SEEQUENT

leapfrog | GEO

Leapfrog Geo **2025.1**

new release

Leapfrog 2025.1 Release Notes

Seequent is proud to present Leapfrog 2025.1, a landmark release of Leapfrog.

Leapfrog 2025.1 will deliver value in two distinct ways.

First, the latest version delivers a feature-packed, high-quality release synonymous with our market leading solution for 3D geological modelling and mineral resource estimation. The following release notes outline extensive enhancements to Leapfrog's structural workflows, including structural trends and resulting modelled surfaces as well as features and functionality to create large scale multi-domain resource estimates more efficiently and with fewer manual steps. This value can be realised from the moment you download and install the latest version of Leapfrog.

Leapfrog 2025.1 is the first iteration to connect and leverage Seequent's newly launched platform, Seequent Evo.

With the availability of Evo, Leapfrog 2025.1 will become a cloud-integrated application like never before. Capabilities that were previously limited or unavailable to the desktop environment can now be the new normal. Leapfrog 2025.1, enabled by Evo, breaks new ground in data management and collaboration, data-driven geological modelling and block model management by leveraging cloud processing, computing and connectivity.

We invite you to explore the content below, deep dive with our feature highlight videos and reach out to your local Seequent team to learn more.

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leapfrog

1. Leapfrog Features and Functionality

1.1. Better Models with Refreshed Structural Trends

Understanding the structural controls and complexities of a deposit is a fundamental step in any geological interpretation. Leapfrog's structural trend informs numeric, intrusion and indicator interpolants, where it is used to better transform the interpretation into geologically plausible geometry models. No model is perfect, but a structurally informed model can better assist understanding mineralisation, continuity or discontinuity and ultimately, new target identification and areas for resource definition drilling.

Since its introduction, the structural trend has been essential in making implicitly modelled surfaces and volumes geologically meaningful and useful. However, it has not been without its limitations and challenges, for example how intelligible the inner workings are.

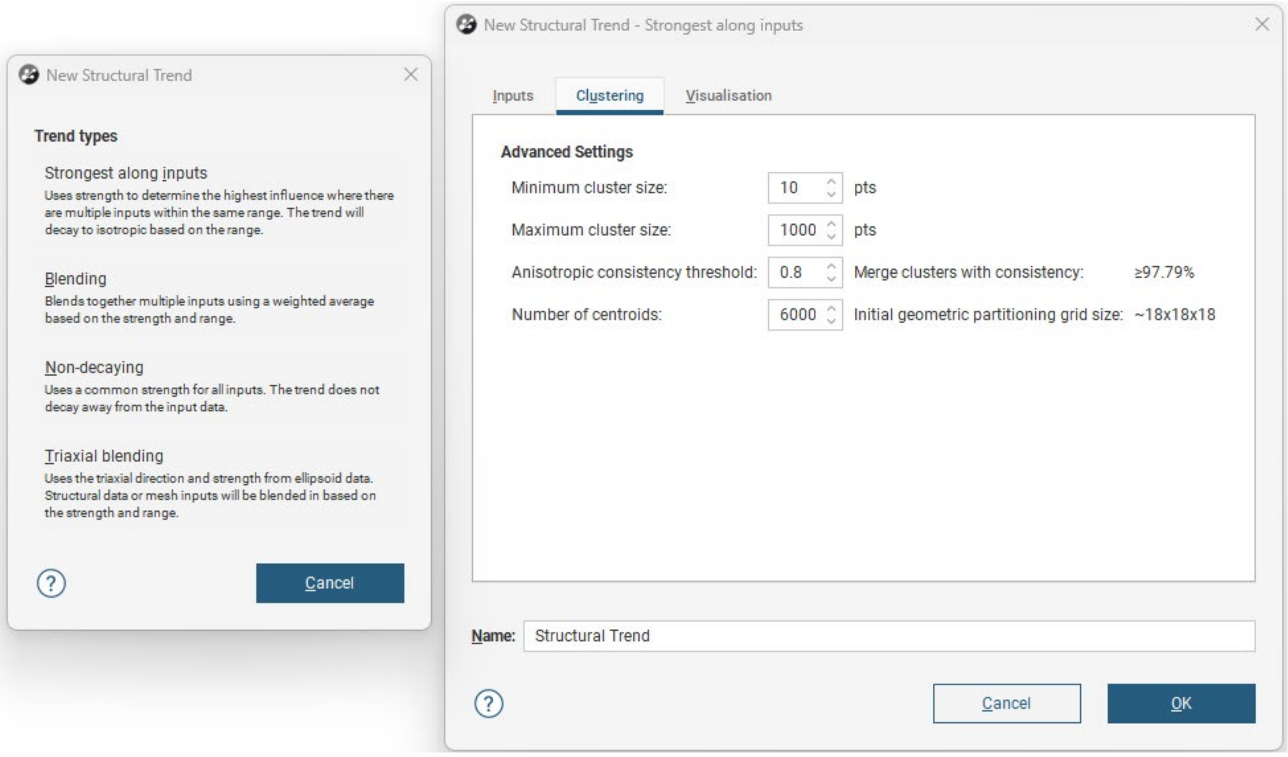
In Leapfrog 2025.1, a significant effort has been made to overhaul the structural trend's usability, visualisation and data handling. The updates not only provide a more precise and cohesive presentation of the data but streamline the workflow by reducing time spent on trial and error. These improvements reflect our commitment to continually advancing Seequent's core modelling capabilities, ensuring they meet the evolving needs of our users.

Structural trend types and compatibility

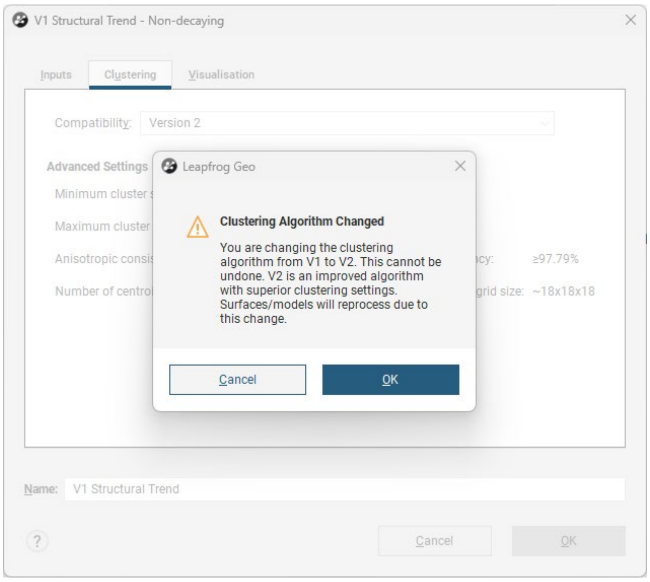
Generating a "good" trend previously involved somewhat of a trial-and-error approach. Several options under trend type and compatibility were available however the impact and outcome of using one option over another was not obvious, nor was there ample information to assess suitability of the options for selected input data.

By design, Leapfrog aims to deliver scientifically sound and intuitive workflows underpinned by smart defaults and algorithms that can be validated quickly with excellent visual capabilities. The following updates have been made to align the structural trends to this core principle:

- Trend type selection: a quick description of each type is presented to the user as a first step.
- Change trend type: should you wish to experiment and test different trend types; a post processing option can be used to change from one trend type to another without having to recreate new objects.
- Dialog design: once a trend type is selected, only controls and settings relevant to that trend are presented to the user. This removes a previous source of confusion where parameters were presented, potentially updated by the user, but were not actually utilised by trend.
- Deprecate redundant functions: a consequence of product development over Leapfrog's lifespan is that some features and functionality become redundant. Version 1 and 2 'compatibility' in structural trends is an ideal example of this. An improvement to data clustering was added to the software as Version 2. A more stable and reproducible implementation, Version 2 has been the default setting for some time however, at the time, removal of Version 1 could not be done without putting existing projects and workflows at risk. This is no longer the case, and therefore this redundant option can be tidied up.



From Leapfrog 2025.1 onwards, new structural trends will not have the option of Version 1 compatibility. However, upgrading projects to Leapfrog 2025.1 will preserve preexisting Version 1 compatibility structural trends. When a preexisting Version 1 structural trend is opened in Leapfrog 2025.1, the clustering tab will have a dropdown with version 1 displayed. You can decide to keep this setting, and no changes will be made. If you change the compatibility to Version 2 clustering parameters will become available. Clicking OK to commit this change, will prompt a final confirmation as this change cannot be undone.



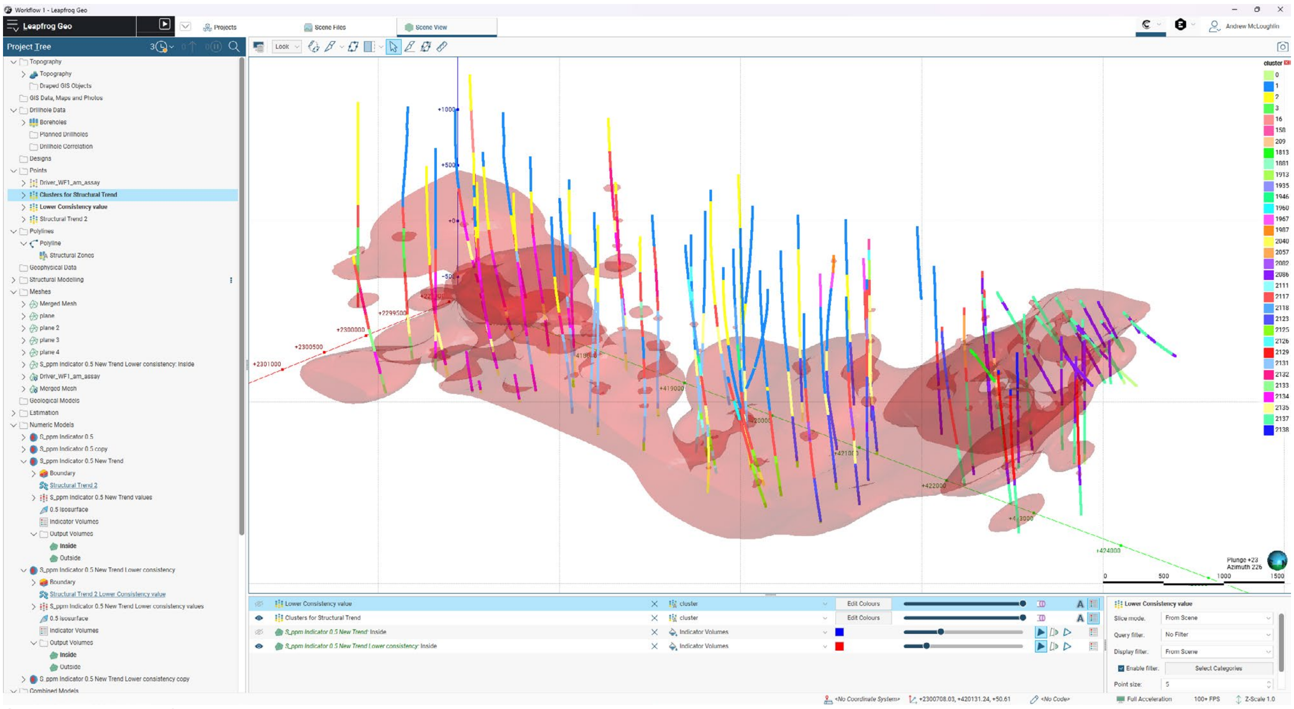
Data handling in structural trends

In Leapfrog 2025.1, each input data type can now have a query filter applied. A small addition, but useful where subsets of data are required as the input to a structural trend.

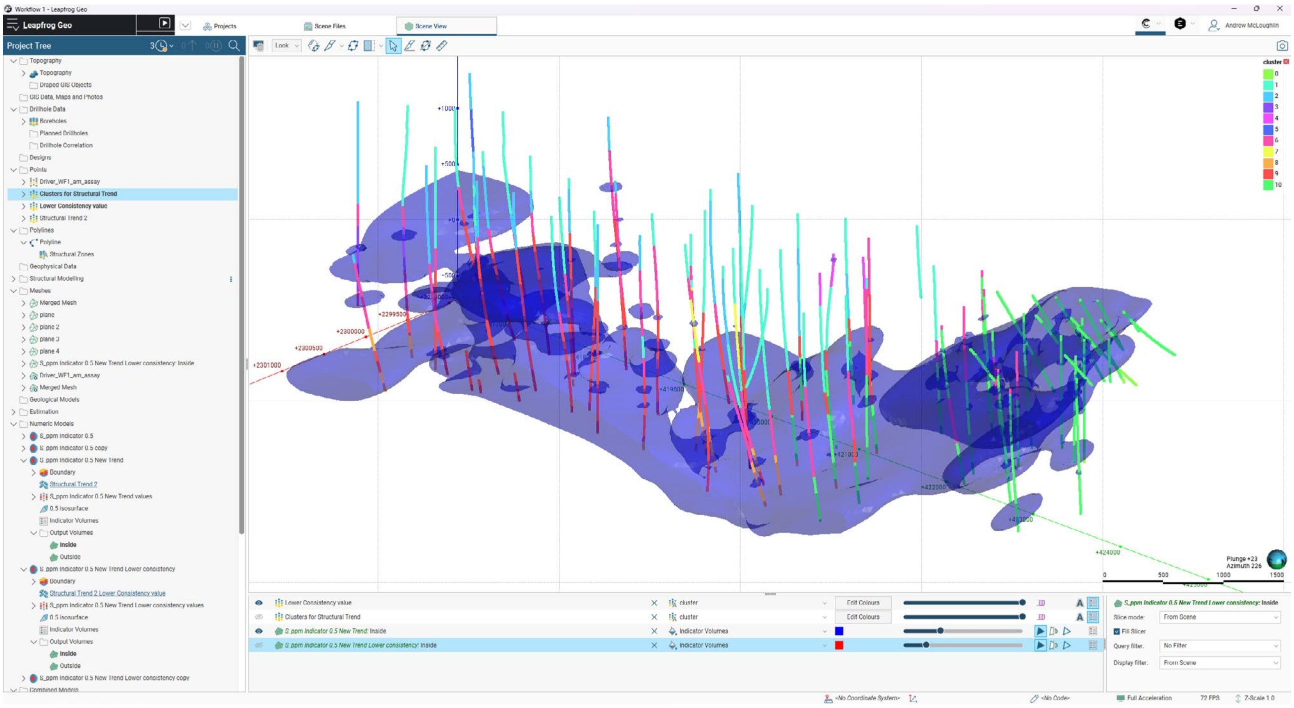
The most notable change is the new ‘clustering’ parameters. Clustering refers to the algorithm that calculates local orientations from the input data (contact points or structural disks) then groups these into clusters of similar orientation. The process of clustering, described as ‘domaining’ in previous communications, has always been a part of the structural trend process, though its controls were not exposed. Furthermore, it has not been well explained in Leapfrog that clustering, though part of the structural trend, is related to the input points of the surface or model to which the structural trend is applied, and the results of clustering can have a profound effect on the modelled surface.

The benefit of controlling clustering is best described through the context of applying the structural trend to a surface with a mixture of data sources. Consider a combination of exploration data, often sparse, and resource data, often dense, being used in a numeric model. Previously, with unexposed hard coded clustering parameters, this combination of data densities would generate unwanted breaks in the modelled volumes, despite the use of a structural trend to inform continuity across those breaks. This situation could not be improved through adjusting any of the available settings in the structural trend or surface interpolant.

Now, clustering settings can be adjusted to better fit the input dataset of the model. If a numeric model has a combined dataset of 128,567 input points, a minimum cluster size for the structural trend is set to 1,285 (1% of 128,567, a recommended proportion based on internal testing) and the maximum is set to 12,857 (10 % of input points, a recommended proportion based on internal testing). Setting a consistency threshold of 0.6 (recommended based on internal testing) yields 95% consistency between clusters. These settings will produce a more continuous volume which honours the geological interpretation and the structural trend more closely.



Structural Trend Clustering Before Adjusting Parameters

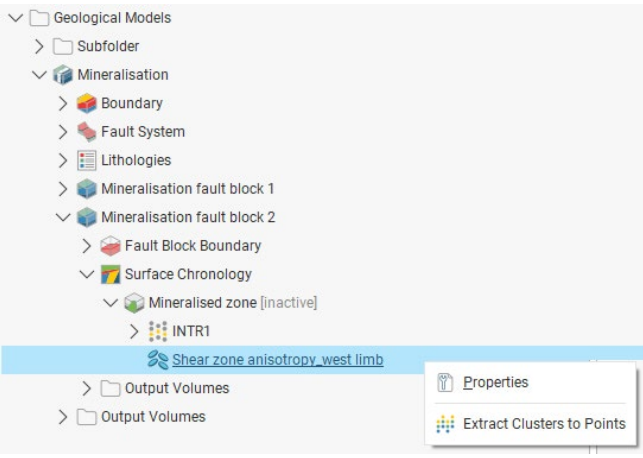


Structural Trend Clustering After Adjusting Parameters – a more continuous volume with fewer clusters.

Structural trend visualisation

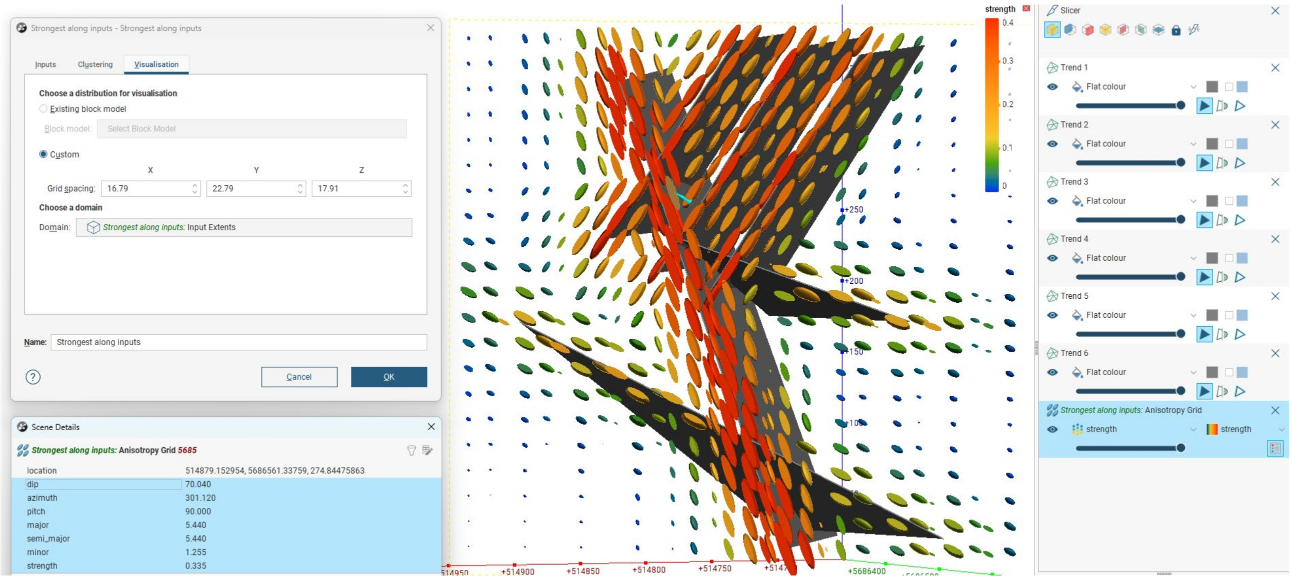
Several improvements have been made to the visualisation of the anisotropies of the trend as well as the visualisation of the clusters.

Once the structural trend has been applied to a surface or model, clustering can be visualised by extracting the cluster information and evaluating it on the input dataset. Visualising cluster information on the input points can help with comparing and validating the results produced by the structural trend and clustering parameters. It can also be used to better understand the impact of clustering for different datasets when other factors like trend type and surface interpolants remain the same.



A new customisable visual representation of the structural trend replaces the fixed 10 x 10 x 10 grid of previous versions. This enhancement offers a more accurate and user-friendly depiction of the trend and can match the actual extents of the input data. The trend can be visualised within a specific domain as well as any custom grid setting. Additionally, block models can be used as a grid to inform the visualisation of the trend.

Display options include orientation information and strength. The strength parameter describes how many times stronger the trend is in the maximum and intermediate plane than in the minimum direction. Strength will affect the relative weighting of the input data on the blending of the structural trend for each trend type. Input data with higher strength makes a greater impact on the blending.

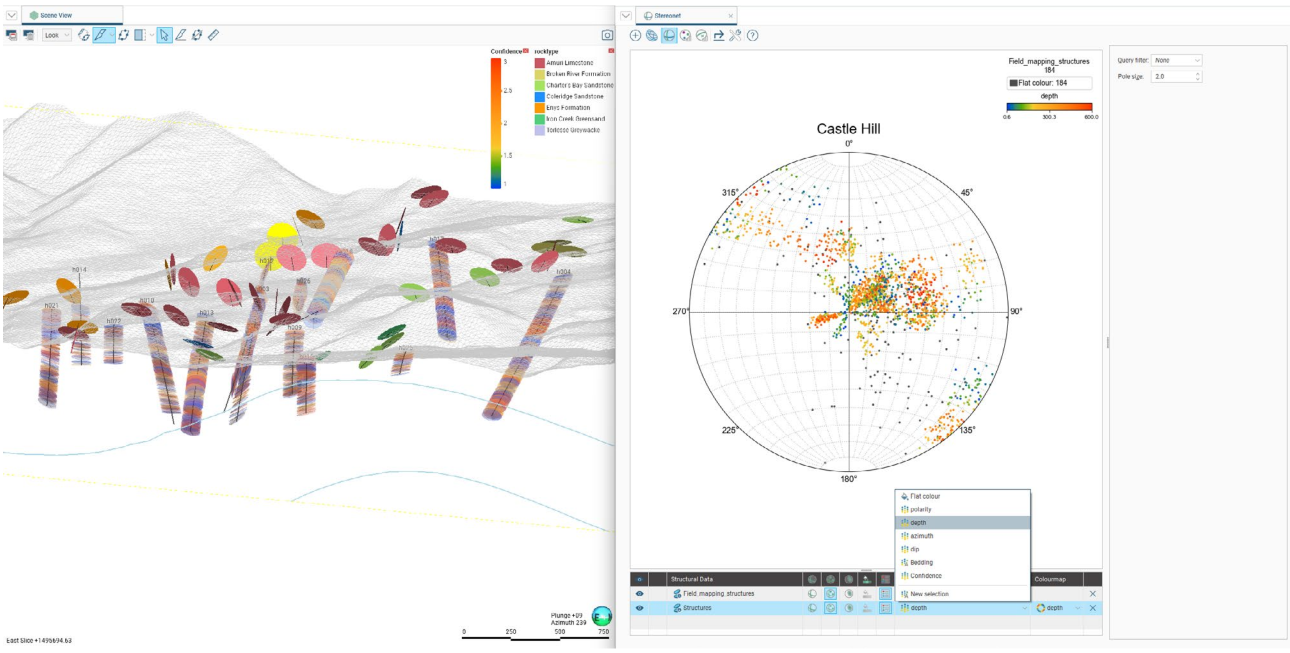


1.2. Improvements to Stereonets

The volume and variety of structural measurements and information collected from core, field and face mapping has been increasing and with ML and other technological advancements in core scanning and processing this is set to grow even more. It is often difficult to extract due to a lack of features and functionalities in software. Please refer to the section on Leapfrog and Evo for information on the new data type, "ellipsoid data" derived from Driver, and the additional insights from this data.

In Leapfrog 2025.1 several improvements have been made to improve the user experience and to facilitate analysis of an increasingly rich quantity of structural data. These improvements include:

- The layout of panels, controls and legends have been redesigned and improved, providing easier and more familiar interactions.
- Numeric data from imported numeric columns (e.g. confidence, drillhole support, logged depth) can be visualised in the stereonet with editable colourmaps.



1.3. Streamlined Model Updates - Face Mapping using Polylines

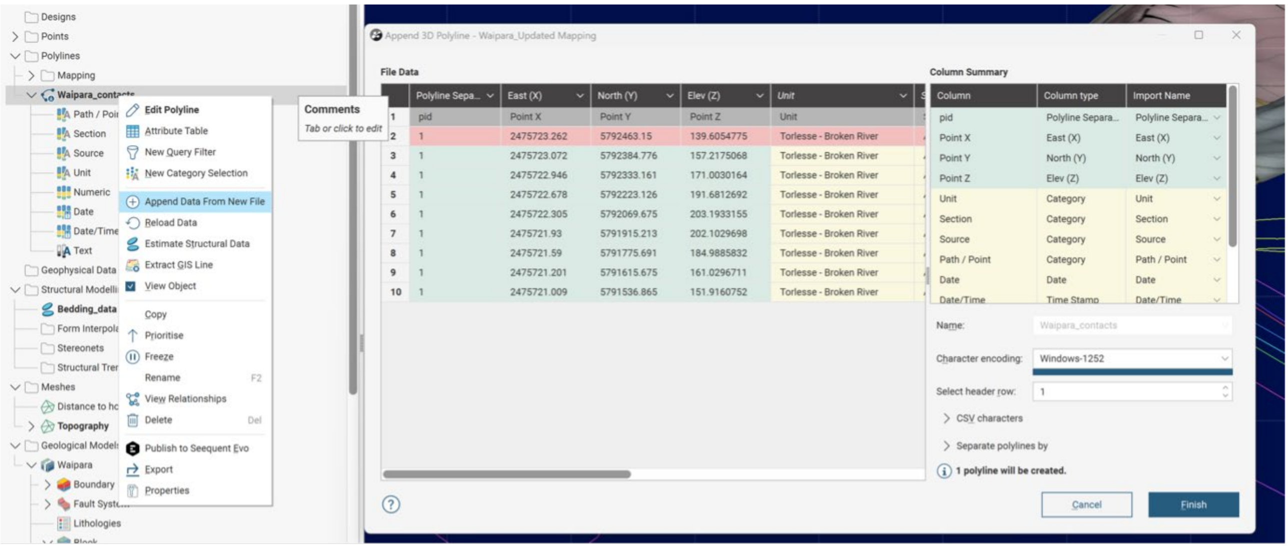
Polyline append

Building on the release of polyline attribution in Leapfrog 2024.1 we have continued to improve polylines in Leapfrog for 2025.1, further enhancing how mapping data is incorporated into the model.

Importing multiple Polyline files can quickly create a data management headache, with hundreds of polylines for each new set of mapping data. Managing this data can be a time-consuming and click-heavy process, especially when new query filters must be created to use the mapping in downstream modelling.

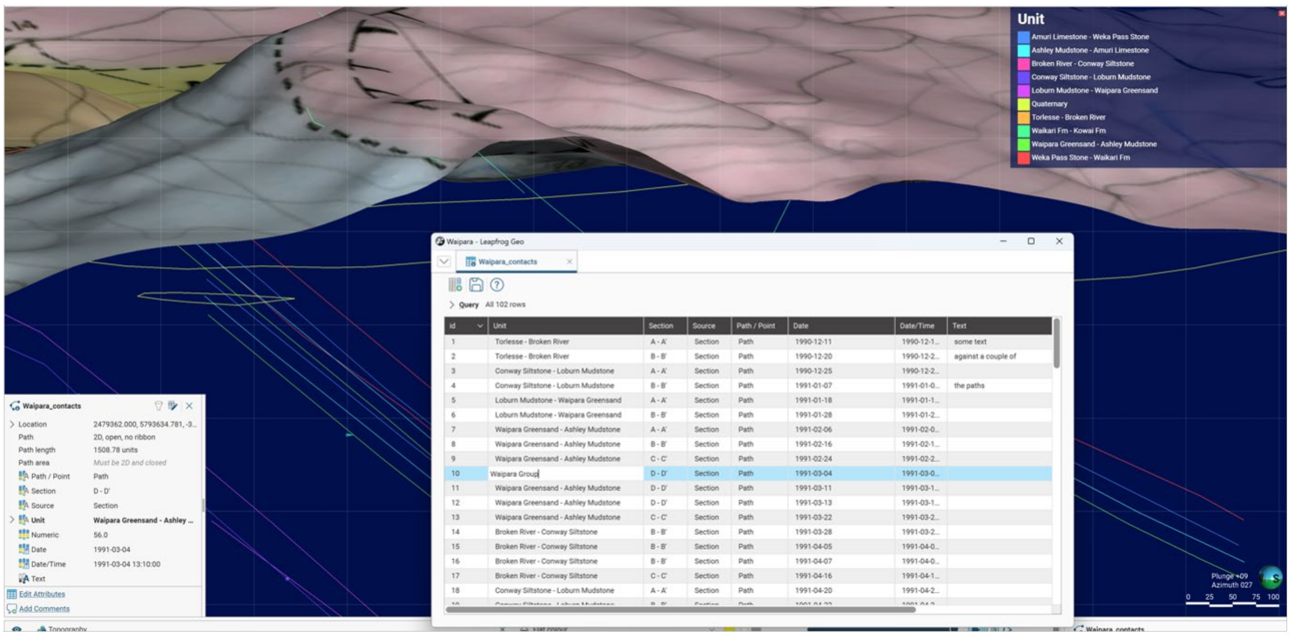
To remedy this, polylines can now be appended from file, allowing mapping data to be managed as one polyline object in the Leapfrog project. Consequently, model updates are more streamlined and considerable time can be saved.

The polyline importer now features a count of how many new polylines will be created during import. Additionally, 'Annotation_id' is auto detected as a line separator, speeding up the import of mapping data created by Rock Mapper.



Smarter attribute table

Editing and adding new attributes is easier than ever before with the enhanced attribution table, allowing for direct table editing, without going through the scene category selection process. The attribution table can be opened from the shape list properties with the row of interest highlighted, allowing for the rapid in-table editing and/or addition of new data, including entirely new columns of different data types.

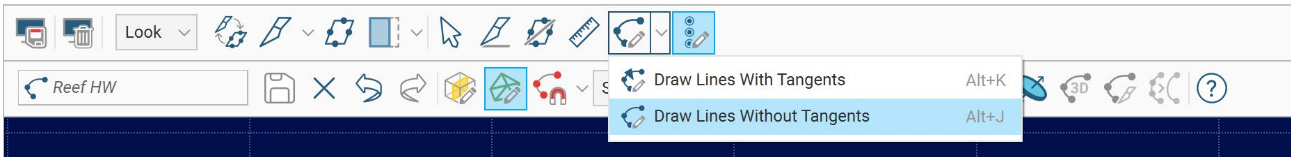


Optional polyline tangents

Tangents, while extraordinarily useful, are not always required when adjusting model surfaces and when not needed, added clicks and frustration. In this release, we added a new Polyline drawing option to digitise lines without tangents, removing the need to delete them afterwards. The default choice for this option can also be configured in the Leapfrog settings under Scene / Editors.

Tangent information was previously automatically added onto imported Polylines, which can lead to unexpected model results as the orientation was often not correct. This behaviour has been removed so that imported Polylines will no longer get Tangents added by default.

When editing Polylines, other lines can often get in the way of the scene view. To address this, we have now enabled query filters to be switched while in polyline edit mode.



1.4. Data Preparation, Visualisation and Analysis

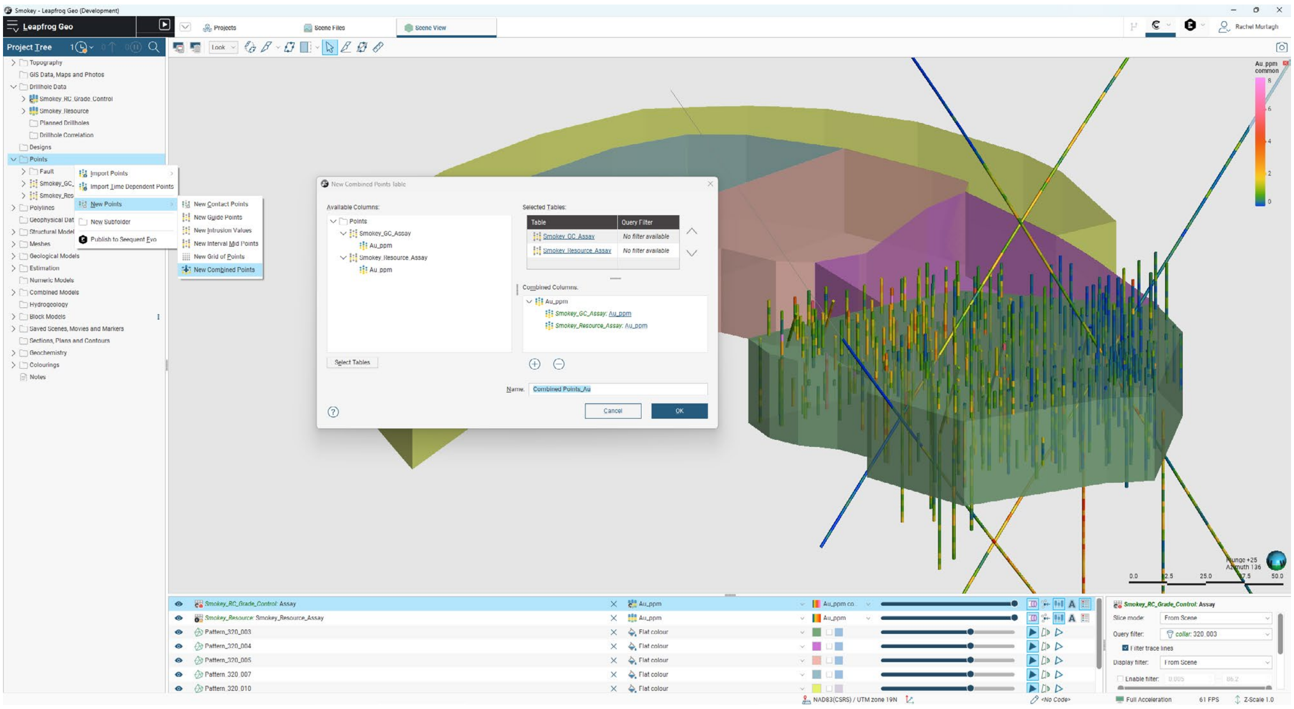
Combine Point Sets

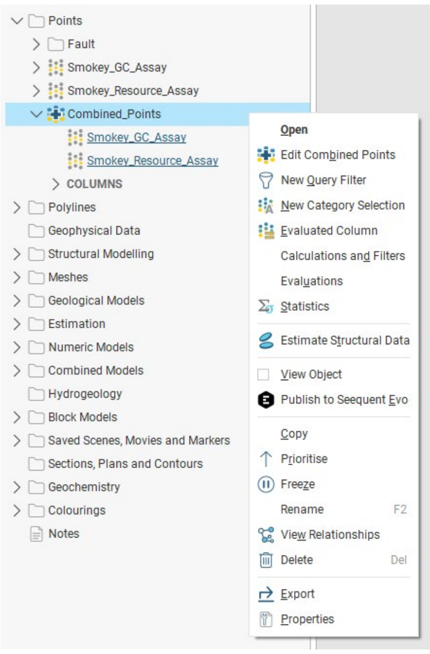
Commonly, numeric values from different sources are imported into a Leapfrog project as separate data types (e.g. drilling intervals and points). Combining these data sets for downstream workflows was a tedious and manual workaround, often forcing users out of Leapfrog and into a spreadsheet.

A new option to combine point sets, enables more flexible and comprehensive workflows mitigating the need to leave Leapfrog and reducing the opportunity for errors in data preparation.

For example, in numeric modelling or resource modelling workflows, users had to choose between points or drillhole intervals as an input. In some cases, additional values could be added to the model but data analysis via statistics, creating calculations and filters were not possible on the combined input values. Now, the process of combing mixed data sources has been streamlined into two steps; extract point values from interval data and combined the point sets to create a combined data set. Not only does this provide a quicker dataset to use in modelling, but it also provides the same optionality as a standard point table.

New Combined Points can use any available imported points tables, downhole points, interval mid points, and grid of points.

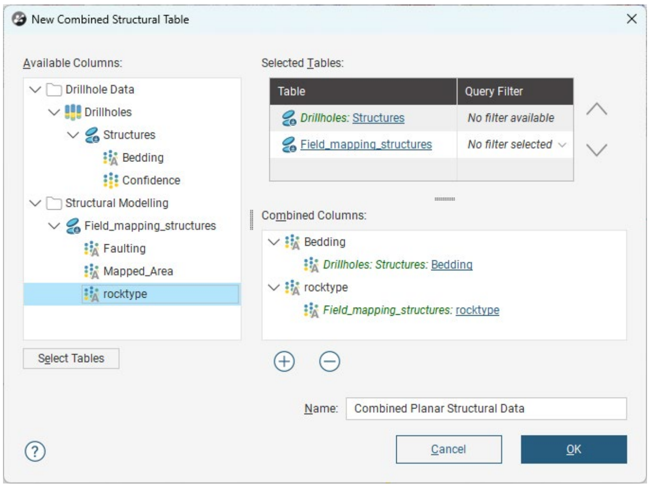




Combine Structural Data

Like point datasets, structural datasets can often come from different sources. Core logging and surface and face mapping are imported into a Leapfrog project and saved to Drillhole Data and Structural Modelling folders, respectively. Alternatively, due to data collection advances over the life of an operation, structural information can be recorded and stored as different tables for example, historical manual logging versus measurements generated through automated fracture detection and analysis.

Where both datasets are useful as a single input to subsequent processes, a new option to combine structural datasets removes the need to leave Leapfrog to achieve this.

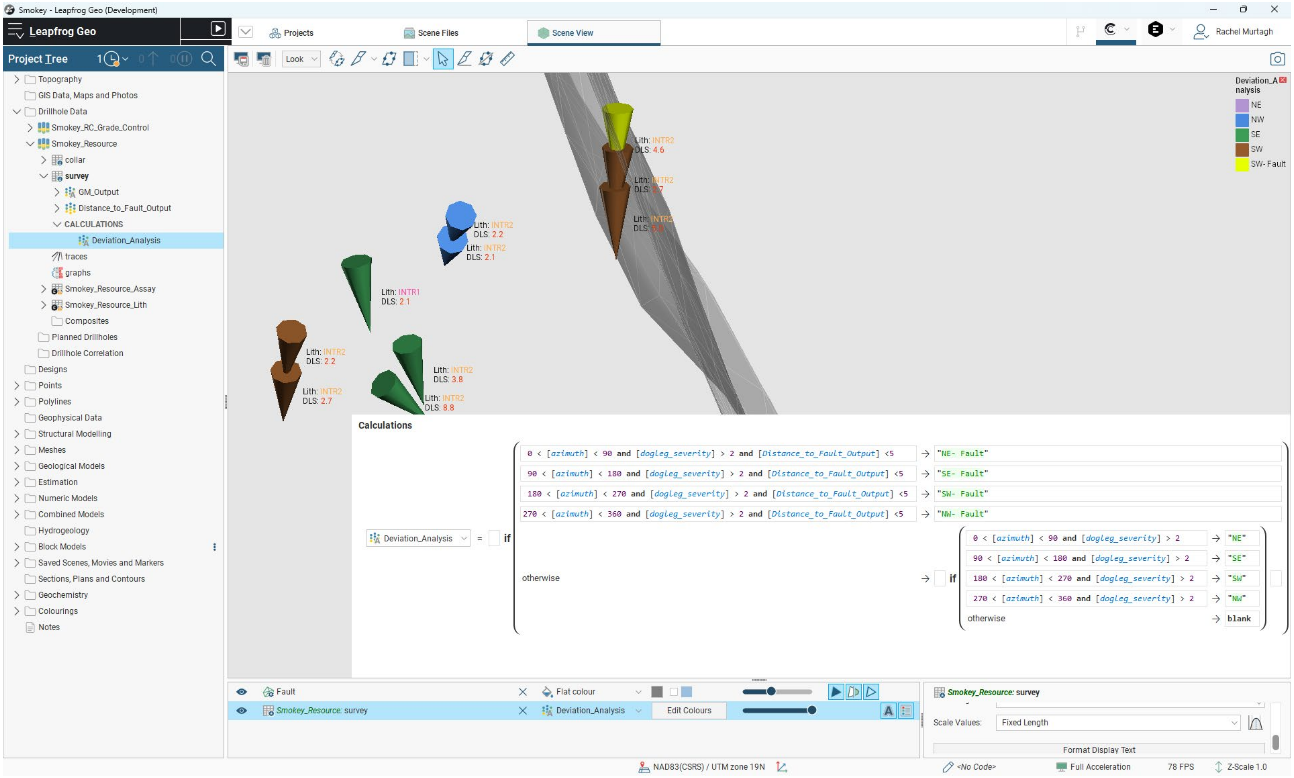


Survey data analysis

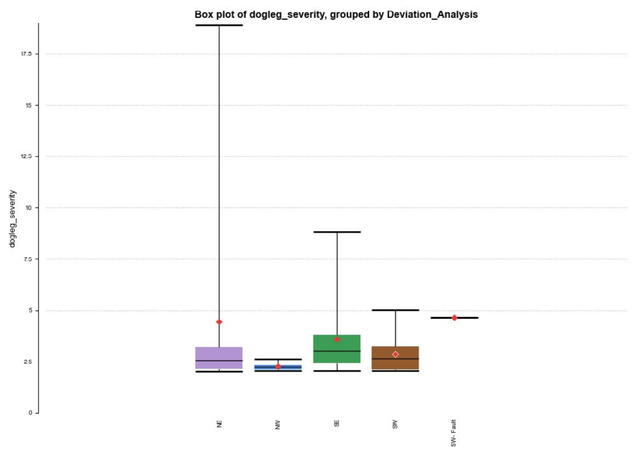
Leapfrog 2025.1 builds on functionality to analyse survey data to derive meaningful insights on drilling data, as well as generate derivations of the data to inform activities like drillhole survey analysis and planning.

The combination of calculations and statistics on the survey table allows for investigations on survey data such as dogleg severity analysis. Rather than being limited to just one factor when using the category from numeric option, you can combine several factors such as orientation, dip and distance to an element of interest (e.g. planned stope or fault) to gain deeper insight into what combination of conditions lead to high DLS.

In this example, a nested If statement can be used to ascertain which compass bearing (SW, SE etc) experiences the highest DLS as well as the impact the distance to a fault surface has on DLS. Labelling survey measurements with lithology codes provides an extra layer of context.

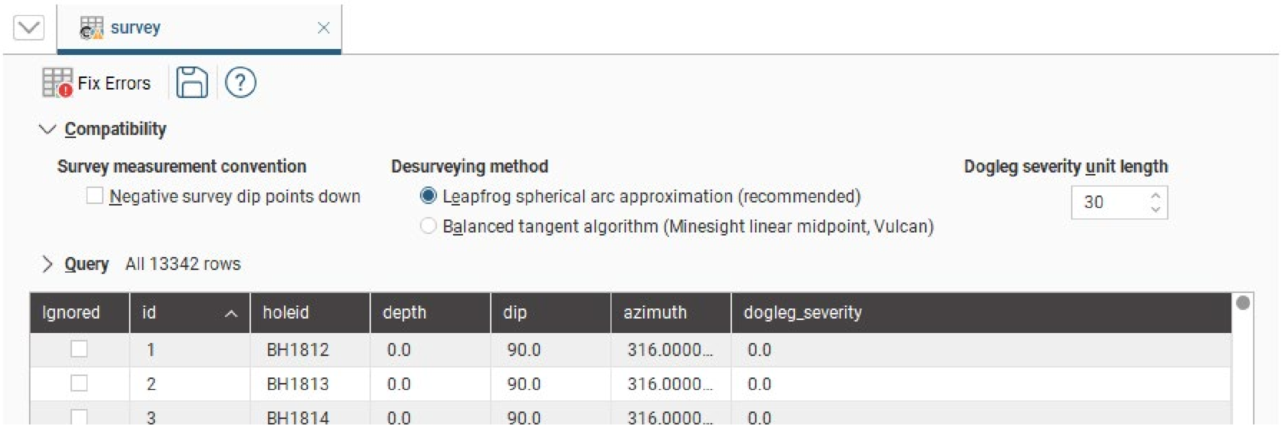


A quick look at the statistics shows a more holistic impression of which compass bearing has the highest number of high DLS measurements as well as a sense of potentially erroneous outlier data.



Name	Count	Mean	Std. dev.	Coeff. var.	Variance	Minimum	L. quartile	Median	U. quartile	Maximum
dogleg_severity	1,016	0.756754	1.08375	1.43211	1.17452	0	0.193	0.545	0.96	18.908
NE	17	4.44318	4.51272	1.01565	20.3646	2.016	2.129	2.575	3.197	18.908
NW	10	2.2604	0.17809	0.0787869	0.031716	2.047	2.117	2.219	2.306	2.628
SE	25	3.57896	1.78787	0.499549	3.19647	2.038	2.424	3.007	3.812	8.844
SW	11	2.86464	1.01312	0.353665	1.02641	2.041	2.103	2.659	3.22	5.012
SW- Fault	1	4.638	#ERR	#ERR	#ERR	4.638	4.638	4.638	4.638	4.638
*Inactive	952	0.572585	0.49184	0.858981	0.241906	0	0.165	0.503	0.865	1.983

By convention DLS is usually expressed as degrees deviation per 30 distance units but those requiring a different value for the unit length, e.g. in the US degrees/100 foot is commonly used, a new option to configure the dogleg severity unit length has been added to the survey table.



Calculations on more tables

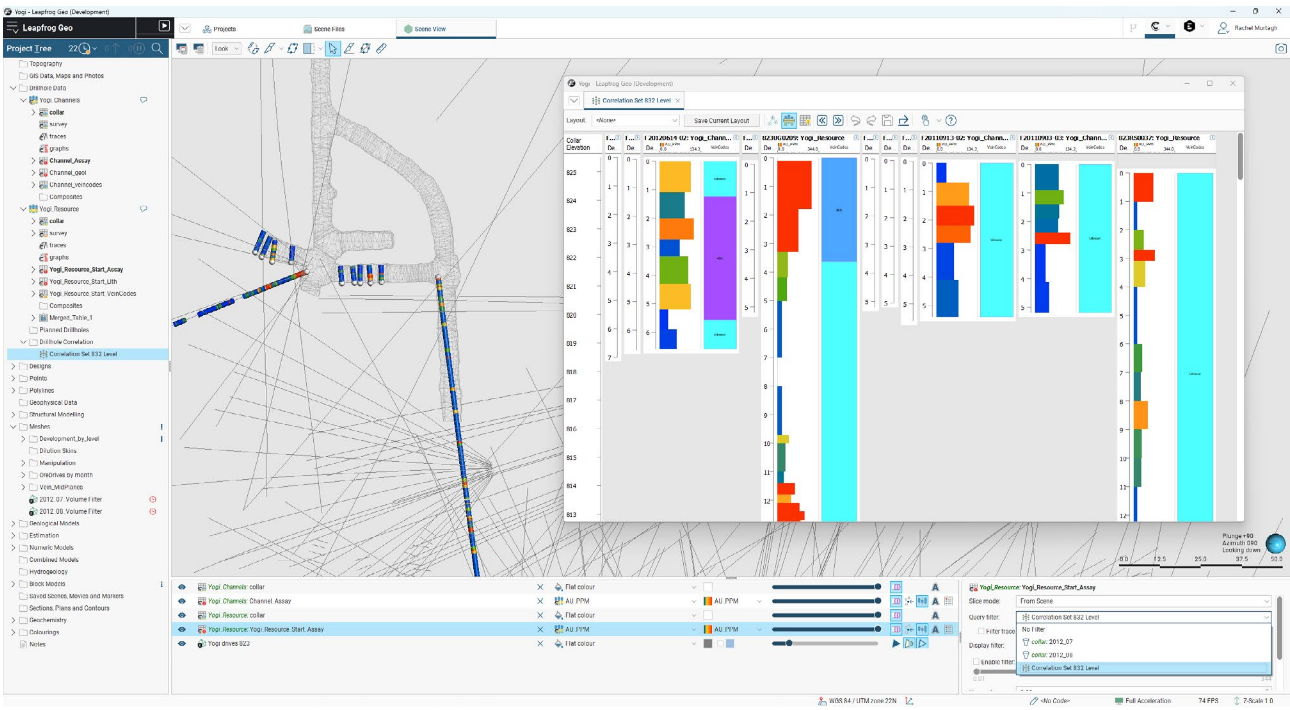
Calculations are generically useful and, where possible and sensible, the ability to create a calculated column will be added to morbootse tables. In Leapfrog 2025.1 the option to create variable, numeric and category calculated columns has been added to the following tables:

- Collar
- Downhole lineations (on drilling)
- Downhole structural data (on drilling)
- Lineations (structural folder)
- Structural data (structural folder).

Correlation set as scene filter

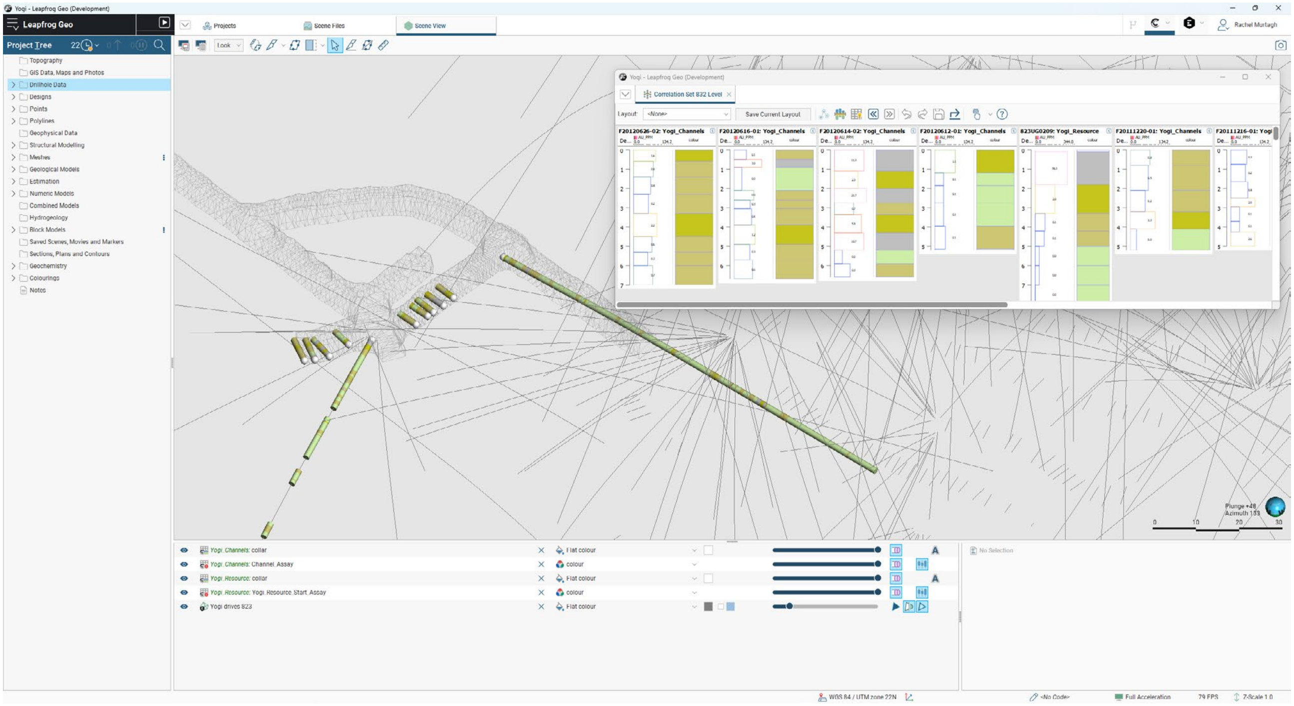
Correlation sets can be used to filter data in the 3D scene, enabling a quick and simple way to represent the data being analysed in the correlation view in the 3D scene. The correlation set filter can be selected from the scene properties drop down for the following data types:

- Collars
- Intervals
- Structural data
- Screens
- Composite data.



Visualise hex colours in the correlation view

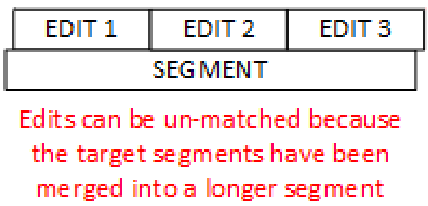
Colour is a fundamental piece of geoscience data, increasingly being autogenerated as part of core photo capture. It helps identify changes in rock type, mineralogy and alteration, for example. Having colour information, such as Imago's core tray dominant colour, visualised alongside assay, lithological logging, and downhole geophysics in the correlation tab and the 3D scene can help with creating and updating interpretation tables and in some cases with decisions when modelling contacts.



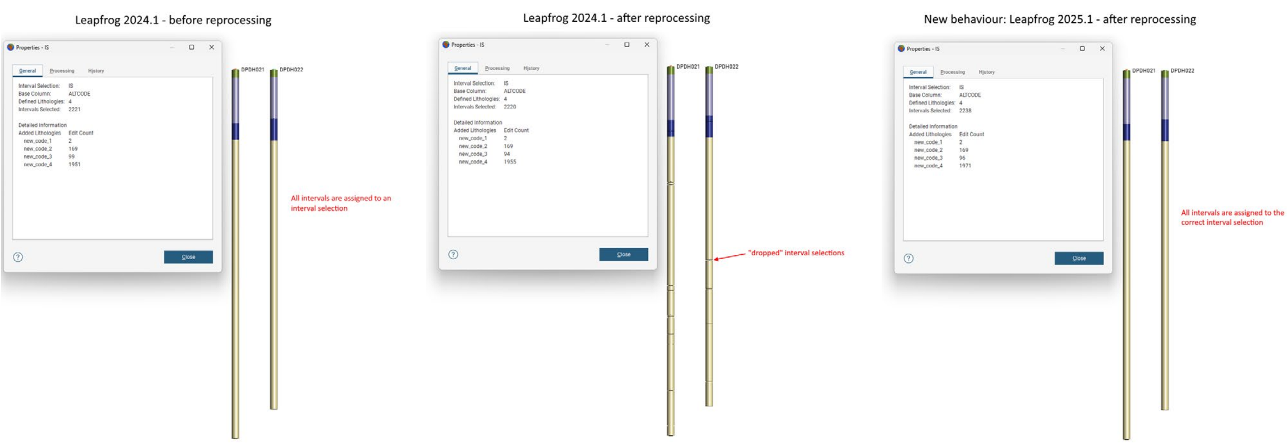
Interval Selection Validation Checks

Over several releases, the rigidity of the validation checks performed when drilling data is re-processed have been relaxed so that interval selection edits behave as expected when the interval tables on which they are based are reloaded. In the first iteration, improvements were made to add a tolerance to interval 'from' and 'to' matching, and to handle the situation where intervals are split.

In this release we now also handle the situation where adjacent intervals in the data base are merged, for example after relogging. Provided the start and end points of the new interval matches the previously adjacent intervals, and these all have the same interval selection code, then the interval selection is preserved.



This behaviour has been improved in Leapfrog 2025.1.



Designs visualisation improvement

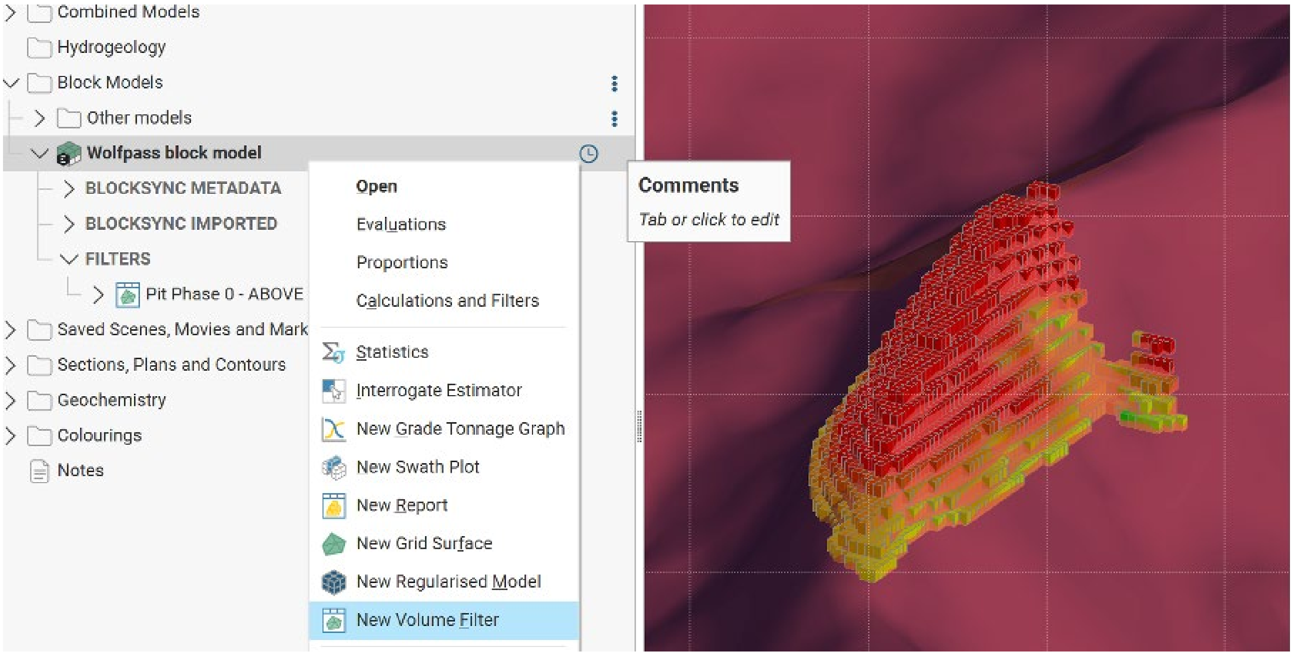
A compulsory update to the code that handles importing design files included some improvements for design files in Leapfrog.

It has been noted that certain files, particularly those designs with complex geometries, have a cleaner visualisation with fewer overlapping lines. It was also found that the files which opened in MicroStation but caused an error in Leapfrog are now opening in Leapfrog without an issue. Finally, it was a previous issue that an object extruded to a particular level in MicroStation was imported incorrectly into Leapfrog. This issue has also been resolved in the latest update.

Block model volume filter

Filtering to the blocks of interest that fall inside a volume is now significantly easier and faster with a new option to directly create quick filters from any closed mesh volume.

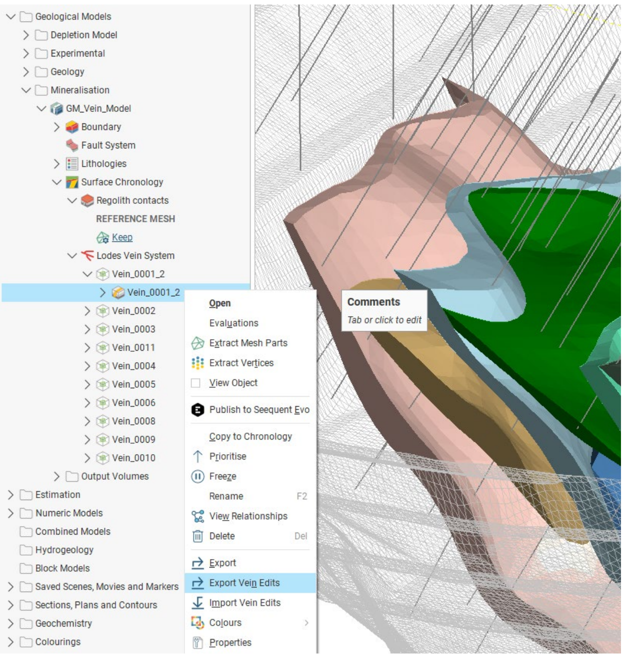
Previously, filtering to blocks that fall inside a shape (such as a mining stope) would require adding the mesh to the grouped mesh tool, evaluating this onto the block model and then manually creating a filter – this process can now be done in a single, easy step.



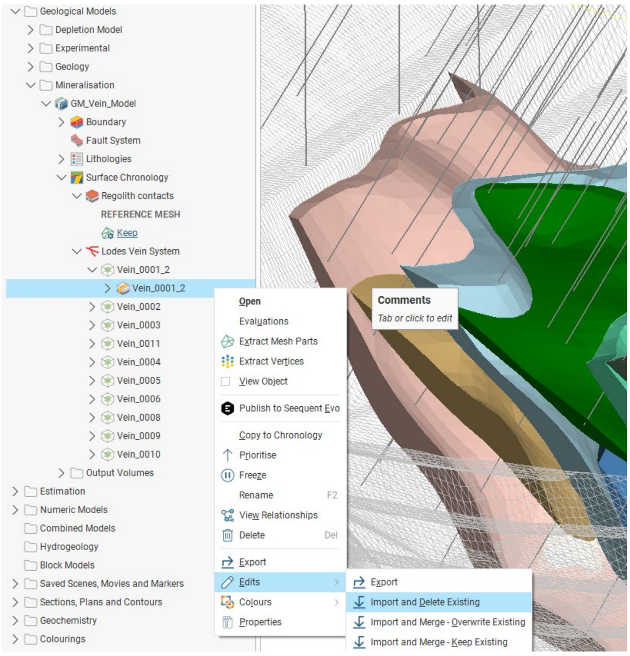
1.5. Streamlined Model Updates - Vein Edits

Importing vein edits has been updated to be more consistent with how interval selection edits are imported. In Leapfrog 2025.1, edits can be imported using a choice of three options:

- Import new edits and **delete** all existing edits
- Import new edits, merge with the existing edits and **overwrite** any existing edits, where the edit is in both existing and new lithology
- Import the new edits, merge with the existing edits and **keep** any existing edits, where the edit is in both existing and new and ignores the new edit.

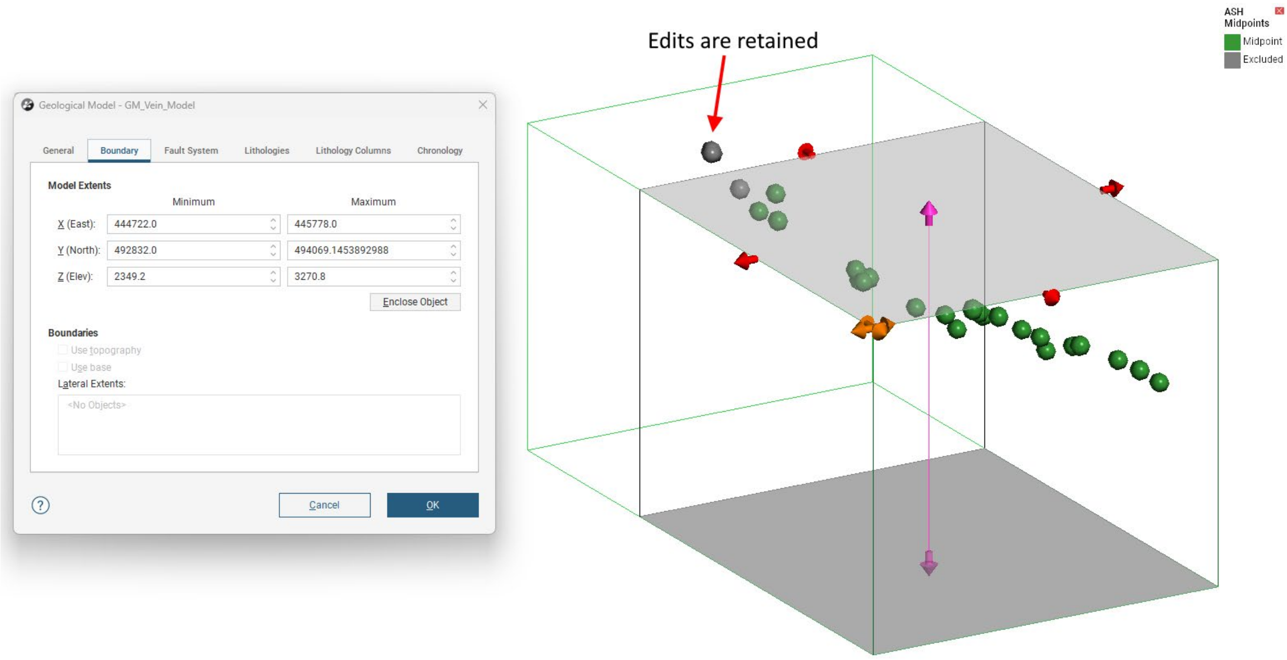


Vein editing in Leapfrog 2024.1



Vein editing in Leapfrog 2025.1

Another small change, to retain vein mid-point edits when boundary settings are updated, has been included in this version. Edits that become invalid (refer to non-existent points) when the boundary settings are changed are now retained so that if the settings are reverted the edits are still existing and are re-applied.

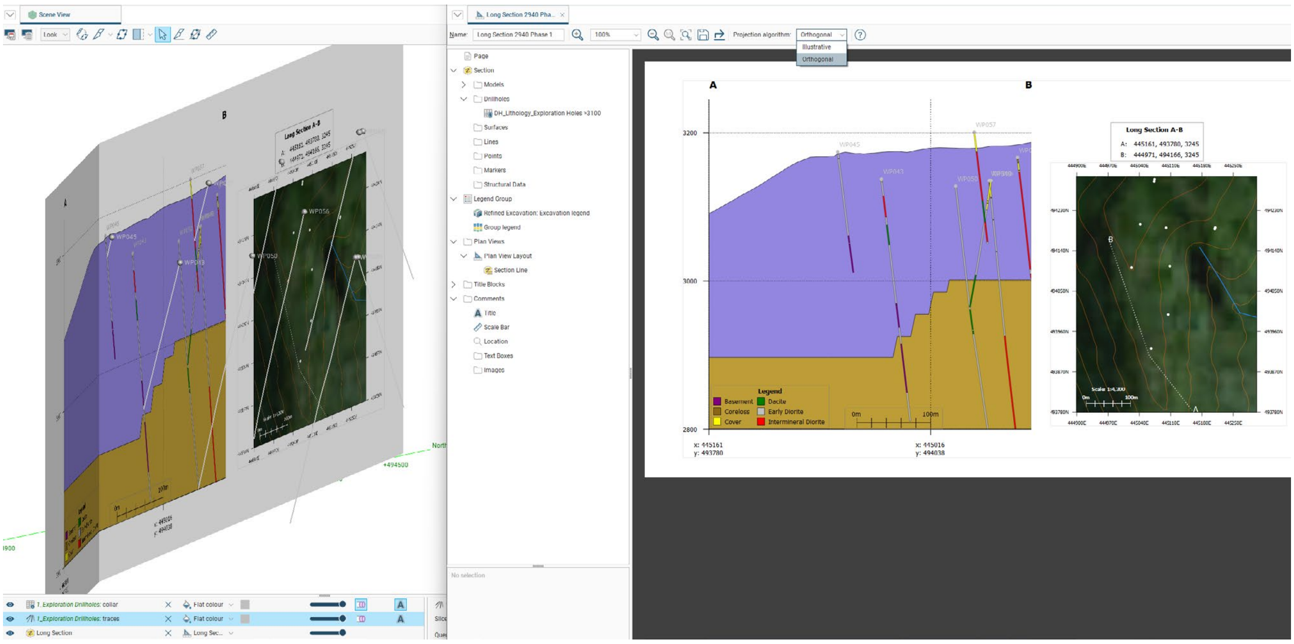


1.6. Communicate Effectively with Cross Sections

Orthogonal or illustrative (formerly scaled) projection on long sections

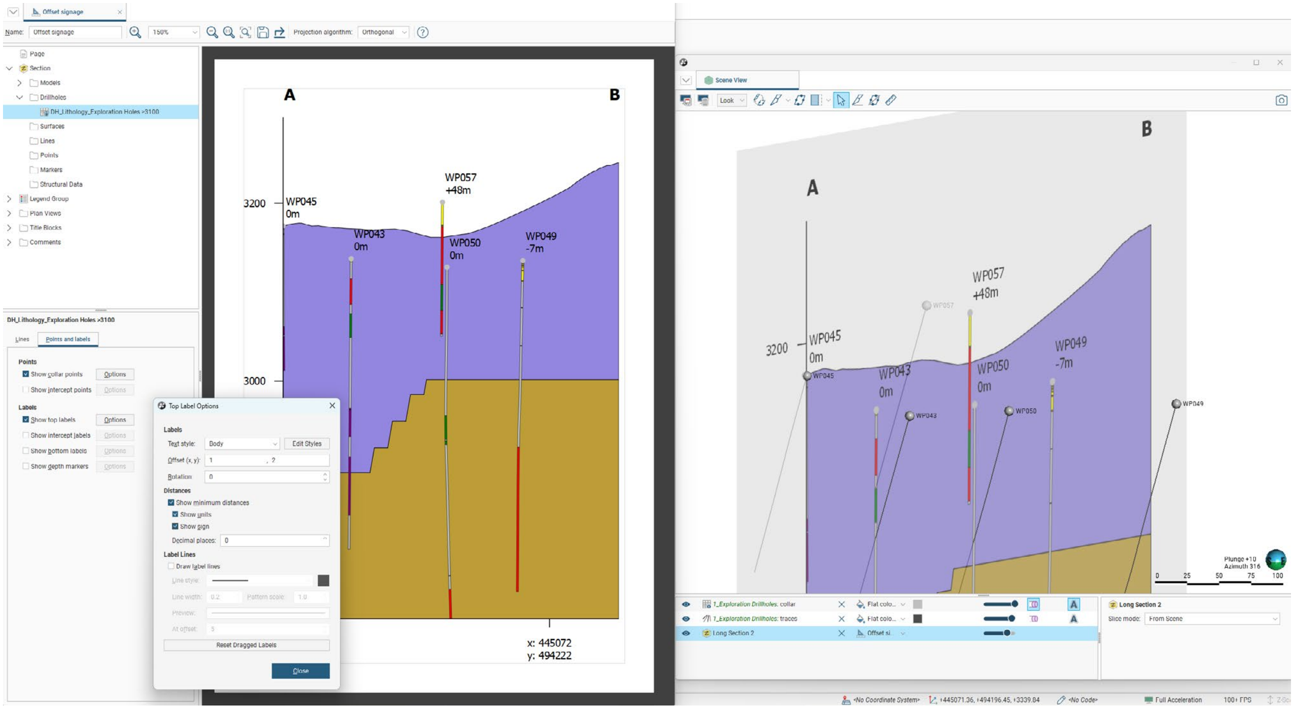
Before Leapfrog 2025.1, drillholes, planned drillholes and polylines were rendered onto the section using an "illustrative" (renamed from scaled) projection method only. In certain instances, this projection style resulted in misalignment with regular points, which were projected orthogonally. While illustrative projection results in a pleasing visual it can be an inaccurate representation of data. Where this style of projection did not fit the intended purpose of the cross section, additional work was required to discretise the polyline the long section was made from. Now, an option to set an illustrative or orthogonal projection style puts the choice back into the users' hands and removes significant manual work some users faced. For Leapfrog 2025.1, drillholes, planned drillholes and polylines will have the option available. Future updates will enable more data types to also have this option.

- **Illustrative Projection:** This option may lack precision on long curved sections but allows for seamless integration into the section layout, providing an easy-to-understand display of non-vertical holes and lines. It is ideal for communication with management and visual reports intended for non-technical audiences.
- **Orthogonal Projection:** This option ensures accurate projection of non-vertical holes and lines onto long curved sections. While it may make the display less smooth, it guarantees that the projection is true to its definition, enabling users to safely share data with contractors and technical stakeholders.



Minimum distance notation

In Leapfrog 2025.1, an additional option called "Show sign" annotates the minimum distance label with a positive or negative to show its relative position to the section in 3D. The measure of minimum distance represents the closest distance any part of the data is to the section (e.g. if a polyline or drillhole trace passes through the section, the minimum distance will be 0m). For vertical drillholes, the distance is meaningful and easy to understand. For angled drillholes the distance may be difficult to interpret, and the strip view can provide better context.



Page size preset options

Before Leapfrog 2025.1, page sizes absent from the list of presets, for example 11" x 17" (tabloid or ANSI B) which are commonly used in the US, had to be customised. Setting up customised page sizes often required converting from inches to mm and there was no way to save the custom size.

To ease this overhead, the following page size presets have been added:

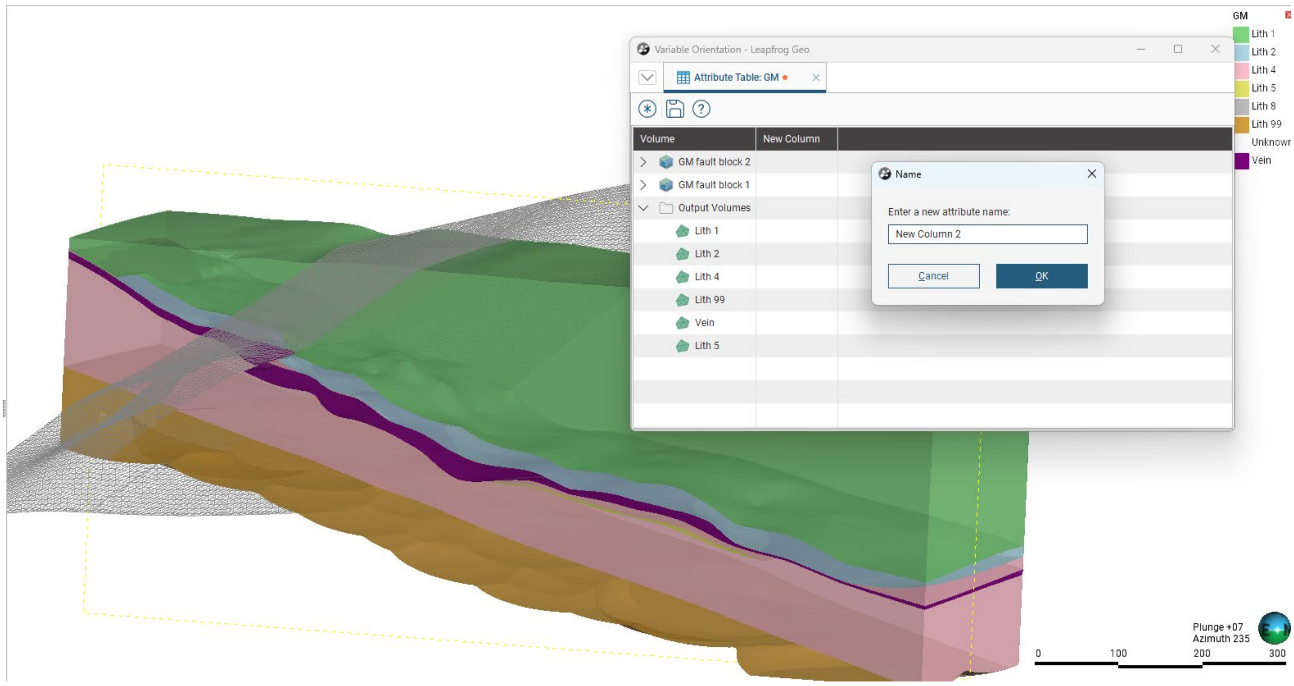
- Tabloid (ANSI B) (279.4 x 431.8 mm)
- ANSI C (431.8 x 558.8 mm)
- ANSI D (558.8 x 863.6 mm)
- ANSI E (863.6 x 1117.6 mm).

1.7. Multi-dimensional Attribution Unlocks New Workflows

Building on Leapfrog 2024.1, several additions improve how information is created on a volume or mesh in Leapfrog and how that information can be used in Leapfrog projects or other applications.

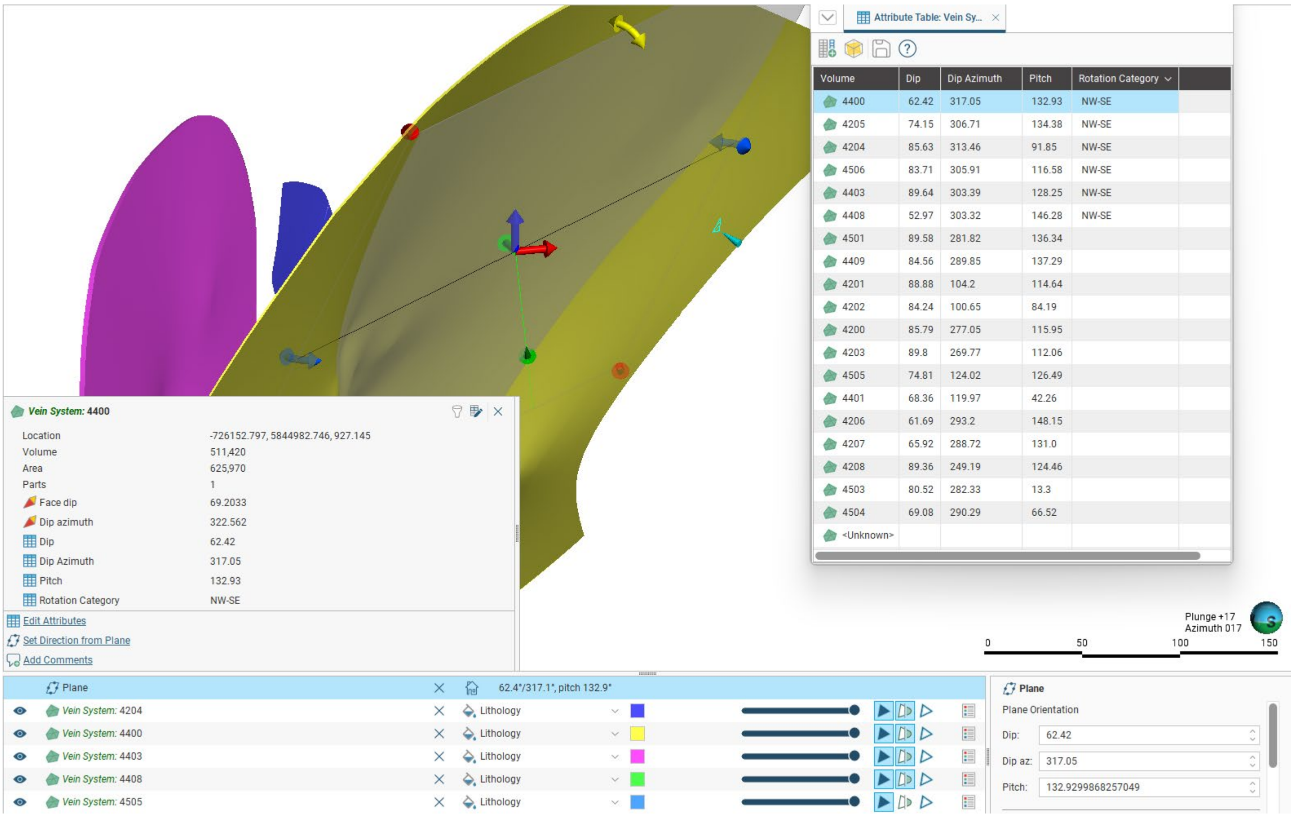
Orientations for Volume Attributes

Previously, volume attribute tables were only available on geological and numeric models. This feature allowed a new column to be created manually which could then have a value assigned for each volume within the model.



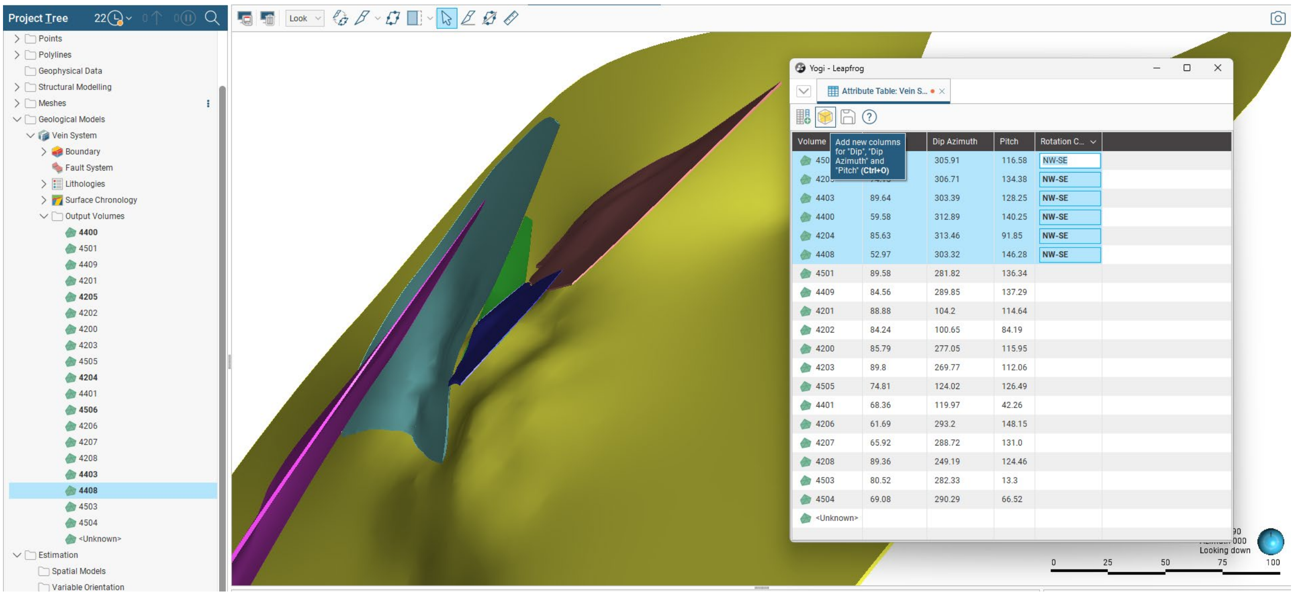
Leapfrog 2024.1

Some small but very useful improvements have been made to this table with more in the pipeline. First, you can now generate orientation columns, Dip, Dip Azimuth and Pitch, in a single action either by clicking the icon in the ribbon or using Ctrl+O. Once the orientation columns are created, orientation values can be generated quickly by using the scene's moving plane tool. Visualise the volume(s) of interest in the 3D scene, then draw the moving plane to represent the general orientation of the volume(s). Further edit the moving plane using the handles in the scene (pitch, for example, might need to be updated more specifically). When the moving plane is set satisfactorily click on the volume you wish to assign this orientation to.



Leapfrog 2025.1

Recall, that when you click and drag to multi-select several cells and click into one of the cells, you can bulk update the selected cells (only a unique input is accepted, as opposed to a set of different inputs). Use this, for example, to assign a common attribute value to multiple volumes.



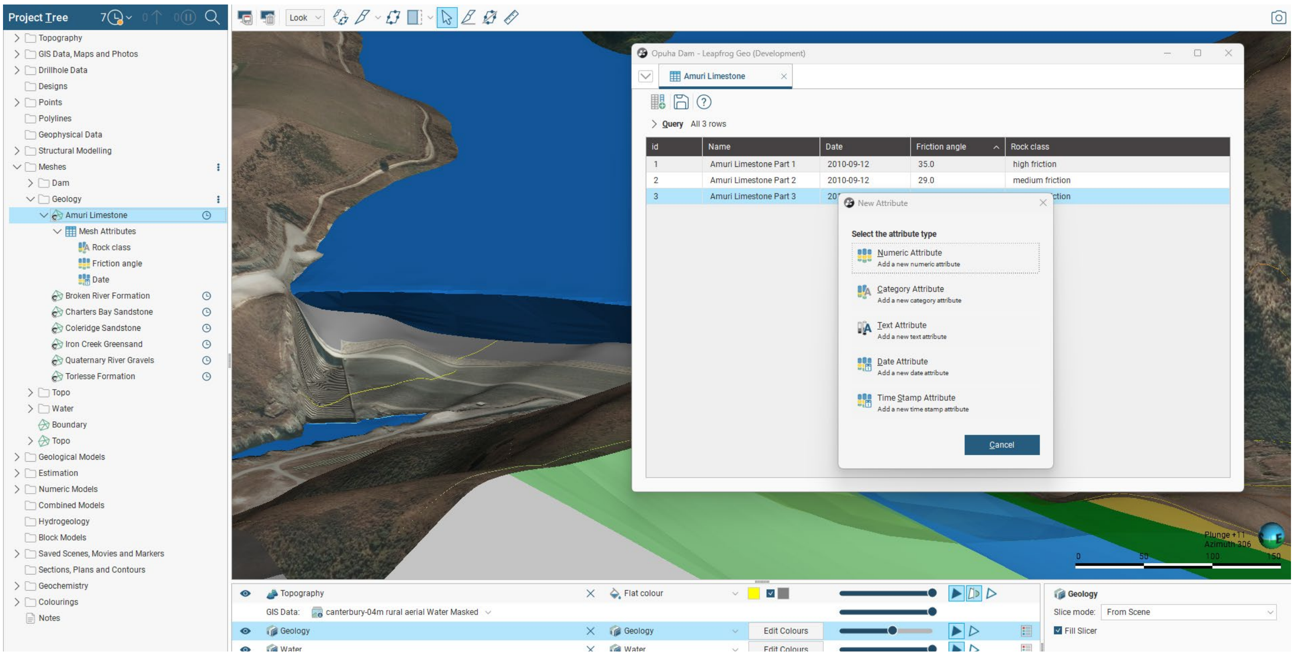
The maximum trend of continuity is a very important piece of information to have per volume or where volumes can be represented by a common orientation. Please refer to Section 6.1 for more details on where this information is carried through, making assigning orientations semi-automated.

Attribute Table for Meshes

Leapfrog 2025.1 extends attribution from polylines and modelled volumes to meshes in the Meshes folder. Attribution on the modelled volumes have some limitations that are resolved by attributing meshes once extracted to the Meshes folder.

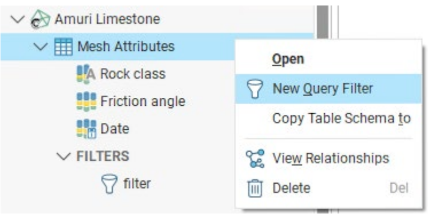
For example, when volumes in the Geological Model or Numeric Model are assigned an attribute, the entire volume, inclusive of all its mesh parts, is assigned the attribute. Any information pertaining to individual parts that needed specific communication cannot be generated. To have any distinction between mesh parts, individual parts would have to be extracted and named which was time consuming and bloated a project with a needless number of meshes.

Now, attributes are available on static and extruded meshes in the Meshes folder.



Mesh parts can be attributed with numeric, category, date and text information. These attributes can be visualised in the scene and where applicable properties can be filtered using edit colours, display filters and value filters.

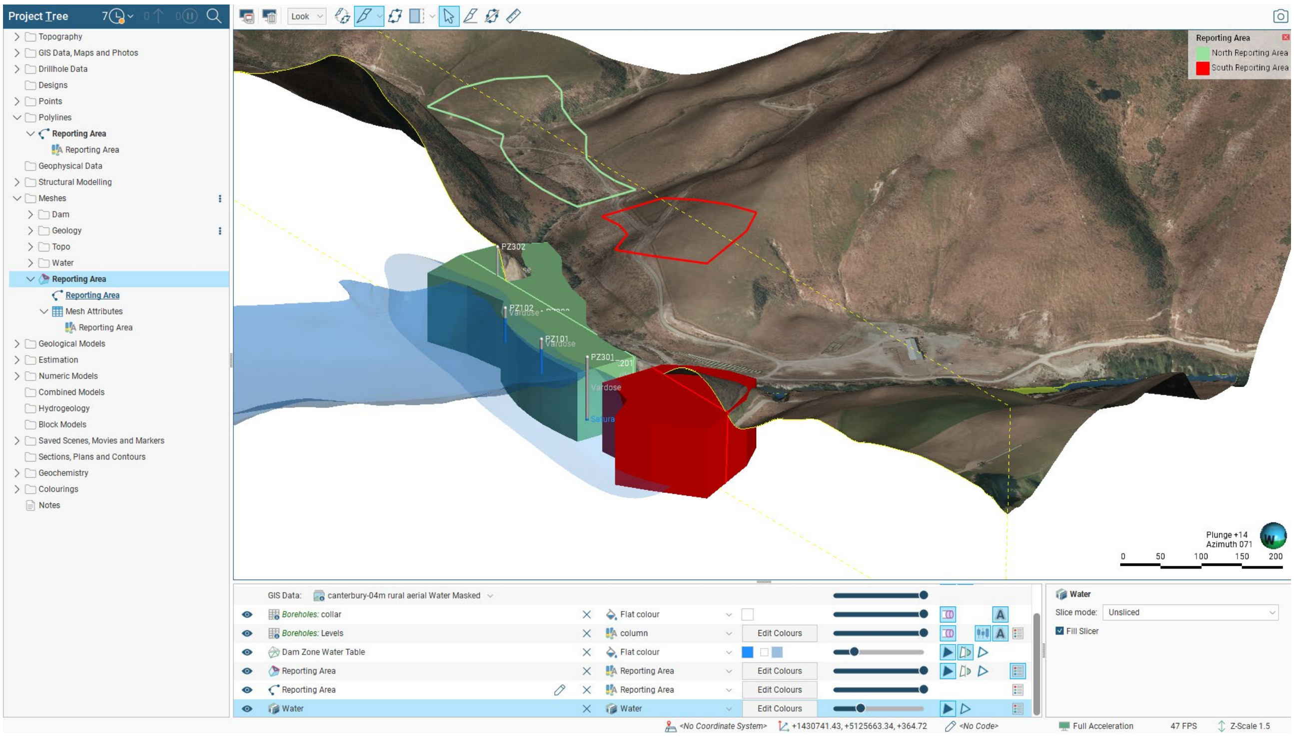
Additionally, query filters can be created, and the table column configuration can be copied to any suitable mesh saving time where similar properties are being recorded for many meshes. Filters based on attributed information can be used to filter mesh parts in the 3D scene. Work is underway to allow these filters to be used as part of refining input data to a process.



Extruded Mesh

Extruded Mesh is somewhat unique in Leapfrog being an extrapolated surface or volume created from a polyline. Before, when an attributed polyline was used as an input to an extruded mesh, the attributed data was not carried through, leading to a loss of information between the input data and the output data. To work around this, the polyline would need to be copied and edited to extract individual parts and, again, a naming convention would need to be used to provide the information.

Now, attributed information flows from the polyline to the extruded mesh without any additional effort required. All the same benefits for data visualisation and filtering are available on the extruded mesh attribution table as it is for the polyline attributes.



This improvement generates simple volumes from a single attributed polyline which is a very common requirement in ground works of many descriptions.

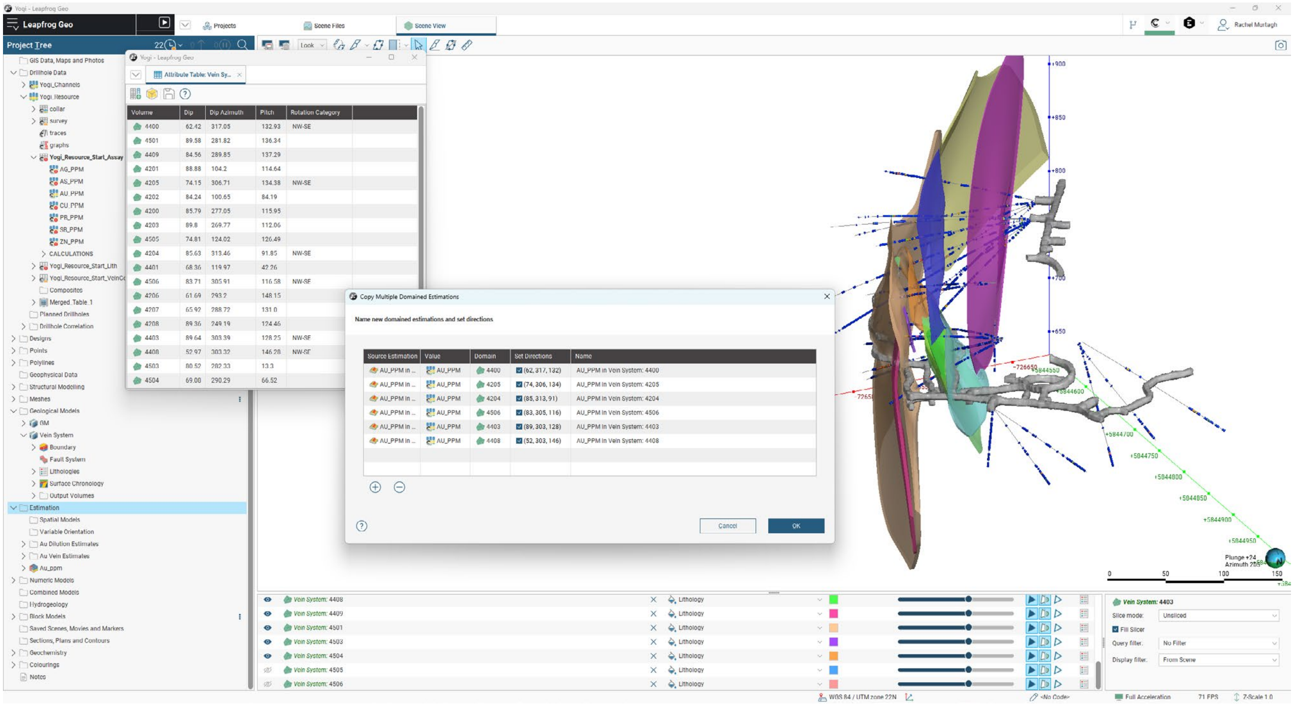
2. Leapfrog Edge Features & Functionality

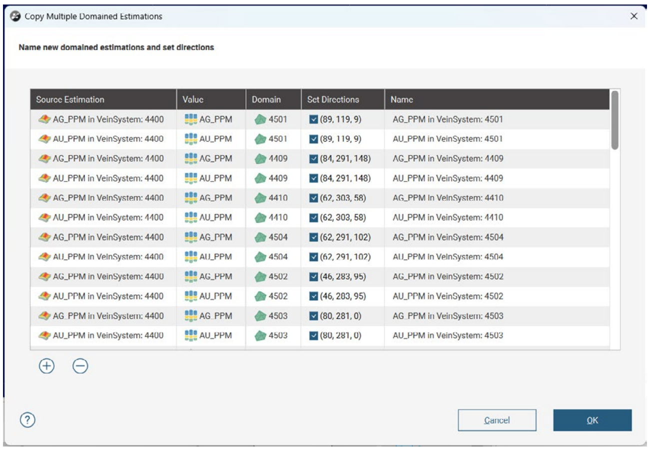
2.1. Efficient Multi-domain Set-up and Rotation Management

This release introduces Copy Domained Estimations, enabling users to replicate the Spatial models and estimators defined for one domain across multiple others in a single action. This new capability is particularly powerful when used alongside Volume Rotation Attribution, streamlining the setup of mineral resource estimations for complex deposits with multiple geological domains and variables.

With Volume Rotation Attribution, each geological domain can retain its specific dip, dip azimuth, and pitch, ensuring domain-specific orientations flow seamlessly through the estimation process. Once variography and estimation parameters are defined for a key variable in one domain, Copy Domained Estimations allows users to duplicate those settings—including variograms and search ellipses—across other variables and domains, preserving each domain's unique orientation automatically.

This update significantly reduces workload, improves consistency across domains, and accelerates the delivery of resource models and reduced risk of user error during repetitive tasks.





Source Estimation	Value	Domain	Set Directions	Name
AG_PPM in VeinSystem: 4400	AG_PPM	4501	(89, 119, 9)	AG_PPM in VeinSystem: 4501
AU_PPM in VeinSystem: 4400	AU_PPM	4501	(89, 119, 9)	AU_PPM in VeinSystem: 4501
AG_PPM in VeinSystem: 4400	AG_PPM	4409	(84, 291, 148)	AG_PPM in VeinSystem: 4409
AU_PPM in VeinSystem: 4400	AU_PPM	4409	(84, 291, 148)	AU_PPM in VeinSystem: 4409
AG_PPM in VeinSystem: 4400	AG_PPM	4410	(62, 303, 58)	AG_PPM in VeinSystem: 4410
AU_PPM in VeinSystem: 4400	AU_PPM	4410	(62, 303, 58)	AU_PPM in VeinSystem: 4410
AG_PPM in VeinSystem: 4400	AG_PPM	4504	(62, 291, 102)	AG_PPM in VeinSystem: 4504
AU_PPM in VeinSystem: 4400	AU_PPM	4504	(62, 291, 102)	AU_PPM in VeinSystem: 4504
AG_PPM in VeinSystem: 4400	AG_PPM	4502	(46, 283, 95)	AG_PPM in VeinSystem: 4502
AU_PPM in VeinSystem: 4400	AU_PPM	4502	(46, 283, 95)	AU_PPM in VeinSystem: 4502
AG_PPM in VeinSystem: 4400	AG_PPM	4503	(80, 281, 0)	AG_PPM in VeinSystem: 4503
AU_PPM in VeinSystem: 4400	AU_PPM	4503	(80, 281, 0)	AU_PPM in VeinSystem: 4503

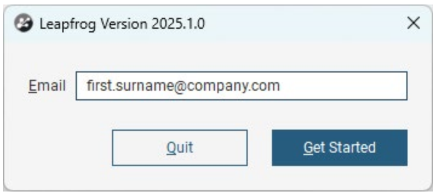
3. User Interface and Interactions

Interactions with an aesthetic and accessible interface is firmly at the heart of Leapfrog's product design principles. Leapfrog 2025.1 includes several improvements and adjustments to ensure users continue to experience the best Seequent software provides.

3.1. Getting Started with Leapfrog 2025.1

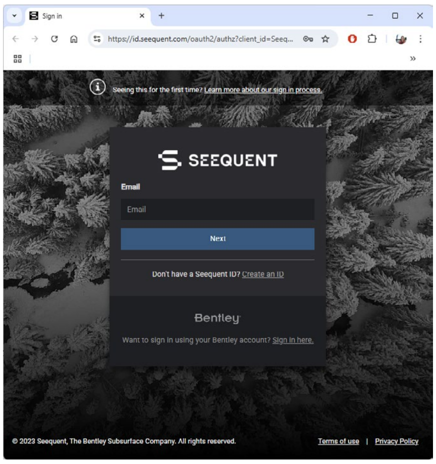
Leapfrog 2025.1 includes changes to the 'getting started' workflow. These changes are necessary to facilitate Leapfrog's integration with Seequent Evo. While the interface will look slightly different, the general flow has remained the same.

After downloading and running the installation file for Leapfrog 2025.1, a new dialog requesting an account email will pop up.

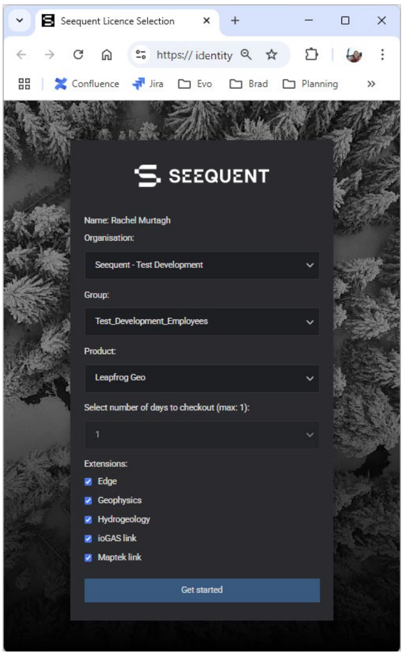


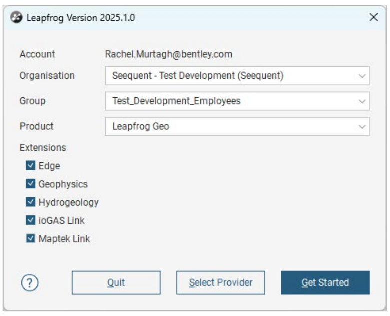
By entering an email address at this stage of getting started, Leapfrog can initiate some checks necessary to prepare the proceeding stages.

For existing Seequent accounts, the following stage will be familiar. If Seequent Connector is **not** signed in (unlikely, if you have been using previous versions of Leapfrog), a browser window is opened to sign in with your Seequent ID. If Seequent Connector is signed in (more likely) this step is skipped.



The next stage, to select organisation, group, product and extensions, has changed slightly. Previously, this stage was also completed in the browser. In Leapfrog 2025.1, this is completed in Leapfrog itself. The options and choices will be the exact same between both dialogs.





3.2. Speed Improvements

An important part of implicit modelling is the process of interpolation. Different interpolation methods are used in Leapfrog across many functions. For example, the intrusion surface use either linear or spheroidal interpolants. Interpolants are also used in evaluating models back onto data (e.g. evaluating a GM onto a set of points or drilling).

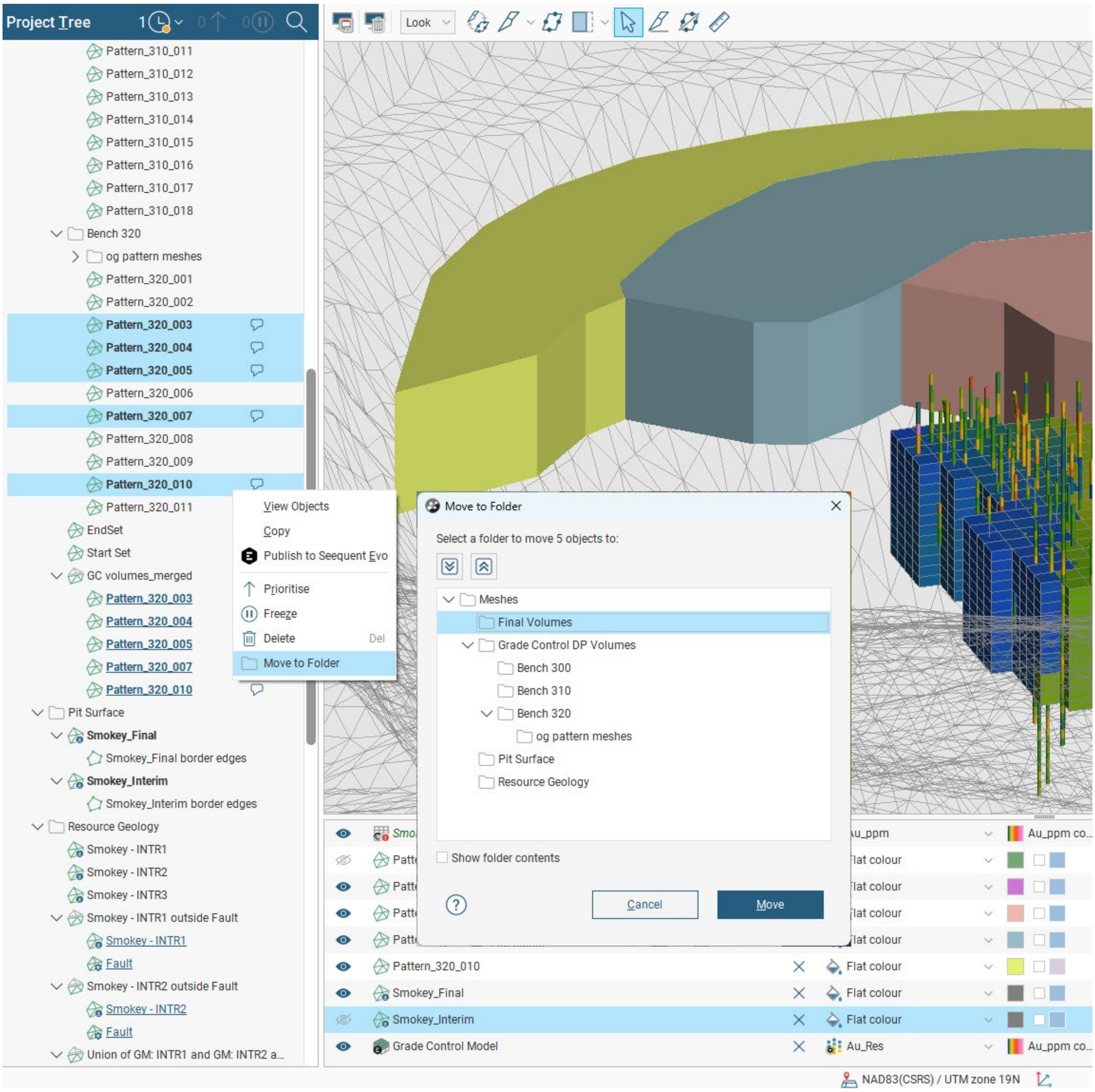
In Leapfrog 2025.1, a phase of improvement looked specifically at the performance and behaviour of the RBF and the techniques used in these areas. These techniques are important as they can be tailored to specific problems; in a data rich environment like subsurface modelling, the problem to solve is how to crunch large datasets faster and more optimally. An iteration on the FastRBF™ has been developed for the spheroidal interpolant specifically. The result is an increase in speed of about 20%, meaning spheroidal interpolant run roughly 20% faster in the tests conducted.

In practice, this does not necessarily mean that the processing time to update a Leapfrog model or project will be faster by 20%. There are nuances in each project and model that are not predictable and therefore might not result in such an increase. However, in certain scenarios speed and performance could be notably faster.

3.3. Moving Meshes Between Folders

A new menu option "Move to Folder" addresses the challenges users face when managing large numbers of meshes in the LF project tree. The previous method of (multi-)select and drag-and-drop was cumbersome, especially when moving to folders located off the project tree 'viewport'.

In Leapfrog 2025.1, you can select one or more meshes and choose the destination folder, ensuring a smoother and more efficient workflow. Additionally, it includes checks to ensure that the selected objects are allowed to be moved into the chosen folder and the user can view the contents of the target folder before confirming the move to ensure accuracy.



3.4. Colouring

Colour maps and legends are powerful visual tools for interpreting complex data. Colour codes can also be standardized across companies for mapping and communication.

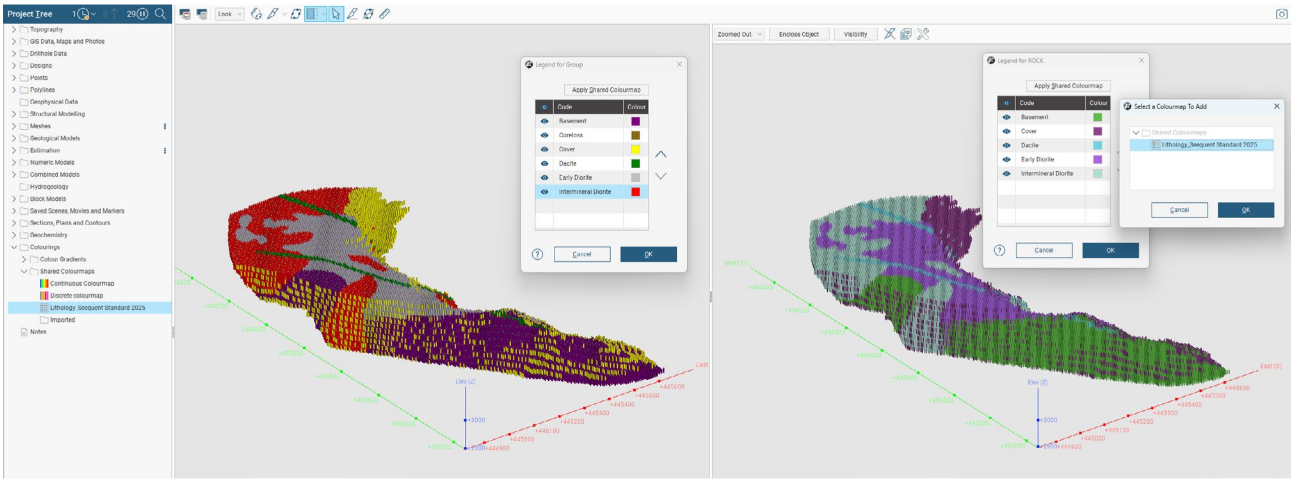
The latest enhancements ensure that colourmaps, both numeric and categoric, are consistent within and across projects and you can trust your data will look the same, no matter where you view it.

Import and share category colourmap

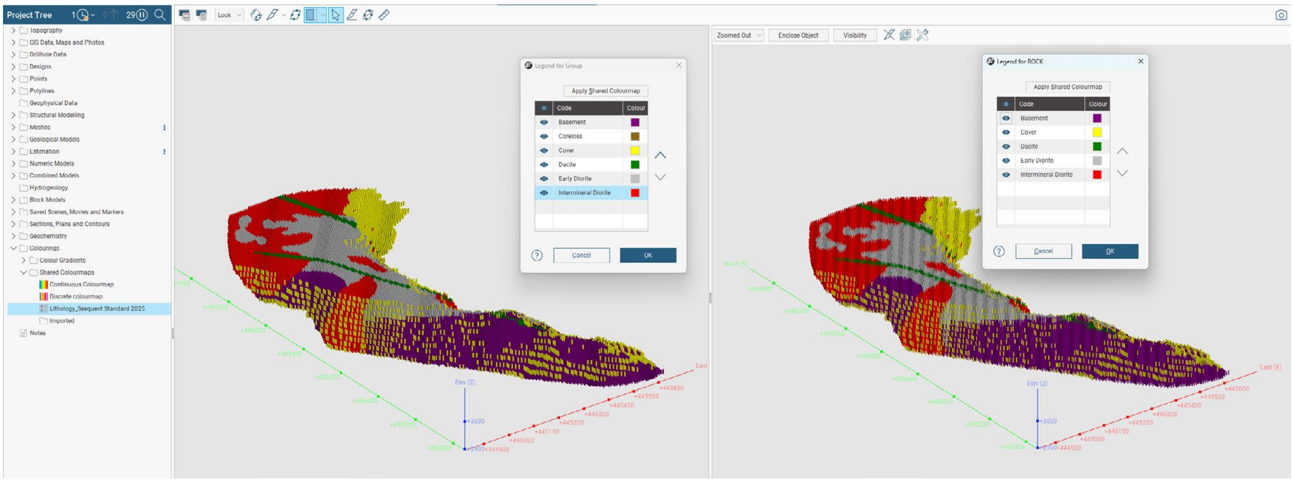
Previously, sharing and importing colourmaps was limited to numeric continuous and discrete colourmaps. In Leapfrog 2025.1 category colours can now be imported as well as shared in the same way as numeric colourmaps.

Once a set of colours has been imported or shared, the set is added to the "Shared Colourmaps" folder in the project tree and becomes available for application to any categorical data set.

This is a significant time saving feature. Category colour standardisation within or across projects would have previously required hand selecting each colour from the colour picker which for larger datasets would have been extremely tedious.



Before



After

Default behaviour for colourmap display

When a shared colormap is assigned to one or more datasets from the project tree, it is immediately updated as the display option in the shape list. Previously, the new colormap would appear as an option in the drop-down list but had to be selected as a subsequent action.

This update applies even if the object is not in the scene; once added, it will default to the newly assigned colormap.

4. Seequent Evo

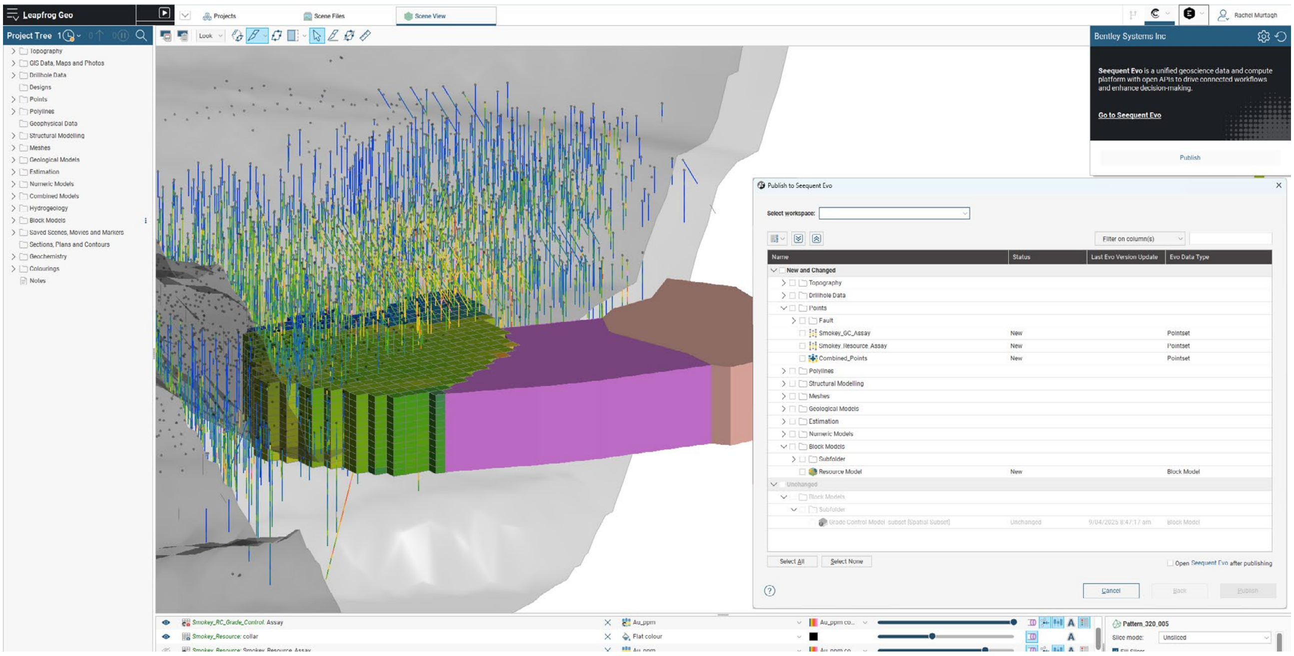
Seequent Evo is a geoscience data and compute platform that enables integrated workflows and collaboration across Seequent's well known desktop applications, newly launched cloud native applications as well as third-party products. It powers geoscience solutions for data processing, modelling, and insight generation. This drives innovation and enables users to continuously improve their workflows and business with open APIs and data.

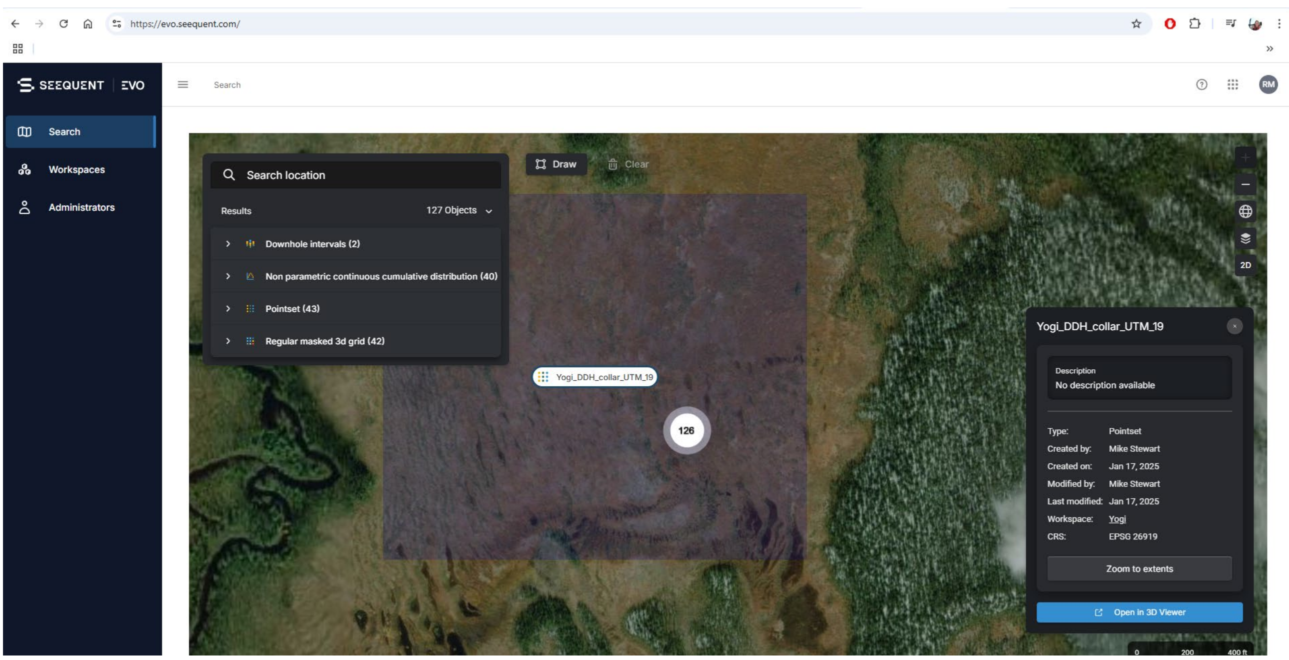
Leapfrog 2025.1 has been built with a comprehensive integration to Seequent Evo. The following sections will focus on the Leapfrog enabled features and workflows. For more information on Evo, its key benefits supported by customer stories and cloud native applications, please visit the Seequent website. To register your interest in Evo, please click here.

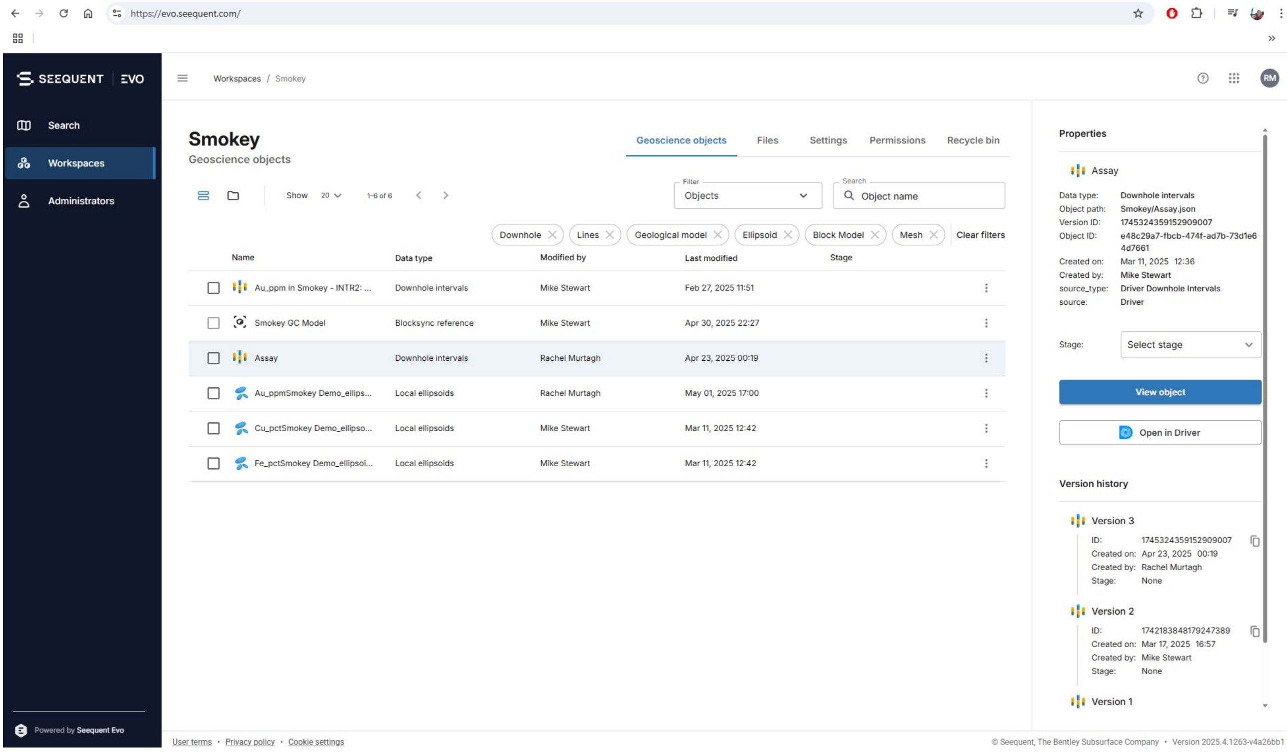
4.1. Data Management, Collaboration and Sharing: Leapfrog and Evo

Once an organisation has access to Evo, Leapfrog 2025.1 is fully equipped to publish and import data to and from Evo. Check out Seequent's other applications for Evo support or explore Evo's open APIs to start publishing and consuming data directly to Evo.

Start getting ahead with seamlessly connected workflows without any of the hassle of file format conversion and incompatibility.







Leapfrog 2025.1 has support for the following data types. Subsequent versions will support more data types so please stay informed of latest news and updates.

Data Type		Import	Publish	Seequent App Connections
Topography			✓	
Drilling Data	Drillhole set (package of collar, survey and interval tables)	✓		MX Deposit, Driver and Leapfrog
	Interval table	✓	✓	
Points		✓	✓	MX Deposit, Driver and Leapfrog
Polylines	Line segments, points, disks, tangents.	✓	✓	
Geophysical data	2D grids	✓		Oasis montaj, VOXI and Leapfrog
Structural Modelling	Planar structural data	✓	✓	Driver and Leapfrog
	Lineation	✓	✓	
	Ellipsoid data	✓		
Meshes		✓	✓	Oasis montaj, PLAXIS, GeoStudio and Leapfrog
Geological Models	GM, Refined GM, Combined GM	✓	✓	Oasis montaj and Leapfrog
Numeric Models	RBF and Indicator RBF interpolant		✓	
LF Edge (LF Geo and Energy)	Variogram models	✓	✓	Geostats Tasks and Leapfrog Edge
	Domain	✓	✓	
	Values	✓	✓	
Contaminants (LF Works)	Variogram models			
	Domain		✓	
Block Models	Regular, octree, fully sub-blocked	✓	✓	BlockSync and Leapfrog
Sections	Sections with GM, Combined GM/GM or GM/NM, Refined GM evaluation		✓	Leapfrog

Attributed data, for example attributes on meshes and polylines are supported by Evo, meaning when the data is published to Evo from Leapfrog, any application supporting attributed data can import and use these attributes. Currently, volume attributes on the GM are not supported by Evo.

4.2. Enhanced Implicit Modelling: Leapfrog and Driver

Identifying and understanding features and patterns in drilling data lays the foundation of geological modelling. Driver is a cloud-based Evo application for rapid spatial exploratory data analysis of drilling datasets. Driver uses machine learning technology to analyse data in a new way.

Combining novel data-driven insights from Driver with the modelling capabilities of Leapfrog helps geologists discover locally varying relationships quickly and auto-generates a new type of input to Leapfrog structural trends. More geologically realistic surfaces and volumes can now be generated as a starting point, reducing the time and effort taken to tweak model parameters and/or add manual constraints.

For more information and to register your interest in Driver, please click here. The following will focus on features in Leapfrog 2025.1 that integrate Driver inputs, specifically 'ellipsoids', via Evo.

Driver

Import drilling data from Evo. Generate data-driven anisotropy & continuity data. Publish ellipsoid data, structural disks or lineations to Evo.

⟷

Evo

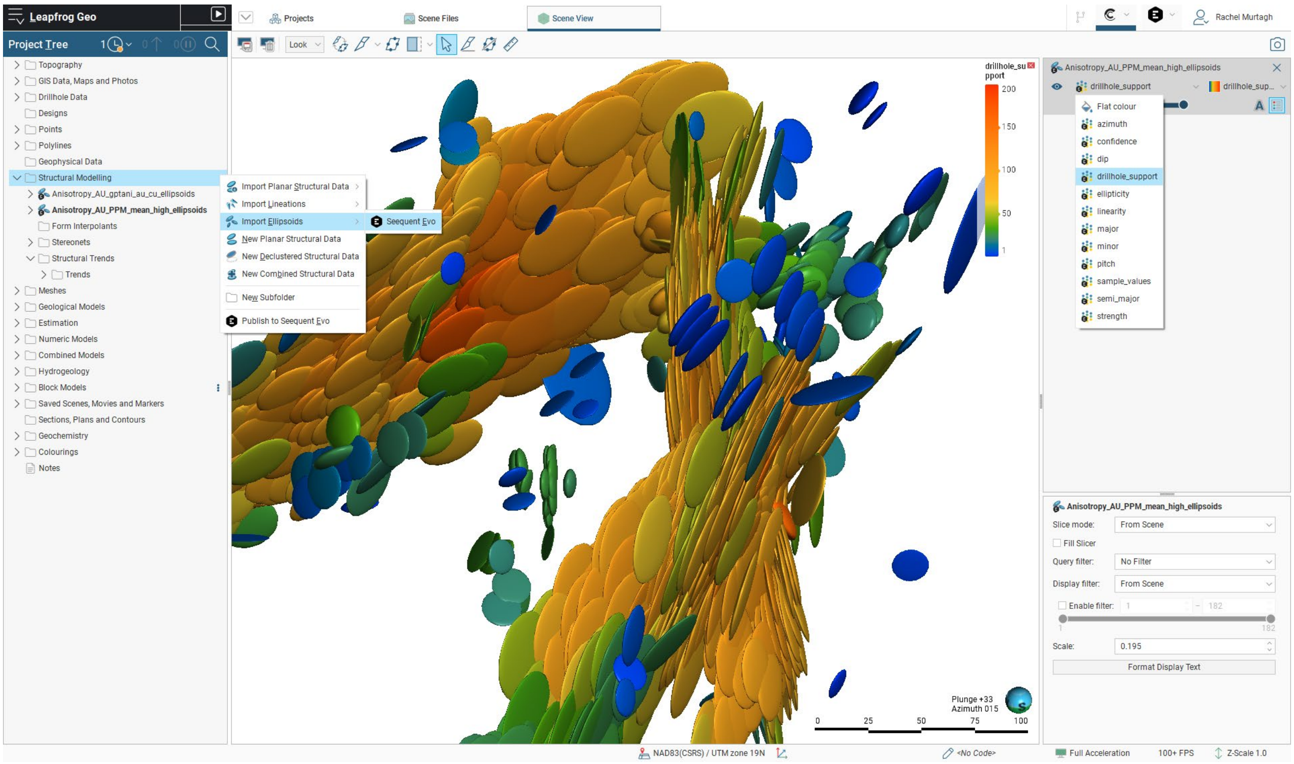
Organise & share data. Explore & visualise all other geoscience data in the workspace

⟷

Leapfrog 2025.1

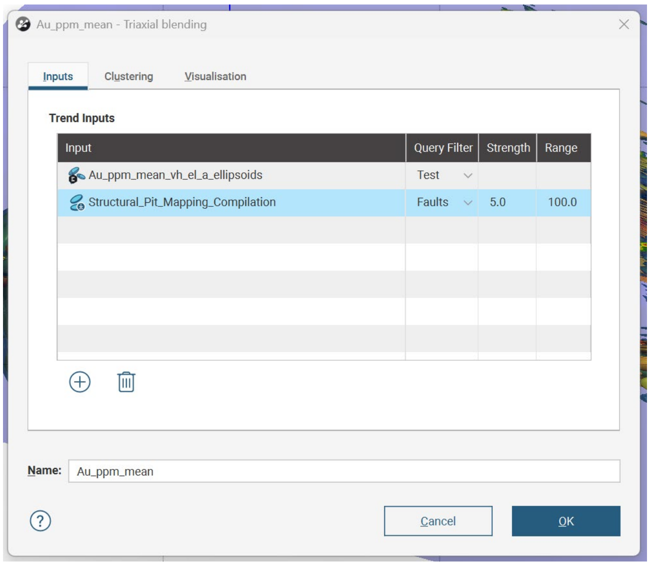
Import and visualise ellipsoid data from Driver via Evo. Generate new triaxial blending structural trend in a single click. Be actively notified of newer versions of ellipsoid data in Evo.

In Leapfrog 2025.1, locally varying anisotropies, represented by ellipsoids, are generated in Driver and imported into the Structural Modelling folder via the import from Seequent Evo option.

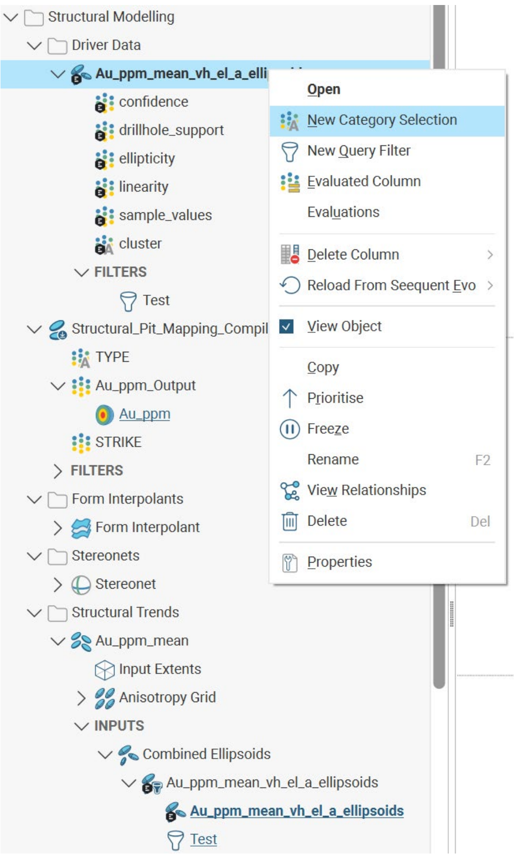


Once imported, ellipsoids can be visualised in the 3D scene and a variety of insightful attributes, generated in Driver, are available for display.

- Data support shows the number of unique drillholes contributing to the local anisotropy ellipsoid.
- Confidence is the score calculated during processing in Driver and represents the percentage of angular space surrounding the control point that is occupied by real samples. Higher values indicate an analysis that is well constrained by data where low values indicate a poorly constrained analysis. Values of ~0.1 or higher are generally of acceptable quality.
- Sample value shows the value of the attribute, e.g. AU grade, at the ellipsoid location as measured and recorded in the drilling data table.
- Ellipticity is a shape metric that indicates how flat the ellipsoid is, i.e. the ratio of the major to minor range.
- Linearity is a shape metric that indicates show elongated the ellipsoid is, i.e. the ratio of the major to semi-major range.
- Strength is a parameter calculated on the ellipsoids on import to LF. It describes how many times stronger the trend is in the maximum and intermediate plane than in the minimum direction. It is this value that is used in the structural trends unlike the traditional structural trends where strength and range are manually entered by the user.



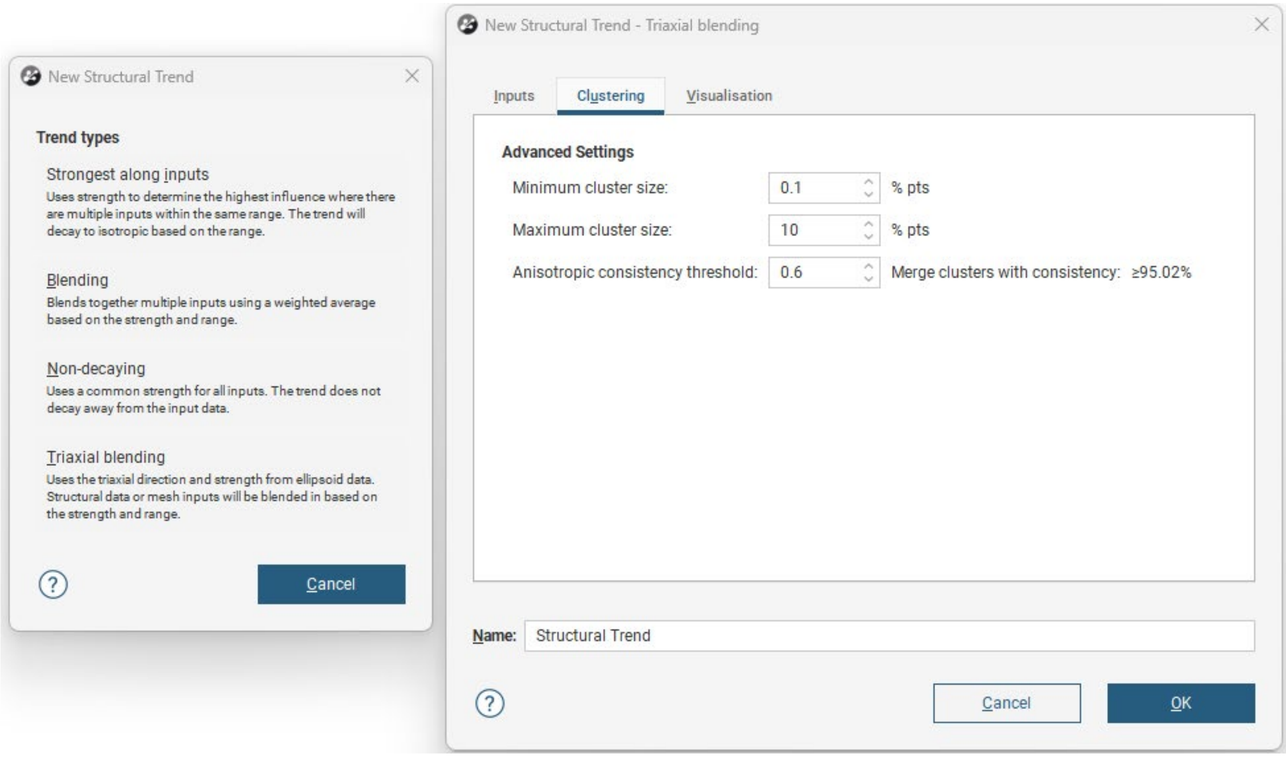
As well as visualisation, imported columns can be interrogated and interpreted using query filters, category selections and evaluations.



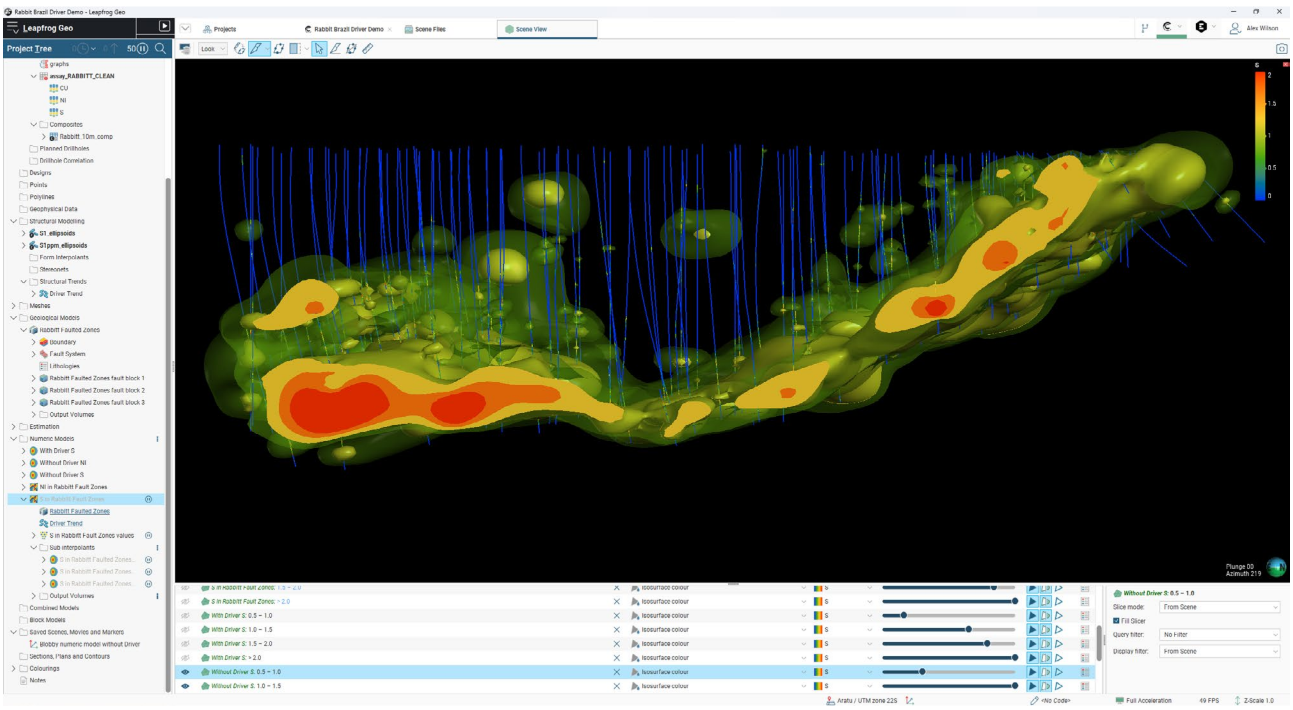
Structural trend types: Triaxial blending

Ellipsoids can be used, in combination with other data if required, as an input to Leapfrog's stereonet for structural analysis and to the structural trend. As mentioned, a significant effort has been made to overhaul structural trends (please refer to Section 5.1 for more details). Alongside this effort, a new type of structural trend, 'Triaxial blending', has been developed.

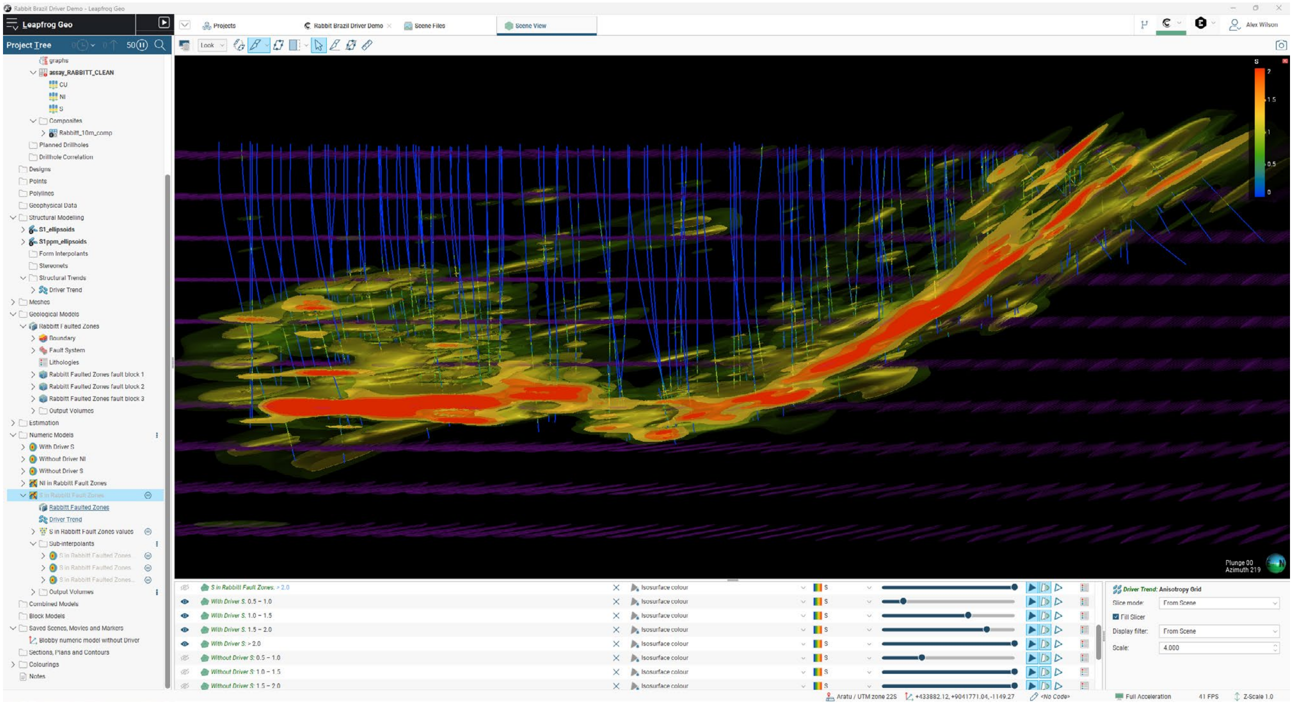
Taking the relative strengths in each of the three directional axes along with the trend direction information, triaxial blending simplifies and blends the data into a representative structural trend. Triaxial blending 'clustering' settings can use a percentage rather than absolute number of points to define minimum and maximum cluster sizes.



The triaxial blending structural trend can be used anywhere traditional structural trends can be used (intrusion surfaces, numeric RBF models, indicator interpolants etc). The significant differentiation when using triaxial blending is that it requires fewer tweaks or manual edits compared to structural trends and models compared to using traditional structural trends. Additionally, the trends and therefore models are data-driven (e.g. assay data), more subjective, repeatable and take less time to create.



Numeric Interpolant – no structural trend



Numeric Interpolant – triaxial blending structural trend

4.3. Block Model Management: Leapfrog and BlockSync

BlockSync redefines how teams manage, analyse, and connect their block model data.

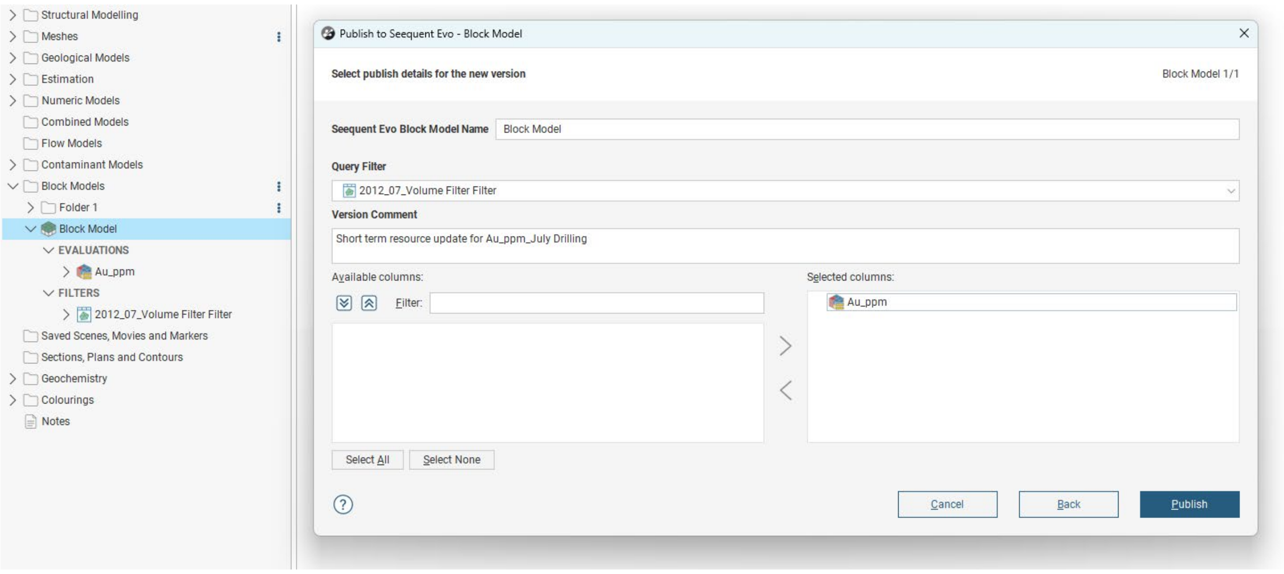
It offers an open, auditable system of record where teams can collaborate on block model data from any source. Rapid model updates and real-time resource insights enhance orebody knowledge and support strategic and operational decision-making.

The following sections will focus specifically on Leapfrog's integration with BlockSync. To learn more about BlockSync's open technology or to register your interest, please click this link.

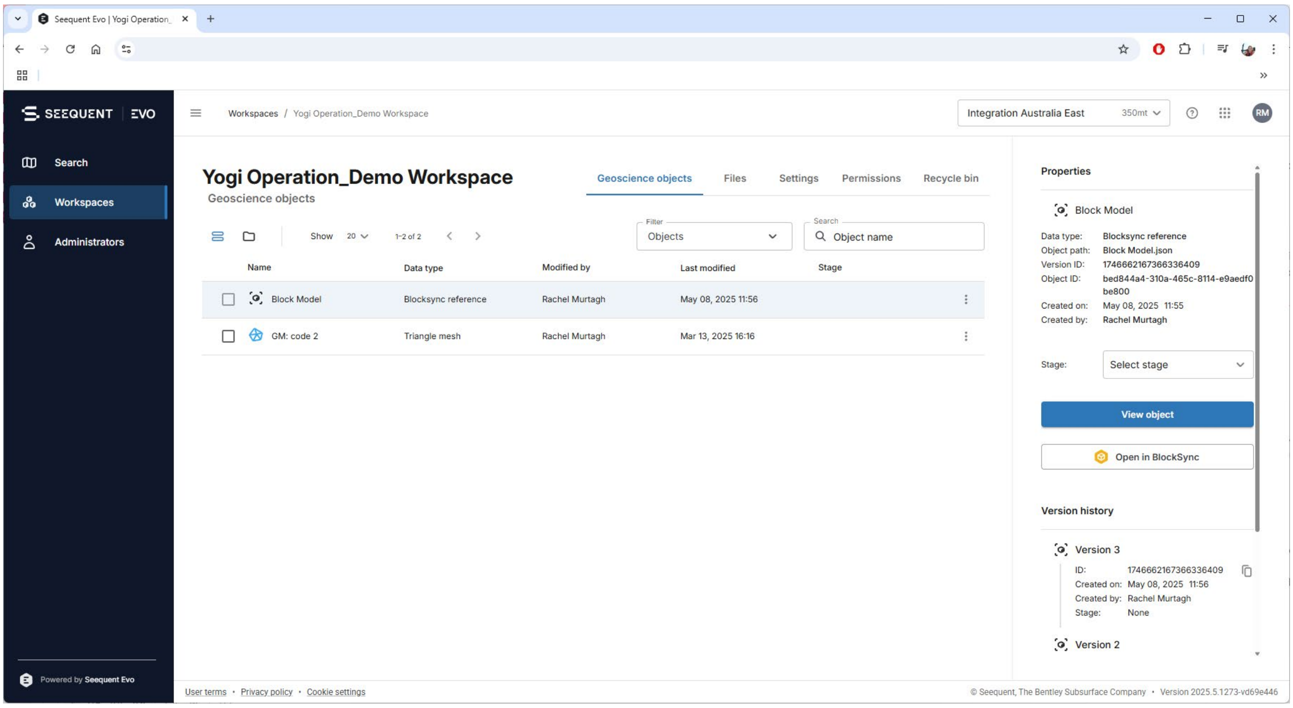
Manage block model data

Four types of block model can be created in Leapfrog (regular, octree, fully sub-blocked and variable z). Additionally, a limited number of block model formats can be imported to a Leapfrog project (*.csv and *mdl). Block models tend be repositories of a significant volume of critical information but commonly bloat the Leapfrog project. This negatively impacts the performance of the Leapfrog application and consequently the productivity of the user. Furthermore, the limitations imposed by proprietary file formats creates barriers and obstacles to efficient ways of working.

By connecting Leapfrog to Evo, and leveraging the BlockSync application, block models (except for the variable z type) can be stored external to the Leapfrog project without compromising workflows and dynamic links to Leapfrog models and mineral resource estimates. For block models originating in Leapfrog, either publish the entire model or a part of the model to Evo. Query filters or volume filters can be used to create a subset of blocks for publishing.

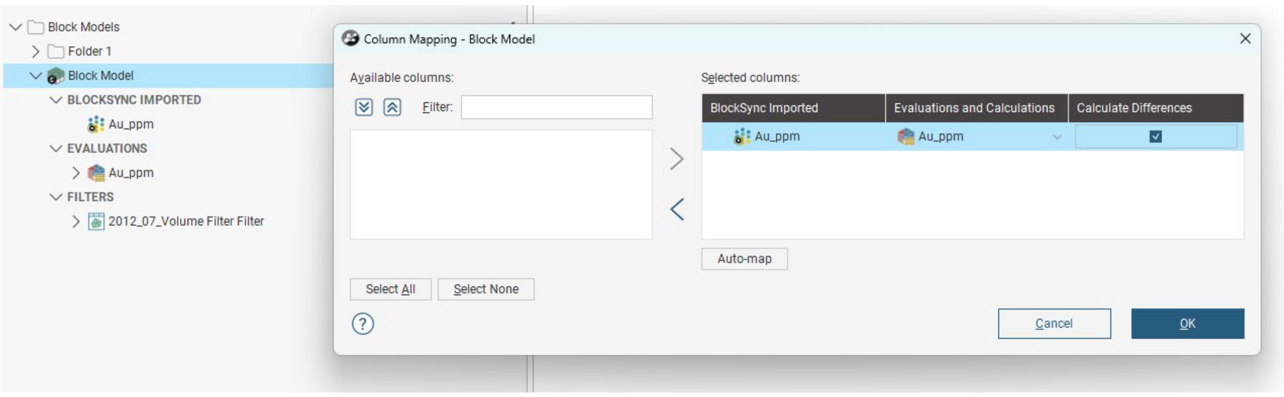


Once published, the block model appears in the specified Evo workspace and is available to BlockSync for further actions such as reporting. The block model is also available for others to view in the Evo viewer or to contribute and collaborate on by importing it to their Leapfrog project.



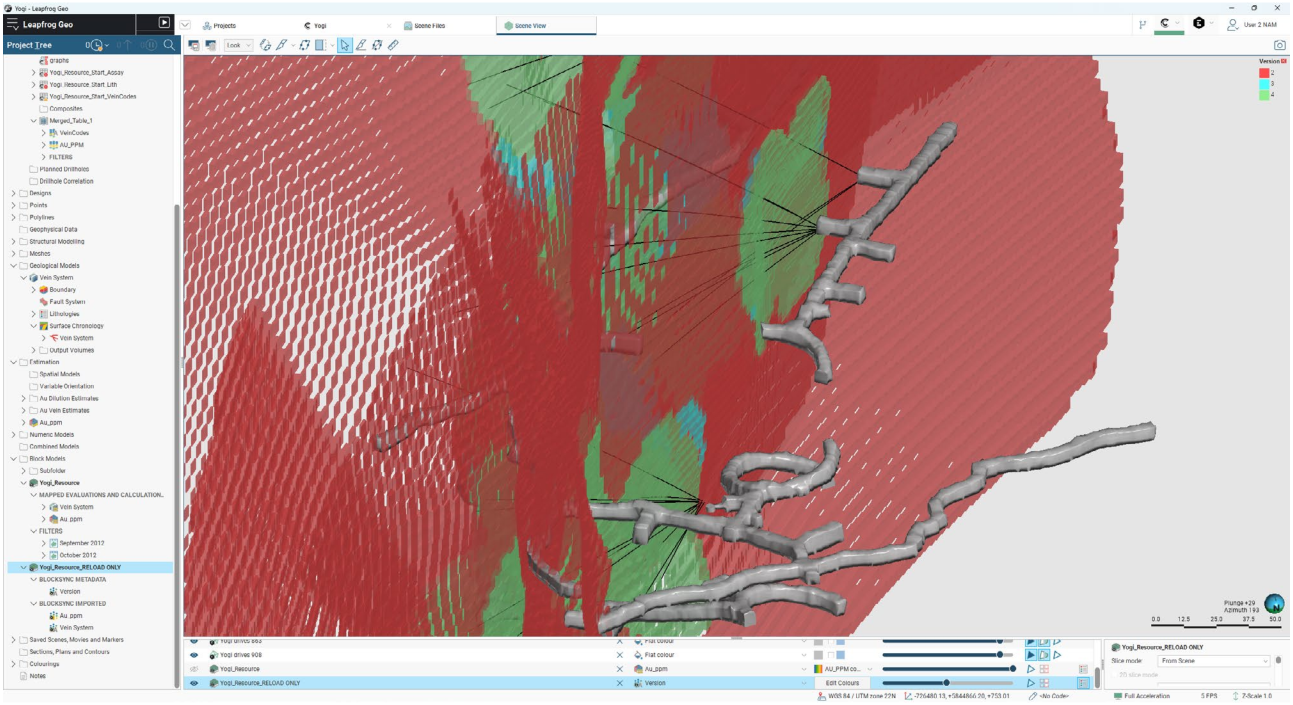
Back in the Leapfrog project, the published block model is now connected to Evo, allowing for several new workflows and features:

- Open the block model in BlockSync directly. Where updates to the block model are coming from different sources, it's useful to be able to quickly and easily go to the system of record to get an immediate update on a shared piece of data.
- Column mapping. When a block model with evaluations is published to Evo, the values are fixed for that version. After this publish event (or if that block model is imported to a Leapfrog project), further work on a local version of the evaluation is carried out. Mapping local evaluations to the BlockSync columns can track changes to the evaluation over time. This allows for a multi-user, collaborative experience as well as providing an auditable system of record in BlockSync. Column mapping also provides the ability to compare a set of values from a published event to the local changes. Differences between a published set of values and local evaluation are calculated and absolute differences, percentage difference and a difference filter are generated and added to the project tree.
- Reloading the block model from the latest or any earlier published version provides flexibility for the multi-user, multi-source experience as well as a safety net.



Auditable system of record supports confident decision-making

As block model updates are published to Evo, a system of record is built up via versions. Version information can be re-imported into the Leapfrog model to facilitate visualisation of how the block model is developing. For example, where a monthly infill drilling campaign contributes to resource updates, published version can help visualise where and how the increasing coverage and confidence the drilling campaign is contributing.



Full model and partial model updates drive efficiency and team collaboration

When importing a block model from Evo, the ability to subset the model by; model extents, published version extents or a custom extent (as defined by base point and boundary size) means the Leapfrog no longer needs to import the entire block model file. Project sizes will be smaller as a result and processes and scene performance will be improved because now the local work can be done on a subset number of blocks rather than the entire block model.

Having imported a block model from Evo, a notification icon is used to draw attention to any updates that might have been published by other contributors and available for reload. This is a simple, yet effective way to stay abreast of changes to the shared block model and keeps teams connected via their geoscience data.

4.4. Collaborative exploration targeting: Leapfrog and Oasis montaj

Cross functional geoscience teams need a shared understanding of the underground through combining data and insights. By connecting exploration and geophysical teams to one another and enabling collaboration on geoscience data, exploration targeting, as one example, can be better focused, and time and costs can be minimized.

Leapfrog 2025.1, Evo and Oasis montaj 2025.1 create a connected workflow that allows cross functional collaboration in a seamless and simpler way than before.

OM 2025.1	⟷	Evo	⟷	Leapfrog 2025.1
Survey acquisition & processing; publish 2D & 3D grids to an Evo workspace. Ingress geological models from LF to constrain inversions.		Organise, visualise & share grids from OM. Explore & visualise all other geoscience data in the workspace.		Import 2D & 3D geophysical grids from OM via Evo. Be actively notified of newer versions of data in Evo. Incorporate grids & other data into modelling. Publish geological models to an Evo workspace.

This iterative process, made easier, allows the teams to continuously improve the geophysical and geological models as new information becomes available. Uncertainty about the best file format for exchanging data between applications, losing intelligible colourings and being unsure or unaware of what data is in what coordinate reference system is all eliminated.