



# Supporting sustainable water management in Central Asia

CAREN makes monitoring data from Central Asia's Water Tower accessible to scientists and local authorities for informed water supply assessment and management

Central Asia's growing population, arid lowland ecosystems, agriculture and hydropower are dependent on headwaters of the Amu Darya and Syr Darya rivers which are mostly fed by snow- and glacier-melt from the Pamir and Tien Shan mountain ranges – know as the region's Water Tower. Concerns related to climate change, epitomised by glacier retreat and precipitation fluctuations, as well as to the cumulative effect of human intervention underpin the need for a better understanding of these hydro-meteorological processes which is critical for assessing the amount and timing of water supply. Sustainable water management relies on sound environmental monitoring, with CAREN playing an important role in making such data accessible to scientists and state agencies for informed decision-making.

### *The need for a modern monitoring infrastructure*

The installation of a state-of-the-art infrastructure for acquisition and processing of monitoring data is at the heart of the CAWa (Central Asian Water) project. Launched in 2008 and funded by the German Federal Foreign Office as the scientific-technical component of the Water Initiative for Central Asia, the project is coordinated by GFZ (German Research Centre for Geosciences) in Potsdam, Germany; the Consortium brings together research institutions across Central Asia in the conviction that transnational water management requires a joint effort, based on sound monitoring and reliable data.

### *Capturing the data*

Over the last few years, the project oversaw the installation of an extensive network of Remotely Operated Multi-Parameter Stations (ROMPS) that continuously capture meteorological and hydrological observations (e.g. snow and discharge parameters, air temperature and humidity, wind speed and direction, barometric pressure, soil temperature etc.). As to data acquisition, some stations are served by a direct



**The challenge:** to provide access to hydro-meteorological monitoring data for reliable water supply assessment in Central Asia

**The solution:** monitoring data collated via satellite at GFZ in Germany is transmitted over the GÉANT and CAREN networks to seamlessly feed into a central database at its Kyrgyz partner institution CAIAG

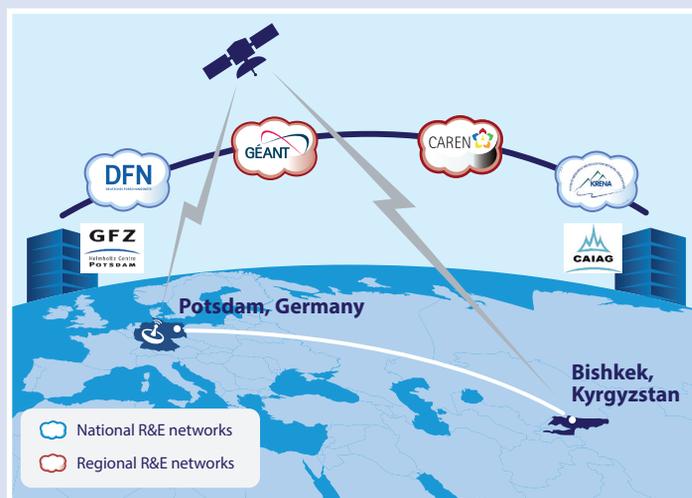
**Key benefits:** the immediate and unrestricted dissemination of all acquired monitoring data to a broad range of users, including national hydro-meteorological services, state agencies and the international scientific community, underpins informed water management strategies

internet connection or a GSM link. However, the main data communications channel, particularly for remote stations, is the VSAT satellite system, with data being collated at GFZ.



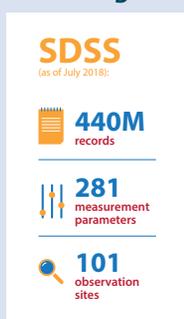
## The role of R&E networks

But for this data to be useful, it needs to be shared in a timely fashion and easily accessible. And that is where national and regional research and education networks come in. The satellite data collected at GFZ is transmitted over the German DFN, the pan-European GÉANT, the Central Asian CAREN and eventually over the Kyrgyz KRENA networks to feed into a central Sensor Data Storage System (SDSS) developed and hosted at the Central-Asian Institute for Applied Geosciences (CAIAG) in Bishkek, Kyrgyzstan. In addition, water levels and volume data derived from satellite altimetry are automatically processed for a lot of selected lakes and reservoirs in the region and continuously added to the SDSS.



Sensor data transmission via satellite and national and regional R&E networks

## Providing the data to a wide user community



SDSS serves one of the key objectives of the CAWA project and other initiatives, such as the 'Global Change Observatory Central Asia' (GCO-CA): the immediate and unrestricted dissemination of all acquired data to a broad range of users, including national hydro-meteorological services, state agencies and the international scientific and academic community.

A user-friendly graphical interface available in English, Russian and German offers the possibility to interactively retrieve hydro-meteorological data and selected water levels using a web browser. The user can select the station and variable of interest, display the data time series, print charts and download the data as XML file for further investigation via major data analysis tools.

"SDSS is a powerful open data source to evaluate the current hydrological and meteorological information, project future resources and to develop sustainable usage policies. CAREN's connectivity drives this tool by feeding a daily data amount of 140 MB. We collaborate with our colleagues at GFZ also in other fields, such as disaster risk management, with SDSS playing an equally important role in making data available to the right people."

*Dr. Alexander Zubovich, Head of the Department 3, CAIAG, Kyrgyzstan*

## CAREN: a modern Silk Road

For many centuries, the Silk Road was the long-distance route through which Asia and Europe traded and communicated. Today, CAREN is upgrading this ancient trade route to a high-speed internet highway. Launched in 2009, CAREN – now in its third phase – currently interconnects R&E communities in Kyrgyzstan and Tajikistan at Gigabit speed, with plans to re-connect Kazakhstan and Turkmenistan (linked in earlier project phases). Uzbekistan is a candidate for future inclusion.

Powerful links to other continental networks, such as GÉANT, gives CAREN worldwide reach, allowing seamless co-operation between scientists, academics and students in Central Asia, Europe and the rest of the world.

Until August 2019, CAREN3 is co-funded with €10M from the European Commission's Directorate-General for Development and Cooperation. Extra funding is being provided by participating countries through agreements between the European Commission and its governments.

### For more information:

CAREN: <https://caren.geant.org>

GÉANT: [www.geant.org](http://www.geant.org)

KRENA: <http://krena.kg>

DFN: [www.dfn.de](http://www.dfn.de)

CAIAG: [www.caiag.kg](http://www.caiag.kg)

GFZ: [www.gfz-potsdam.de](http://www.gfz-potsdam.de)

CAWA project: [www.cawa-project.net](http://www.cawa-project.net)

EU: <https://ec.europa.eu/europeaid>



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