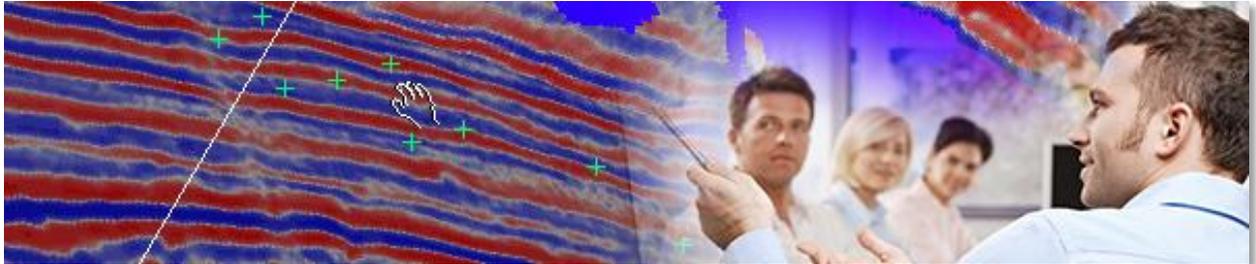




# SEISMIC-RELATED SERVICES



## Our offer

Geostatistics is at the heart of numerous E&P workflows, from seismic data QC and depth conversion to reservoir characterization and volumetrics. Whatever the method you apply, controlling the underlying assumptions and validating the results is critical to avoid any detrimental consequences during prospect evaluation and reservoir uncertainty assessment.

### Consulting - Benefit from renowned expertise

Geovariances consultants help you to efficiently setup solutions tailored to your particular geostatistical needs. Consulting projects can be organized either at your offices or in our premises, on an ad-hoc basis or through long-term commitment. They can:

- Review geostatistical components of your reservoir characterization workflows, whatever your software package
- Implement efficient workflows and integrate ISATIS seamlessly with your other software products
- Quantify the benefit of advanced QCing and modeling methodologies

### Mentoring - Deepen your knowledge on specific issues

Increase your proficiency in geostatistics through one-to-one sessions with our experts

- Receive practical guidance on appropriate and well-proven geostatistical approaches
- Develop your geostatistical skills and, learn new methods

### Training - Increase your skills in geostatistics

Geovariances offers a full suite of petroleum geostatistics courses available worldwide

- In-house sessions and workshops tailored to your specific requirements (basic to advanced)
- Courses focused either on geostatistical concepts or on software practice
- More than 300 people from 20 different countries successfully trained in the last two years

### Scientific Innovation - Going even further

Geovariances has privileged links with the Geosciences/Geostatistics Group at Mines ParisTech. Together, we have the unique capacity to solve technical problems that need theoretical developments

- Research & development projects and consortia
- Working parties and seminars focused on specific issues



## How we can help you

### Seismic Data Optimization

The quality of seismic volumes is critical in building reliable reservoir models. Seismic data are often polluted by acquisition or processing artifacts which may have strong impact on subsequent seismic processing or interpretation.

Geovariances consultants have a unique experience in stochastic filtering techniques and help you enhance your data value by:

- Providing data analysis tools for investigating your seismic data and identifying anomalous and erroneous values in **any seismic scatter or gridded datasets** (seismic picks, velocities, acoustic impedance, etc.). Our consultants help you in achieving this step automatically using batch procedures.
- Getting rid of undesirable noise (structured - acquisition footprint, patterns due to oriented processing windows – random noise) on velocities or amplitudes using **factorial kriging**.
- Building consistent cubes merging several seismic surveys of different dimension 2D or 3D, size, geometry, sampling rates, age, etc.
- Filtering time picking errors and assessing the attached uncertainty.
- Implementing automatic multivariate filtering for extracting common/different components from **4D surveys** using Isatis Multi Acquisition Automatic Factorial Kriging (MAAFK) workflow.

Geovariances consultants are geophysicists. They help you realize the maximum value from your seismic by:

- Estimating **incidence angles** and **fold map** to validate balance between sub-stacks and for AVO / AVA analysis.
- Building synthetic noise cubes to facilitate modeling, uncertainty evaluation and interpretation of 4D impact for 4D feasibility and noise simulation.
- Providing guidance on the use of **stochastic inversion** to generate equiprobable heterogeneous impedance simulations that are consistent with the 3D seismic volume.
- Assessing the uncertainty in your velocity or impedance volumes by applying stochastic simulations.

### Geostatistical Depth Conversion

Applying geostatistics to achieve depth conversion means that the resulting structural model not only ties to the wells but also reflects the inherent spatial behavior of the seismic information.

Geovariances consultants help you in properly building depth structural model and evaluating its reliability by:

- **Optimally integrating available data** from cores, well logs and seismic using state-of-the-art geostatistical techniques.
- Applying non stationary geostatistical algorithms reproducing the velocity or impedance trends.
- Building 2D/3D geologically plausible velocity models.
- **Calibrating velocity functions and models**, taking into account well and seismic data as well as geological features, and trend fitting velocities.
- Running conditional simulations to assess the variability of the depth values and the related probability.
- Providing guidance on the **optimal positioning of wells**.

### Volumetric Uncertainty

E & P decisions must be supported by the best assessment of the uncertainties on volumes.

Geovariances consultants make use of state-of-the-art stochastic simulation techniques and help you take back control of your reserves by:

- Building expectation curves on volumes (GRV), based on flexible combinations of multiple **stochastic simulations** of the reservoir geometry.
- Identifying P10, P50, P90 scenarios on volumes.
- Performing **spill point analysis**.

## Our people

Geovariances has developed a professional expertise confirmed by more than 25 years of experience in the petroleum field.

Our consultants are highly qualified, experienced, versatile and fully committed to supporting your company's needs:

- A team of geostatisticians, geologists, petroleum engineers and geophysicists with worldwide experience.
- Regular contributions to international industry and academic conferences and journals.
- Responsible for the implementation of many significant technical advances over the past 25 years.