LIAG seminar

Winter 2025/2026

Vortragsreihe mit Diskussion

Das LIAG-Seminar findet alle zwei Wochen, jeweils dienstags um 11 Uhr, statt. Nach einem ca. 30-minütigen Vortrag besteht die Möglichkeit zur Diskussion. Die Präsentationen werden entsprechend der Ankündigung im Programm auf Deutsch oder Englisch gehalten.

Die Teilnahme kann vor Ort im großen Sitzungssaal des Geozentrum Hannover erfolgen oder online via Webex (Link unter www.liag-institut.de).

14.10.2025 Identifying fossil fault activity along the eastern Periadriatic Fault system by combined OSL- and ESR-dating of fault gouge

Erick Prince

Faults in slowly deforming regions, such as the Eastern Alps, accumulate strain over long timescales and produce only rare large earthquakes, often missing from instrumental and historical records. Pleistocene glaciations further obscure evidence by eroding or burying fault features, limiting traditional paleoseismology. The Periadriatic Fault (PAF), a major fault in the European Alps, had a main onset of activity during the Oligocene–Miocene and has since slowed, leaving its present-day seismic potential debated. To investigate its Quaternary seismic activity, we applied electron spin resonance (ESR) and optically stimulated luminescence (OSL) dating of fault gouges. These methods are sensitive to shear heating produced during earthquakes. Analyses carried out in gouges from the PAF, the Šoštanj Fault and the Lavanttal Fault reveal contrasting activity patterns, ranging from limited to recurrent seismic activity. Numerical modeling further suggests that earthquake recurrence on the PAF spans from tens of thousands to over a million years depending on the earthquake magnitude. These findings highlight the value of ESR and OSL dating, helping to bridge gaps between geological, historical, and instrumental seismological records in their respective timescales, and contribute to seismic hazard assessments.

28.10.2025 Investigation of the hydrochemical effect on the sustainability of a geothermal plant in a critically stressed fault and fracture-controlled carbonate reservoir: A case study of Poing

Mohamed Thoronka

This study explores thermo-hydro-mechanical-chemical (THMC) processes in the Upper Jurassic aquifer, using the Poing geothermal field near Munich as a case study. A simplified 3D reservoir model is developed and converted into a volumetric representation for finite-element simulations to analyze water–rock interactions and their impact on reservoir stability. Coupled simulations with PHREEQC, COMSOL Multiphysics®, and iCP are employed, alongside sensitivity and uncertainty analyses, to evaluate the potential for induced seismicity

11.11.2025 Climate and environmental variability in the eastern equatorial Atlantic and the northern Neotropics: from orbital cycles to human activity

Rodrigo Martínez-Abarca

This talk explores climate and environmental variability in the eastern equatorial Atlantic and northern Neotropics during the Late Quaternary. Marine sediments from ODP Site 663, analyzed with X-Ray Fluorescence geochemistry, reveal orbital- and half-precessional-scale dynamics of the West African Monsoon over the last 1.25 million years. In contrast, lipid biomarkers and elemental data from Lake Petén Itzá sediments document hydroclimate variability during the past 400 thousand years, shaped by hemispheric-scale changes and human activity in Central America. Together, these records highlight the sensitivity of tropical systems to external and internal forcing and their relevance for understanding past and future climate change in densely populated regions.

25.11.2025 Kein LIAG-Seminar (Veranstaltung BGR)

09.12.2025 Tectonic Modelling and Restoration of the western Tauern Window (European Alps)

Julia Rudmann

This study reconstructs the Miocene tectonic evolution of the Western Tauern Window (TW) in the Eastern Alps, where indentation, extrusion, and exhumation interacted to expose deep crustal nappes. Using an integrated 2-D, 3-D, and 4-D modeling approach that combines geological, thermochronological, and geophysical data, the study retro-deforms the Western Tauern Window in 4-D. The results show that the initial upright folding of a flat-lying duplex structure (between ca. 23 - ca. 17 Ma) gave way to thrusting along the Sub-Tauern ramp (ca. 17 - 10 Ma). Different indentation directions (NW–NE) of the Dolomite Indenter eventually led to asymmetric detachment of the lower crust of the Dolomite Indenter, influencing the deformation style of the upper crust. The new quantitative models clarify long-debated aspects of the tectonic evolution of the TW.

06.01.2026 Medium-deep geothermal energy potential of medium to large cities in Germany classified by Play Types and verified by thermal-hydraulic reservoir simulation

Fredy Hernandez

The German federal government is actively promoting the expansion of geothermal energy, particularly for heat generation. We examine the geothermal utilization potential of medium to large cities in Germany, using a criteria catalogue developed with the Federal Institute for Geosciences and Natural Resources (BGR). This potential evaluation focuses on using qualified hydrothermal geothermal technologies to facilitate site development and data collection. Our assessment utilizes freely accessible resources like the German geothermal information system GeotIS, which provides geological data, reservoir and heat demand maps. By following the ‘Play Type’ concept, we compile a ranked list of cities with significant hydrothermal potential. We employ site-specific geological modelling and numerical simulations to evaluate the optimal sustainability of hydrothermal doublets and explore different scenarios, such as aquifer thermal storage (ATES), when excess heat or solar thermal space is available. Approximately 70% of cities in northern Germany demonstrate a high development potential for geothermal energy

20.01.2026 Semi-Airborne Electromagnetic Imaging of Deep Aquifers in the Cuvelai-Etosha Basin, Namibia – Insights from the First SeeKaquA Measurement Campaign

Wiebke Mörbe

Arid regions, which currently depend on surface water resources, experience severe challenges in supplying clean water due to growing demands and climate change. The SeeKaquA project explores two deep aquifer systems in Southern Africa to make groundwater resources accessible for sustainable water management. Here, we present first results from an UAV-based semi-airborne electromagnetic (SAEM) survey we conducted in the Cuvelai Etosha Basin (CEB) in Namibia to investigate the extend and salinity of the deep fresh water aquifer KOH-II.

03.02.2026 Reservoir Characterization based on statistical inversion method

Timon Stramatompulos

This study investigates the geothermal reservoir properties of the Lower Cretaceous formations Valanginium and Wealden using a combination of seismic interpretation and statistical analysis of well log data. The analysis was conducted with Obendetect software, allowing for detailed mapping of subsurface structures and reservoir characteristics. By correlating seismic attributes with petrophysical trends, the research highlights zones with enhanced geothermal potential.

17.02.2026 Reconstructing Quaternary Coastal Evolution: Chronology of Erosive Marine Terraces on the Noto Peninsula and Sado Island, Japan

Viviana Bonerath

Erosive marine terraces provide valuable evidence for reconstructing past tectonic uplift and sea-level fluctuations. Following the devastating earthquake near the Noto Peninsula in 2024, we used the relationship between terrace formation and landscape change to investigate patterns of uplift and earthquake recurrence. To conduct this analysis, we collected sediment samples from multiple terraces and successfully applied feldspar luminescence dating to establish their depositional ages. The results demonstrate the reliability of this method and enable further investigations of long-term seismic activity and coastal landscape evolution for both Noto Peninsula and Sado Island.

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