**
>
> *Dr. Bolot Moldobekov, Co-Director of Central Asian Institute of Applied Geosciences (CAIAG)*

CAREN: From ancient trade route to high-speed data network

For many centuries the Silk Road was the long-distance route for trade and communication across Central Asia, linking Europe and Asia. Today, the Central Asia Research and Education Network (CAREN) is upgrading this route to a 21st-century high-speed Internet highway for research centres and educational institutions throughout the region. Co-founded by the EC and launched in 2010, CAREN interconnects over 500 research institutes in Kyrgyzstan, Tajikistan, Turkmenistan and Kazakhstan, with Uzbekistan also a candidate country. Thanks to its interconnection with GÉANT, CAREN allows seamless collaboration between Central Asia and Europe, providing the region with a gateway to global research collaboration.

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