

RER7013: Evaluating Groundwater Resources and Groundwater – Surface Water Interactions in the Context of Adapting to Climate Change

Countries in Europe and Central Asia participating in the project

PROJECT FACTS

- 27 countries in Europe and Central Asia participating
- 4-year project (2020–2023)
- Budget of EUR 866,580
- To enhance evidence-based decision making in support of SDG target 6.5



The opportunity

Although groundwater represents 98 per cent of the world's unfrozen freshwater, many aspects concerning the sustainable management of this resource are complex, and adequate information often remains elusive. The global risk of over-depletion, quality deterioration and pollution, alongside factors including increasing groundwater usage and intensified agricultural and industrial activities is significantly exacerbated under the different scenarios of climate change. While these effects can threaten the resilience of communities, populations and ecosystems which depend on groundwater, an improved understanding of complex and transboundary aquifer systems and groundwater – surface water interactions is indispensable for the future effectiveness of integrated water management.

The analysis of stable isotopes and natural radioisotopes is a powerful tool for characterizing and understanding complex aquifer systems, especially when assessing the long-term exploitation of groundwater. However, knowledge of, and capacities to

deploy, isotope-based techniques varies significantly among the 27 countries in Europe and Central Asia that are involved in this IAEA technical cooperation project.

The proposal

This project aims to bridge these gaps by transferring isotope hydrology-related knowledge and technical capacities between Member States by:

- (1) increasing awareness about isotope-based methods
- (2) exchanging and transferring knowledge and building capacity in the use of isotope hydrology techniques, through training courses and fellowships
- (3) answering specific regional or sub-regional and transboundary questions, such as on the impact of a changing climate and of increasing anthropogenic activities on groundwater resources, and
- (4) sustaining and enhancing a regional network of professionals for isotope-based water resources monitoring and assessment.

The IAEA supports scientists and water professionals all around the world by promoting the use of isotope techniques and transferring scientific knowledge to its Member States.

Good quality water supply for human consumption, industry and agriculture is becoming increasingly difficult due to impacts of land use and climate change, population growth, increasing industrialization and water overexploitation. To address these challenges, the IAEA is working to strengthen science, technology and innovation in water resources assessment through the introduction of new tools in isotope hydrology and by developing methods for better understanding constraints and efficiently managing and protecting water supplies in its Member States.

Through 50 active technical cooperation projects, the IAEA currently supports more than 38 countries throughout the globe in sustainably managing their scarce freshwater resources. In addition, there are several regional water TC projects in Africa, Asia and Pacific, Latin America, and Europe and Central Asia. From 2012 to 2020, the IAEA supported 57 countries and territories as well as several regions in their efforts to sustainably manage their water resources through 93 projects with a total disbursement of over €16 million.



IAEA

International Atomic Energy Agency

The benefits

The project enhances evidence-based decision-making in integrated water management by improving the monitoring and characterization of groundwater resources in the Europe and Central Asia region.

Taking into account the specific boundary conditions of relevant major groundwater resources and their exploitation in the sub-regions, project participants proposed seven case studies and formed dedicated teams accordingly. These case studies are expected to enhance regional cooperation in the field of water and isotope hydrology, and to support the development of new technical capacities and competencies in the participating countries, as well as to help clarify persisting issues related to the sustainable management of water resources.

The seven case studies cover pressing regional and transboundary problems, such as the impact of climate change on karst aquifers and groundwater – surface water interactions in the Western Balkans, nitrate contamination of aquatic systems in Eastern Europe and Caucasus, the vulnerability of stratified transboundary aquifers to over-abstraction and pollution, contamination problems of selected Europe’s coastal aquifers, and water balance and quality control in Central Asia, among other challenges. The full list of case studies can be seen in the table below. The project will support countries by facilitating fellowships, providing expert advice, consumables and equipment for sampling campaigns and, where necessary, direct support for the isotopic analysis of samples.

Case-study	Participating Member States
Application of isotope hydrology techniques in the ‘Oko’ Transboundary Karst Aquifer shared by Bosnia-Herzegovina and Montenegro (KARST)	Bosnia and Herzegovina, Montenegro
Assessment of water resource degradation in coastal aquifers (COASTAL)	Bulgaria, Cyprus, Georgia, Montenegro, Portugal, Russia, Turkey
Application of isotope hydrology in the transboundary Syr Darya river basin (SYR DARYA)	Kazakhstan and Tajikistan
Source, age and recharge patterns of groundwaters in Southeast Europe (SARGE)	Bulgaria, Moldova, Romania, Ukraine
Influence of climate change on groundwater resources and groundwater – surface water interaction in the Sava River basin (SAVA)	Bosnia and Herzegovina, Croatia, Serbia, Slovenia
Vulnerability assessment of deep stratified, often transboundary aquifers using isotope (dating) methods (VULNERABILITY)	Armenia, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Latvia, Moldova, Romania, Russia, Slovakia, Slovenia
Environmental tracers for the assessment of nitrate contamination of coupled groundwater – surface water systems (NITRATE)	Czech Republic, Georgia, Poland, Russia, Ukraine

