

TRAINING CATALOG 2027

Subsurface // Oil & Gas



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About Geovariances

Who we are

Geovariances: four decades of geostatistics for subsurface modeling

Geovariances is a globally recognized provider of premium geostatistics solutions for the oil & gas, geology, and geotechnical sectors, offering advanced software, expert consulting, and industry-leading training.

Founded in 1986 as a spin-off from the Center for Geostatistics at the Paris School of Mines (now Mines Paris – PSL), we have led geostatistical innovation for four decades. Our commitment to scientific rigor and technical excellence is reflected in the CFSG specialized geostatistics course, which we still deliver jointly with Mines Paris – PSL.

We help organizations improve performance and make informed, data-driven decisions by integrating geostatistics into their subsurface workflows, from reservoir characterization to geological mapping and site investigation. Our solutions enable them to evaluate alternative scenarios, better understand subsurface complexity, and reduce technical and operational risks.

At Geovariances, we understand the challenges subsurface professionals face in achieving operational efficiency while managing uncertainty in sparse, heterogeneous data. That's why our team of dedicated experts works closely with clients to tailor geostatistical approaches to their needs, delivering reliable, actionable insights that improve decision-making.

Geovariances has been a Datamine company since 2022.

Our global offering

ISATIS.NEO – THE POWER OF GEOSTATISTICS AT YOUR FINGERTIPS

Isatis.neo is Geovariances' flagship geostatistical software, trusted by leading industry players for its analytical strength, usability, and transparency. With a user-friendly interface, intuitive workflows, and robust algorithms, Isatis.neo delivers deep insight into subsurface projects while ensuring full auditability and reproducible results.

As the most comprehensive geostatistics desktop solution on the market, Isatis.neo supports a wide range of estimation and simulation methods. It enables users to meet the highest technical standards in reservoir characterization, geological modeling, ground investigation, and project risk analysis.

TRAINING, CONSULTING & MENTORING SERVICES

Geovariances offers a broad portfolio of training courses in applied geostatistics, delivered by seasoned specialists with deep domain expertise. Whether you are new to geostatistics or seeking to enhance your knowledge in advanced modeling techniques, our training programs are designed to build both theoretical understanding and practical competence.

We also offer tailored consulting and mentoring, supporting you in areas such as:

Subsurface engineering:

- Building ground models (geology, geotechnical parameters) and characterizing their variability
- Assessing geotechnical risks through multiple risk scenarios
- Modeling aquifer geometry
- Optimizing measurement and monitoring networks

Oil reservoir characterization:

- Processing seismic data: filtering, cube merging, and time-to-depth conversion.
- Modeling lithofacies, geological structures, petrophysical and geomechanical parameters
- Analyzing geobody connectivity
- Identifying spill points and delineating potential reservoir traps
- Generating scenarios for gross rock volume and recoverable oil resources

Our services are available onsite, online, or at Geovariances' offices worldwide, ensuring flexible access to world-class expertise.

Learn more at: [Geovariances Technical Resources](#).

Meet the team

DISCOVER OUR EXPERTS

At Geovariances, our strength lies in our instructors' expertise. Our training programs are delivered by expert consultants, recognized for both the quality of their work and their ability to translate advanced geostatistical knowledge into practical solutions across the entire mining value chain, from exploration and resource estimation to project management and operational optimization.

**Pedram Masoudi, Ph.D. – Senior Consultant in Geostatistics**

Pedram is a specialist in geostatistics and a lead trainer for Isatis.neo. He applies geostatistics to mineral resource estimation and classification in accordance with international standards such as JORC, as well as to geological and domain modeling. His additional strengths include Python programming and machine learning, with broader experience in geotechnical site characterization, petroleum exploration, and contaminated soil studies.

**Roberto Rolo, Ph.D. – Data Science and Resource Expert**

Roberto is a Mining Engineer from UFOP with a master's and Ph.D. in geostatistics from UFRGS in Brazil. His expertise includes implicit geological modeling, ore grade estimation, and designing simulation workflows that comply with international mineral reporting codes. He is also highly skilled in Python and machine learning applications in the geosciences.

Travel policy

To ensure the health and safety of our employees during travel, Geovariances adheres to the following guidelines:

Air Travel:

We prefer regular passenger aircraft for travel, and if charter planes are necessary, they must meet a minimum standard of twin-turbo engines with at least two crew members. We reserve the right to refuse travel on planes that do not meet this standard, and any resulting delays will be charged to the customer. We will travel in business class or its equivalent for international flights over six (6) hours.

Ground Transportation:

Rental vehicles must be full-size sedans equipped with ABS brakes and a minimum of four airbags. If the vehicles provided do not meet this standard, Geovariances reserves the right to upgrade them, with associated costs to be borne by the client.

Driving Limits:

Daily driving time is limited to a maximum of 10 hours. Any additional costs incurred to comply with this limit will be charged to the contracting party.

Helicopter Travel:

Helicopter transportation will be evaluated on a case-by-case basis, considering safety and operational requirements.

Geostatistics for subsurface characterization

Data analysis, mapping, and subsurface property modeling with geostatistics

Turn spatial data into sound decisions. Learn to analyze datasets, map surfaces, model subsurface properties, and quantify uncertainty with practical geostatistical workflows.

OBJECTIVES

- **Enhanced data insight:** Develop a deep understanding of your data through advanced geostatistical analysis, leading to more informed decision-making.
- **Improved mapping quality:** Learn to create high-quality maps by integrating various data types, ensuring comprehensive spatial representations.
- **Uncertainty quantification:** Master techniques to quantify uncertainties in your models, providing a clear assessment of confidence levels in your results.
- **Technique selection:** Understand the assumptions underlying different geostatistical methods to select the most suitable approach for your data.

COURSE CONTENT

DAY 1: ANALYZING DATA AND THEIR VARIABILITY IN SPACE AND MAPPING

Introduction to geostatistics:

- **Understanding the role of geostatistics** compared to deterministic spatial interpolation methods and identifying scenarios where it offers real added value.
- **Reviewing common deterministic interpolation methods** (nearest neighbor, moving average, inverse distance, etc.) and highlighting their strengths and limitations.

□ DURATION

14 hours / 2 days

□ LEVEL

Fundamentals

□ TYPE

Theory and practice

□ MODE

Online or in-person course

Open or in-company sessions

□ PRICE

Scheduled session (online):
EUR 1,100 / person

On-demand session: price upon request

Exploratory data analysis (EDA) and validation:

- **Using statistical tools** to analyze, control quality, and detect outliers: mean, variance, histograms, correlation coefficients, linear regression, etc.
- **Visualizing data in 2D and 3D** to better understand their distribution and spatial structure.

Spatial variability assessment:

- **Calculating, interpreting, and modeling** the experimental variogram to identify the spatial structures present in the data.
- **Presentation of key theoretical variogram models** and learning how to adjust them to the data.

Interpolation by kriging:

- **Fundamental principles and properties of kriging**, including its characteristic effects, such as smoothing.
- **Optimizing the kriging neighborhood**: single or moving neighborhood, search size, number of samples, etc.
- **Analyzing kriging weights** based on interpolation parameters (position, neighborhood, nugget effect, etc.).

DAY 2: REFINING THE MAPS

Cross-validation:

- **Implementing cross-validation** to assess variogram models and confirm the accuracy of interpolation results.

The different variants of kriging:

- **Discovering and applying different types of kriging**, such as simple, ordinary, and measurement error kriging, to identify the most appropriate method for your data.

Multivariate geostatistics:

- **Analyzing correlations between variables**, whether quantitative or semi-quantitative (such as remote sensing, DTM, land use, physico-chemical models, pollutants, etc.), using scatter plots and correlation coefficients.
- **Examining spatial relationships between variables** with cross-variograms.
- **Incorporating secondary variables** into interpolation through cokriging and collocated cokriging: principles, applications, and benefits over traditional kriging.

Non-stationary geostatistics:

- **Considering spatial trends and drifts** using methods tailored for non-stationary conditions.

Simulations and risk analysis:

- **Introduction to geostatistical simulation methods** for quantifying uncertainties and analyzing risks, illustrated with practical examples.

Practical exercises:

- **Exercises applied to real-life cases** to reinforce theoretical knowledge and enhance practical skills that can be used immediately.

OUTLINES

- **Balanced learning approach.** Theory paired with practical applications, so you understand and apply the concepts.
- **Hands-on software training.** Computer exercises in [Isatis.neo](https://www.isatis.neo.com/), on real datasets.
- **Personalized feedback.** Individual guidance from experienced trainers throughout the online sessions.
- **Comprehensive resources.** A temporary software license, documentation, journal files, and datasets to keep and reuse after the course.
- **Certificate of completion** issued at the end of the session.

WHO SHOULD ATTEND

This course is ideal for professionals working with spatial data across various fields, including:

- Geoscientists and reservoir engineers involved in geomodeling and reservoir characterization and looking for a practical, synthetic, and pragmatic introduction to geostatistical methods for reservoir characterization.
- Environmental consultants and engineers aiming to enhance data analysis and mapping capabilities.
- Academics and researchers.
- Agricultural engineers, air quality specialists, climatologists, epidemiologists, foresters, geotechnical engineers, soil scientists, and others interested in spatial data analysis.

PREREQUISITES

No prior knowledge of geostatistics is required; however, a basic understanding of elementary statistics is recommended to facilitate comprehension of course material.

Geological modeling by geostatistics

Build realistic geological models that reflect complexity and uncertainty. Apply indicator kriging, SIS, TGS, PGS, and implicit modeling through hands-on workflows in Isatis.neo.

OBJECTIVES

- **Unlock the skills to build reliable, realistic, data-driven geological models** that capture uncertainty, boosting the credibility of your subsurface interpretations and empowering you to make smarter, more confident decisions.
- **Get hands-on with powerful geostatistical methods**, like Indicator Kriging and simulations (SIS, TGS, PGS), and apply them using Isatis.neo's intuitive tools, including implicit modeling and the Unfolding feature for tackling complex stratigraphy with confidence.

COURSE CONTENT

Foundations & Indicator Kriging

- Discover indicator kriging, how it works, and when to use it.
- Learn how to apply it in practice in Isatis.neo to build geological models and define domains.

Conditional simulations

- Learn about the main facies simulation methods: sequential indicator simulation (SIS), truncated Gaussian simulation (TGS), and multi-Gaussian simulation (PGS).
- Understand their principles, key steps, and differences.
- Implement them in Isatis.neo using the dedicated options.

Implicit modeling

- Explore how to use potential fields to model stratigraphic units or intrusive bodies automatically.

Create consistent and continuous surfaces from geological data.

Unfolding

- Handle geological structures that have been folded or deformed.

□ DURATION

21 hours / 3 days

□ LEVEL

Advanced

□ TYPE

Theory and practice

□ MODE

Online or in-person course

Open or in-company sessions

□ PRICE

Scheduled session (online):
EUR 1,650 / person

On-demand session: price upon request

- Learn how to “unfold” these structures and convert complex geometries into a flattened space where continuity is more isotropic and easier to model.

OUTLINES

- **Balanced learning approach.** Theory paired with practical applications, so you understand and apply the concepts.
- **Hands-on software training.** Computer exercises in lsatis.neo, on real datasets.
- **Personalized feedback.** Individual guidance from experienced trainers throughout the online sessions.
- **Comprehensive resources.** A temporary software license, documentation, journal files, and datasets to keep and reuse after the course.
- **Certificate of completion** issued at the end of the session.

WHO SHOULD ATTEND

Ideal for professionals in mineral resource evaluation, geological surveys, geotechnical engineering, and petroleum exploration who want to strengthen their geological or facies modeling skills. Whether you’re aiming to build more robust models or integrate uncertainty assessments into your workflows, this training will help you make better-informed, data-driven decisions.

PREREQUISITES

This course covers advanced geostatistical concepts. Participants should therefore have a solid foundation in variography and kriging. Prior experience with Turning Bands Simulation is highly recommended.

Multiple-point statistics simulations with Isatis.neo – MPS

Model complex geological patterns beyond traditional two-point methods. Learn MPS simulation with DeeSse in Isatis.neo, from training images to realistic uncertainty-aware realizations.

OBJECTIVES

This course introduces you to Multiple-Point Statistics (MPS), a powerful simulation technique for **modeling complex spatial variability using training images**. Developed in collaboration with the University of Neuchâtel, the course combines **theoretical foundations with hands-on practice using Isatis.neo and its integrated DeeSse engine**.

You will learn to select suitable training images, prepare conditioning data, and **generate realistic categorical and continuous subsurface models**. The course is particularly relevant to applications in mining, hydrogeology, remote sensing, and reservoir modeling. MPS enables you to assess uncertainty and reproduce complex geological features, such as channelized permeability, stratigraphic structures, and ore grades in vein deposits.

COURSE CONTENT

General introduction

- Introduction to the geostatistical approach
- Understanding conditioning data and training images
- General principles of Multiple-Point Statistics
- Introduction to the Direct Sampling algorithm

Hands-on exercises:

- Introduction to Isatis.neo fundamentals
- First application of DeeSse to stationary categorical and continuous cases

From stationary to non-stationary simulations

- Understand the main DeeSse parameters

□ DURATION

14 hours / 4 half days

□ LEVEL

Intermediate

□ TYPE

Theory and practice

□ MODE

Online or in-person course

Open or in-company sessions

□ PRICE

Scheduled session (online):
EUR 1,100 / person

On-demand session: price
upon request

- Learn why training images are needed and how to obtain or generate them
- Identify the essential properties of a suitable training image
- Handle non-stationarity within the simulation grid
- Explore multivariate simulations

Hands-on exercises:

- Complete a practical case study based on the Areuse delta
- Generate a training image and an orientation trend to control simulations
- Perform the joint simulation of two variables

Applying MPS to real-world data

- Handle non-stationarity using analog data
- Use secondary attributes to improve simulation results
- Explore examples involving climate data, an Australian bauxite mine, bedrock topography, and geophysical data
- Apply the Direct Sampling technique to time-series simulations

Hands-on exercises:

- Complete a two-dimensional case study using secondary variables from the Herten fluvioglacial aquifer
- Fill gaps in satellite images using multivariate and multi-temporal techniques

Modeling with elementary training images

- Understand elementary training images and invariances
- Explore an application example from a mining site in South Africa
- Discover multi-scale simulations based on Gaussian pyramids

Hands-on exercises

- Complete simple applications using elementary training images and invariances
- Explore Gaussian pyramids
- Build a first two-dimensional fluvioglacial facies model using the Herten aquifer case study

Overview of advanced MPS methods

- Cross-validation
- Multi-scale simulations on unstructured grids
- Inequality and block conditioning
- Connectivity conditioning

Complementary hands-on exercises: modeling a fluvioglacial deposit

- Build elementary training images
- Get introduced to Python programming for task automation
- Build a stratigraphic model
- Model a fluvioglacial aquifer from borehole data

OUTLINES

- **Balanced learning approach.** Theory paired with practical applications, so you understand and apply the concepts.
- **Hands-on software training.** Computer exercises in lsatis.neo, on real datasets.
- **Personalized feedback.** Individual guidance from experienced trainers throughout the online sessions.
- **Comprehensive resources.** A temporary software license, documentation, journal files, and datasets to keep and reuse after the course.
- **Certificate of completion** issued at the end of the session.

WHO SHOULD ATTEND

This course is tailored for professionals and researchers involved in spatial modeling who want to enhance their ability to simulate complex geological structures and facies distributions using Multiple-Point Statistics (MPS). Ideal participants include:

– **Geologists & geomodelers**

Working in mining, oil & gas, or hydrogeology, those who need to model intricate geological patterns – such as channels, fractures, or stratigraphy, that are difficult to capture with traditional variogram-based approaches.

– **Reservoir engineers**

Focused on building realistic facies or property models that improve reservoir characterization and flow simulations.

– **Environmental & hydrogeological scientists**

Needing to simulate spatial heterogeneities in aquifer systems with geological realism.

– **Geostatisticians and data scientists**

Looking to deepen their expertise in MPS and apply advanced simulation techniques using training images and high-resolution geological analogs.

– **Consultants and technical advisors**

Supporting clients with subsurface modeling projects who want to stay at the forefront of geostatistical innovation.

– **Researchers and academics**

Engaged in spatial data analysis, stochastic simulation, or geoscientific modeling who want to explore MPS in practical workflows.

PREREQUISITES

None. A theoretical understanding of geostatistical approaches is an advantage. This will help participants make the most of the course.

Machine learning applied to geosciences

Put machine learning to work on real geoscience and mining challenges. Build, evaluate, and apply classification and regression models by connecting scikit-learn with Isatis.neo.

OBJECTIVES

- Define geological and geometallurgical domains with unsupervised learning and assess the quality of the clusters you obtain.
- Build, validate, and tune supervised models, and know when a model is fit to be applied.
- Predict grades and lithology with neural networks, using Deep Kriging.
- Run the full workflow from Python and scikit-learn into Isatis.neo.

COURSE CONTENT

- **General aspects of machine learning** and an introduction to the Python language.
- **Unsupervised learning**
Data transformations, clustering techniques in theory and practice, and cluster quality assessment.
- **Supervised learning**
Predictive models in theory and practice, model validation, hyperparameter tuning, and model application.
- **Deep Kriging**
Estimating grades and lithology with neural networks.

OUTLINES

- **Balanced learning approach.** Theory paired with practical applications, so you understand and apply the concepts.
- **Hands-on software training.** Computer exercises in [Isatis.neo](https://www.isatis.neo), on real datasets.
- **Personalized feedback.** Individual guidance from experienced trainers throughout the online sessions.

□ DURATION

21 hours / 3 days

□ LEVEL

Intermediate

□ TYPE

Theory and practice

□ MODE

Online or in-person course

Open or in-company sessions

□ PRICE

Scheduled session (online):
EUR 1,650 / person

On-demand session: price upon request

- **Comprehensive resources.** A temporary software license, documentation, journal files, and datasets to keep and reuse after the course.
- **Certificate of completion** issued at the end of the session.

WHO SHOULD ATTEND

This course assumes you know your geology and your geostatistics and teaches you machine learning.

It suits:

- reservoir geologists and geomodelers who build facies and property models;
- petrophysicists working on lithology and rock-type classification from well logs;
- geologists mapping structures and formations from sparse data;
- geotechnical engineers and hydrogeologists characterizing ground conditions and aquifers;
- geostatisticians looking to extend their methods beyond kriging;
- consultants, researchers and postgraduate students working on subsurface problems.

PREREQUISITES

A working knowledge of statistics, algebra and geostatistics is recommended. Familiarity with Python is optional.

Petroleum geostatistics

Seismic data filtering and depth conversion with geostatistics

Learn to use geostatistics effectively for accurate time-to-depth conversion and thorough uncertainty analysis of reservoir volumes.

OBJECTIVES

- Understand and implement geostatistics to build robust reservoir structural models.
- Improve seismic data quality with geostatistical filtering.
- Make the best use of all available data to achieve robust time-to-depth conversion.
- Perform quantified uncertainty analysis on traps and reservoir volumes.

COURSE CONTENT

SESSION 1: QC AND FILTERING

Quality control of seismic data

- Identify possible data outliers, anisotropies, trends, etc.

Understanding and filtering of several artifacts (noise, footprints, acquisition artifacts)

- Quantification of the spatial variability: variogram calculation, interpretation, and modeling.
- Seismic filtering by kriging (2D/3D): principles and properties.

SESSION 2: TIME-TO-DEPTH CONVERSION

Multivariate geostatistics for time-to-depth conversion

- Integration of seismic data or velocity model parameters and well information in the interpolation. Analysis of the correlations between variables. Multivariate variogram. Co-kriging.
- Multi-layer approach and Bayesian techniques to reduce the uncertainties.

SESSION 3: UNCERTAINTY ANALYSIS

Uncertainty quantification

□ DURATION

14 hours / 2 days

□ LEVEL

Advanced

□ TYPE

Theory and practice

□ MODE

Online or in-person course

Open or in-company sessions

□ PRICE

On-demand session only

Price upon request

- Introduction to conditional simulations for uncertainty quantification.
- Difference between kriging and conditional simulations.

Trap analysis and volumetrics

- Probability maps.
- Risk analysis.

How to find the best model

- Introduction to Geostatistical Inversion.

SESSION 4: EXERCISES WITH ISATIS.NEO AND CONVERSIONS & UNCERTAINTIES WORKFLOW.

OUTLINES

- **Balanced learning approach.** Theory paired with practical applications, so you understand and apply the concepts.
- **Hands-on software training.** Computer exercises in isatis.neo, on real datasets.
- **Personalized feedback.** Individual guidance from experienced trainers throughout the online sessions.
- **Comprehensive resources.** A temporary software license, documentation, journal files, and datasets to keep and reuse after the course.
- **Certificate of completion** issued at the end of the session.

WHO SHOULD ATTEND

This course targets geophysicists involved in data interpretation and mapping of surfaces that limit the reservoirs.

PREREQUISITES

Since the course covers advanced geostatistical concepts, it is strongly advised that attendees have a solid understanding of variography and kriging.

The course *Data analysis, mapping, and subsurface property modeling with geostatistics* covers the fundamental concepts of geostatistics for Oil & Gas and provides an ideal foundation for this course.

Advanced geostatistics for reservoir characterization

Learn the latest techniques in reservoir characterization and property and facies modeling through stochastic simulations.

OBJECTIVES

- Create robust 3D static reservoir models using standard and advanced geostatistical simulation techniques and explore their advantages and limitations.
- Enhance model quality by integrating multiple data sources during interpolation and applying seismic data filtering.
- Develop facies models, with a focus on analyzing proportion curves and understanding the role of the stratigraphic reference surface.
- Learn simulation techniques for populating the model with petrophysical properties guided by the facies distribution.

COURSE CONTENT

DAY 1: HORIZON MAPPING AND GEOPHYSICAL RESERVOIR CHARACTERIZATION

- Overview of the standard geomodeling workflow
- Data integration techniques (kriging in the multivariate case, kriging with external drift and kriging with Bayesian drift, kriging with uncertain data) with application examples in Time-to-Depth conversion and regional integration of seismic data
- Introduction to geostatistical filtering of seismic data with factorial kriging
- Application of geostatistical simulations for assessing uncertainty on maps

DAY 2: POPULATING A GEOLOGICAL MODEL WITH FACIES

- Facies definition from logs with a geostatistical clustering technique
- Presentation of facies distribution modeling concepts
- Common simulation algorithms for categorical variables (facies)

□ DURATION

21 hours / 3 days

□ LEVEL

Intermediate

□ TYPE

Theory and practice

□ MODE

Online or in-person course

Open or in-company sessions

□ PRICE

On-demand session only

Price upon request

- Indicator simulations (**SIS**)
- Truncated Gaussian (**TGS**) and Plurigaussian (**PGS**) simulations
- Boolean simulations (**object-based**)
- Multiple-Point Statistics (**MPS**)
- Process-based approaches (**Flumy**)
- Accounting for structural constraints in facies modeling

DAY 3: POPULATING A GEOLOGICAL MODEL WITH PROPERTIES – CONNECTIVITY INTEGRATION

- Advanced analysis of petrophysical properties in facies
- Common simulation algorithms for petrophysical properties
- Volumetrics and quantification of the associated uncertainty
- Accounting for dynamic data (honoring connectivity information).

OUTLINES

- Balanced learning approach.** Theory paired with practical applications, so you understand and apply the concepts.
- Hands-on software training.** Computer exercises in lsatis.neo, on real datasets.
- Personalized feedback.** Individual guidance from experienced trainers throughout the online sessions.
- Comprehensive resources.** A temporary software license, documentation, journal files, and datasets to keep and reuse after the course.
- Certificate of completion** issued at the end of the session.

WHO SHOULD ATTEND

This course targets professionals, geologists, geophysicists, and reservoir engineers involved in reservoir characterization.

PREREQUISITES

Since this course explores advanced geostatistical concepts, it is strongly recommended that attendees possess a solid understanding of variography and kriging. The course *Data analysis, mapping, and subsurface property modeling with geostatistics* covers the fundamental principles of geostatistics specific to the Oil & Gas industry and provides an ideal foundation for this advanced course.

An overview of geostatistics for the oil & gas industry

Discover the role of geostatistics in reservoir characterization: a one-day awareness seminar designed to broaden your perspective.

OBJECTIVES

This seminar offers a clear, practical introduction to how geostatistics – through techniques such as variogram analysis, kriging, simulation, and uncertainty quantification – can support seismic interpretation, facies modeling, property estimation, and risk assessment. Designed for managers and decision-makers, it combines useful theory with real-world applications, with no prior geostatistical experience needed.

COURSE CONTENT

Introduction: Geostatistics concepts and tools and their applications

Core concepts and applications of geostatistics in the E&P field, laying the foundation: experimental variogram and variogram fitting, kriging and its variants, and simulations.

Geostatistics for data analysis, control, and enhancement; mapping; geological modeling; and quantification of uncertainty.

Application 1: Data analysis, control, and enhancement

Statistical data quality checks, outlier detection, identification of spatial behavior and hidden correlations, characterization of geological properties, data transformation using Gaussian anamorphosis.

Application 2: Seismic data filtering

Geostatistical characterization of noise and acquisition artifacts, techniques for filtering seismic amplitude/velocity data, considering global vs. local strategies and 4D contexts.

Application 3: Time-to-depth conversion

□ DURATION

7 hours / 1 day

□ LEVEL

Awareness

□ TYPE

Theory and practice

□ MODE

Online or in-person course

Open or in-company sessions

□ PRICE

On-demand session only

Price upon request

Different geostatistical approaches to translate seismic time measurements into accurate depth models

Application 4: Mapping continuous properties

Kriging methods (ordinary and with local parameters), integration of auxiliary and uncertain data or interval-defined data, multivariate mapping, and regional 3D modeling.

Application 5: 3D facies modeling

Facies proportion modeling, incorporating seismic data, considering diagenesis and sedimentological concepts, modeling of physical processes: the example of meandering channelized systems, and hybrid modeling workflows.

Application 6: 3D petrophysical property modeling

Property mapping, conditional modeling to the facies, handling border effects, and integrating hydrological connectivity.

Application 7: Uncertainty quantification

Understanding kriging variance, using simulation outputs for volumetrics, risk curves, and probability mapping (to be above a threshold or part of a reservoir or a facies)

Conclusion & discussion

Practical deployment of geostatistics and next steps for operational use

WHY ATTEND?

- **Global perspective:** From seismic data processing to reservoir uncertainty, this seminar shows how geostatistics integrates across reservoir workflows.
- **Engaging format:** Learn through a mix of conceptual insights, illustrative case studies, and open discussions.
- **Accessible to all:** No prerequisites required — this seminar is designed to raise awareness and build understanding, not to teach hands-on techniques.

WHO SHOULD ATTEND

Ideal for project managers, decision-makers, and technical leaders seeking a concise introduction to geostatistical methods in reservoir characterization.

Boost your proficiency
in Isatis.neo and Isatis.py

Isatis.neo Fundamentals

Turn geostatistical knowledge into confident Isatis.neo practice. Import and explore real data, model variograms, run kriging, validate results, and take your first steps with simulation.

OBJECTIVES

Isatis.neo offers a streamlined, powerful environment for exploring spatial data, creating accurate models, and easily quantifying uncertainty. This course ensures that, in just one day, you'll feel confident in boosting your analysis and incorporating best-practice geostatistics into your daily projects.

COURSE CONTENT

–Getting around Isatis.neo

The interface, the 3D viewer, the Python calculator, and the batch tools: what each one is for, and where it fits in a working session.

–Bringing data in

Import points, block models, and wireframes, and prepare a dataset for analysis.

–Exploring the data

Quality control with histograms and scatter plots. Detect outliers, analyze trends, and assess anisotropy. Variogram calculation and modeling, in 2D and in 3D.

–Estimating

Set up a neighborhood, run point and block kriging, then check results with cross-validation and model validation.

–A first look at simulations

What conditional simulation gives you that a single estimate does not: a set of equally probable outcomes, and a way to read uncertainty from their spread.

OUTLINES

–**Balanced learning approach.** Theory paired with practical applications, so you understand and apply the concepts.

–**Hands-on software training.** Computer exercises in [Isatis.neo](https://www.isatis.neo), on real datasets.

□ DURATION

7 hours / 1 day

□ LEVEL

Basic

□ TYPE

Practice

□ MODES

Online or in-person course

Open or in-company sessions

□ PRICE

On-demand session only

Price upon request

- **Personalized feedback.** Individual guidance from experienced trainers throughout the online sessions.
- **Comprehensive resources.** A temporary software license, documentation, journal files, and datasets to keep and reuse after the course.
- **Certificate of completion** issued at the end of the session.

WHO SHOULD ATTEND

This course is ideal for professionals with a foundation in geostatistics who want to take full control of their spatial data workflows in Isatis.neo, whether they work in mining, petroleum, or environmental science.

PREREQUISITES

This course focuses on practical exercises with Isatis.neo, and it will not include theoretical reminders on geostatistics. Participants must therefore have a fundamental knowledge of geostatistics.

Isatis.neo Scripting

Turn repetitive tasks and project-specific logic into robust, reusable workflows. Build tailored data processing and integrate Python libraries to work faster and consistently across projects.

OBJECTIVES

- **Save time, reduce manual errors, and standardize recurring processes in Isatis.neo.** By the end of this course, you will know how to create flexible batch files that adapt to different datasets, domains, and variables.
- **Extend Isatis.neo's capabilities with Python-based calculations tailored to your data and workflows.** By the end of this course, you will be able to write, test, and run scripts directly within Isatis.neo.

COURSE CONTENT

The course consists of two modules that can be attended independently:

Module 1: Working with batch files

- Understand the structure of an Isatis.neo batch file.
- Record workflows using the batch recorder.
- Replace fixed parameters with variables and arrays.
- Use loops to process multiple variables or domains.
- Add conditions and stopping rules to control execution.
- Adapt, run, and maintain reusable workflows.
- Apply these techniques through guided exercises based on realistic projects.

Module 2: The Isatis.neo Python Calculator

- Discover the Python Calculator environment and its different execution modes.
- Learn the Python concepts needed to create calculations in Isatis.neo.
- Access and manipulate project data through scripts.
- Write reusable routines for customized data processing.

□ DURATION

Module 1: 3 hours / 0.5 day

Module 2: 3 hours / 0.5 day

□ LEVEL

Intermediate

□ TYPE

Practice

□ MODE

Online or in-person course

Open or in-company sessions

□ PRICE

On-demand session only

Price upon request

- Import and apply external Python libraries.
- Combine calculations, conditions, and functions to address project-specific requirements.
- Test and refine scripts through guided practical exercises. Explore and experiment with different scripting modes and options.

OUTLINES

- **Balanced learning approach.** Theory paired with practical applications, so you understand and apply the concepts.
- **Hands-on software training.** Computer exercises in isatis.neo, on real datasets.
- **Personalized feedback.** Individual guidance from experienced trainers throughout the online sessions.
- **Comprehensive resources.** A temporary software license, documentation, journal files, and datasets to keep and reuse after the course.
- **Certificate of completion** issued at the end of the session.

WHO SHOULD ATTEND

This training course is designed for any Isatis.neo user who wants to improve their automation and Python programming skills or optimize their workflows using Python's computing capabilities.

PREREQUISITES

Familiarity with Isatis.neo is recommended, which you can gain by completing the "*Isatis.neo Fundamentals*" course. Prior experience with scripting or Python is helpful but not required.

Isatis.py Hands-on

Need maintainable geostatistical automation? Learn Python fundamentals and use Isatis.py libraries to turn recurring technical tasks into clear, reusable scripts.

OBJECTIVES

Manual technical procedures become difficult to maintain when data or parameters change. You will learn to write Python-based workflows integrating the Isatis.py geostatistical library and external scientific libraries. You'll start by learning to **interpret and write Python scripts** (module 1), then apply them to **data preparation** and **Exploratory Data Analysis** (module 2), **variography** and **kriging** (module 3), **conditional simulations** (module 4), **multivariate modeling** (module 5), and **categorical variable modeling** (module 6). You'll also explore how to integrate **Isatis.py** into your projects to generate visuals, streamline processes, and efficiently manage large datasets, benefiting from its built-in multi-threading and parallel computing capabilities.

COURSE CONTENT

The course consists of six modules that you can complete independently.

Module 1 – Introduction to Python

Set up the Python environment

- Explore the basics of Anaconda and Python.
- Read and interpret Python code before creating a first script.

Build reusable scripts

- Define variables and arrays that can be adapted to different domains or datasets.
- Use loops and conditional statements to control automated workflows.

Integrate libraries and automate tasks

- Install and use external scientific libraries to add functionality and generate visuals and graphics.

□ DURATION

3 hours per module

□ LEVEL

Intermediate

□ TYPE

Practice

□ MODE

Online or in-person course

Open or in-company sessions

□ PRICE

On-demand session only

Price upon request

- Record and automate simple recurring tasks as input data changes and for audit purposes.
- Practice the scripting workflow through hands-on exercises using Isatis.py.

Module 2 – Exploratory Data Analysis

Script dataset visualization

- Create two-dimensional and three-dimensional data visualizations with Isatis.py.

Configure data-preparation operations

- Run declustering operations to address the effect of preferential sampling.
- Script drillhole desurveying and interval compositing for subsequent analysis

Assemble the analysis pipeline

- Configure Principal Component Analysis (PCA) to investigate multivariate structure.
- Run contact analysis on the mineral deposit dataset.
- Organize the confirmed operations as a clear, interpretable Python workflow.

Module 3 – Kriging

Configure continuity inputs

- Script the calculation and review of experimental variograms for the estimation workflow.

Run estimation operations

- Configure and run simple kriging and ordinary kriging in Isatis.py.
- Build a two-dimensional contamination-mapping workflow from pollution data.
- Build a three-dimensional modeling workflow for an iron deposit.

Validate outputs and control domains

- Run the confirmed validation steps on estimation outputs.
- Implement data selection within polygons to manage domain limits in the three-dimensional model.
- Organize the operations as clear, interpretable Python scripts.

Module 4 – Continuous Simulations

Prepare the scripted simulation inputs

- Implement data selection from meshes for the simulation workflow.
- Configure anamorphosis before Gaussian simulation.
- Set up Hierarchical Data Format version 5 (HDF5) file handling for large datasets and outputs.

Configure continuous-simulation operations

- Run Turning Bands Simulation and Sequential Gaussian Simulation through Isatis.py.
- Configure point-support and block-support simulations.
- Configure simulations with local anisotropies.

Validate and deliver workflow outputs

- Run the confirmed validation steps on generated realizations.
- Generate Isatis.py outputs and graphics for spatial-uncertainty visualization.
- Organize the complete pipeline as clear, interpretable Python scripts.

Module 5 – Multivariate Estimation

Configure multivariate inputs and estimators

- Configure and run ordinary cokriging and rescaled cokriging through Isatis.py.
- Implement the workflow for heterotopic datasets in which variables are not sampled at all the same locations.

Script transformation and imputation

- Integrate the Projection Pursuit Multivariate Transform (PPMT) into the pipeline.
- Configure multivariate data imputation where values are missing.

Generate and check multivariate outputs

- Run multivariate simulations in Isatis.py.
- Check whether the resulting outputs reproduce complex relationships among variables.
- Organize the hands-on mineral deposit workflow as clear Python scripts.

Module 6 – Indicator Estimation and Simulation

Configure categorical estimation

- Configure and run indicator kriging on categorical data through Isatis.py.

Script categorical simulations

- Configure and run Plurigaussian Simulation (PGS).
- Configure and run Sequential Indicator Simulation (SIS).

Generate and review facies outputs

- Combine the three operations in a hands-on Python workflow based on the confirmed mineral deposit dataset.
- Generate and review facies models from categorical variables.

OUTLINES

- Balanced learning approach.** Theory paired with practical applications, so you understand and apply the concepts.
- Hands-on software training.** Computer exercises in [Isatis.py](#), on real datasets.
- Personalized feedback.** Individual guidance from experienced trainers throughout the online sessions.
- Comprehensive resources.** A temporary software license, documentation, journal files, and datasets to keep and reuse after the course.
- Certificate of completion** issued at the end of the session.

WHO SHOULD ATTEND

Company developers, geoscientists, and data scientists with Python scripting experience and a recommended practical geostatistics background who implement geostatistical workflows with Isatis.py.

PREREQUISITES

Except for the first module, which introduces Python coding, you need Python scripting experience. Practical geostatistics knowledge is also recommended, as this course focuses on implementing workflows rather than teaching methods.

Training schedule

2027 session dates

– *Data analysis, mapping, and subsurface property modeling with geostatistics*

April 26-27

September 27-28

– *Geological modeling by geostatistics*

May 17-19

October 4-6

– *Multiple-point statistics simulations with Isatis.neo – MPS*

June 14-17 (4 half-days)

October 18-21 (4 half-days)

– *Machine learning applied to geosciences*

June 21-23

November 15-17

① Note that the following courses are available upon request:

– Practical courses: Isatis.neo Fundamentals, Isatis.neo Scripting, and Isatis.py Hands-on.

– Oil & Gas dedicated courses: Seismic Data Filtering and Depth Conversion with Geostatistics, Advanced Geostatistics for Reservoir Characterization, and An Overview of Geostatistics for the Oil & Gas Industry.

We can offer all our courses in French if demand from participants is sufficient.

GEOVARIANCES

DATAMINE FRANCE

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