Rapid, Repeatable, Automated Velocity Calibrations with CoViz 4D

We asked the industry.

What do you need to improve your efficiencies with regard velocity modelling/calibrations?

Allow users to rapidly update velocity models using the latest data. Previously keeping models current was very time consuming leaving models to be updated over longer periods, years.

Easy to use interface, automation and repeatability.

Uncertainty workflows are providing a rapid and consistent view of the uncertainty associated with the depth calibration

COVIZ 4D

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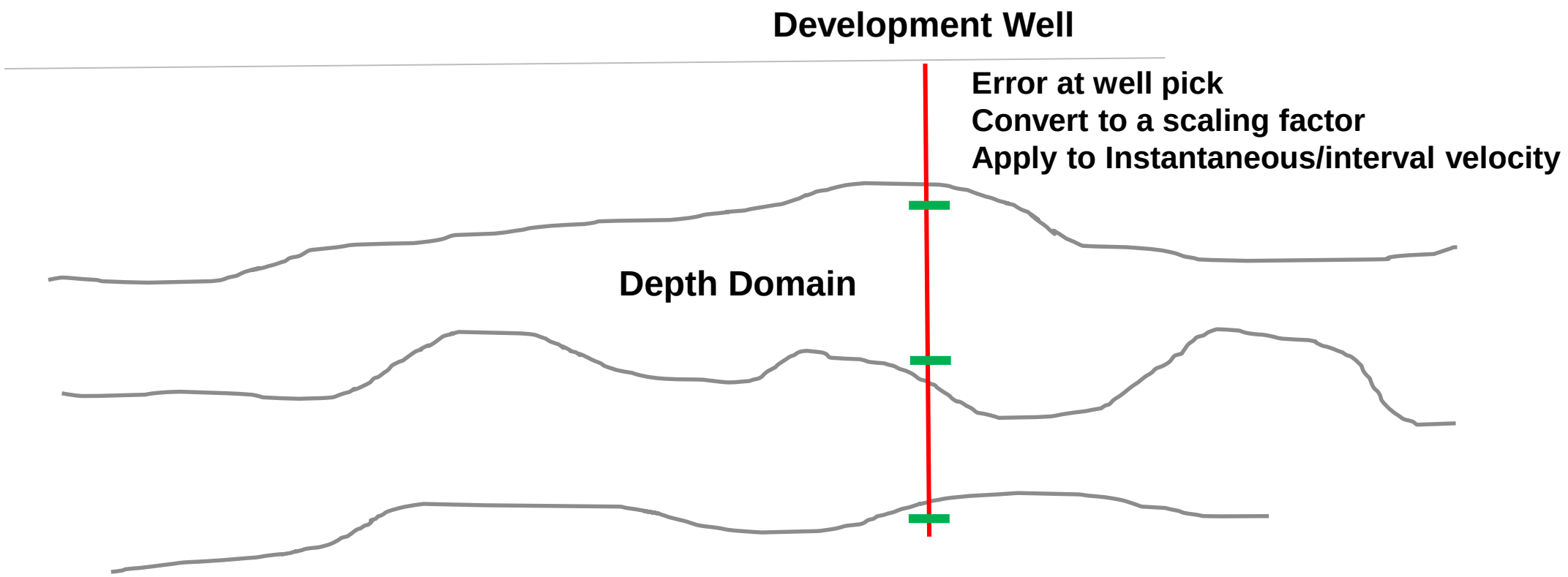
How the process works.



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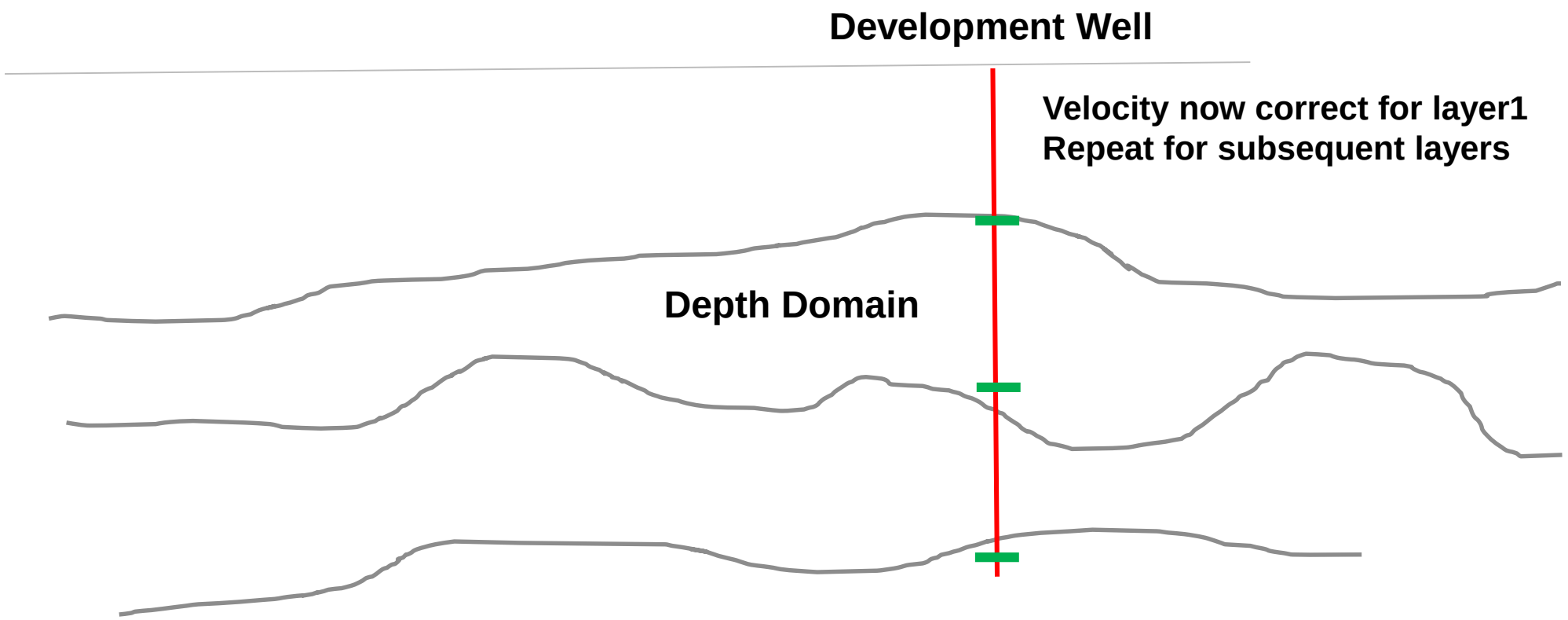

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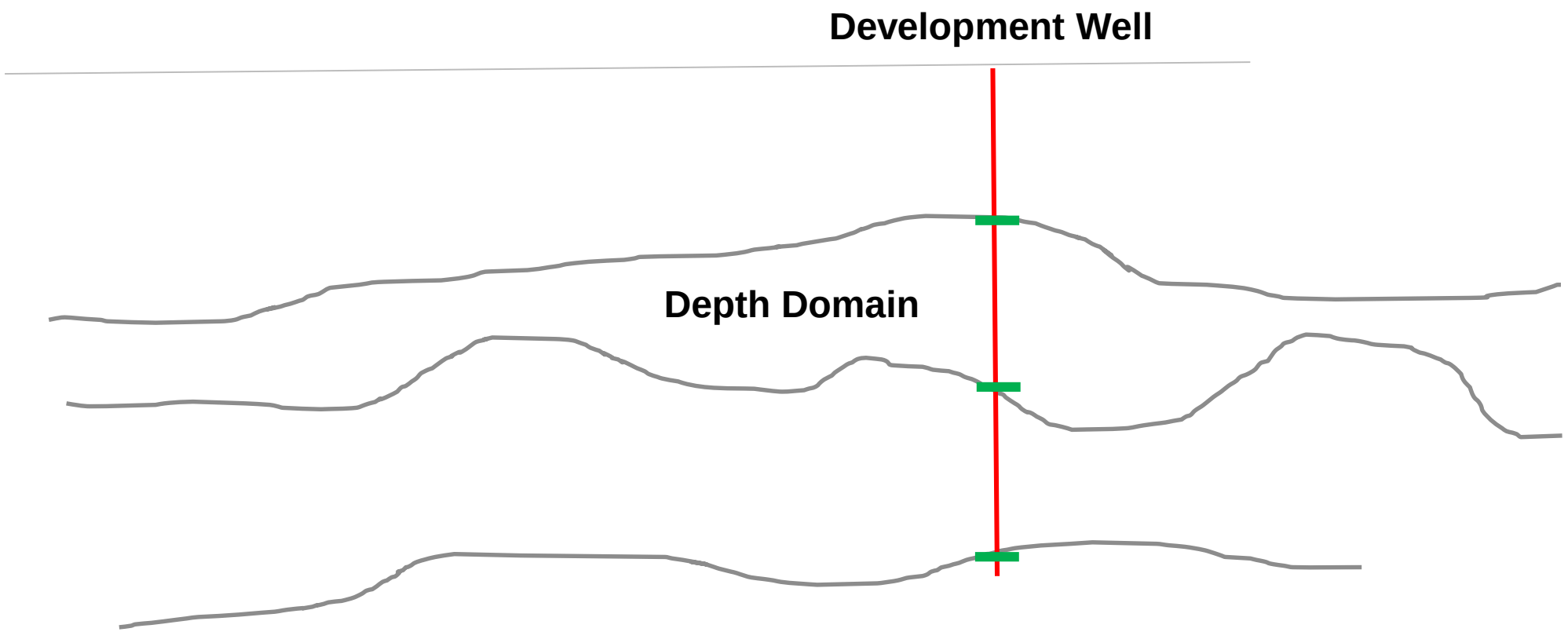

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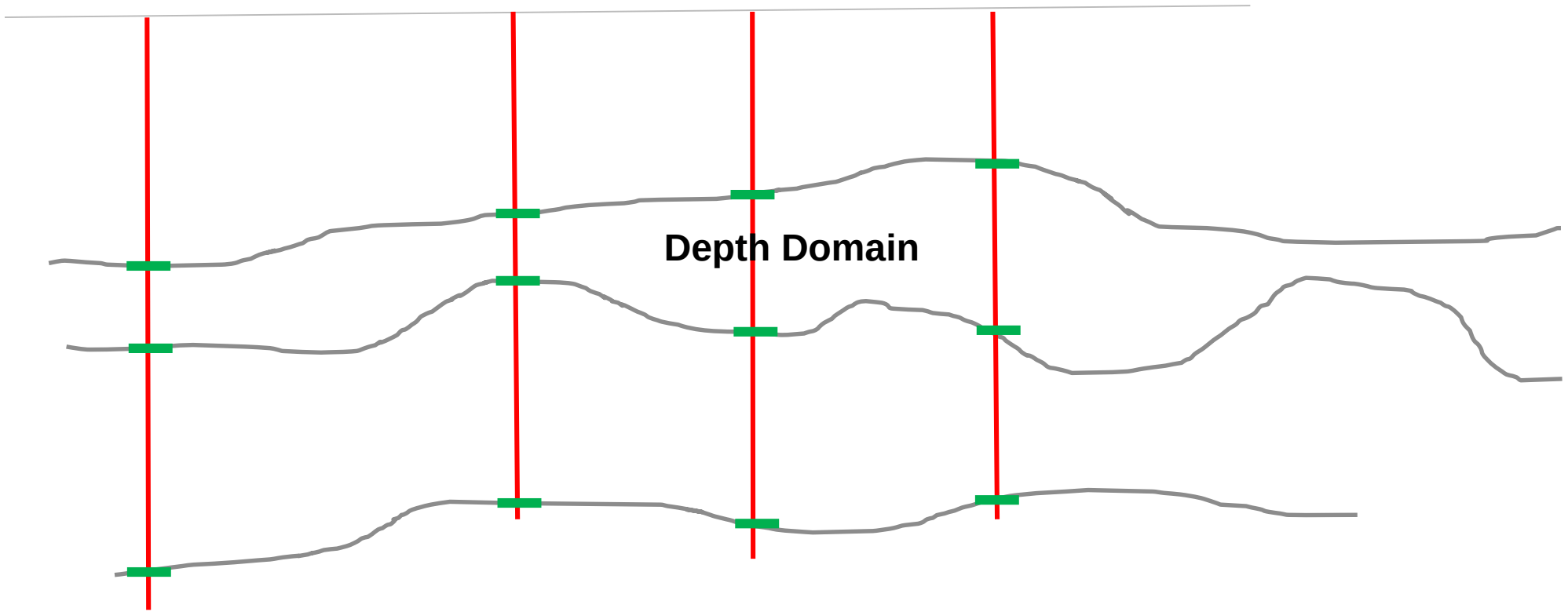
Lots of wells, requiring Fast, Easy, Reproducible updates to the Velocity Model
Not a black box – lots of intermediate output to QC results



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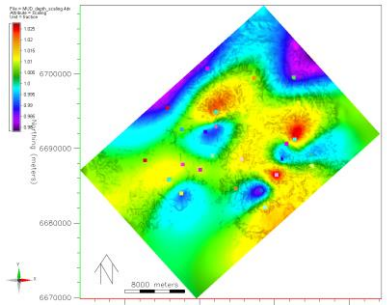
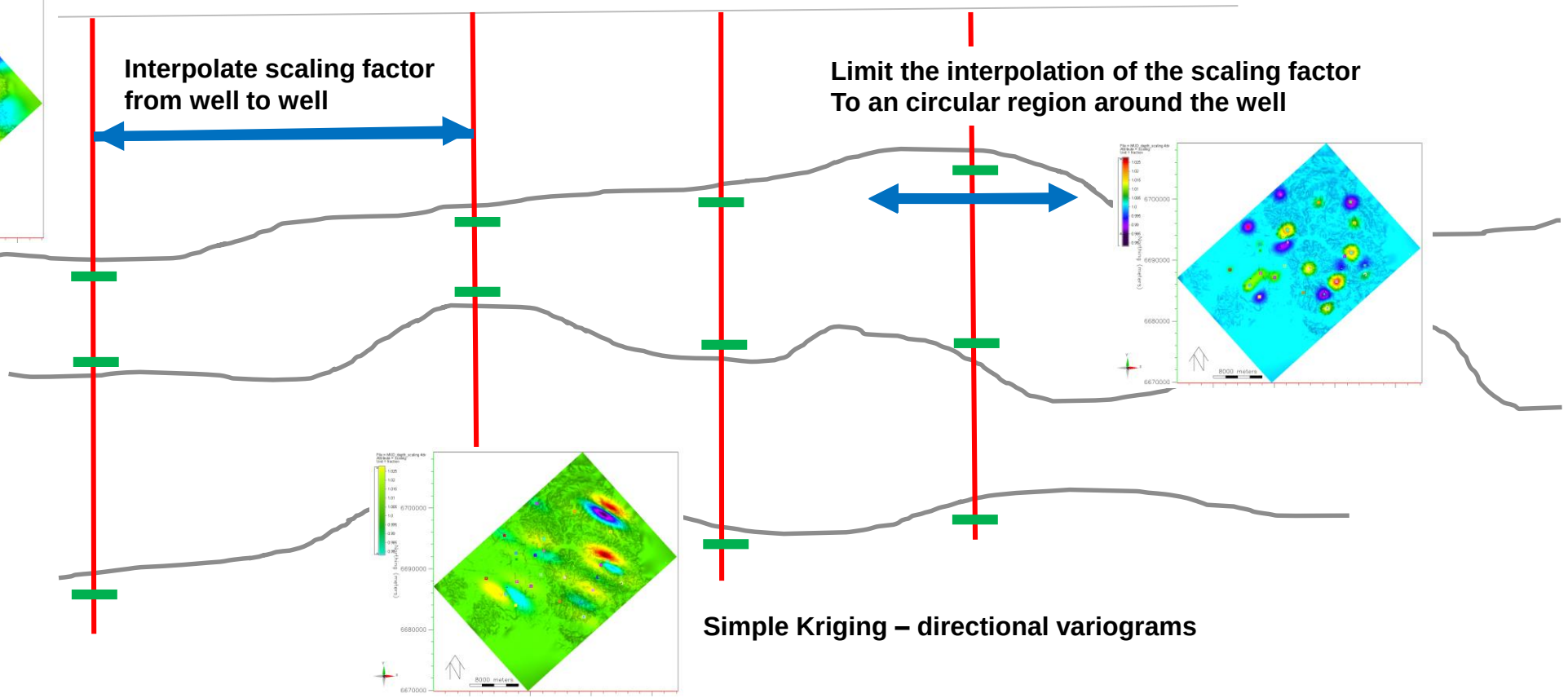
One model does not fit all.
Various methods to model the distribution of the scaling factors between wells
Scaling factors are gridded in 2D and expanded into 3D.





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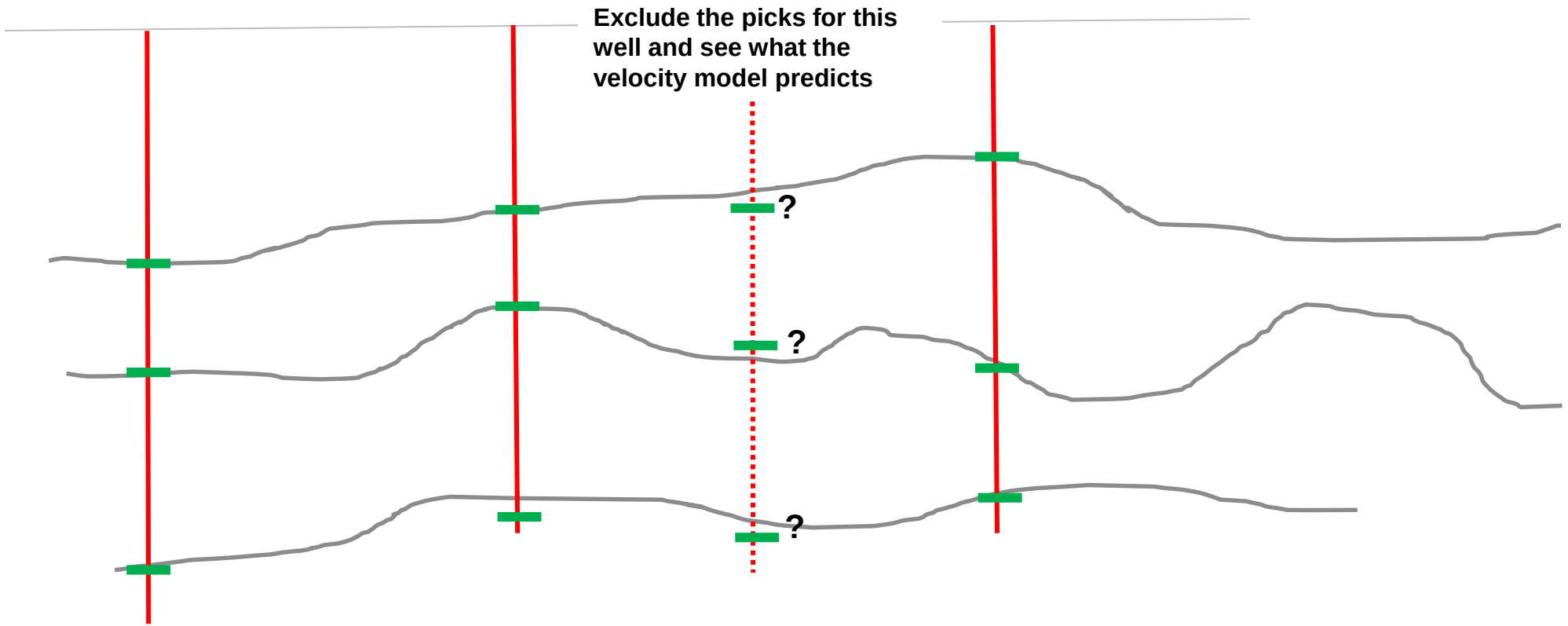
Well Drop Out.
How good is your velocity model ?
DGI only commercial company offering an automatic well drop out process



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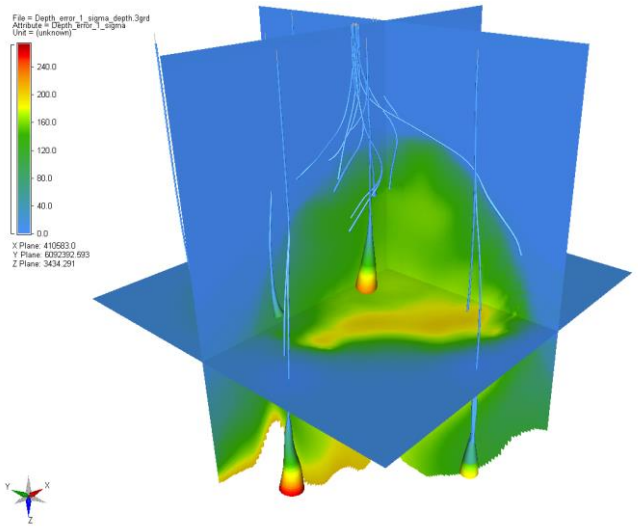
Depth Uncertainty.

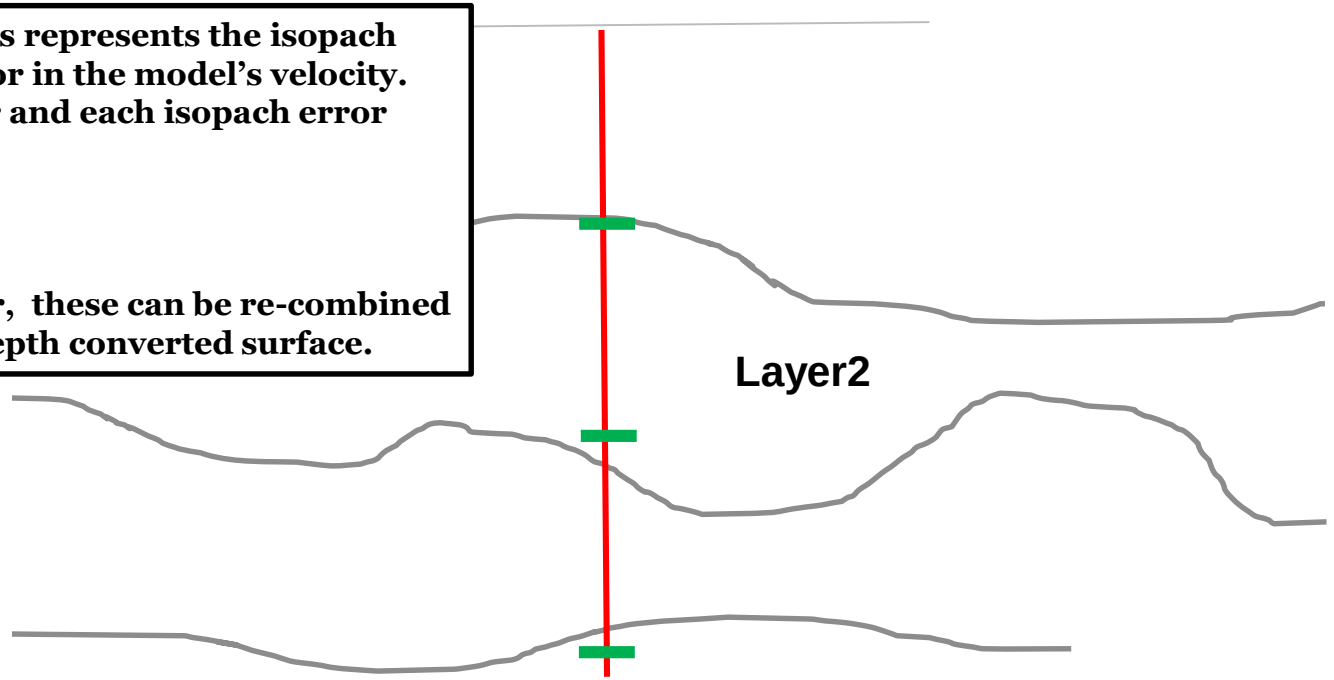
Planning a well you will need to know the depth uncertainty to 2 Standard Deviations

Top of layer2 now correct. Base of layer 2 still has an error. This represents the isopach error. These errors can be due to errors in the time thickness or in the model's velocity. An estimation of timing uncertainty can be made for each layer and each isopach error split between a velocity error term and a time error term:

Isopach Uncertainty = SQRT((velocity error)² + (time error)²)

Having estimated time and velocity uncertainties for each layer, these can be re-combined and summed downwards to deliver cumulative error at each depth converted surface.





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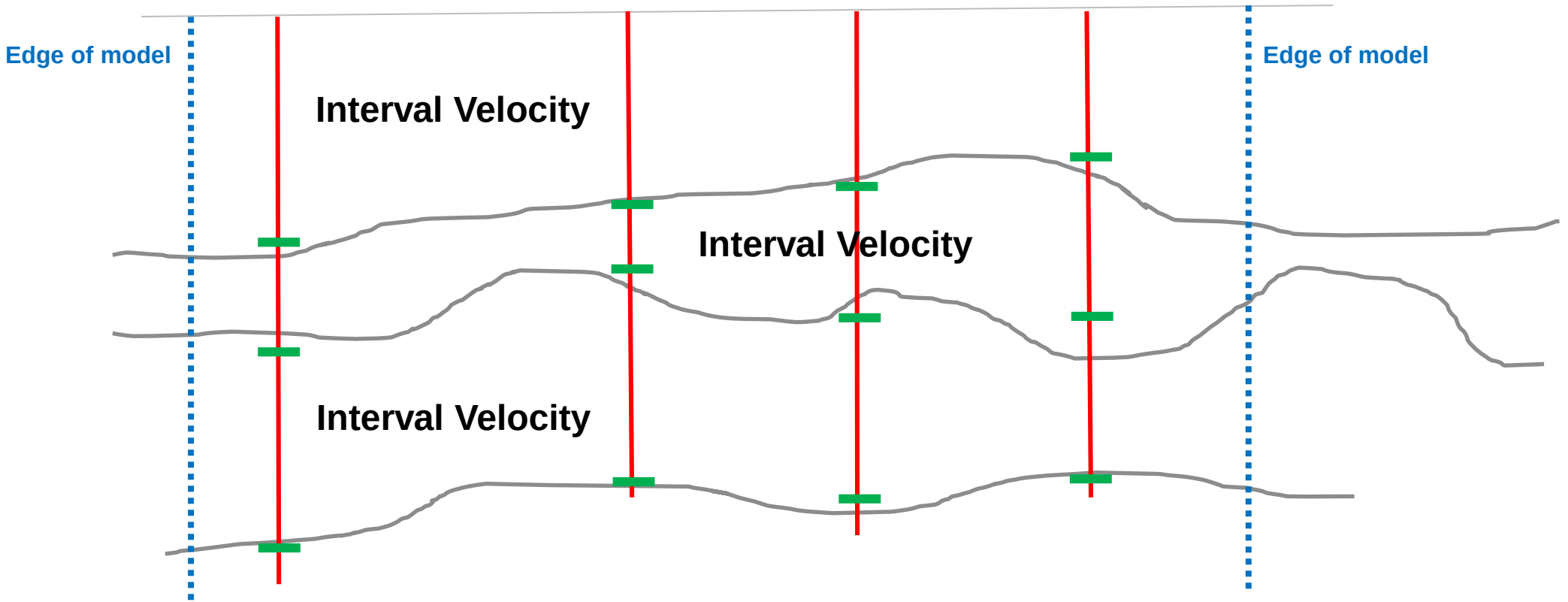
Limitations to Interval Velocity – requires layer cake structure



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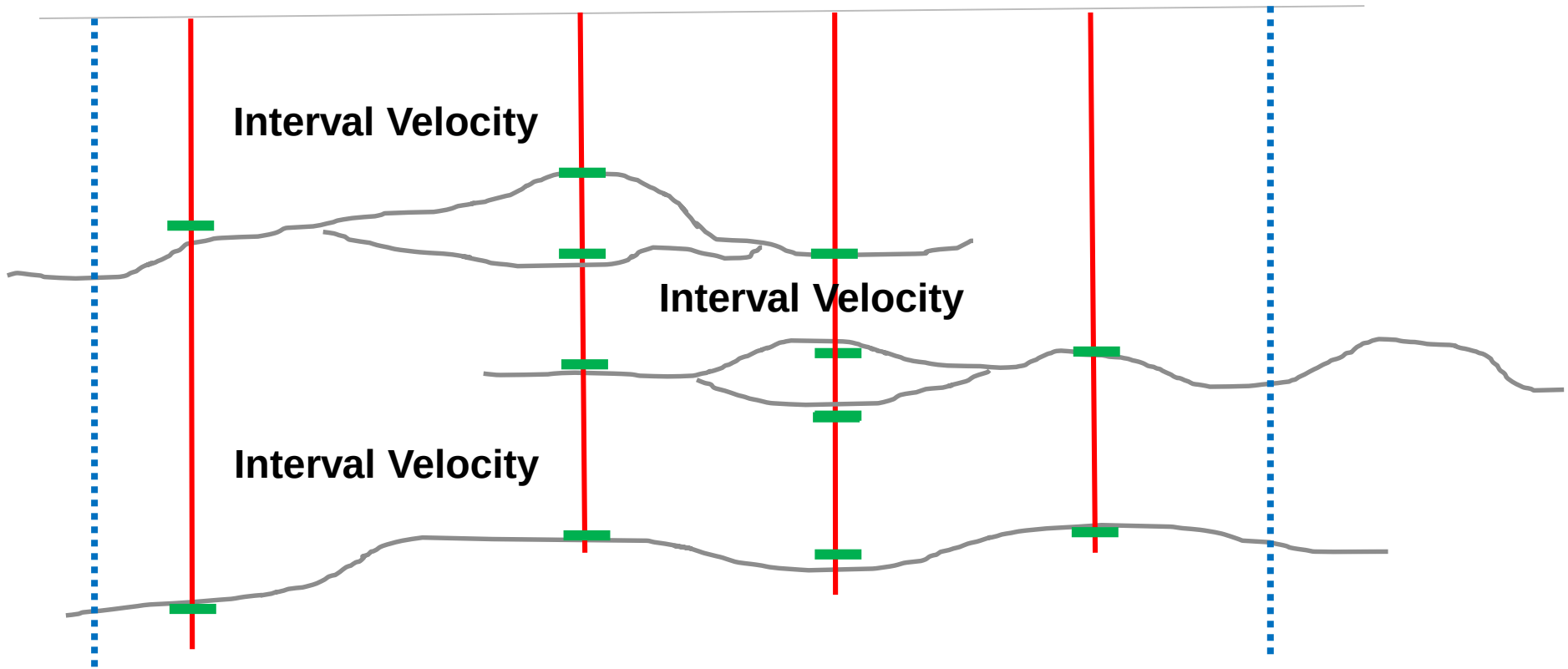
Limitations to Interval Velocity – when using discrete geobodies



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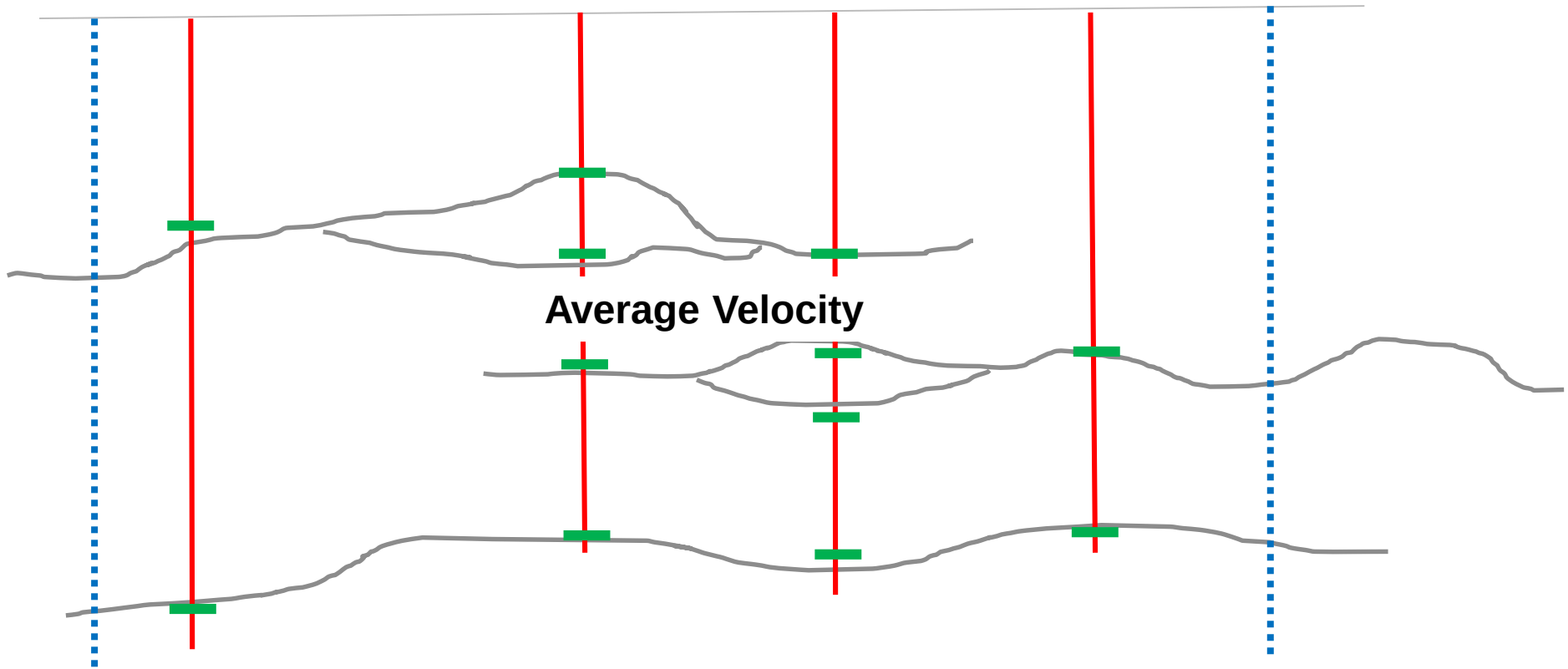
Solution - Average Velocity Calibration



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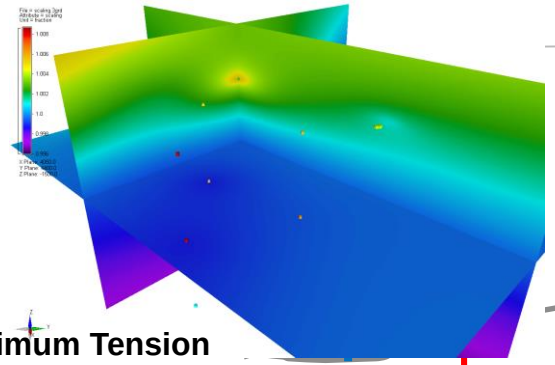
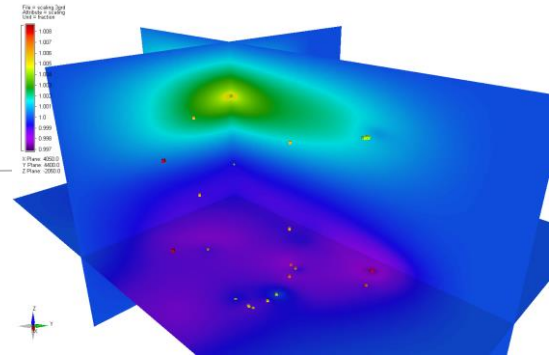
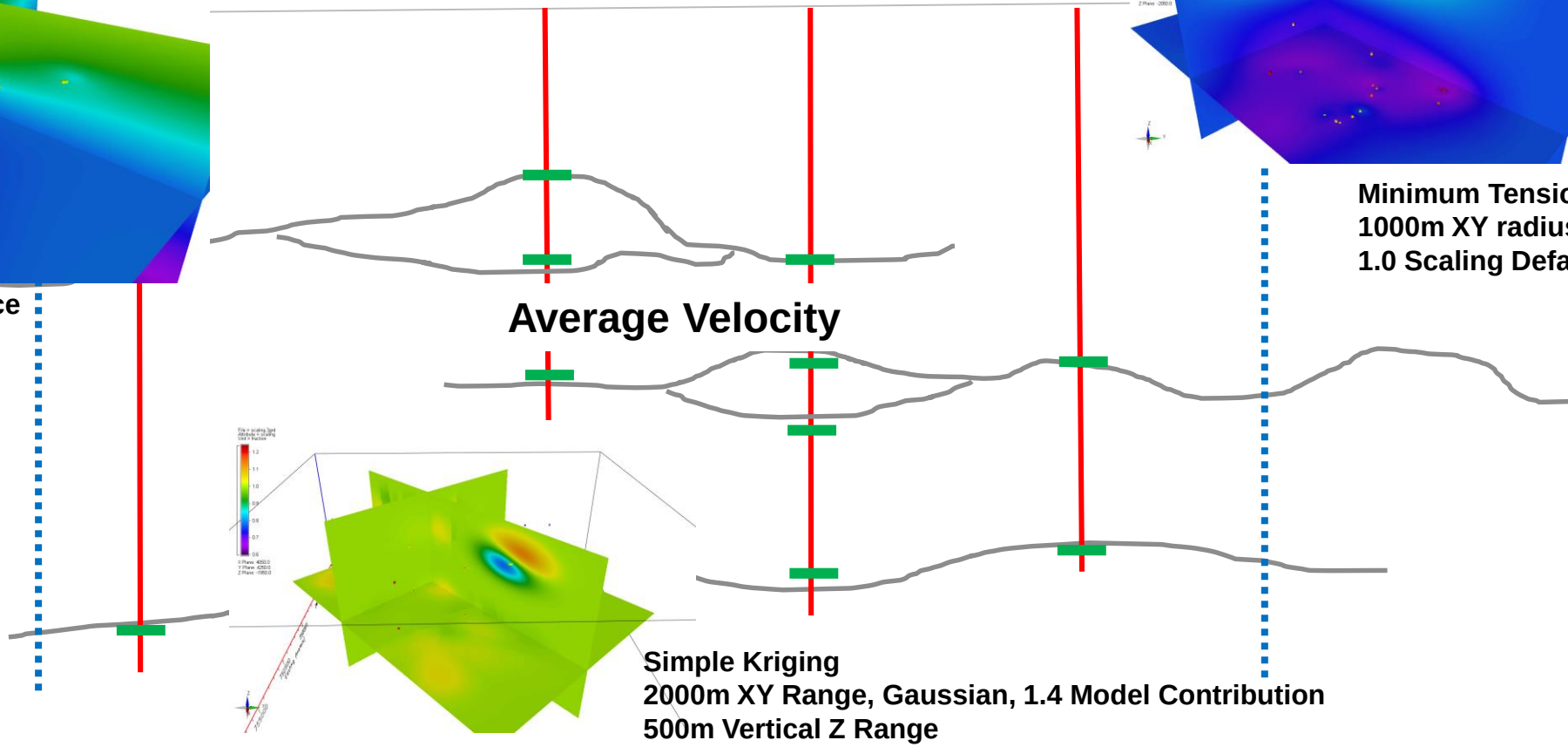
Average Velocity Calibration



Minimum Tension
No XY radius of influence
No Scaling Default



Minimum Tension
1000m XY radius of influence
1.0 Scaling Default



Average Velocity

Simple Kriging
2000m XY Range, Gaussian, 1.4 Model Contribution
500m Vertical Z Range
Scaling Default is the average of the scaling found at the wells

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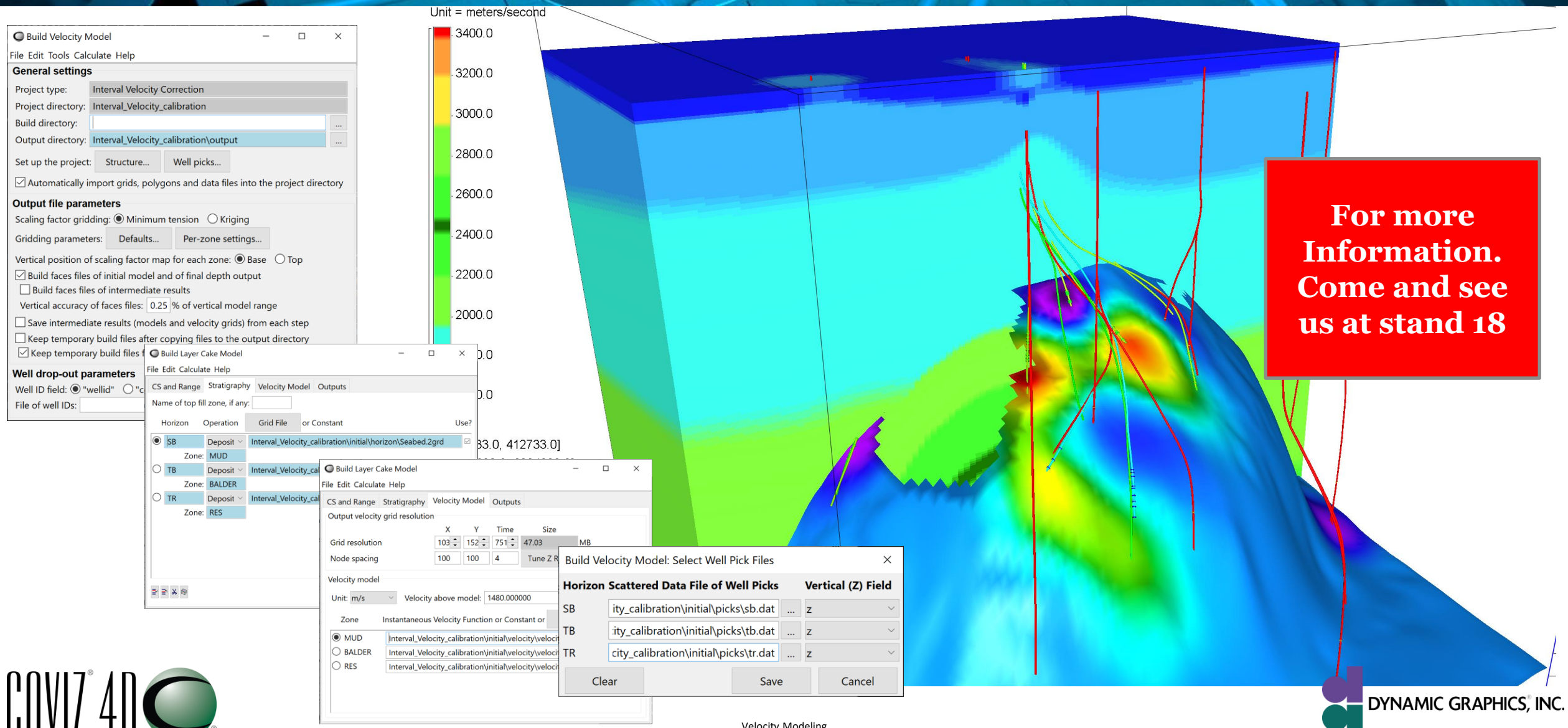

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