leapfrog | EDGE

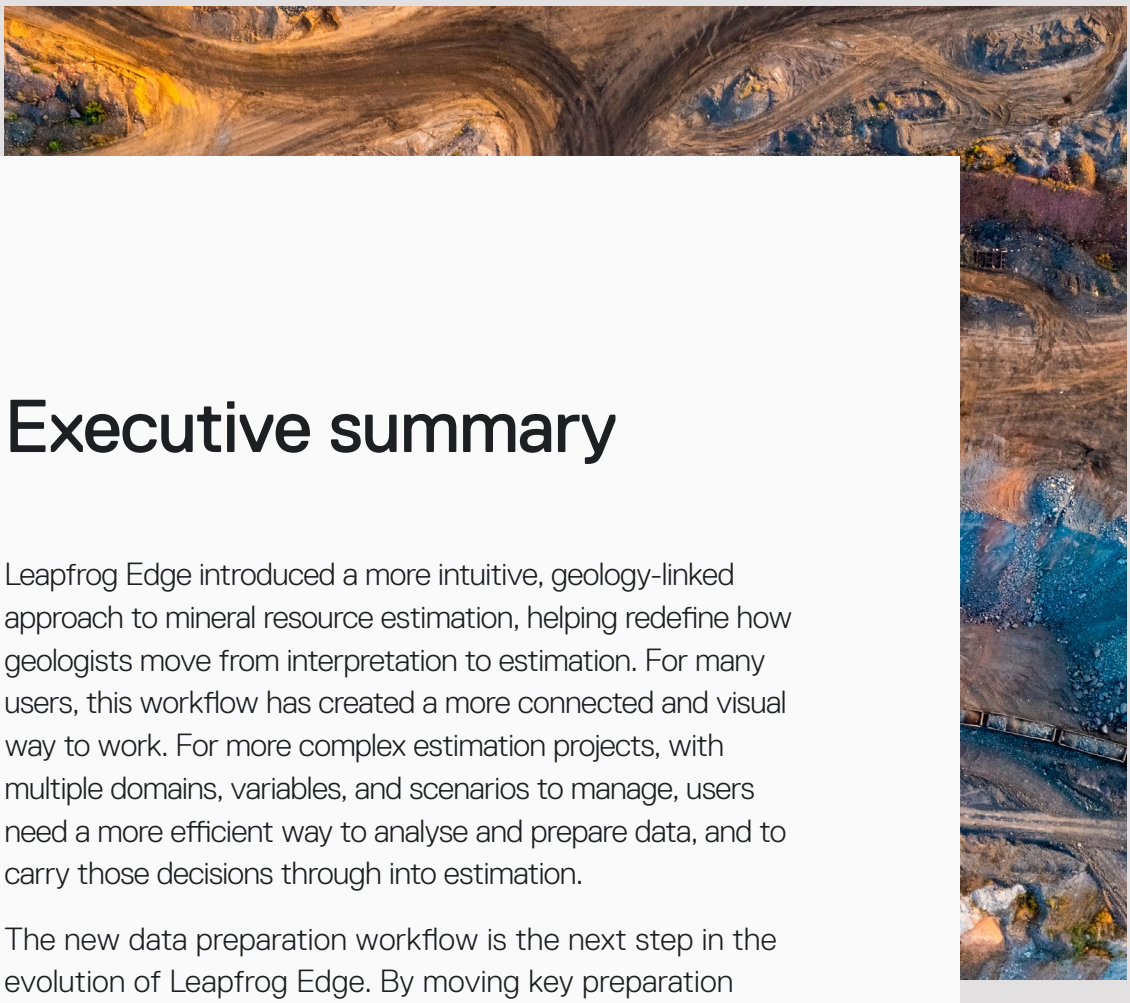
WHITE PAPER

THE EVOLUTION OF RESOURCE ESTIMATION IN LEAPFROG EDGE

How the new data preparation workflow makes complex estimation more scalable and transparent

SEEQUENT

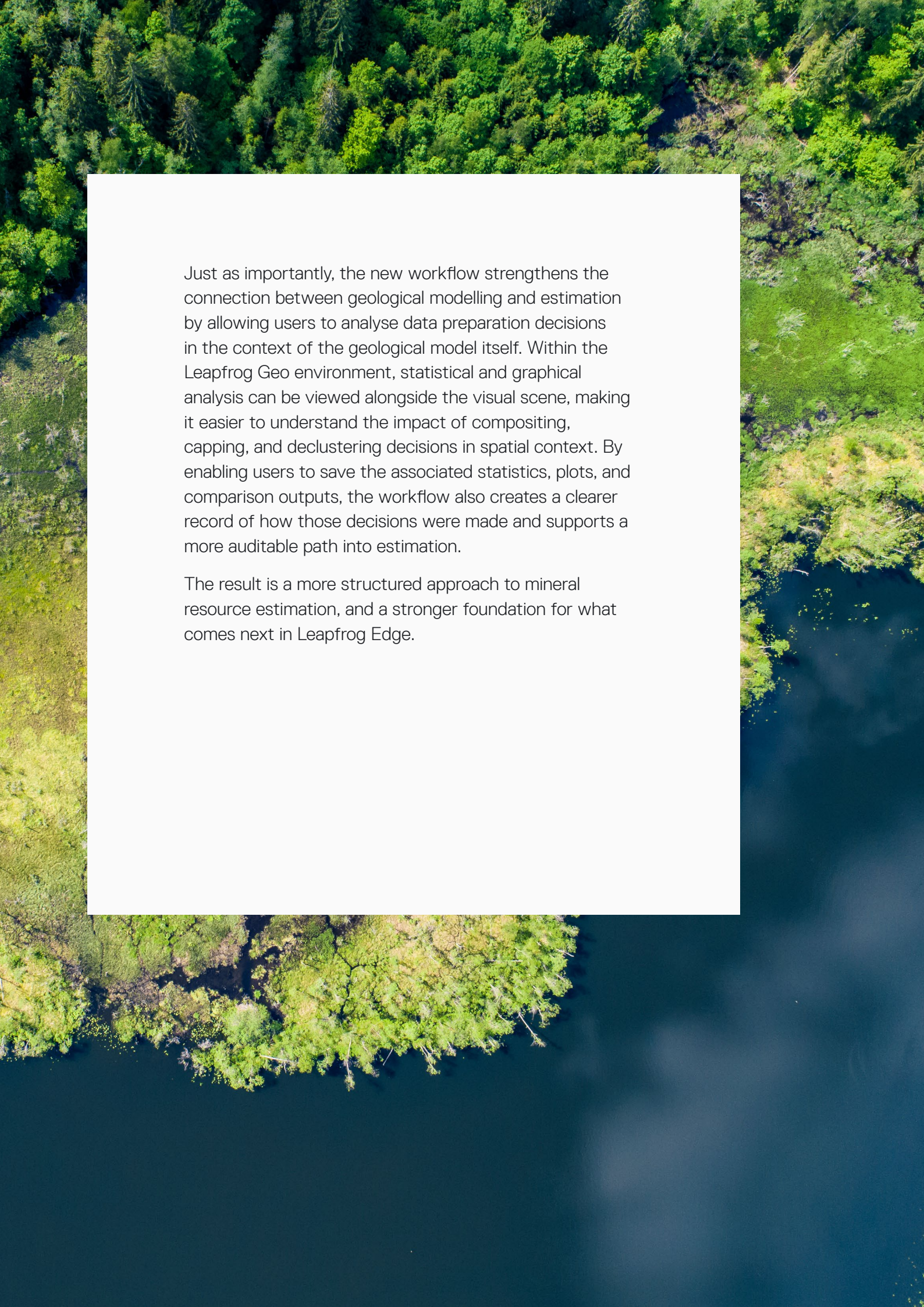
Seequent, The Bentley Subsurface Company



Executive summary

Leapfrog Edge introduced a more intuitive, geology-linked approach to mineral resource estimation, helping redefine how geologists move from interpretation to estimation. For many users, this workflow has created a more connected and visual way to work. For more complex estimation projects, with multiple domains, variables, and scenarios to manage, users need a more efficient way to analyse and prepare data, and to carry those decisions through into estimation.

The new data preparation workflow is the next step in the evolution of Leapfrog Edge. By moving key preparation decisions upstream from the domained estimator, it creates a more logical path into estimation. Instead of repeating preparation steps inside individual estimation objects, users can now complete that work earlier in the workflow and carry the resulting estimation dataset into downstream estimation. This makes it easier to compare compositing, capping, and declustering approaches, test scenarios, and manage complex multi-domain projects with greater consistency and confidence, supported by dedicated analysis and comparison tools throughout the workflow.



Just as importantly, the new workflow strengthens the connection between geological modelling and estimation by allowing users to analyse data preparation decisions in the context of the geological model itself. Within the Leapfrog Geo environment, statistical and graphical analysis can be viewed alongside the visual scene, making it easier to understand the impact of compositing, capping, and declustering decisions in spatial context. By enabling users to save the associated statistics, plots, and comparison outputs, the workflow also creates a clearer record of how those decisions were made and supports a more auditable path into estimation.

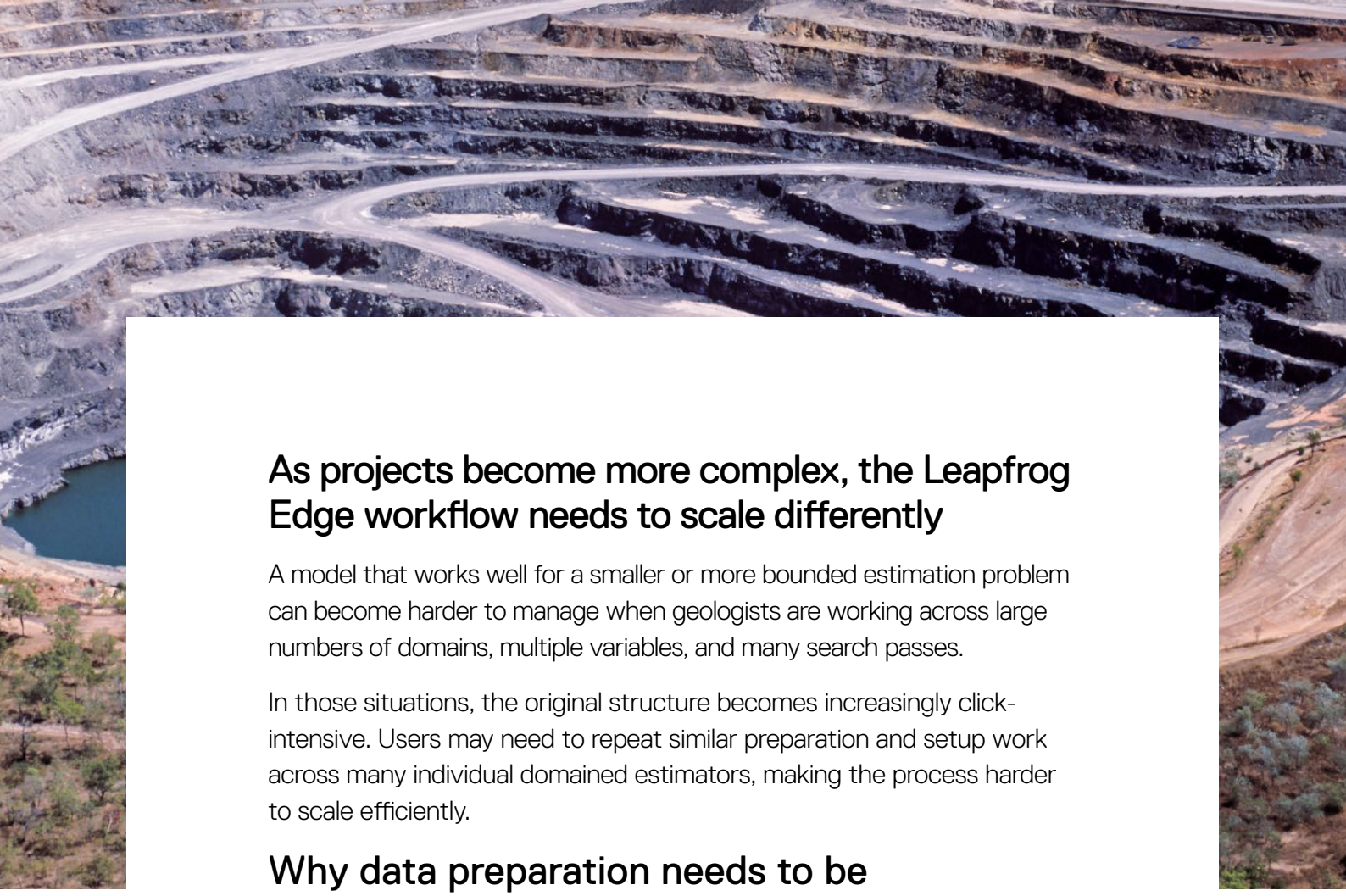
The result is a more structured approach to mineral resource estimation, and a stronger foundation for what comes next in Leapfrog Edge.

Why resource estimation workflows continue to evolve

When it was first released, Leapfrog Edge introduced a different way of thinking about mineral resource estimation. At a time when much of the market was still shaped by older, CAD-rooted estimation tools, Edge brought a more integrated, workflow-driven approach that was closely connected to geology.

Rather than asking users to work through software built around legacy conventions and specialist product knowledge, it offered an experience that was more visual, accessible, and better aligned with the many geologists who already worked in the Leapfrog environment.

The domained estimator brought together the key components of estimation into a single bounded estimation problem. Users could define the domain, select and analyse inputs, configure parameters, and generate an estimate within one workflow-driven environment. For many projects, this provided a practical way to move from geological interpretation into estimation. It was a successful paradigm shift and an important step in the evolution of estimation inside the Leapfrog Geo interface.



As projects become more complex, the Leapfrog Edge workflow needs to scale differently

A model that works well for a smaller or more bounded estimation problem can become harder to manage when geologists are working across large numbers of domains, multiple variables, and many search passes.

In those situations, the original structure becomes increasingly click-intensive. Users may need to repeat similar preparation and setup work across many individual domained estimators, making the process harder to scale efficiently.

Why data preparation needs to be handled differently

Data preparation shapes both the quality of an estimate and how clearly it can be defended. Decisions about compositing, capping, filtering, and declustering affect the inputs that feed the model and influence how confidently those inputs can be compared and explained.

As projects grow more complex, those decisions need to be easier to manage across the broader workflow. Geologists need a clearer way to prepare data consistently, compare alternatives, and carry those choices into estimation without unnecessary repetition. Under reporting frameworks such as NI 43-101 and the JORC Code, they also need to explain how data was prepared, how domains were defined, and how high-grade values were treated.

An enhanced data preparation workflow helps address that need by making estimation more scalable, transparent, and auditable.

CHAPTER 2

A more efficient way to prepare data for estimation

The new data preparation workflow introduces a more intuitive way to prepare data for estimation in Leapfrog Edge. Rather than carrying out key preparation tasks inside individual domained estimators, users can now complete that work earlier in the workflow and use the resulting prepared datasets across multiple domains and estimation scenarios.

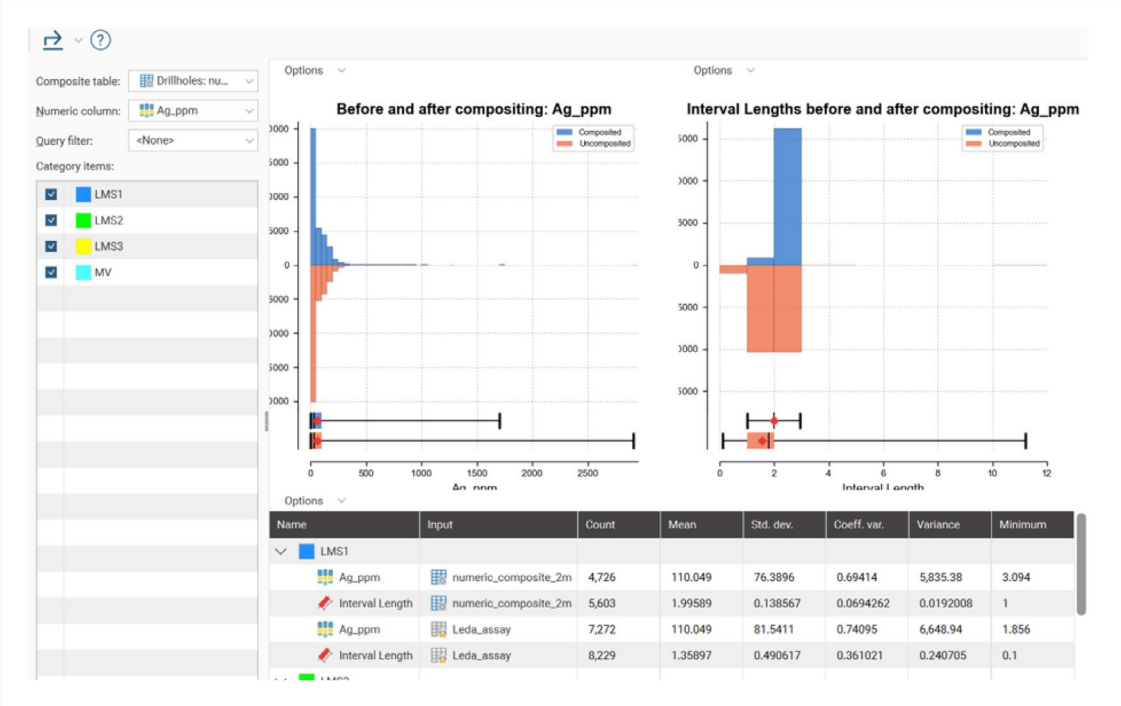
The new workflow reflects that reality more directly by creating a clearer sequence:

Define the data → Analyse and prepare it → Carry validated inputs into estimation

Some of the new features and benefits of this workflow include:

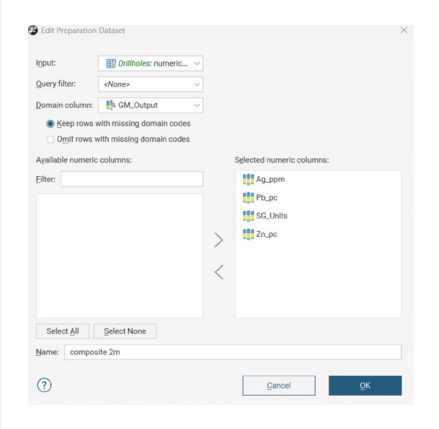
01 Compositing comparison

The compositing comparison tool gives users a more visual way to understand the statistical impact of compositing decisions before moving into estimation. It provides a comprehensive, side-by-side analysis of each numerical composite, showing before-and-after grade distribution, interval length comparisons, and a detailed table of statistics. A new composite status column lets users easily visualise residual intervals and how these have been handled.



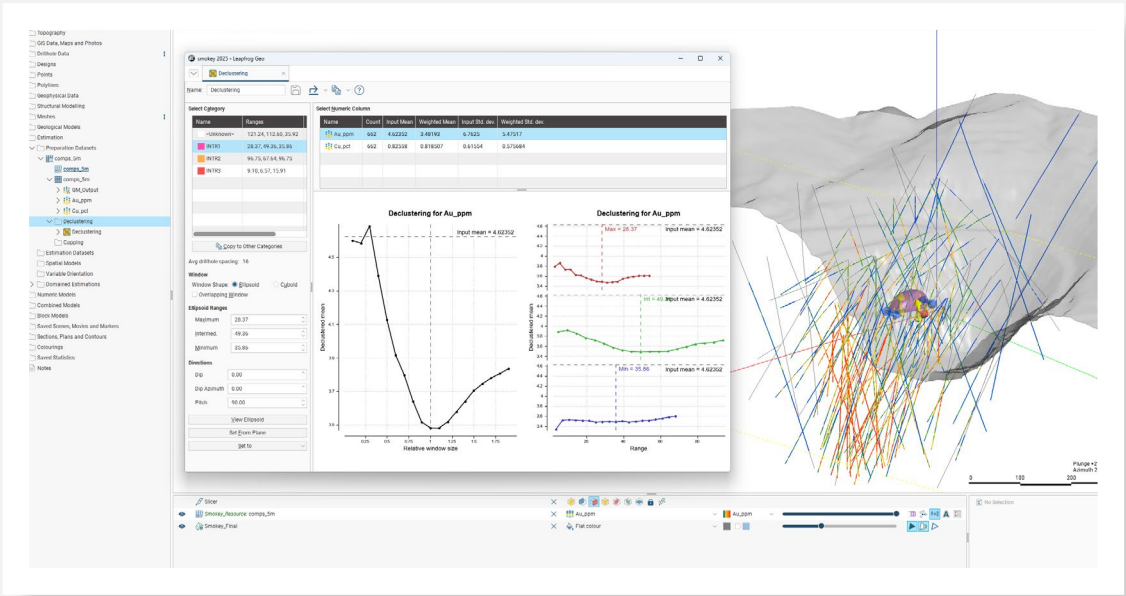
02 Preparation datasets

Preparation datasets create a traceable starting point for estimation inputs, making it easier to prepare data before it is used downstream. Users can create as many estimation datasets as needed to support their analysis.



Global declustering

A standalone declustering step makes spatial bias correction more visible.

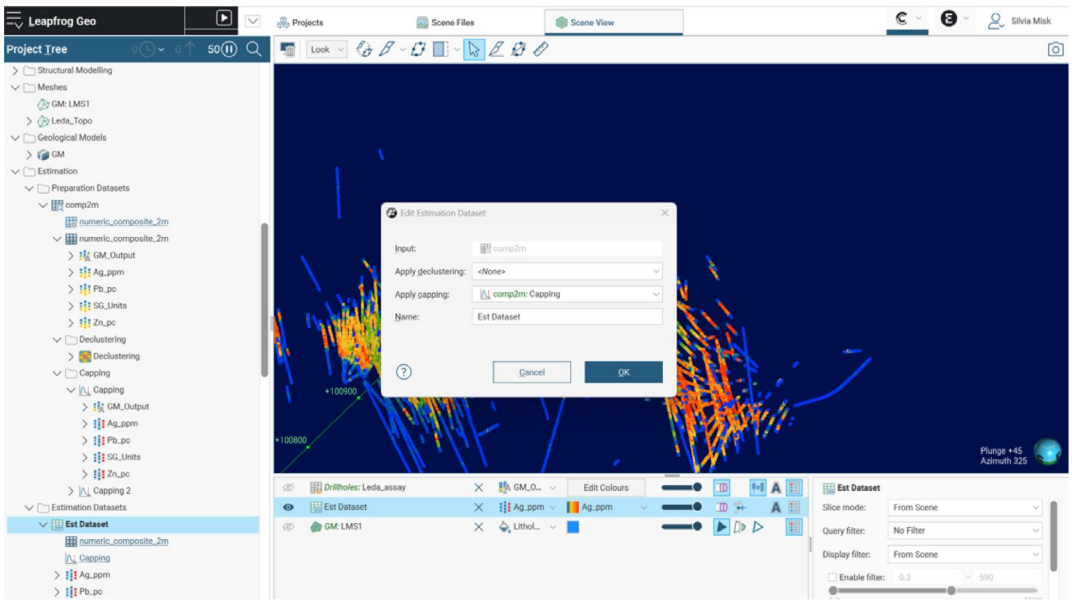


Capping

Capping tools provide a more transparent way to evaluate outlier thresholds, compare scenarios, and understand the statistical and practical impact of capping decisions, with a dynamic link between graphs, statistics, and the scene.

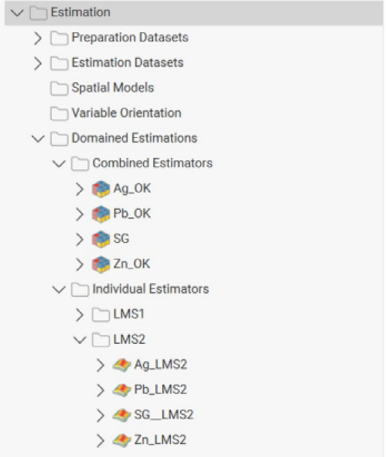
03 Estimation datasets

Preparation decisions come together into a reusable, validated input for downstream estimation, supporting greater consistency, flexibility, and scenario testing.



Domained estimators

The workflow creates a cleaner handoff into estimation by separating preparation from estimation setup while maintaining a direct connection to domain-based estimation. For users with existing estimates already set up, it may also provide a simpler path into the new workflow by allowing the input to be updated to select an estimation dataset, rather than requiring the estimator to be rebuilt from scratch.



Domained Estimations

CHAPTER 3

The practical value of a more structured data preparation workflow

The new data preparation workflow marks an important step in the evolution of estimation in Leapfrog Edge.

By moving key data preparation decisions upstream, it gives resource geologists a clearer, more scalable way to manage complex estimation work, improve transparency around input decisions, and carry validated data into estimation with greater confidence. Separating data analysis from domained estimation also creates a stronger foundation for future improvements in how estimation projects are created, managed, and extended over time.

For existing users, the value is immediate: a workflow that is easier to manage today and better equipped for the demands of more complex projects tomorrow.

Better resource estimation starts with Leapfrog Edge.

Visit seequent.com/leapfrog-edge to explore product videos, customer success stories, or request a free 14-day trial or live demo.

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