

ENGINEERING GEOLOGY AND GEOTECHNICS SESSION

Ali Bayram, Ali Özvan, Yasemin Leventeli

Engineering Geology and Geotechnics integrate geoscientific knowledge and methods into engineering practice across a broad range of applications, from site selection, planning, design, and construction of engineering structures and infrastructure systems to the assessment of natural hazards and the sustainable use of natural resources. Detailed characterization of geological conditions, determination of the physical and mechanical properties of soil and rock masses, evaluation of their engineering behavior, and development of reliable geological and geotechnical models are fundamental to the safety, functionality, and long-term performance of structures and infrastructure. In this process, field and laboratory investigations, geomechanical analyses, numerical modelling studies, and emerging monitoring technologies play an important role in accurately understanding engineering problems and developing reliable solutions.

Climate change, rapid urbanization, population growth, and increasingly diverse infrastructure needs are making the challenges faced by the fields of Engineering Geology and Geotechnics more complex. In addition to natural hazards such as earthquakes, landslides, rockfalls, slope instabilities, erosion, and soil liquefaction, changes in hydrogeological conditions, fluctuations in groundwater levels, and the effects of extreme precipitation on ground behavior are also of growing importance to engineering practice. A sound assessment of these challenges requires the integrated evaluation of geological, geotechnical, and hydrogeological data, the identification of uncertainties, and the formulation of engineering decisions based on scientific evidence. Engineering solutions are expected not only to meet technical requirements but also to contribute to disaster risk reduction, the mitigation of environmental impacts, and the development of resilient settlements.

The **Engineering Geology and Geotechnics Session**, to be held as part of the 79th Geological Congress of Türkiye, aims to bring together current scientific research, methodological advances, and practical experience in these fields. Topics of interest include geological and geotechnical site investigations; soil and rock mechanics; rock mass classifications and determination of geomechanical parameters; engineering geological models; foundation engineering and excavations; slope stability; landslide and rockfall hazard assessment; earthquake effects and ground behavior; liquefaction and ground improvement; groundwater–soil–rock interactions; groundwater management and dewatering; tunnels and other underground structures; and the engineering geological assessment of infrastructure corridors. Furthermore, the role of remote sensing, geographic information systems, geophysical methods, numerical analyses, and innovative monitoring techniques in engineering geology and geotechnical applications will be among the key topics addressed during the session.

Another key focus of the session is the environmental and societal dimensions of engineering projects, together with sustainable engineering approaches. Efficient use of natural resources, protection of groundwater systems, adaptation to climate change, the conservation of geological heritage and the natural environment, and assessment of the long-term impacts of engineering activities are among the important issues to be addressed. The integration of data from different disciplines and the practical application of scientific research findings are essential for developing more reliable, innovative, and sustainable solutions to engineering challenges.

In line with the main theme, **"Geosciences for Addressing Global Challenges: Earth – Society – Future,"** the session seeks to promote the exchange of scientific knowledge and practical experience, foster interdisciplinary collaboration, and encourage discussion of solutions to current challenges in Engineering Geology and Geotechnics. We invite colleagues from public institutions, universities, and the private sector to contribute to the session by sharing their scientific research and practical experience, and by advancing geoscientific knowledge in response to societal needs, environmental responsibilities, and the pursuit of a safer and more sustainable future.