

Preface

Soils and shales are receiving increasing attention as rarely in the past decades. Indeed, many of the scientific and technological challenges of this century involve such materials. The development of engineering solutions to the energy quest and to minimize the impacts on climate requires in fact a deep understanding of the geomechanical behaviour of soils and shales. Applications such as geo-energy exploitation and underground energy storage, CO₂ geological sequestration, nuclear waste disposals, enhanced geothermal system—to mention a few—can be carried out only if reliable predictions can be made on the actual behaviour and long-term performance of such systems. The understanding and the capability to perform predictions of the behaviour of these systems can be gained only through advanced theoretical and experimental research on the involved geomaterials. Moreover, there is a strong need for shared knowledge among the different researchers and practitioners working for these challenging applications.

In this spirit, the ATMSS International Workshop “Advances in Laboratory Testing & Modelling of Soils and Shales” (Villars-sur-Ollon, Switzerland; 18–20 January 2017) has been organized to promote the exchange of ideas, experience and the state of the art among major experts active in the field of experimental testing and modelling of soils and shales. The workshop has been organized under the auspices of the Technical Committees TC-101 “Laboratory Testing”, TC-106 “Unsaturated Soils” and TC-308 “Energy Geotechnics” of the International Society of Soil Mechanics and Geotechnical Engineering.

This volume contains the invited keynote and feature lectures, as well as the papers that have been presented at the workshop. The topics of the lectures and papers cover a wide range of theoretical and experimental research, including unsaturated behaviour of soils and shales, multiphysical testing of geomaterials, hydromechanical behaviour of shales and stiff clays, the geomechanical behaviour of the Opalinus Clay shale, advanced laboratory testing for site characterization and in situ applications, and soil–structure interactions.

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