SAIMM
THE SOUTHERN AFRICAN INSTITUTE OF MINING AND METALLURGY
FOUNDED 1894

Application of Multiple Point Statistics to Mineral Resource Estimation—School

OBJECTIVES

The course is aimed at providing geostatistics practitioners and mineral resource evaluators with newly developed skills, knowledge and competency for application in the evaluation and classification of Mineral Resources. The development of these skills is seen as being of strategic importance.

To increase the knowledge and competency amongst technical staff of the application of Multiple Point Statistics in Mineral Resourses estimation and evaluation.

23–26 April 2018

School of Mining Engineering at the University of the Witwatersrand

Lecturers:
Prof. Philippe Renard and Prof. Julian Straubhaar

Philippe Renard, Prof. Dr. Eng., (born 1967), Professor of Hydrogeology at the University of Neuchatel, Switzerland (2006-present), PhD from École des Mines de Paris in 1996 (honours), Lecturer in hydrogeology at the Swiss Federal Institute of Technology Zurich (ETHZ) from1997 to 2001. Water supply engineer in Kankan,Guinea for the French ministry of Cooperation from 1992 to 1993. His research focuses on groundwater hydraulics in porous and fractured rocks, upscaling techniques, and innovative geostatistical methods for uncertainty quantification. He has been working on the regional modeling of saltwater intrusions in Cyprus and Tunisia. He has participated to numerous international projects such as the evaluation of the groundwater resources in the north-west of the Sahara (Mauritania) for the world bank. He was editor of Hydrogeology Journal, president of the geoENVia association and is currently a member of the leadership team of the Groundwater Committee of the International Association of Hydraulic Research (IAHR). He is the author of more than 100 scientific articles in international journals and covering a wide range of topics. His current research is focused on the development of multiple-point statistics methods as well as pseudo genetic approaches for heterogeneity modeling, uncertainty quantification and inverse groundwater modeling.

Julien Straubhaar, Prof. Dr., born in 1979, senior researcher in the stochastic hydrogeology group of the University of Neuchâtel. He holds a PhD in applied mathematics (University of Neuchâtel, 2007), with a focus on numerical methods for partial differential equations and in particular preconditioners for linear equations. His current research mainly deals with geostatistics and inverse methods. He is author of more than 20 scientific papers published in international journals and he has been a reviewer for several scientific journals. Over the last ten years, he has been heavily involved in the development of parallel multiple-point statistics algorithms, in particular Impala and Deesse softwares, which are available in professional products.

WHO SHOULD ATTEND

The course content will be of interest to:

• Geostaticians
• Geologists
• Surveyors
• Samplers
• MRM practitioners
• Mineral resource technicians.

Introduction to the theory and practice of Multiple-Point Statistics

Prof. Philippe Renard and Prof. Julian Straubhaar

23–26 April 2018

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Schedule

The course will start every morning at 9 am and end around 5 pm every day.

Day 1—23 April 2018

Morning—General introduction:

➢ Overview of the course
➢ Basic concepts / overview of different types of models for geological heterogeneity
➢ Introduction to Ar2GEMS
➢ Sequential Indicator Simulations versus DeeSse on a discrete case.

Afternoon—Non-stationary simulation:

➢ Understanding DeeSse parameters in a categorical case and parameter sensitivity
➢ Requirements of a training image / how to get it and what should be its properties
➢ Dealing with non-stationarity in the simulation grid
➢ A simple practical case study: The Areuse delta
➢ Links between Ar2GEMS, GIMP, and QGIS
➢ How to generate a Training Image and a trend of orientation to control the simulation.

Day 2—24 April 2018

Morning—Modular modeling with elementary training images:

➢ Introduction to elementary training images and invariances
➢ Building elementary training images
➢ Parameterization of the structure for 2D and 3D applications
➢ Construction of a non-stationary 3D model.

Afternoon—Modeling a fluvio-glacial aquifer from borehole data:

➢ Introduction and discussion about the data set. How to approach the problem?

➢ Introduction to python scripting to automatize the tasks
➢ Construction of the regions, preparation of training image.

Day 3—25 April 2018

Morning—Follow-up on nested models with the fluvio-glacial example:

➢ Continuation of previous day example (modeling rotations and facies)
➢ Modeling horizons with DeeSse
➢ Filling the facies with continuous properties.

Afternoon—Multivariate simulations, multivariate gap-filling:

➢ Multivariate MPS and gap-filling
➢ Tests on synthetic applications
➢ Multivariate, multitemporal satellite image gap-filling.

Day 4—26 April 2018

Morning—MPS using actual data as training image: time-series modeling and analog:

➢ How to deal with non-stationary when using analog data?
➢ Use of secondary attributes: example from a Bauxite mine in Australia.
➢ Time-series simulation using the Direct Sampling technique
➢ MPS quality check.

Afternoon—Discussion and perspectives:

➢ Course wrap-up: when and how to use MPS for which purposes?
➢ Possible brief presentations from course participants (only volunteers) to engage discussion and feedback from instructors on possible MPS applications
➢ An overview of ongoing research topics and new algorithms
➢ Final open discussion and course evaluation.

REGISTRATION FORM

TITLE AND INITIALS: ....SURNAME: ....

COMPANY: ....

DESIGNATION: ....

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.... POSTAL CODE: ....

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REGISTRATION FEES—Four-day Course—R8 000

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