

Foreword – Special issue on the third international symposium on Coupled Phenomena in Environmental Geotechnics

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## Foreword – Special Issue on the Third International Symposium on Coupled Phenomena in Environmental Geotechnics

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The Third International Symposium on Coupled Phenomena in Environmental Geotechnics (CPEG2020) follows from the very successful second CPEG held at the University of Leeds, UK, in 2017. As with the first and second CPEG events, CPEG2020 was organized under the auspices of the Technical Committee No.215 (TC215) on Environmental Geotechnics of the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE), with Kyoto University and the Japanese Geotechnical Society (JGS) conjointly hosting the event. The CPEG2020 event was held on 20–21 October 2021, with all presentations and discussions taking place online. Initially, the event was supposed to be held in person in 2020. However, it was postponed twice due to the COVID-19 pandemic raging across the world, resulting in the cancellation of the in-person format.

Despite this, the organizing committee were delighted to see the online event attracting more than 400 delegates from 57 countries. Four keynote lectures were delivered, respectively, by Professor Emeritus Craig H. Benson from the University of Wisconsin-Madison, Professor Catherine N. Mulligan from Concordia University, Professor Toru Inui from Osaka University, and A/Professor Dimitrios Zekkos from the University of California Berkeley. In addition, three special presentations were delivered by renowned worldwide experts and some promising rising

stars. We were encouraged to receive about 150 abstract submissions, from which, finally, 80 papers from 15 countries were accepted for publication after a rigorous peer review process by at least two reviewers. Unfortunately, a few papers were withdrawn by their authors due to the initial postponements of the conference. The conference proceedings are published in volume 9 of the Japanese Geotechnical Society Special Publication (JGSSP)—a free-access platform launched by JGS. We want to thank the organizing committee members, the TC215 members, the paper authors, and all the delegates for their contributions to the success of this symposium again. We also appreciate the generous support of the Obayashi Foundation, which enabled the event to take place and for the delegates to register free of charge.

The State-of-the-Art Report presented by Professor Kano Ueshita and Dr Pietro Sembenelli at the 10th International Conference on Soil Mechanics and Foundation Engineering (10ICSMFE) in Stockholm in 1981 has provided essential insights and set the course for environmental geotechnics. Since then, there have been numerous events related to environmental geotechnics. CPEG has been held quadrennially since 2013. A wide range of issues pertaining to coupled processes in environmental geotechnics was discussed at the CPEG events (e.g., chemical-physical, biophysical, multiphase flow). Eight important topics are discussed in the proceedings of CPEG2020, including bentonite-based barriers, radioactive wastes, waste landfills, environmental monitoring, risk assessment,

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geotechnical and environmental analysis, remediation and contamination analysis, soil–water–chemical interactions, and energy geotechnics.

We are pleased to publish this special virtual issue in *Soils and Foundations*—a leading international journal in soil mechanics and geotechnical engineering. While special issues for the previous CPEG events were published in ICE's *Environmental Geotechnics*, *Soils and Foundations* was selected for CPEG2020 in order to effectively reach the environmental geotechnics contributions to different readerships, and thereby widen the potential of this academic area. The session chairs and the guest editors nominated several papers published in the conference proceedings for consideration in this special issue. The nominated papers had to be substantially updated (~30% increment) for inclusion in this special issue in accordance with *Soils and Foundations*' rules for conference papers submitted after updates. We received twenty-one submissions. These submissions were subjected to the strict journal's peer review rules which resulted in accepting fifteen papers for publication. These papers are as follows:

- Muawia Dafalla, Abdullah Shaker, Abdullah Almajed, Lemboye Kehinde 'Assessment of shear strength for clay liners using a dynamic probe', <https://doi.org/10.1016/j.sandf.2023.101312>
- Jonathan Domizi, Mirko Felici, Evelina Fratolocchi 'Sorption and hydraulic performance of cement-bentonite cutoffs in saline sulphatic solutions', <https://doi.org/10.1016/j.sandf.2023.101315>
- Takuro Fujikawa, Kenichi Sato, Chikashi Koga, Hirofumi Sakanakura, Hiroshi Kubota, Yosuke Nagayama. 'Evaluation of carbonated incineration bottom ash using exhaust gas and CO<sub>2</sub> discharged from waste incineration facilities as ground material', <https://doi.org/10.1016/j.sandf.2022.101270>
- Nicolò Guarena, Andrea Dominijanni, Mario Manassero. 'The role of diffusion induced electro-osmosis in the coupling between hydraulic and ionic fluxes through semipermeable clay soils', <https://doi.org/10.1016/j.sandf.2022.101177>
- Kazuki Hamada, Masahiko Katoh. 'Formation of pyromorphite by hydroxyapatite during lead migration in soil with different phosphorus sorption abilities', <https://doi.org/10.1016/j.sandf.2022.101241>
- Eugeniusz Koda, Piotr Osinski, Anna Podlasek, Anna Markiewicz, Jan Winkler, Magdalena Daria Vaverková. 'Geoenvironmental approaches in an old municipal waste landfill reclamation process: Expectations vs reality', <https://doi.org/10.1016/j.sandf.2023.101273>.
- James L. Hanson, Derek C. Manheim, Nazli Yeşiller. 'Geoenvironmental assessment of climate impacts from landfill gas emissions', <https://doi.org/10.1016/j.sandf.2023.101279>.
- Jialin Mo, Kazuto Endo, Takuya Miura, Hiroyuki Arai. 'Bench scale percolation tests on radioactive Cs-contaminated soil in Fukushima and soil modified with water-absorbing polymer agent', <https://doi.org/10.1016/j.sandf.2022.101237>
- Mazhar Nazir, Ken Kawamoto, Toshihiro Sakaki, Toshiko Komatsu, Per Moldrup. 'Gas transport parameters of differently compacted granulated bentonite mixtures (GBMs) under air-dried conditions', <https://doi.org/10.1016/j.sandf.2022.101223>
- Ibuki Nishimura, Hitoshi Matsubara. 'Electricity-reaction–diffusion system for microbially induced carbonate precipitation', <https://doi.org/10.1016/j.sandf.2022.101217>
- Sho Ogata, Eita Nishira, Hideaki Yasuhara, Naoki Kinoshita, Toru Inui, Kiyoshi Kishida. 'Multi-physics numerical analyses for predicting the alterations in permeability and reactive transport behavior within single rock fractures depending on temperature, stress, and fluid pH conditions', <https://doi.org/10.1016/j.sandf.2022.101207>
- Lohit Krishna Pranav Puligadda, Mamoru Kikumoto. 'Concept of effective suction for describing hysteresis of multiphase pressure–saturation relationship in porous media', <https://doi.org/10.1016/j.sandf.2022.101267>
- Ta Thi Hoai, Toshifumi Mukunoki, Mai Trong Nhuan, Nguyen Thi Hoang Ha. 'Temperature and concentration dependence of ammonium migration in bentonite-clay mixtures: A case study in Hanoi, Vietnam', <https://doi.org/10.1016/j.sandf.2022.101251>
- Yasutaka Watanabe, Shingo Yokoyama. 'Effects of alteration on shear characteristics of compacted Ca-bentonite immersed in alkaline solutions', <https://doi.org/10.1016/j.sandf.2022.101199>
- Tao Wu, Liangtong Zhan, Song Feng, Ping Chen. 'Numerical analysis of moisture and gas transport in earthen final covers considering effects of vapor and temperature gradient', <https://doi.org/10.1016/j.sandf.2022.101262>

The papers in this special issue demonstrate the importance of environmental geotechnics as a tool for achieving a more sustainable future. In this special issue, two important topics are discussed. First, geotechnical and environmental aspects of various novel materials are explored to determine whether the materials can be used for construction. Second, soil–air–water interactions are evaluated through theoretical and experimental approaches to achieve a realistic depiction of soil behavior.

We, the Associate Editor – Professor Takeshi Katsumi (as CPEG2020 Chair) – and the Guest Editors – Professor Abdelmalek Bouazza (as previous TC215 Chair), A/Professor Andrea Dominijanni (as previous TC215 Secretary), Professor Giancarlo Flores (as CPEG2020 Secretary), and Professor Toshifumi Mukunoki (as JGS Secretary) – contributed to the entire editorial works of this special issue, including the final decision of the nominations. Professor Masahiko Kato and Dr. Yasutaka Watanabe (Editorial Board Members—EBM) and A/Professor Atsushi Takai and A/Professor Takuro Fujikawa (Guest EBM)

handled the editorial works. Many individuals acted as anonymous reviewers. Dr. Lincoln W. Gathuka helped with the organizational works of the CPEG2020 event. Professor Junichi Koseki and Professor Ryosuke Uzuoka, past and current Editor-in-Chief, provided the broad perspective for this special issue. Miscellaneous administrative

tasks were contributed by Ms. Aya Saito and Ms. Natsuko Obata, administrative staff of JGS. Finally, we would like to thank the authors for their contributions, which will serve to fill existing knowledge gaps and will allow for better responses to the challenges faced in environmental geotechnics.