Abstract:

Industrial plant operators recognise the benefits of process control to reduce the variability of key process indicators. However, the actual financial value for the operation often remains elusive leading to the question: what is the cost of variability?

A similar vague understanding reigns among metallurgists about optimization. Is it better to maximize the plant feed rate or the recovery? The literature provides examples of attempts, focusing either on comminution or mineral separation, but the results rarely generalize. Stage objectives can hardly make sense without considering the global performance.

The technological developments of automated quantitative mineralogy of the last two and a half decades introduced new capabilities to solve this mineral processing control and optimisation conundrum. As the mineral liberation distribution determines the ultimate grade and recovery curve, it seems natural to consider it for process control and optimisation applications.

This plenary lecture examines the introduction of mineral liberation in the quest to generalise the solution of the process control and optimisation problem of separation plants. It will first review the advances of the last decade, focusing on model, simulation, control and optimisation developments. Then it will provide a prospective outlook of promising research work and technologies that will bring closer the materialisation of plant-wide or even mine-wide control.