Press kit

Isatis 2015 – March 30th, 2015

Worldwide leader in Geostatistics, Geovariances enables its clients involved with mapping, resource estimation or risk analysis to benefit from almost 30 years' experience in marketing geostatistics software solutions and expertise to Oil & Gas, Mining and the Environmental industries.

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Geovariances

Where no one has gone before

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B. Press release

Isatis innovates once again offering "Simulation Reduction", a unique application aiming at picking a representative subset of a few grade simulations to help appraise the upside potential and the downside risk of a deposit in a more efficient way.

Avon, March 30th 2015 – Geovariances announced today the release of Isatis 2015, the new version of its software known in the Mining industry as the leading software solution in geostatistics.

New to **Isatis 2015** is a one-of-a-kind application for **Simulation Reduction** aiming at facilitating project evaluation. **Simulation Reduction** identifies the most representative subset of simulated grades among hundreds of realizations which best capture the different scenarios, each simulation being associated to a probability of occurrence.

This approach is easy to set up in an industrial context and can be implemented to characterize the risk attached to a project due to the uncertainty on the resource. It may be applied to help with:

- Reserve optimization,
- Open pit optimization and mine scheduling,
- Evaluation of projects when taking financial and technical uncertainties into account,
- Mine optimization for a portfolio of deposits.

SLN from Eramet Group has supported the related research consortium and applied **Simulation Reduction** to their Tiébaghi orebody. Five sets of simulated recoverable grades have been identified by the procedure. From these five representative scenarios, SLN has derived five pit designs allowing in particular the optimization of the entry sectors for the mining operations.

Another noteworthy development of **Isatis 2015** is an **innovative variogram fitting procedure in the Universal Kriging framework**. This iterative application performs simultaneously the identification of a global trend and the automatic fitting of the residual variogram, thus avoiding bias classically observed when computing variograms on residuals.

Isatis 2015 new capabilities also include:

- The ability to incorporate an **external script** into an Isatis journal file making it easier the automation of user own workflow,
- The ability to process very big data sets in a faster way.

www.geovariances.com

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C. Where to find Isatis?

Geovariances is to present Isatis at:

- **CIM 2015 – Montreal, Canada** – May 10-13, 2015
- **Geomin 2015 – Antofagasta, Chile** – July 8-10, 2015
- **The Danie Krige Geostatistical Conference 2015 – Johannesburg, South Africa** - August 19-20, 2015

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D. Isatis technical features

State-of-the art and industry benchmark for geostatistical software package

- **Comprehensive geostatistical package:**
  - The reference in geostatistics for more than 20 years.
  - Exclusive range of proven and robust geostatistical algorithms:
    - Interactive exploratory data analysis and automatic variogram modeling.
    - Standard linear geostatistics for estimation and mapping.
    - Numerous methods for stochastic simulations applied to uncertainty assessment (i.e. Turning Bands, SGS) and facies modeling (i.e. SIS, Plurigaussian, MPS).
    - Advanced geostatistics (non-linear geostatistics, multivariate techniques) for improved mineral resource estimation.
  - Automatic procedures for model updating and easy reproduction of workflows.
  - Full storage of workflows and input parameters for auditing.
  - Integrated with mainstream mining packages (i.e. CAE Studio, Gems, Vulcan).

  Isatis includes a wealth of various statistical and geostatistical applications. Learn more about them at http://www.geovariances.com/en/isatis-ru324.

- **One-of-a-kind cutting-edge technology:**
  - Developed and implemented by specialists whose expertise is based on +25 years' experience in geostatistics and software development.
  - In continuous innovation thanks to consortia or research programs in partnership with renowned international public or private companies (more info on the current consortiums at http://www.geovariances.com/en/scientific-innovation-ru320).
  - Exclusive R&D agreement with Mines ParisTech Geostatistics Group, geostatistics discipline birth place.
  - Agreement with Ephesia Consult for the implementation of their Impala library (optimized multiple-points statistics simulation) in Isatis.

- **Used by the Mining industry leaders:**
  - + 3500 users over the world.
  - Used by the Top Mining Companies: AngloGold Ashanti, Areva, BHP Billiton, Codelco, De Beers, Eramet, Gold Fields, Rio Tinto, Vale.
  - Used by consulting companies for audits, reviews and due diligence (including AMC Consultants, Coffey, CSA Global, Cube Consulting, Golder Associates, Quantitative Group, Snowden, SRK).

- **Applied for:**
  - Drill hole spacing analysis and optimization.
  - Grade control model.
  - Comparison of selectivity and estimate precision.
  - Linear and non-linear resource estimation.
  - Resource classification.
  - Resource variability analysis.
  - Reconciliation.

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E. What Isatis users say about the software

*"I am using Isatis for resource estimation. This is the most **powerful geostatistical package**, used by most of the consultants. Using Isatis is simple for geostatistitians."*

Marat Abzalov, Exploration Manager at Rio Tinto Exploration, Australia

*"Isatis, in our experience, is by far the most **powerful software solution for variography**."*

Ted Coupland, Director and Principal Geostatistician at Cube Consulting, Australia

*"I did the 9 month course in Geostatistics at Fontainebleau and one of the biggest revelations there is the fact that when variables are correlated one can be used to krige the other. It is called **multivariate kriging**. Geovariances is the marketer of Isatis and it can do so much more – **there is no other software on the planet to touch it**."*

Ashley Brown, Director, Reserves at Inmet Mining, Canada

*"Geovariances is acting in **improving constantly the current software Isatis**, developing new modules in response to the industrial demand, and adapting the estimation procedure based on specific problems encountered."*

Monique Le Guen, Geology Department Manager - Resources & Reserves at Eramet, France

*"Isatis has proven to be the **most effective commercial tool** of any I have used for multivariate data analysis, mapping and modeling over the last 16 years of my career."*

David Garner, Principal Geomodeler at Statoil, Canada

***"Best Geostatistical toolbox on earth**! I've been using Isatis since 1995, and have been affilitated with the Paris School of Mines before that. **You can't beat the reliability and the varity of the tools and methods available** to solve litterally any spatial problem. It's great to use in conjuction with lager commercial earth modeling packages, or simply on its own. "*

Jeffrey Yarus, Senior Manager of Earth and Reservoir Modeling at Landmark Graphics Corporation, the USA

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F. Geovariances key points

World leader in Geostatistics

- **French independent software vendor specialized in geostatistics**
  - Founded in 1986 by three engineers from the Geosciences Research Department/Geostatistics Group at Mines ParisTech.
  - Developer and exclusive distributor of two software packages:
    - ISATIS, the industry benchmark software for Geostatistics for more than 20 years,
    - KARTOTRAK, integrated software solution for contaminated site characterization.
  - Training provider in geostatistics.
  - Consulting service provider related to mineral resource estimation, oil reservoir modeling, contamination mapping and characterization, etc.

- **Real know-how and professional expertise in geostatistics**
  - Almost 30 years of experience in applying geostatistics to address mine exploration, oil/gas exploration or environmental issues (i.e. contaminated site characterization).
  - Versatile team of highly qualified geologists, mining engineers and geostatisticians with worldwide experience.
  - Regular contributions to international industry, academic conferences and professional journals.

- **Committed to fully support the industry's needs by constantly improving its software products and technology:**
  - Continuous investment in research and development through research consortia or partnerships with research leaders in their respective industries:
    - Mines ParisTech for the development of ISATIS,
    - CEA for the development of KARTOTRAK,
    - Ephesia Consult for the implementation of their Impala library in ISATIS
  - Responsible for the implementation of many significant technical advances over the past 25 year.

- **Location**
  - Headquarter based in Avon-Fontainebleau.
  - Local office in Brisbane (Australia).
  - Local representation in São Paulo (Brazil).

- **Key figures :**
  - Number of employees : **+45**
  - Turnover : **+5 M€**
  - **+400** company customers over the world
  - **+3000** software users over the world

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G. Geovariances vision

- **To offer our customers the leading-edge technologies in geostatistics**
  Based on a research and partnership strategy

  While independent software vendor, Geovariances invests in R&D via consortia and partnerships with research centers world leaders in Geostatistics or their respective industries, to provide even more innovative solutions and closer to the needs of its customers.

- **To provide the most complete solution in geostatistics**
  To answer any kind of expectations, from the beginner to the expert in geostatistics

  With its highly qualified human resources in geostatistics, mathematics, geology and software development, Geovariances can offer the expertise industrials, consultancies or local authorities (who need to apply geostatistics in response to their specific problems) expect.

  The service as a priority

  Geovariances is well aware of the strategic challenge that conducted studies or software computing results mean for its customers. The company builds on its partners' and own expertise to answer its clients' challenges and to provide solutions on which they can rely confidently. That is why Geovariances is committed to offer quality and accuracy to the users of its software packages.

  Whether its customers encounter a technical problem or they need to be guided in the software use, Geovariances' aim is that software users come back to their productive task as quickly as possible. **Geovariances Technical Support**, consisting of specialists, is in direct contact with the users to respond quickly their questions and is committed to keep in touch with them as much as they need. That is why **Geovariances Technical Support** is recognized and praised by all its beneficiaries.

- **To be the first geostatistics sponsor**
  And develop new markets

  Geostatistics is essential in a world where needs in raw material are constantly growing and natural resources are everyday scarcer and deeper and complex to extract, and where environmental risk control becomes compulsory. Advanced geostatistics allow better estimation of resources or better characterization of pollution and enable an improved risk assessment. Geostatistics is the essential tool for a better waste management and a better cost control.

  So that everyone can benefit from geostatistics added value, Geovariances offers a large portfolio in geostatistics training and helps everyone who needs to go further in their projects by offering specific mentoring services.

  Geovariances' aim is to maintain its leadership in geostatistics after more than 25 years' experience worldwide.

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H. Priority targets and a few customer references

- **Priority targets**

  Mining companies, consultancies, resource geologists and geostatisticians.

- **Some customer references**

  MINING COMPANIES

  - Anglo American
  - Anglogold
  - Areva
  - Barrick Gold
  - BHP Billiton
  - Codelco
  - De Beers
  - Eramet
  - Gold Fields
  - Impala Platinum
  - Newcrest
  - Newmont
  - Rio Tinto
  - SNIM
  - Vale
  - Votorantim Metais

  CONSULTANCIES

  - AMC Consultants Pty Ltd (Australia)
  - CSA Global (Australia)
  - Coffey Mining (Australia)
  - Cube Consulting (Australia)
  - Golder Associates (Australia)
  - Quantitative Group (Australia)
  - Snowden (Australia)
  - SRK (Australia, Canada, United Kingdom, USA)
  - Zstar (South Africa)

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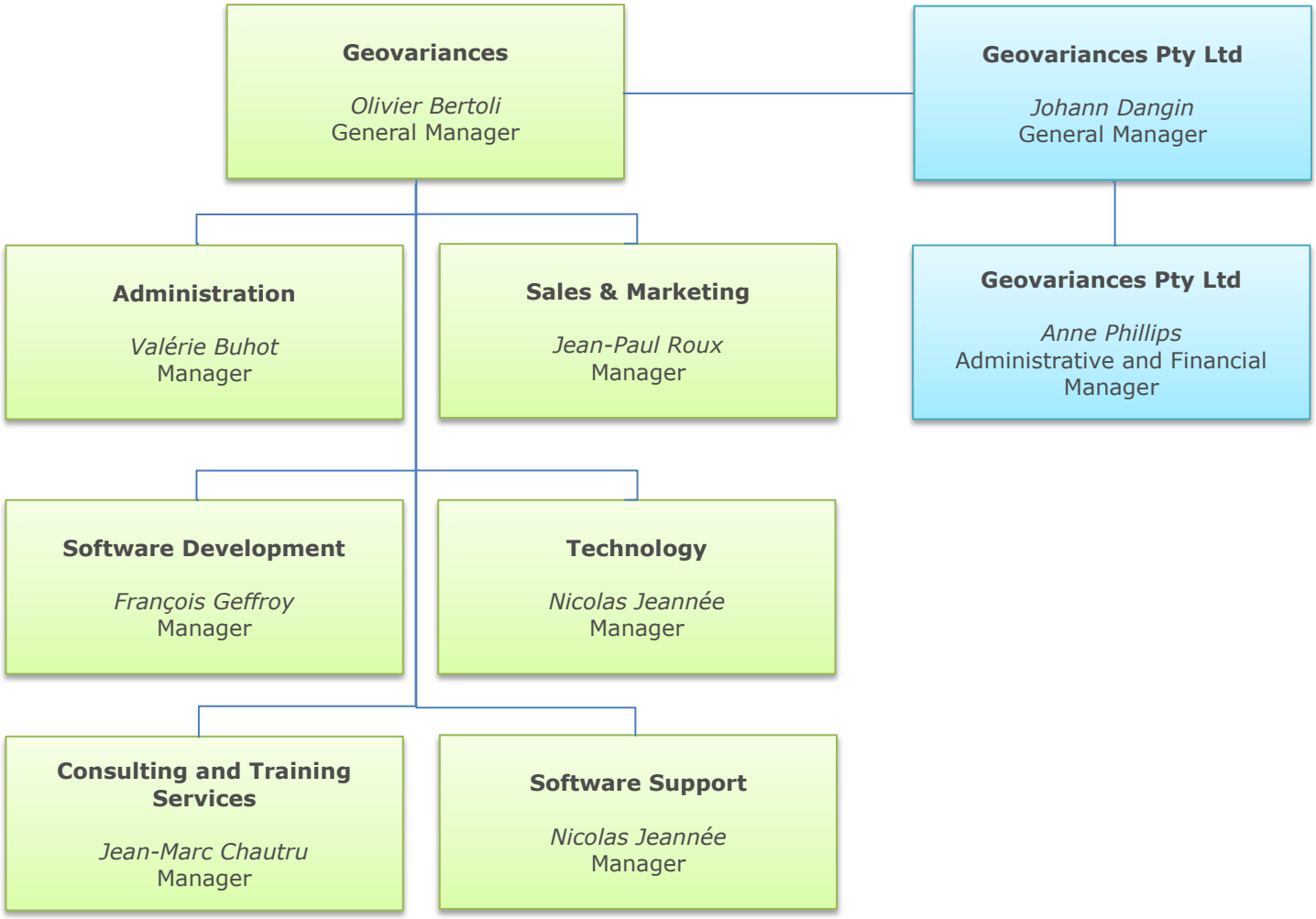
I. Organization chart



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