

# Preface

Although many papers have presented different aspects of truncated gaussian and plurigaussian simulations, no single work gives a comprehensive view of the theory and practical applications of this new and interesting geostatistical simulation method. Our aim in writing the book has been to encourage readers to test this method of simulating the geometry of reservoirs and ore-bodies for themselves. That is why we wrote a suite of programs called *Pluridemo* to demonstrate how the method works.

Initially this material was developed as the notes for short courses on plurigaussian simulations. The first such course was given in Fontainebleau in September 1998. Others have been given at Petrobras training centre in Rio de Janeiro in 1999 and at the IAMG annual conference in Trondheim in 1999.

The original impetus for developing the truncated gaussian method came from Georges Matheron in response to a request from the Institut Français de Pétrole, in particular from Lucien Montadert who realized the importance of being able to simulate the internal architecture of reservoirs. The plurigaussian method was a natural development from the truncated gaussian method. This cooperation between the IFP and the Centre de Géostatistique resulted in the development of the *HERESIM* program as well as practical applications for many oil companies including AGIP, Gaz de France, Petrobras and PDVSA.

Applications of the methodology to mining were initiated during a short course to engineers and geologists of Anglo American Corporation in 1999. Soon afterward a test case was carried out for Rio Tinto Ltd on data from the Rossing uranium mine.

The authors would like to thank these mining and petroleum companies for their support in developing and testing this new simulation method. Special thanks are due to Christian Ravenne formerly of the IFP for his geological insights and for his enthusiasm while developing the method.

## Preface to the Second Edition

Since the book on plurigaussian simulations was first published 8 years ago, many new case-studies have been published with applications in water resources as well as petroleum and mining. Several new case-studies are included in this edition of

the book. One pleasant surprise when we carried out the literature search, was to find that truncated gaussian and plurigaussian simulations are being used as the initial reservoir model for history matching (that is, for updating the reservoir model when new production data or seismic information becomes available). The reason is that two of the methods for history matching, the ensemble Kalman filter (EnKF) and the gradual deformation method, require an underlying gaussian model.

In addition to including more case-studies, the main change made since the first edition has been to add a new theory chapter (Chap. 2). When the previous edition was published our primary objective was to show reservoir engineers and geologists how the method could be used in practice. As the method is now well-established, it is important to present the theoretical aspects of the method so that mathematicians, statisticians and physicists can see its theoretical underpinnings. Those who prefer a more intuitive presentation can skip Chap. 2, and start reading at Chap. 3.

Finally the new version of the PluriDemo package designed to allow users to discover plurigaussian simulations by “playing” with them, is now available on the website. See Chap. 9 for details.

Plurigaussian Simulations in Geosciences

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