

ISSMGE, 9th International Congress on Environmental Geotechnics

Technical session

Characterisation, remediation and management of contaminated sites and waste materials

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Anthropogenic activities have been causing widespread environmental pollution to air, water, and land. When released to the environment, toxic chemicals, such as heavy metals, pesticides, and other organic pollutants, can be absorbed by human bodies through dermal contact, ingestion, and inhalation, leading to severe human health problems (NRC, 1991). The release of these toxic chemicals can also damage ecological systems (Chapman, 2002). To date, land contamination has become a major challenge to modern society. Environmental systems located in areas which suffer from severe pollution due to industrial and urban development, are usually exposed to both natural and anthropogenic sources of contamination, which reflect into contamination of soils and the alteration of soil properties. The management process of contaminated sites starts from the site characterisation phase which leads to the knowledge of the main current characteristics of the contaminated porous media, the boundary conditions as well as the coupled chemo-mechanical processes acting within them. This phase is crucial to achieve rational indications about the hazard of the site, the distribution, mobility and fate of the contaminants in the porous media and supports a more sustainable choice of remedial strategies. Though several in situ and ex situ treatment methods exist to remediate polluted sites, selecting an appropriate site-specific remediation technology is still challenging for successful clean-up of polluted sites. Furthermore, contaminated site remediation emerging techniques using by-products and waste (e.g., biochar, shells, seagrass) should be further explored to reduce the use of raw materials and promote solutions in line with the principles of circular economy. The massive exploitation of these recently advancing novel remediation approaches will bring about a rapid, reliable, eco-sustainable, low cost, risk-based contaminant clean up strategy. Finally, also methods for more efficient management of the globally increasing quantity of waste need to be further explored, with the aim to share solutions that either reduce landfill residual or maximise raw materials recovery.

The Session “Characterisation, remediation or management of contaminated sites and waste materials” will mainly focus on: i) multidisciplinary and multiscale characterisation of contaminated sites aimed to investigate the current state of the system and find experimental evidence of bio-chemo-mechanical coupling processes; ii) experimental and/or modelling studies addressing emerging remediation techniques; iv) emerging technique for treating and managing waste materials.

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