

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?

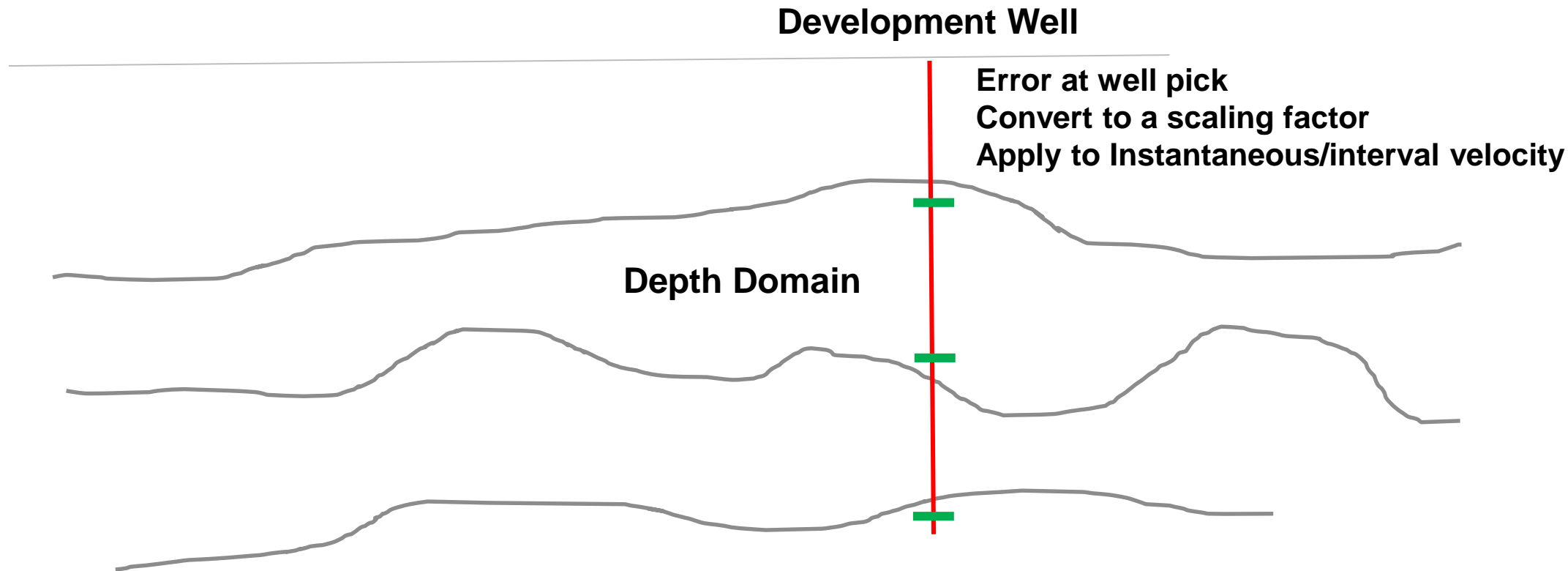
Allow users to rapidly update velocity models using the latest data. Previously keeping models current was very time consuming leaving models to be updated over longer periods, years.

Easy to use interface, automation and repeatability.

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

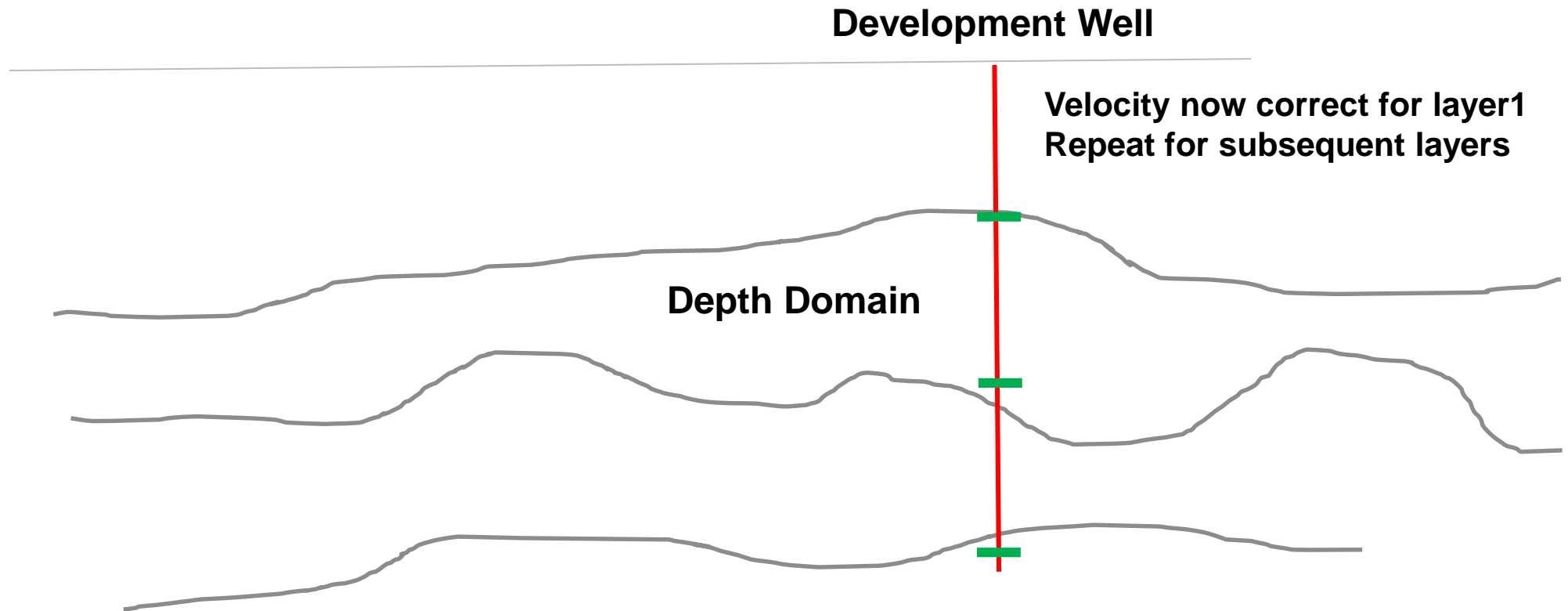
Rapid, Repeatable, Automated Velocity Calibrations with CoViz 4D

How the process works.



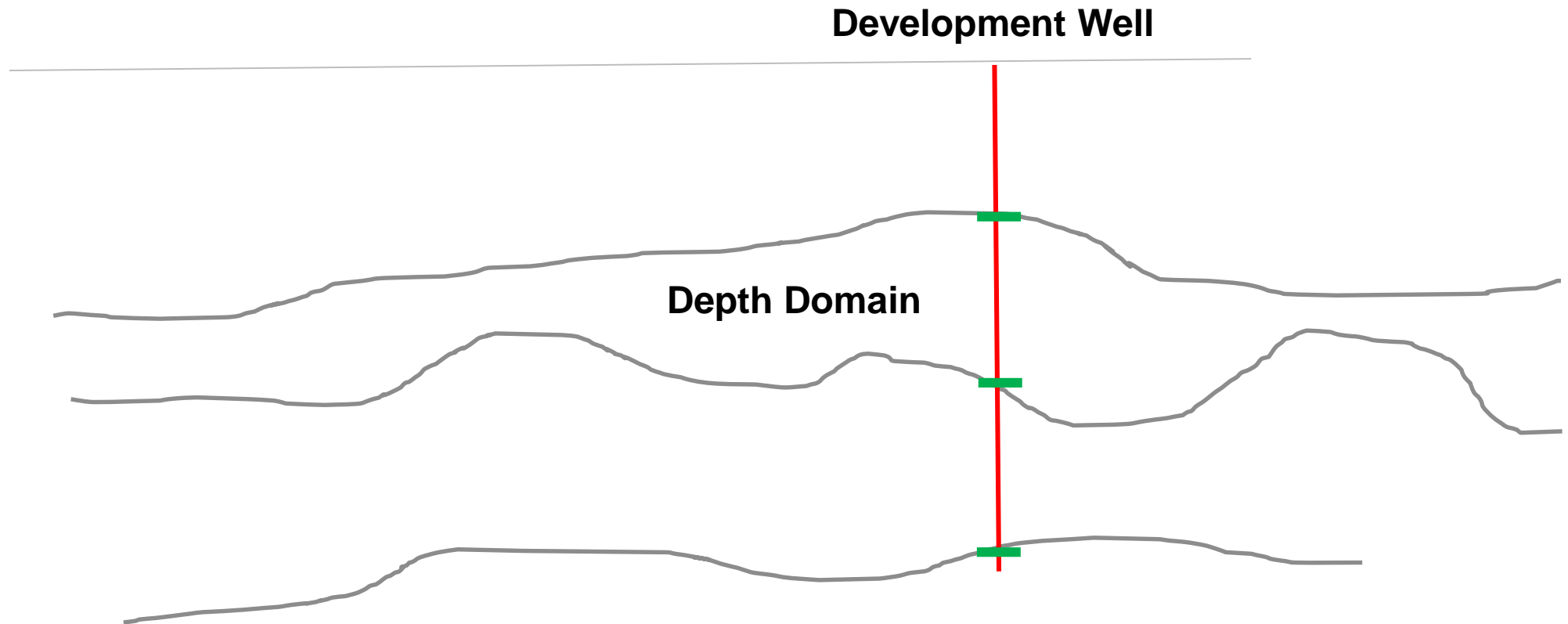
Rapid, Repeatable, Automated Velocity Calibrations with CoViz 4D

How the process works.



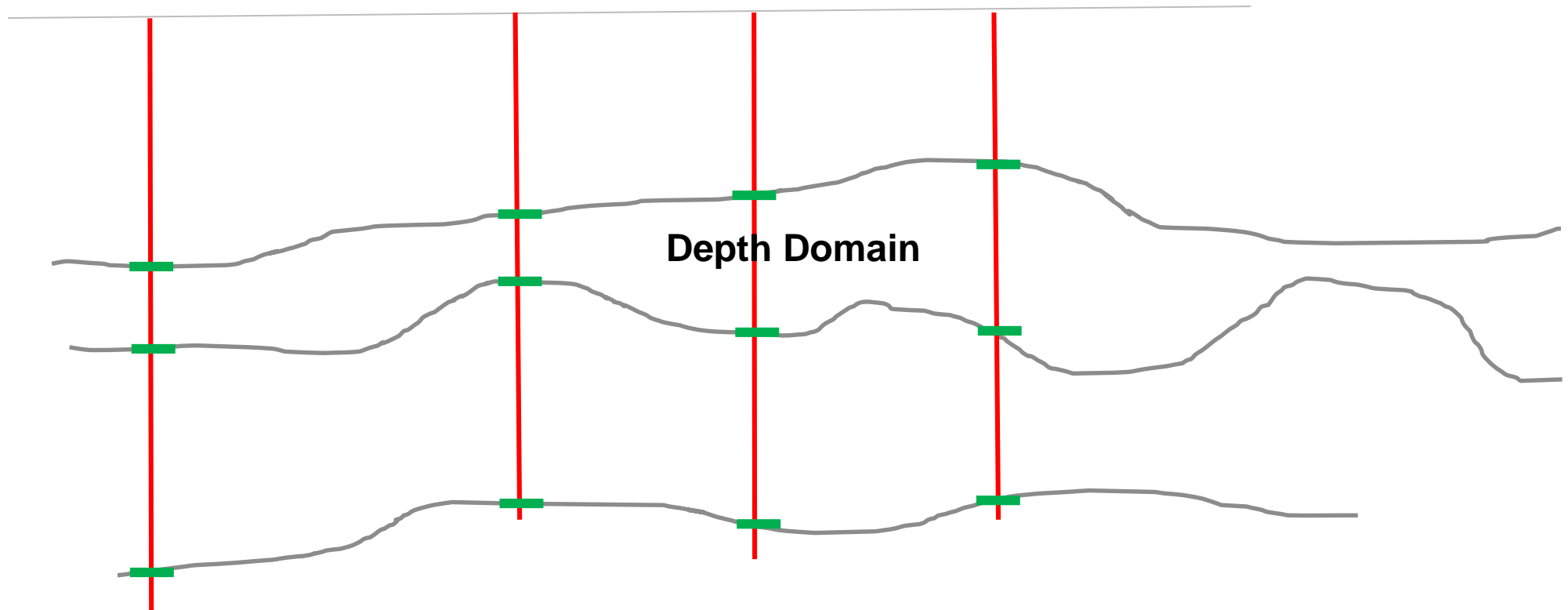
Rapid, Repeatable, Automated Velocity Calibrations with CoViz 4D

How the process works.



Rapid, Repeatable, Automated Velocity Calibrations with CoViz 4D

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

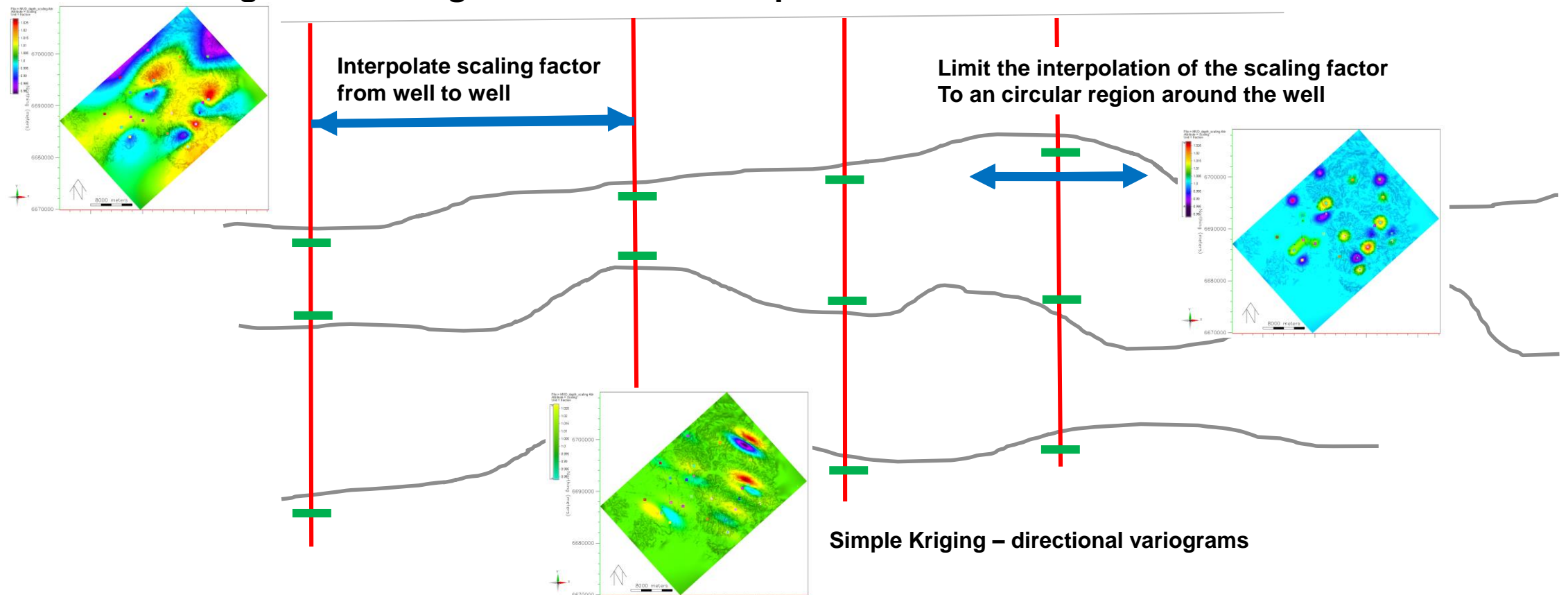


Rapid, Repeatable, Automated Velocity Calibrations with CoViz 4D

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.

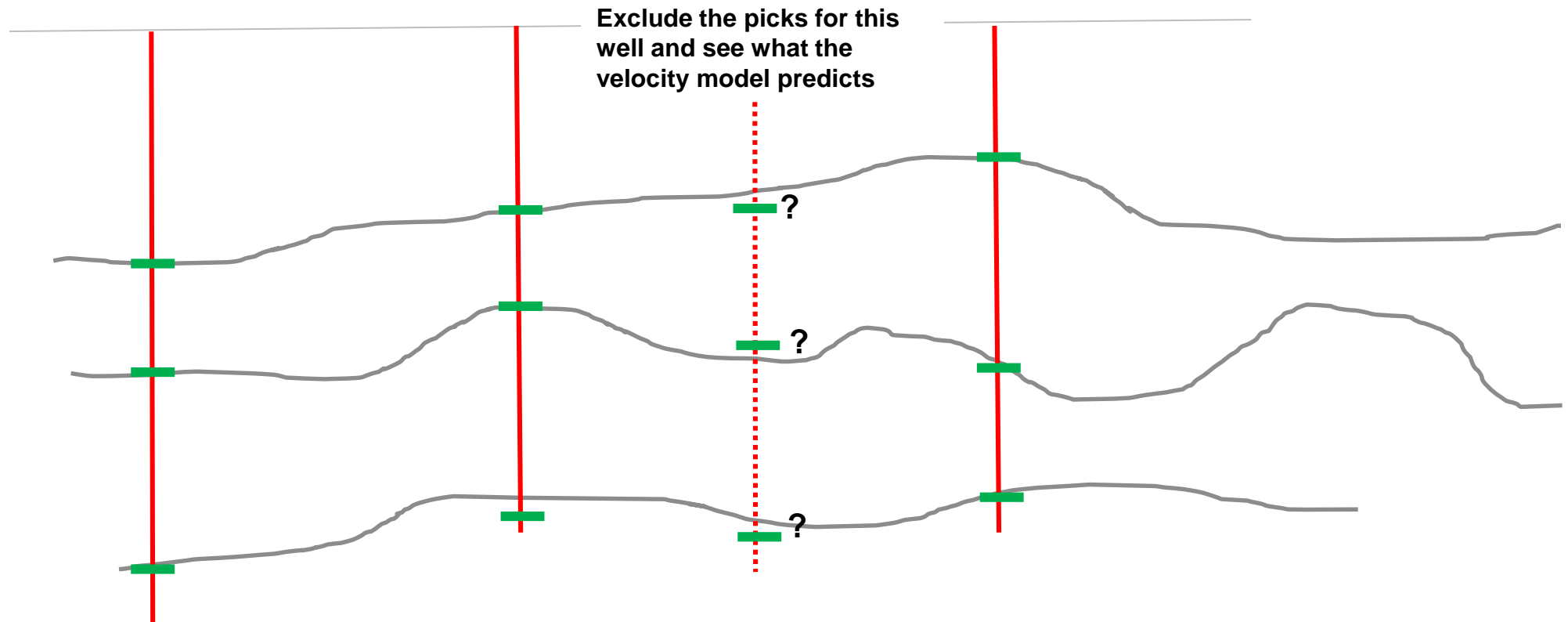


Rapid, Repeatable, Automated Velocity Calibrations with CoViz 4D

Well Drop Out.

How good is your velocity model ?

DGI only commercial company offering an automatic well drop out process



Rapid, Repeatable, Automated Velocity Calibrations with CoViz 4D

Depth Uncertainty.

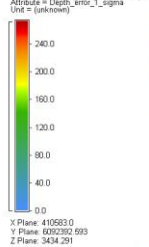
Planning a well you will need to know the depth uncertainty to 2 Standard Deviations

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:

$$\text{Isopach Uncertainty} = \text{SQRT}((\text{velocity error})^2 + (\text{time error})^2)$$

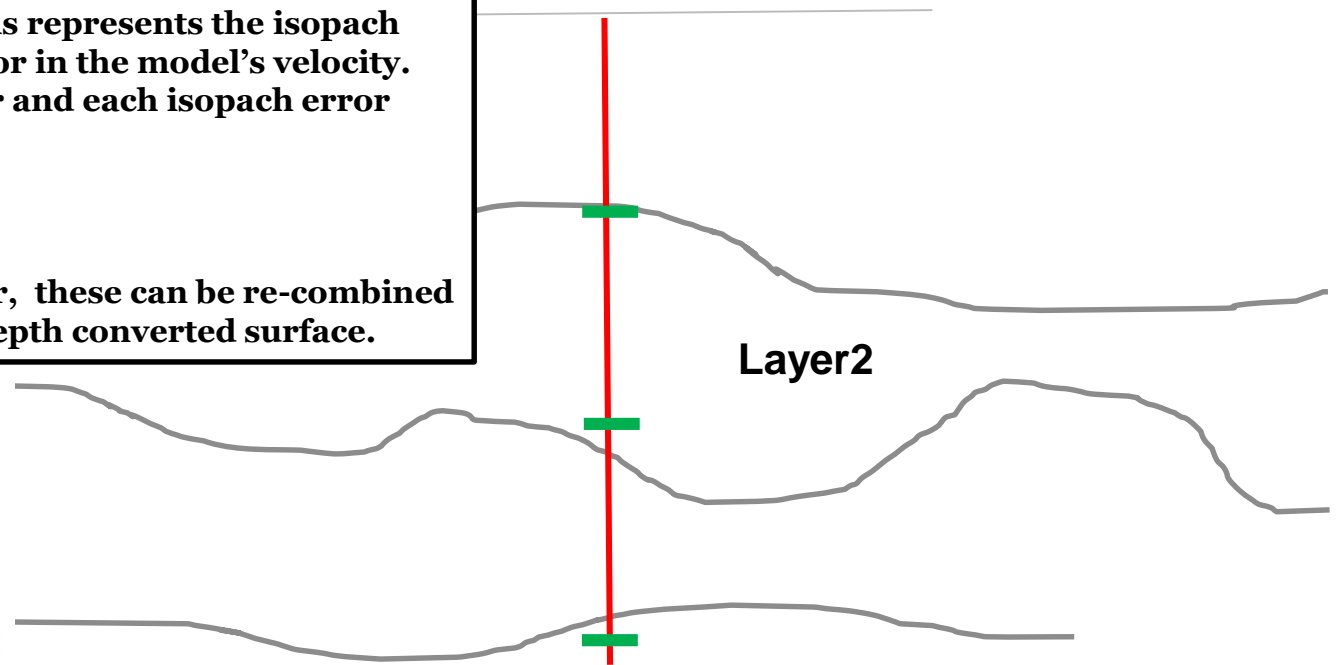
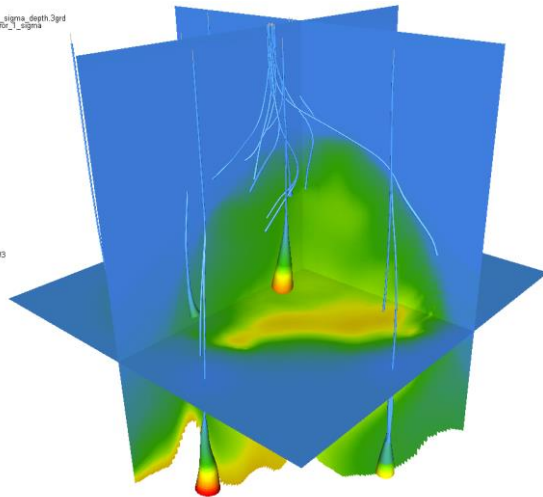
Having estimated time and velocity uncertainties for each layer, these can be re-combined and summed downwards to deliver cumulative error at each depth converted surface.

File = Depth_err_1_sigma_depth.3prd
Attribute = Depth_err_1_sigma
Unit = (unknown)



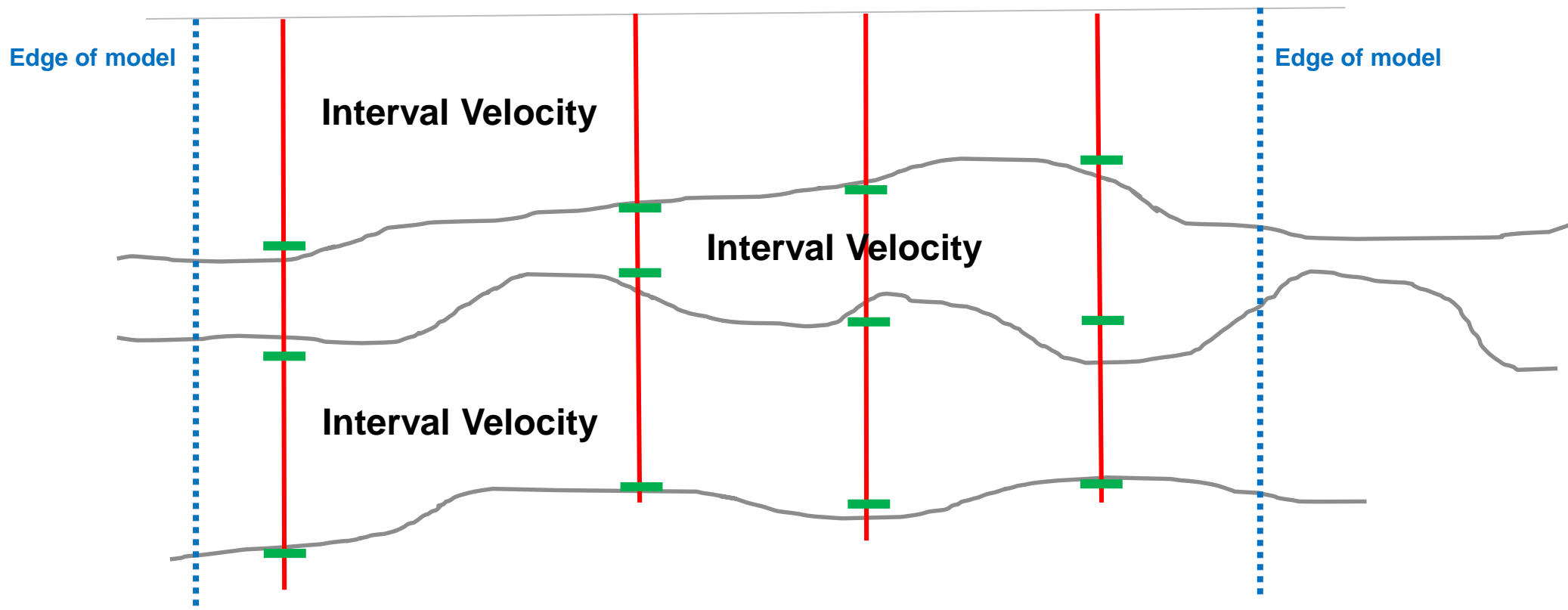
240.0
200.0
180.0
120.0
80.0
40.0
0.0

X Plane: 410583.0
Y Plane: 6262392.593
Z Plane: 3434.291



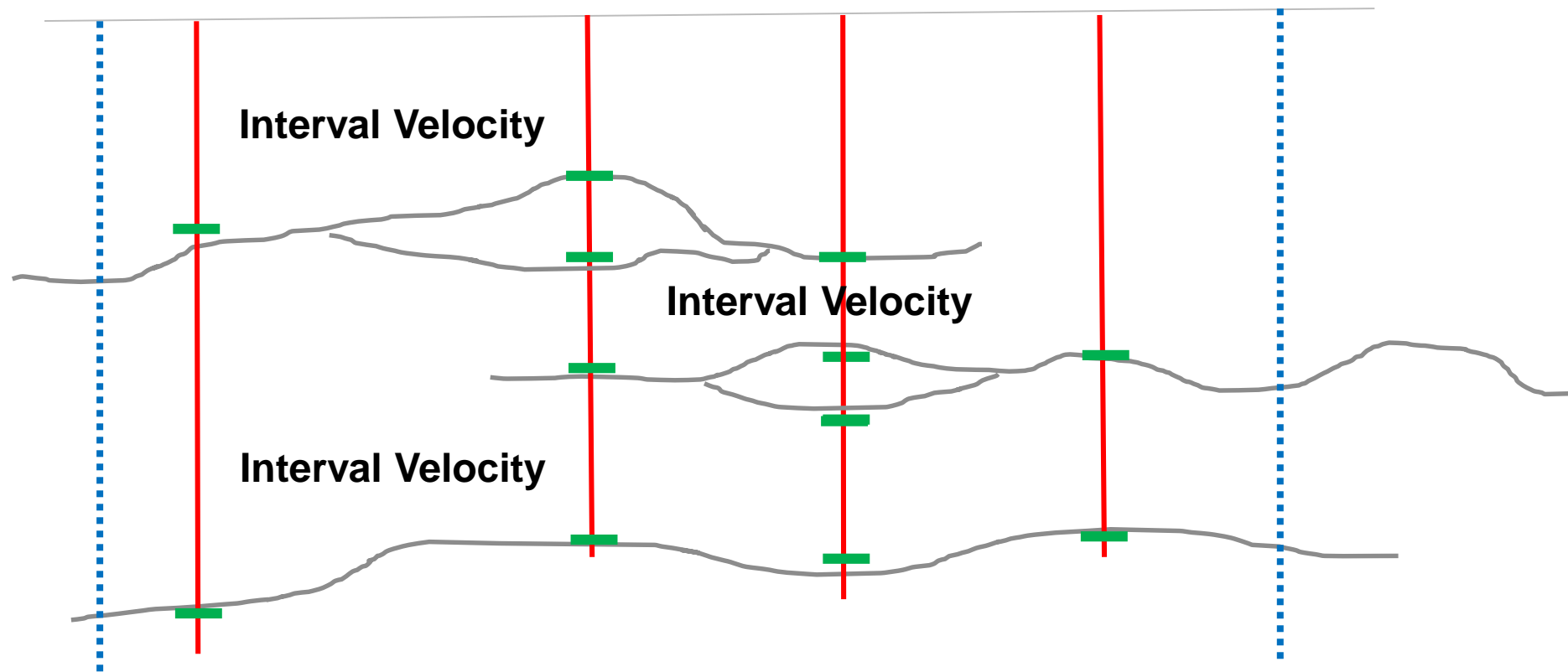
Rapid, Repeatable, Automated Velocity Calibrations with CoViz 4D

Limitations to Interval Velocity – requires layer cake structure



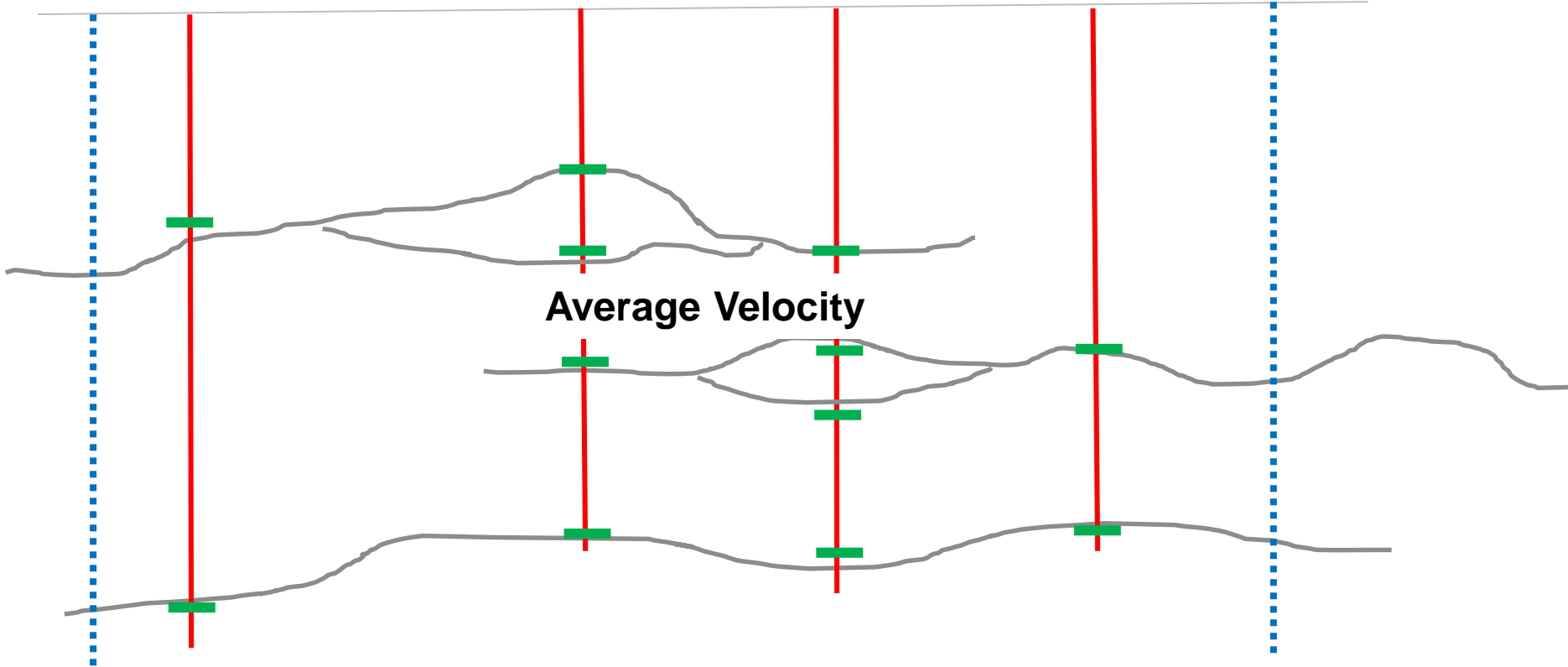
Rapid, Repeatable, Automated Velocity Calibrations with CoViz 4D

Limitations to Interval Velocity – when using discrete geobodies



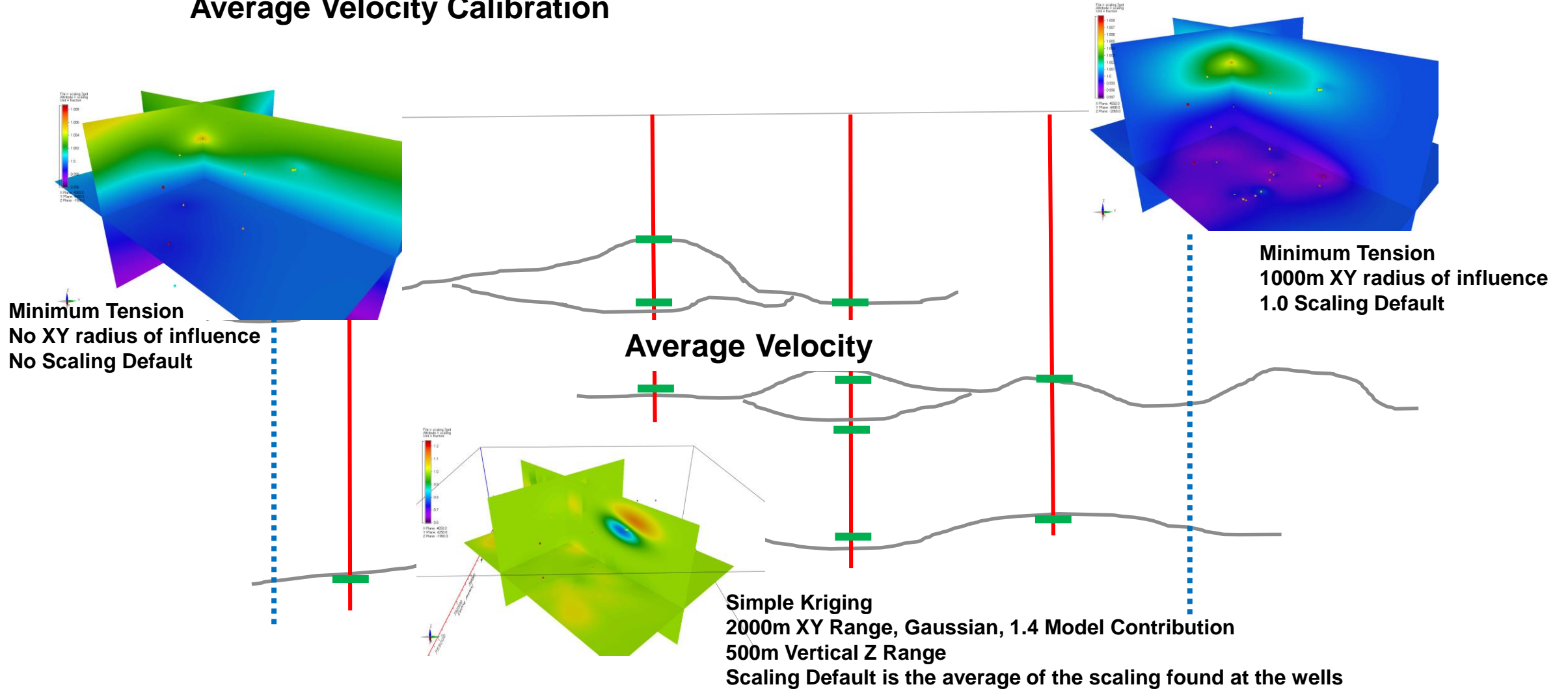
Rapid, Repeatable, Automated Velocity Calibrations with CoViz 4D

Solution - Average Velocity Calibration

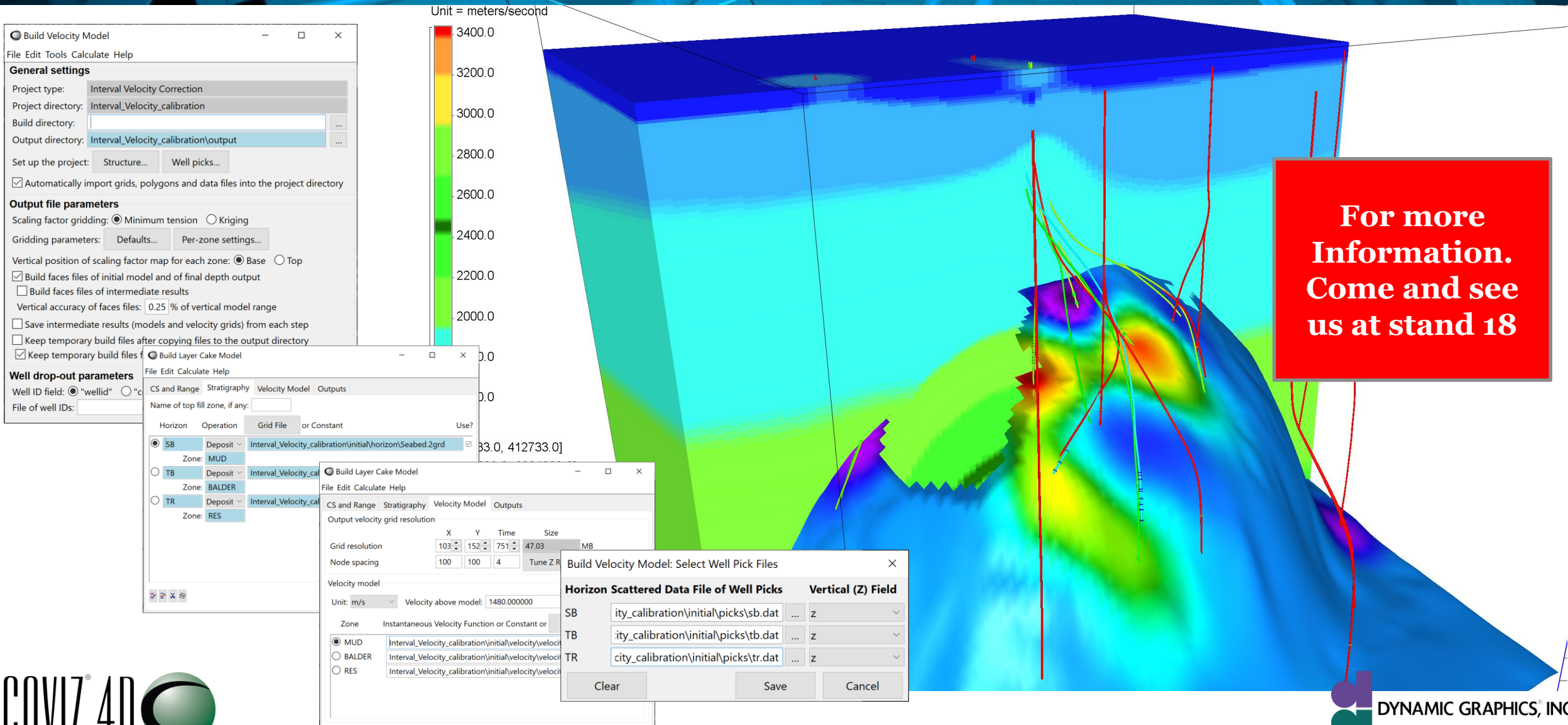


Rapid, Repeatable, Automated Velocity Calibrations with CoViz 4D

Average Velocity Calibration



Rapid, Repeatable, Automated Velocity Calibrations with CoViz 4D



**For more
Information.
Come and see
us at stand 18**

Build Velocity Model

File Edit Tools Calculate Help

General settings

Project type: Interval Velocity Correction

Project directory: Interval_Velocity_calibration

Build directory: []

Output directory: Interval_Velocity_calibration\output

Set up the project: Structure... Well picks...

Automatically import grids, polygons and data files into the project directory

Output file parameters

Scaling factor gridding: Minimum tension Kriging

Gridding parameters: Defaults... Per-zone settings...

Vertical position of scaling factor map for each zone: Base Top

Build faces files of initial model and of final depth output

Build faces files of intermediate results

Vertical accuracy of faces files: 0.25 % of vertical model range

Save intermediate results (models and velocity grids) from each step

Keep temporary build files after copying files to the output directory

Keep temporary build files

Well drop-out parameters

Well ID field: "wellid" "c

File of well IDs: []

Build Layer Cake Model

File Edit Calculate Help

CS and Range Stratigraphy Velocity Model Outputs

Name of top fill zone, if any: []

Horizon	Operation	Grid File	or Constant	Use?
<input checked="" type="radio"/> SB	Deposit	Interval_Velocity_calibration\initial\horizon\Seabed.2grd		<input checked="" type="checkbox"/>
<input type="radio"/> TB	Deposit	Interval_Velocity_calibration\initial\horizon\Tb.2grd		<input type="checkbox"/>
<input type="radio"/> TR	Deposit	Interval_Velocity_calibration\initial\horizon\Tr.2grd		<input type="checkbox"/>

Zone: MUD

Zone: BALDER

Zone: RES

Build Layer Cake Model

File Edit Calculate Help

CS and Range Stratigraphy Velocity Model Outputs

Output velocity grid resolution

Grid resolution	X	Y	Time	Size
	103	152	751	47.03 MB

Node spacing: X: 100, Y: 100, Z: 4

Velocity model

Unit: m/s Velocity above model: 1480.000000

Zone	Instantaneous Velocity Function or Constant or
<input checked="" type="radio"/> MUD	Interval_Velocity_calibration\initial\velocity\velocity_mud.dat
<input type="radio"/> BALDER	Interval_Velocity_calibration\initial\velocity\velocity_balder.dat
<input type="radio"/> RES	Interval_Velocity_calibration\initial\velocity\velocity_res.dat

Build Velocity Model: Select Well Pick Files

Horizon	Scattered Data File of Well Picks	Vertical (Z) Field
<input checked="" type="radio"/> SB	Interval_Velocity_calibration\initial\picks\sb.dat	z
<input type="radio"/> TB	Interval_Velocity_calibration\initial\picks\tb.dat	z
<input type="radio"/> TR	Interval_Velocity_calibration\initial\picks\tr.dat	z

Clear Save Cancel



All rights reserved. No part of this presentation may be reproduced, translated, or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, use or capture in any information storage or retrieval system, or otherwise, without the express prior written permission of Dynamic Graphics, Inc. The information contained in this document is subject to change without notice and should not be taken as a commitment, representation, or warranty on the part of Dynamic Graphics, Inc. Further, Dynamic Graphics, Inc. assumes no responsibility for errors that may appear in this presentation. The software contained in this presentation is licensed for use by the original licensee only and may be used only in strict accordance with the terms of such license. "CoViz" and the logos shown below are trademarks of Dynamic Graphics, Inc. that are registered trademarks or the subject of pending applications in various countries.
All other trademarks belong to their respective holders.

