



中国科学院武汉岩土力学研究所

Institute of Rock and Soil Mechanics, Chinese Academy of Sciences

# 岩土力学与工程前沿讲坛

Forum on Geomechanics and Geo-engineering

No.SKL2026-04

应岩土力学与工程安全全国重点实验室邀请，德国卡尔斯鲁厄理工大学，应用地球研究所 Christoph Hilgers 教授来实验室进行学术交流并讲学，报告信息安排如下：

报告人  
Lecturer

**Prof. Christoph Hilgers**

报告题目  
Theme

**The Role of Structural Diagenesis on Reservoir Quality**

报告时间  
Time

**2026 年 4 月 16 (周四) 下午 15:00**

报告地点  
Spot

**武汉岩土所研发大楼 11 楼学术交流室**

邀请人  
Inv. by

**李琦 研究员 (地质碳储与工程安全研究中心)**



岩土力学与工程安全全国重点实验室

State Key Laboratory of Geomechanics and Geotechnical Engineering Safety



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## Forum on Geomechanics and Geo-engineering

### 报告简介

Understanding how structural diagenesis shapes reservoir quality is essential for predicting the performance and integrity of subsurface systems used for geothermal energy extraction, gas storage, and carbon management. This talk provides a concise overview of structural and reservoir geology, emphasizing how deformation, fracturing, and stress-driven diagenetic processes influence porosity, permeability, and mechanical properties. These controls directly affect the extraction efficiency of geothermal energy as well as the integrity of subsurface storage applications. Focusing on new analyses from several basins in Germany, such as the Upper Rhine Graben rift basin (an active geothermal region), we examine how fault zones, fracture networks, fluid circulation, and diagenetic mineralization interact to shape reservoir behavior. These insights highlight why structurally complex reservoirs can show strong spatial variability in productivity and long-term stability. A complementary case study from a flooded hard-coal mine illustrates how structural overprints and diagenetic sealing influence mine-water flow, pressure evolution, and subsurface fluid pathways. These examples offer relevant parallels for engineered geothermal systems and underground storage operations. The talk concludes with an outlook on emerging methods to quantify and understand reservoir evolution, including digital structural modeling, coupled hydro-mechanical simulations, and see-through reactive fluid transport. These techniques offer promising avenues for improving the assessment and sustainable utilization of subsurface formations for hydrogen storage, CO<sub>2</sub> sequestration, and geothermal technologies.





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### 报告人介绍



Prof. Dr. Christoph Hilgers heads the Chair of Applied Structural Geology at the Karlsruhe Institute of Technology (KIT) and serves as Scientific Spokesperson of the KIT - Center for Climate, Environment and Resources (CLEAR). His research spans rock deformation from microstructures to reservoir scale, energy and raw-materials system analysis, and practice-oriented global higher-education development. He studied geology at RWTH Aachen University, Germany, completing his Diplom degree (MSc equivalent) followed by a one-year MSc/ICID in Applied Structural Geology & Rock Mechanics at Imperial College London, UK, and later a PhD (Dr. rer. nat.) at RWTH Aachen. Before joining KIT in 2016, he established the German University of Technology in Oman and later served as Professor of Reservoir Petrology at RWTH Aachen. He is President of the BDG (Professional Association of German Geoscientists), Chairman of OGV e.V., an elected member of the Leibniz Society of Sciences, and member of the Board of Trustees of the Helmholtz Research Center GFZ in Potsdam.

