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## Editorial

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Continuous surface mining projects are dynamic, complex, and large-scale with a long-term horizon (usually greater than 20 years) as well as capital intensive. In these projects there is an inherent uncertainty related to the spatial variability of the geological parameters (e.g., size and quality of reserves, properties of geological formations, etc.) and to several other parameters (e.g., selling prices, demand, taxes, environmental regulations, etc.) that significantly affect the initial planning and final design (Galetakis et al., 2011; Roumpos et al., 2014). Taking into account the large investments that should be made for the purchase and installation of a continuous mining system and the long depreciation period required, strategic mine planning is the most important technical aspect for activities of this type, shaping the technical plan to be followed from mine and mineral value chain development to closure (Dimitrakopoulos, 2018). In this framework, the efficient long-term planning and production scheduling of continuous surface mines, adjusted to the spatial peculiarities of the corresponding mining fields, require an integrated and life-of-mine consideration.

Continuous surface mining operations face many challenges in the context of the current environmental, technical, economic and social conditions and their interrelations. The challenges mainly refer to Pavloudakis et al. (2009, 2012), Pavlides et al. (2015) and Roumpos et al. (2015, 2018):

- a the more complicated and continuously varying mining conditions combined with the requirements for highly efficient exploitation technologies and enhanced recovery of the mineral resources

- b the possibility to develop models of the deposits in a way that allows improved quantitative understanding of the spatial variability of the reserves and the related uncertainties, which in turn helps to optimise mine exploitation and to reduce fluctuations in the quality of the run-of-mine ore
- c the stringent environmental legislation in relation to land rehabilitation, ecological restoration of the mining sites and long-term sustainability of the post mining operations
- d the economic performance of the surface mining projects
- e the social acceptance of the projects and the contribution to long-term viability and sustainability of the local and regional economies.

This special issue aims to cover the latest developments and related research in the field of continuous surface mining, focusing on some of the above mentioned challenges. It contains the revised and expanded versions of 13 papers presented at the 14th International Symposium of Continuous Surface Mining (ISCSM2018), which was organised between September 23 and 26, 2018 in Thessaloniki, Greece.

The key subjects of the papers are:

- 1 mine planning and design
- 2 modelling and simulation
- 3 equipment and mining systems
- 4 geotechnical engineering
- 5 occupational health and safety, environment
- 6 geological exploration, quality control, homogenisation.

The subject of ‘mine planning and design’ is investigated in the paper by Ignjatovic et al. The authors present the current state, development perspectives, and opening plans for new opencast mines and planned continuous mining systems which are foreseen to operate in the future time period in Serbia.

Three papers refer to the second key point that is ‘modelling and simulation’. Hay et al. introduce the ultimate pit limit (UPL) problem, and highlight how the requirements for this differ between truck and shovel and fully mobile in-pit crushing and conveying (FMIPCC) systems. A potential solution that includes the additional requirements for calculating the UPL for FMIPCC systems is presented, with a simple case study showing the application of the method. Stefouli et al. evaluate the use of earth observation data, and in particular multi-temporal Sentinel-1 and Sentinel-2 data, for the monitoring of the Amyntaio lignite mine and the assessment of quarrying and rehabilitation activities. Kapageridis et al. describe the application of mine planning software in the reserves estimation and modelling procedures of the operational lignite mine of LARCO GMMSA at the lava deposit in Servia, Kozani.

Four papers explore the topic of ‘equipment and mining systems’. Agioutantis et al. describe a real-time event driven data management tool, which was developed as a productivity and maintenance planning tool for the surface lignite mines in northern

Greece. Menegaki et al. examine the fuzzy cognitive maps (FCM) approach as a means for qualitatively modelling and analysing the efficiency of bucket wheel excavators, a crucial component of continuous surface mining systems. Using both an extensive review of scientific literature and expert judgment as the basis of the analysis, a simulation framework is developed to perform qualitative simulations with respect to the efficiency factors of the bucket wheel excavator. Moczko et al. demonstrate their experiences gained as the Independent Expert during many projects completed in the field of material handling and mining equipment. Finally, Shepel and Drebenstedt focus on the investigation of the process of cutting granodiorite and dolomite samples with an activated cutting tool utilising the impact rock fragmentation principle. Considerations on the applicability of the activated cutting technology to the continuous excavation of hard rocks are also discussed in this paper.

The topic of ‘geotechnical engineering’ is investigated by Steiakakis et al. In their work, the authors introduce a cloud-based database software monitoring system that can efficiently record, transfer, store, analyse and evaluate monitoring data and generate easy to view and easy to use information.

Three papers refer to the topic of ‘occupational health, safety and environment’. Falah et al. deal with the use of sodium silicate solution for the production of environmentally friendly alkali activated mine tailings. Pavlovic et al. assess the social and environmental risks on opencast coal mines. In this paper the authors also present the case study of the Tamnava-West Field in Serbia. Triantafyllou et al. investigate the PM10 emissions from the Mavropigi mine in northern Greece. Specifically, the percentage of the contribution of each individual activity – emission of fugitive dust over the period of one year is calculated. Furthermore, the dispersion of PM10 is simulated.

Finally, the subject of ‘Geological exploration, quality control, homogenisation’ is examined by Apostolidou and Georgakopoulos. In their study, the authors characterise lignites and sub-bituminous coal samples from Greece and Bulgaria through high-resolution, solid-state <sup>13</sup>C nuclear magnetic resonance spectroscopy (NMR).

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We hope that the issue will be of interest to the readers and contribute to the innovative analysis and planning of continuous surface mining systems.

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