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VIRTUAL INSTITUTES

DESERVE is a Helmholtz Virtual Institute funded from the Initiative and Networking Fund of the Helmholtz Association.

Helmholtz Virtual Institutes bring together the key competencies of one or more Helmholtz Centres with those of one or more universities. Further national and international partners may be involved as associated partners, thus turning Virtual Institutes to centres of international scientific excellence.

Virtual Institutes have their own executive and management structure, and develop special measures to qualify their young researchers.

The Helmholtz Association is dedicated to pursuing the long-term research goals of state and society, and to maintaining and improving the livelihoods of the population. To this end, the Helmholtz Association carries out top-level research to identify and explore the major challenges facing society, science, and the economy.

PARTNERS

DESERVE offers the unique opportunity to integrate the scientific results already achieved or presently elaborated in the Dead Sea region into a joint scientific approach based on earth, water, and environmental sciences. DESERVE is designed as a cross-disciplinary and cooperative international project of the

Helmholtz Centres of Karlsruhe Institute of Technology (KIT), German Research Centre for Geosciences (GFZ), and Helmholtz Centre for Environmental Studies (UFZ) with well-established partners and associated partners from Germany, Israel, Jordan, and Palestine.



DESERVE
The Virtual Institute
DEad SEa Research VEnue



THE DEAD SEA

A Two-edged Environment

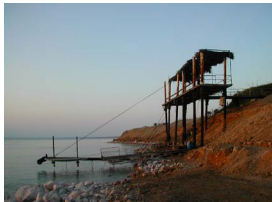
The Dead Sea is a unique environment located in the Dead Sea Rift Valley. The fault system of the Dead Sea Rift Valley forms the political borders among Israel, Jordan, and Palestine.



Terrace formation along the Dead Sea, indicating the level decline.

At the same time, it is the unifying central basis of life in this region and of great economic and ecological importance, as it collects and channels the water from the mountains.

However, the Dead Sea region faces big water-related challenges. Among them are sea level decline, desertification, flash floods, ascending brines polluting freshwater, sinkhole development, and the repeated occurrence of earthquakes.



Past and present landing stage indicating the level decline.

Climate change and extensive exploitation of groundwater and surface water even aggravate the situation.

These processes are closely connected to the physiological and geological structure of the Dead Sea basin and result in three key challenges: Environmental risks, water availability, and climate change. They can be only mastered in an interdisciplinary research effort involving all riparian countries.

DESERVE is aimed at studying coupled atmospheric, hydrological, and lithospheric processes, such as sinkholes, flash floods, and earthquakes.



Sinkholes along the shore.

This interdisciplinary research approach will contribute to a sound scientific understanding of the ongoing processes.

Furthermore, it allows for the development of prediction models, remediation strategies, and risk assessments with respect to environmental risk, water availability, and climate change.

DESERVE

Interdisciplinary Process-based Research

Monitoring

The sustainable management of resources and the estimation of environmental risks require reliable data.

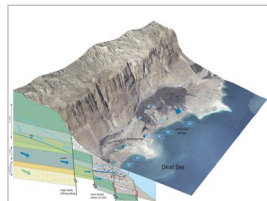


Meteorological tower in the Dead Sea water.

DESERVE establishes a long-term monitoring network of meteorological, hydrological, and seismic stations, combined with field experiments and short-term intensive measurement campaigns. Also, paleo-data will provide insights into past conditions.

Modelling

The measurements are complemented by models. Climate models will help to assess the impact of climate change. Rainfall-runoff and groundwater models, combined with climate models



Schematic cross-section of the Western Dead Sea ridge.

and observations, are applied to estimate present and future water availability. Sinkhole and subsidence as well as earthquake models will be adapted to the special conditions of the region and used to estimate sinkhole and earthquake hazard.

Risk: Forecasting and Remediation

The joint use of observations and models will provide insights into the coupled atmospheric, hydrological, and lithospheric processes and will allow to identify sinkhole-prone areas, to develop a re-



Student taking a flood water sample.

gional seismic risk assessment as well as a flashflood warning system.

Education and Knowledge Exchange

DESERVE aims to improve the interdisciplinary education of young researchers and to establish a spirit of cooperation among the different disciplines of earth and environmental sciences. Interdisciplinary Winter Schools will put this into practice.

Contact

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