

Introduction to Geostatistics

COURSE OUTLINE

Geostatistics has become one of the important tool kits for tackling subsurface problems in the Oil and Gas industry. For the geologist, geophysicist, reservoir engineer, petrophysicist or manager, a knowledge and understanding of the theory and application of geostatistics is now key in subsurface analysis, prediction and uncertainty estimation.

The course “Introduction to Geostatistics” prepared by Earthworks Environment & Resources Ltd. is a comprehensive introductory course designed to equip attendees with a philosophical, theoretical and practical grounding in the subject. Whether mapping reservoir layers, undertaking stochastic depth conversion, building full field reservoir models for fluid flow or taking risk based decisions, delegates will find the course will provide them with the necessary skills and comprehension.

The course is non-mathematical and no prior knowledge of statistics is required. The course has been running since 1993 and is regularly updated, the last major update taking place in 2001. The course is primarily run for oil companies and feedback indicates that it is very highly rated by attendees.

CONTENTS

1. Overview & History of Geostatistics
2. Univariate Statistics
3. Normal Score Transform (Anamorphosis)
4. Bivariate Statistics & Correlation
5. Introducing Stochastic Theory: Random Function Model
6. Regionalised Variables and the Variogram
7. Kriging – predicting values at unmeasured locations
8. Variogram Modelling & Coping with Trends
9. DEM example and practicals
10. Simulation – Stochastic Realisations
11. Comparison of Deterministic, Best Estimate & Stochastic Models
12. Support or the Effect of a Change of Scale of Measurement
13. Data Integration
14. Petroleum Case Study and data integration practicals
15. Introduction to Reservoir Modelling
16. Depth Conversion
17. Depth Conversion and further data integration practicals
18. Additional topics
 - 18.1. Connectivity & Spillpoints
 - 18.2. Entropy
 - 18.3. Baye’s Theorem
 - 18.4. Stationarity & Trends
 - 18.5. Perceptions of Risk
 - 18.6. Fuzzy Analysis

Instructor – Ashley Francis, BSc, M.I. Soil Sci.

Ashley is a geophysicist whose career has encompassed 17 years world-wide oil industry experience of exploration, development and production geophysics. He also makes occasional forays advising clients in nuclear and engineering sectors on subsurface definition and uncertainty. Since 1993 he has specialised in geostatistics in addition to geophysics. Ashley has worked in or on behalf of service companies, consultancies and oil companies in North and South America, Europe, Africa, Middle East, Far East and Australasia. He lectured in Borehole Geophysics to Honours Graduates at the University of the Witwatersrand, South Africa 1989-90 and was a Visiting Research Fellow at the Post Graduate Institute in Sedimentology, University of Reading, UK (1995-7). He has been teaching geostatistics to MSc Petroleum Geoscience students at Imperial College, London, since 1998/99. He is a committee member and regular attendee at the SEG Development & Production Forum and was Chairman of the 2000 meeting. He has presented widely at conferences on the subjects of geophysics and geostatistics. Ashley is a member of SEG, EAGE, IAMG, BSSS, IPSS and IAS.

Feedback from previous courses

Our feedback scoring is categorised from a minimum of 1 (Very Poor) to 6 (Exceptional) with intermediate grades of poor, adequate, good and excellent. The percentage of votes in each of the categories from the most recent 6 courses are given in the table below

	Very Poor	Poor	Adequate	Good	Excellent	Exceptional
Technical Knowledge of Tutor	0%	0%	0%	2%	50%	48%
Training/Presentation Skills of Tutor	0%	0%	0%	4%	73%	23%
Quality of course manual	0%	0%	4%	35%	50%	11%
Quality of presentation material	0%	0%	2%	28%	63%	7%

When asked if this course met their training needs or they would recommend it to their colleagues, all attendees responded Yes to both questions. Geophysicists comprise 44% of delegates, Geologists 28%, Reservoir Engineers 18% and Asset or General Managers 10%. Range of experience of attendees ranges from 0 to 25 years, with a mean experience of 13 years. When asked if this course improved their understanding of geostatistics the responses were Poorly: 0%; Moderately: 18%; Significantly: 82%.

Logistics

Duration and class sizes

The course is designed to run for 4 to 5 days depending on class size. Small classes (6 students) can cover the material more quickly, but for the optimum class size a duration of 5 days is recommended. A reduced course of just 2 days can be provided on request, but this comprises only theory and no practicals and is not recommended.

For a 4 or 5 day course run with practicals on workstations, the optimum class size is 12 students. For the theory only course without practicals a larger class size of up to 20 students is acceptable. For class sizes significantly larger or smaller than the recommendations given here, please contact Earthworks Environment & Resources Ltd. to discuss your requirements.

Requirements

The following facilities must be provided by the client:

**Suitable classroom with tables.
PC projector
Flipchart or whiteboard**

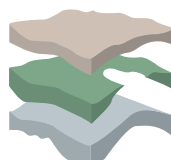
For courses including practicals:

**Workstations (recommend 1 per 2 delegates)
SUN: Solaris
Windows: NT or 2000 professional + Exc**

The Isatis software is straightforward to install and uses the FlexLM license manager. The software will need to be installed prior to commencement of the course in order to allow time for the training license keys to be generated by Geovariances. A demonstration version of Isatis (and also of Exceed for the Windows platform) can be downloaded at www.geovariances.fr Training license key requests must be made to Geovariances, following their installation instructions. Earthworks Environment & Resources Ltd will advise Geovariances that a course has been scheduled.

For further information please contact:

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