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In-situ test site at the International Geothermal Centre Bochum

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The in-situ test site at the International Geothermal Centre (GZB) is located on the campus of the Bochum University of Applied Sciences. The area represents a 10.000 m^2 drill site with existing research, observation and production wells and allows further drill tests and drilling down to depths of 5.000 m – also in conjunction with the approved authorized 50 km^2 mining area "Future Energies" and the GZB's own mobile dual drive drilling rig Bo.Rex capable of drilling down to depths of 1000 m. The site allows for a comprehensive characterization of the subsurface underneath the university's campus in terms of a case study in Bochum pursuing the objective to provide an in-situ test field to researchers from geosciences and other disciplines. The local geology comprises folded and fractured carboniferous sediments including sandstones, siltstones, claystones and coal seams with low matrix permeabilies.

Currently, one research well, 29 production wells, and seven monitoring wells are available. The research well reaching to a depth of about 500 m with an open-hole section between 450 m and 500 m has been fully cored down to 200 m, selected sections were additionally cored down to 450 m. Production wells with depths of up to 200 m are equipped with borehole heat exchangers providing heating and cooling for the GZB and a new lecture building. Monitoring wells vary in depth and reach down to 200 m. The majority of wells were comprehensively characterized using the GZB's borehole geophysical logging system with deviation, caliper, gamma ray and acoustic imaging, but also full waveform sonic, flowmeter and electrical conductivity. Cuttings were collected, documented and partly stored.

The in-situ test site will be complemented by a seismic and hydrogeological observatory comprising borehole seismometers at depths of up to 200 m. The seismic network will ensure permanent observation of natural and potential anthropogenic seismicity. Additionally, drilling activities interpreted as seismic source can be used to develop a better understanding of the geological and geophysical structure of the subsurface. Hydrogeological monitoring wells will be used for field experiments such as flowmeter tests, pumping tests or chemical analysis of groundwater. Synergies arise from linking the field-scale infrastructure with laboratory equipment at the GZB covering basic and advanced physicochemical characterization as well as high resolution 3D imaging technologies under high pressure and high temperature reservoir conditions at various scales from mm to m.

The GZB invites students, researchers and interested parties to participate in and shape the GZB's in-situ research infrastructure activities by addressing fundamental and applied questions related to geothermal energy provision and georesources in general.