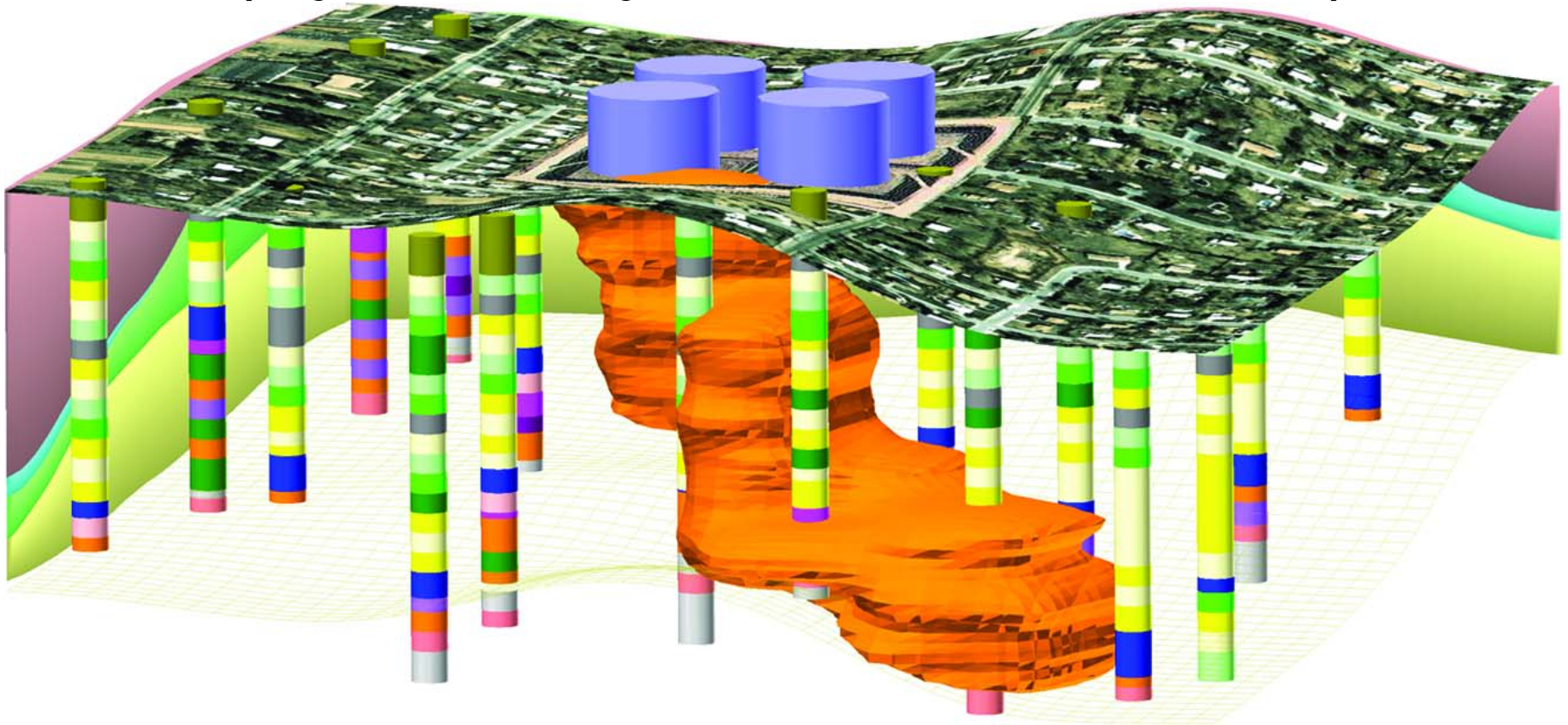


# Three-Dimensional Visualization of Geologic Data (Eye-Candy or Scientific Tool?)



**Jim Reed**

Director of Research & Development - RockWare Incorporated Golden, Colorado

# Pros & Cons of 3-D Visualization

Pros	Cons
<ul style="list-style-type: none"><li>• Conveying Complexity</li><li>• Non-Technical Audience</li><li>• Speed</li><li>• 3D-Only Data</li><li>• Interactive Diagrams</li><li>• Impress Friends</li><li>• Intimidate Enemies</li></ul>	<ul style="list-style-type: none"><li>• “Wimp” Factor</li><li>• Unworkable Hardcopy</li><li>• No Standards</li><li>• Easily Cluttered</li><li>• Dangerously Realistic</li><li>• Hardware Intensive</li></ul>

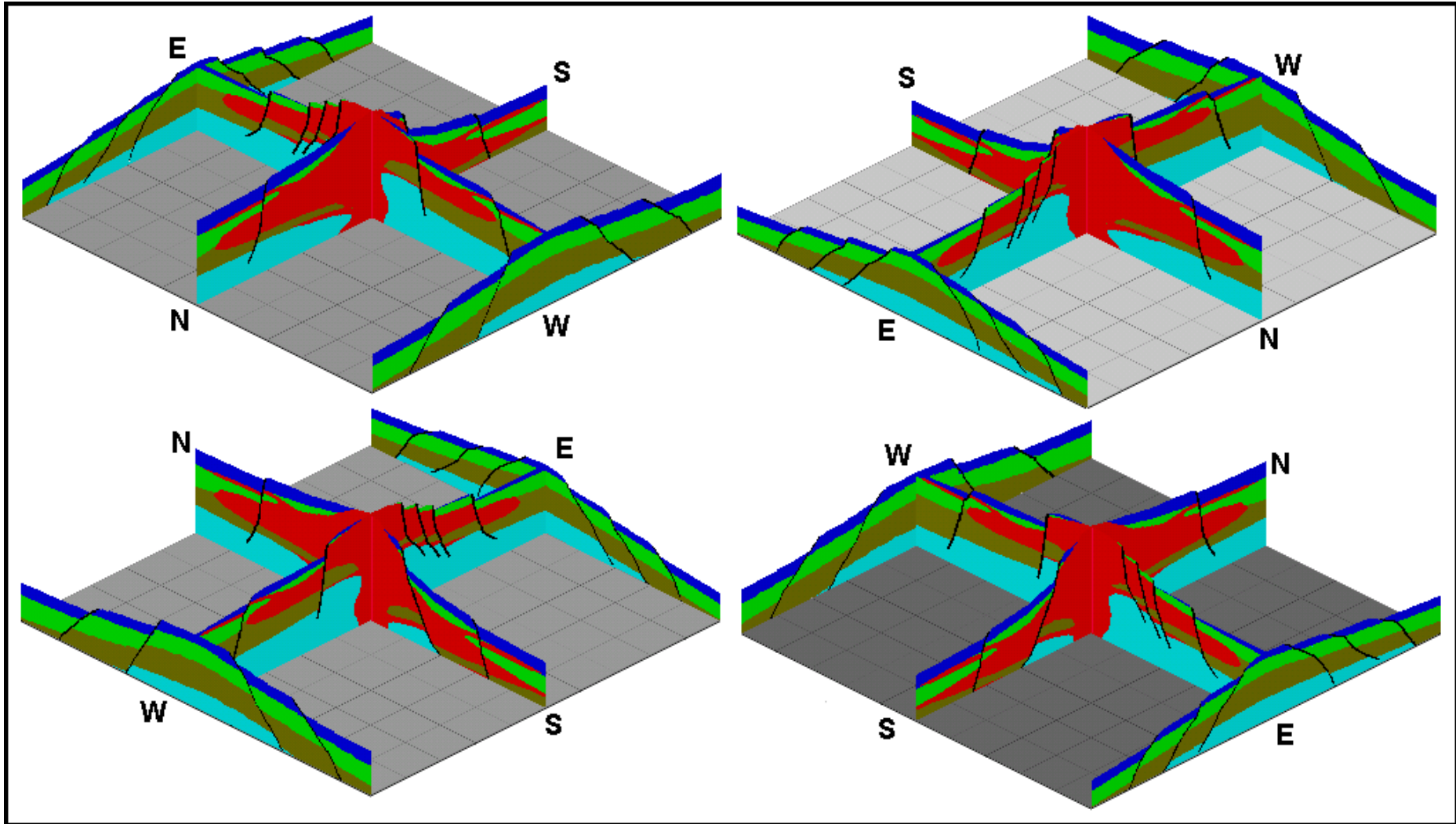
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# Pros & Cons of 3-D Visualization

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# 3-D Diagrams Can Convey Extremely Complex Spatial Concepts



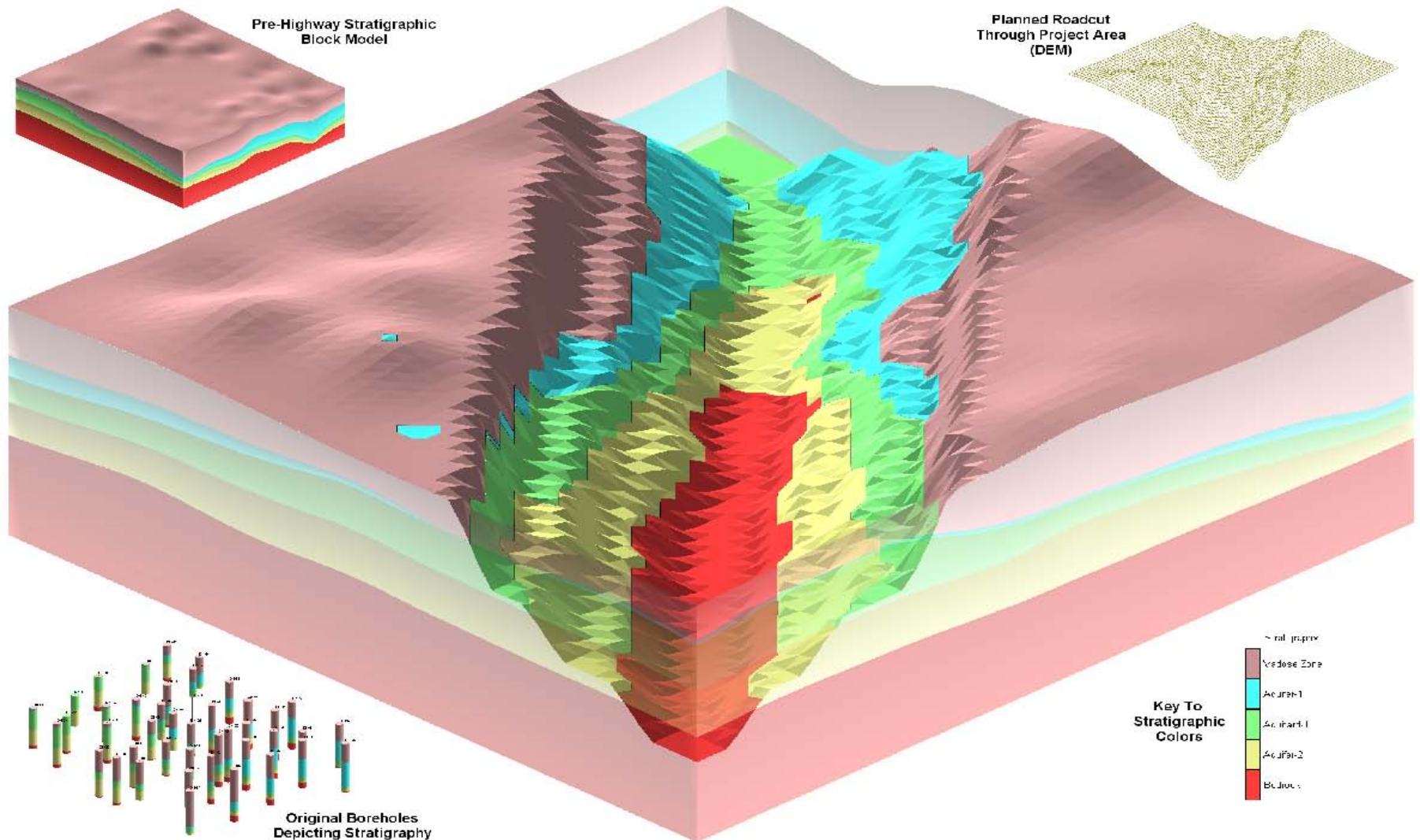
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# Explaining Geological Concepts To Non-Technical Audience

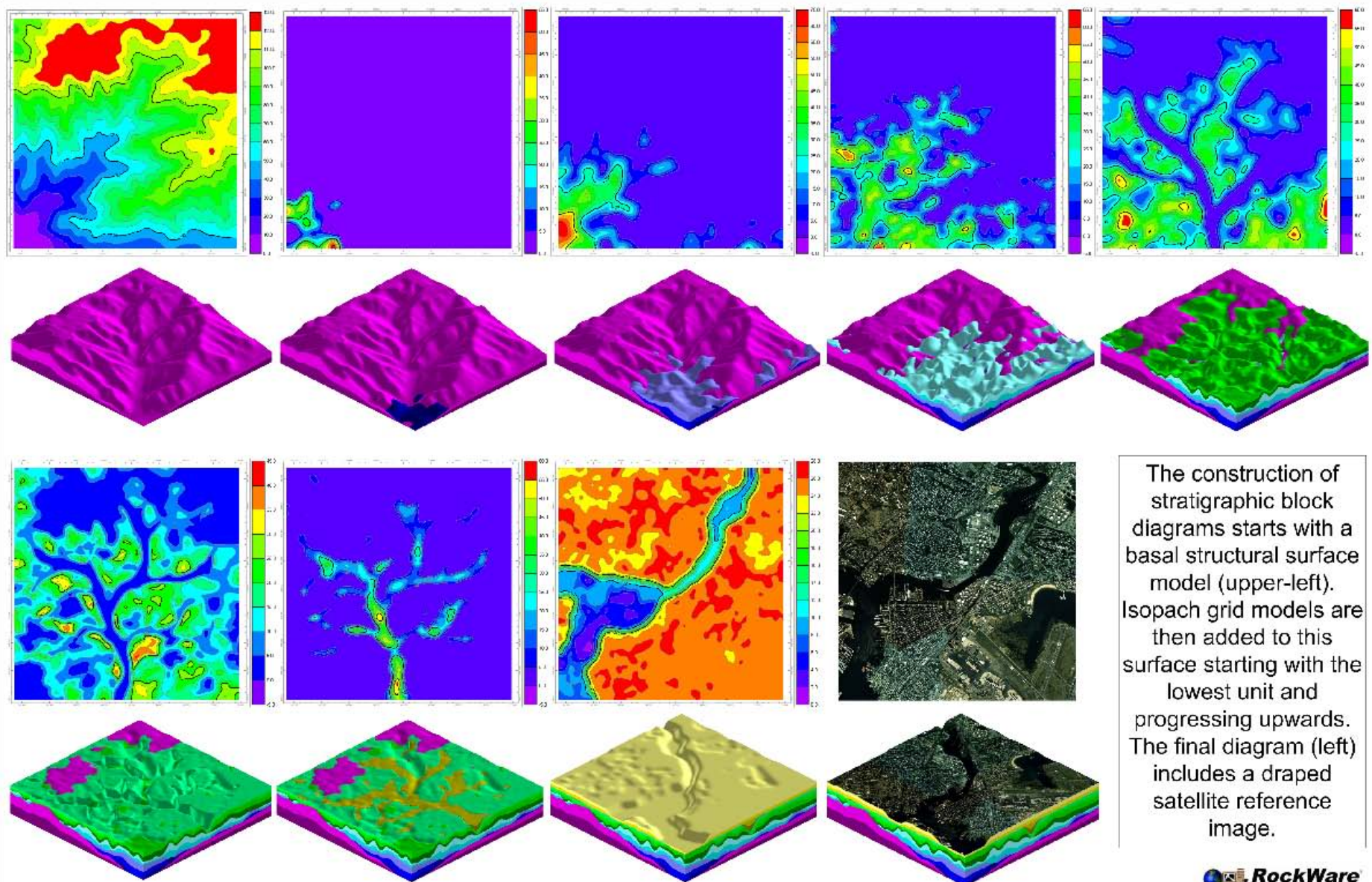


# Pros & Cons of 3-D Visualization

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# Rapid Processing & Re-Processing



The construction of stratigraphic block diagrams starts with a basal structural surface model (upper-left). Isopach grid models are then added to this surface starting with the lowest unit and progressing upwards. The final diagram (left) includes a draped satellite reference image.

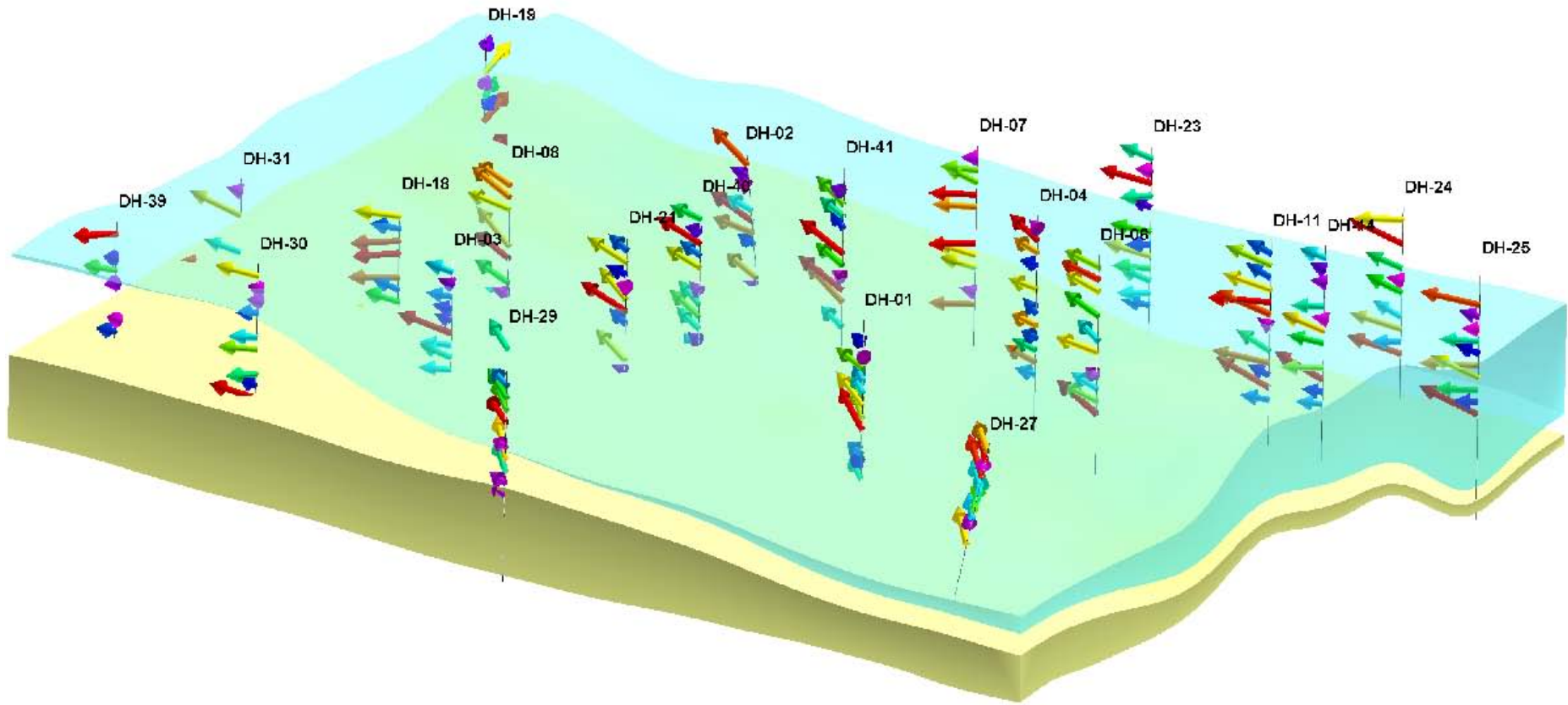


# Pros & Cons of 3-D Visualization

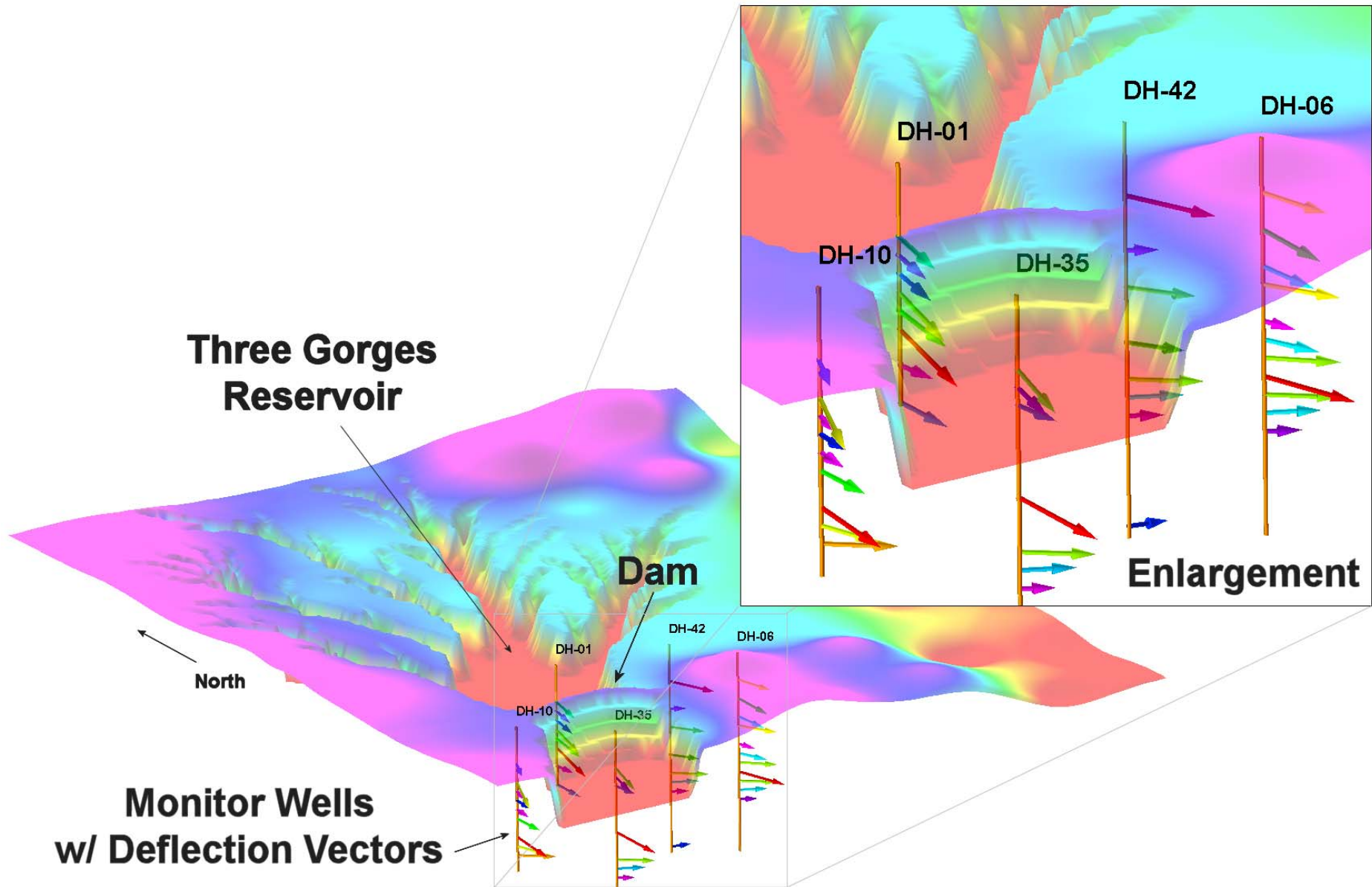
Pros	Cons
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# Display Data That Can Only Be Displayed In 3-Dimensions



# 3D-Only Data (Continued)



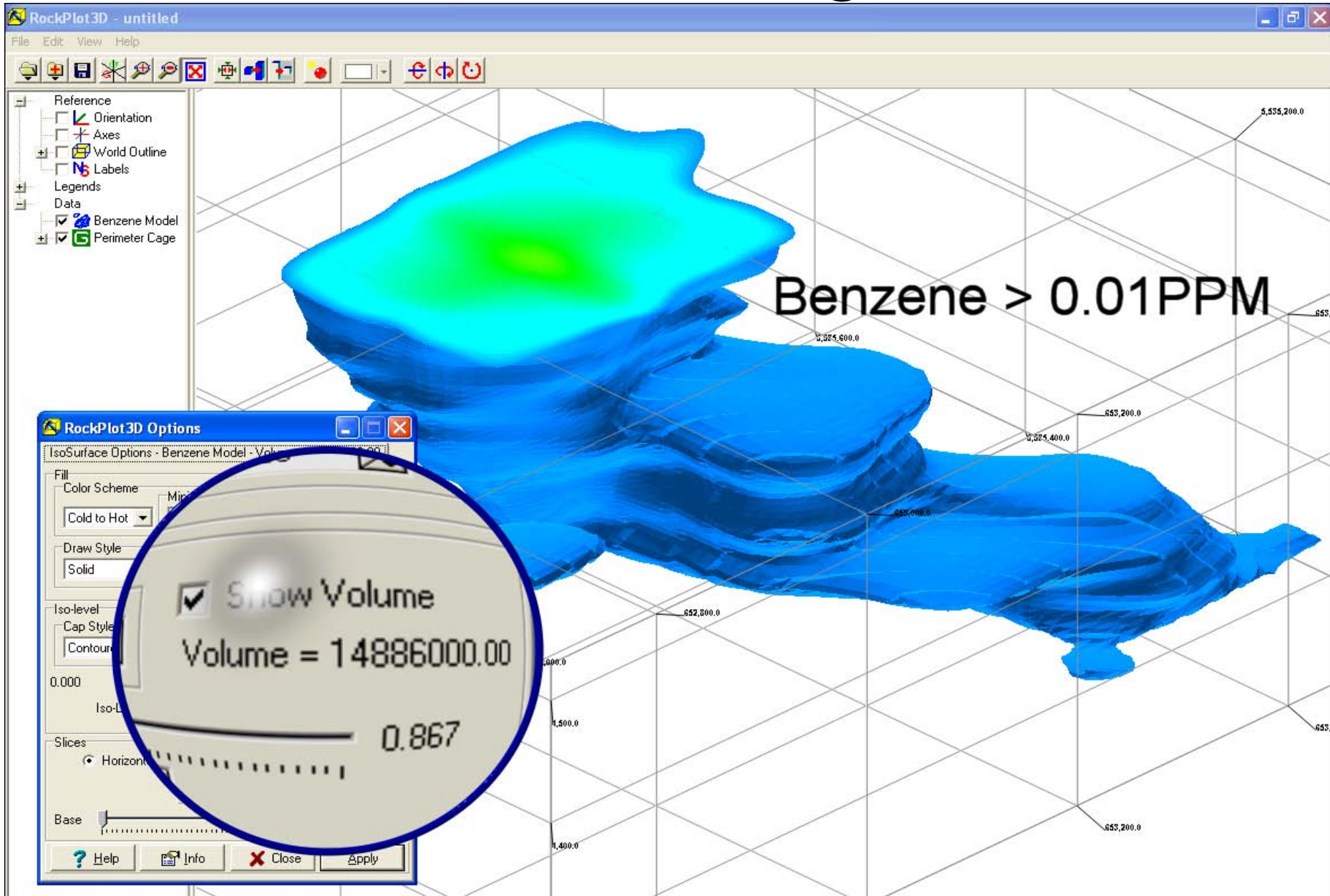
# Pros & Cons of 3-D Visualization

Pros	Cons
<ul style="list-style-type: none"><li>• Conveying Complexity</li><li>• Non-Technical Audience</li><li>• Speed</li><li>• 3D-Only Data</li><li>• <b><u>Interactive Diagrams</u></b></li><li>• Impress Friends</li><li>• Intimidate Enemies</li></ul>	<ul style="list-style-type: none"><li>• “Wimp” Factor</li><li>• Unworkable Hardcopy</li><li>• No Standards</li><li>• Easily Cluttered</li><li>• Dangerously Realistic</li><li>• Hardware Intensive</li></ul>

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# Interactive Diagrams

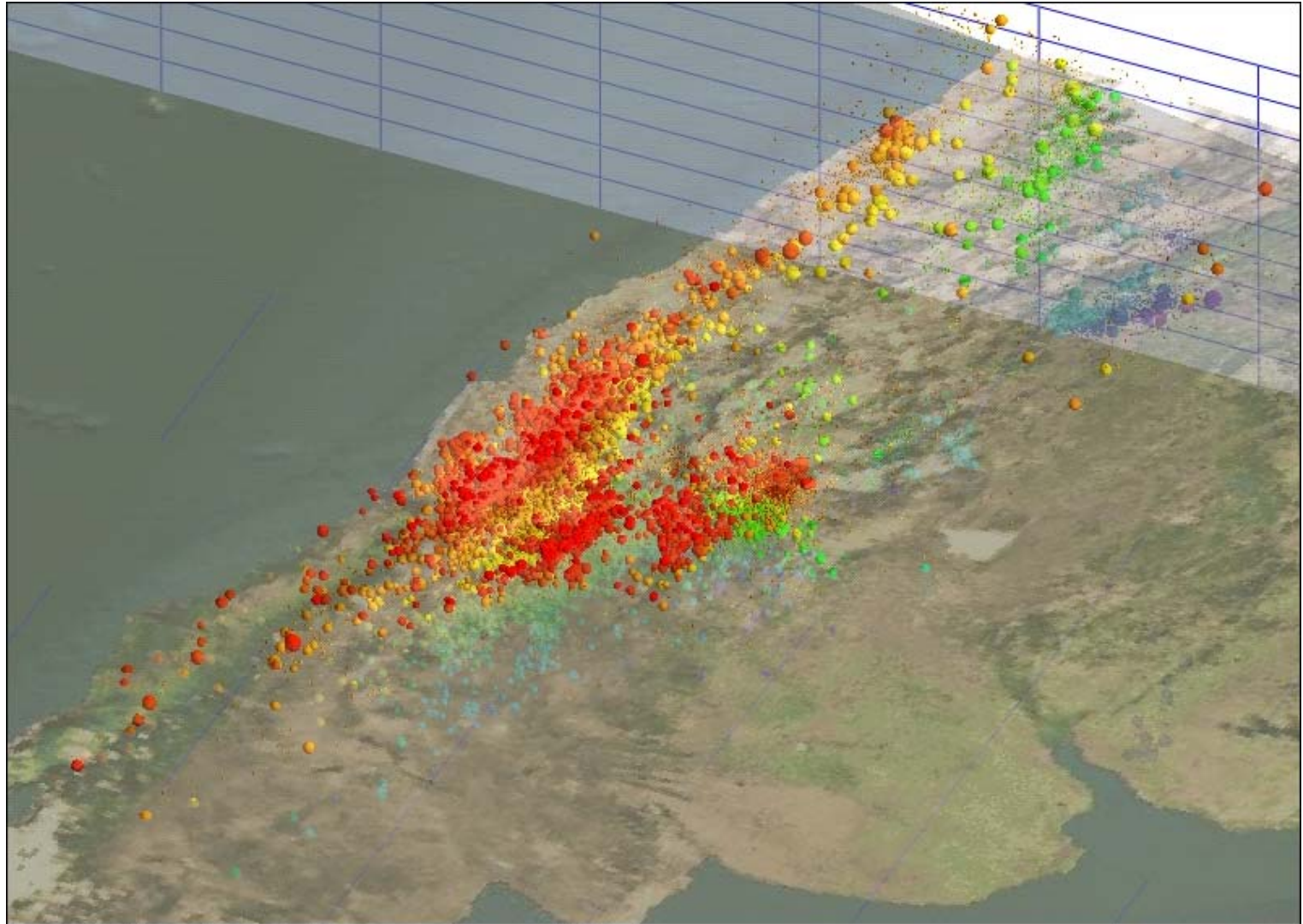


# Pros & Cons of 3-D Visualization

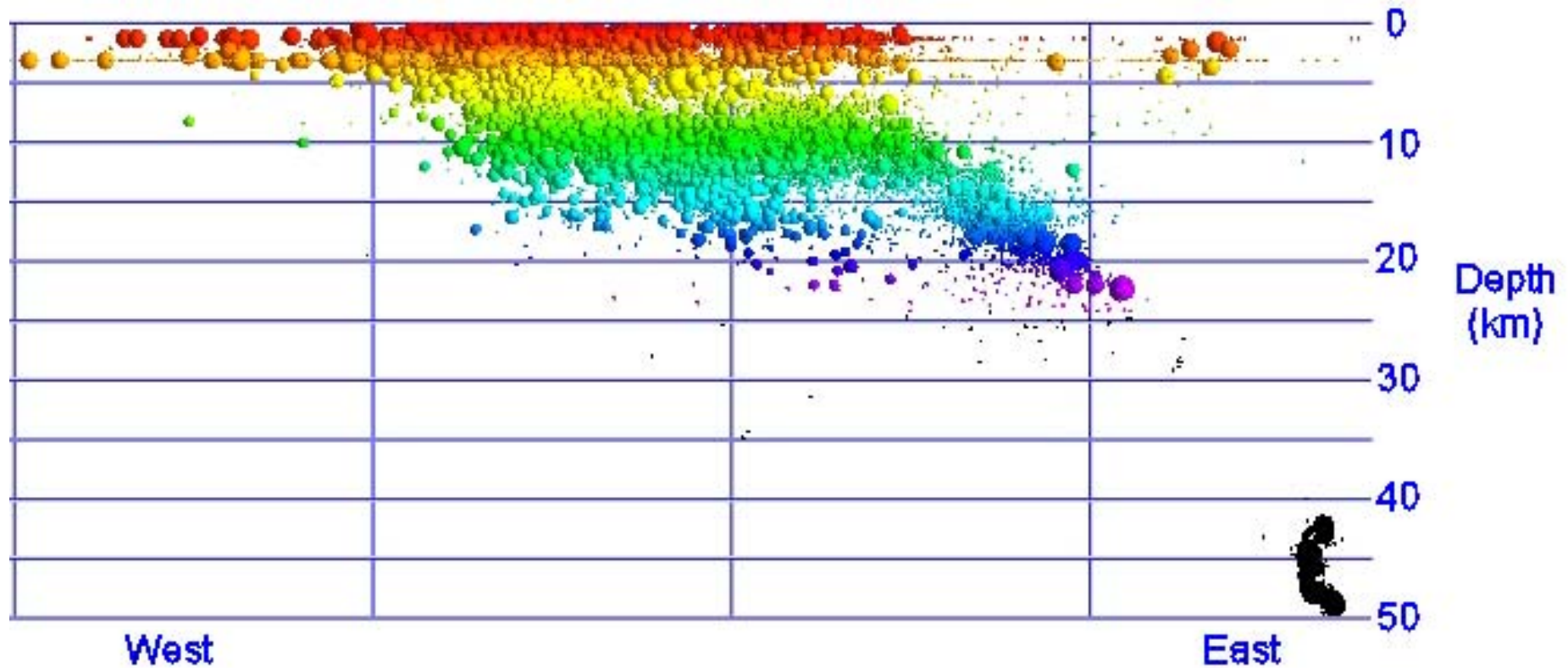
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# Seismic Events Along The Western Coast of Chile

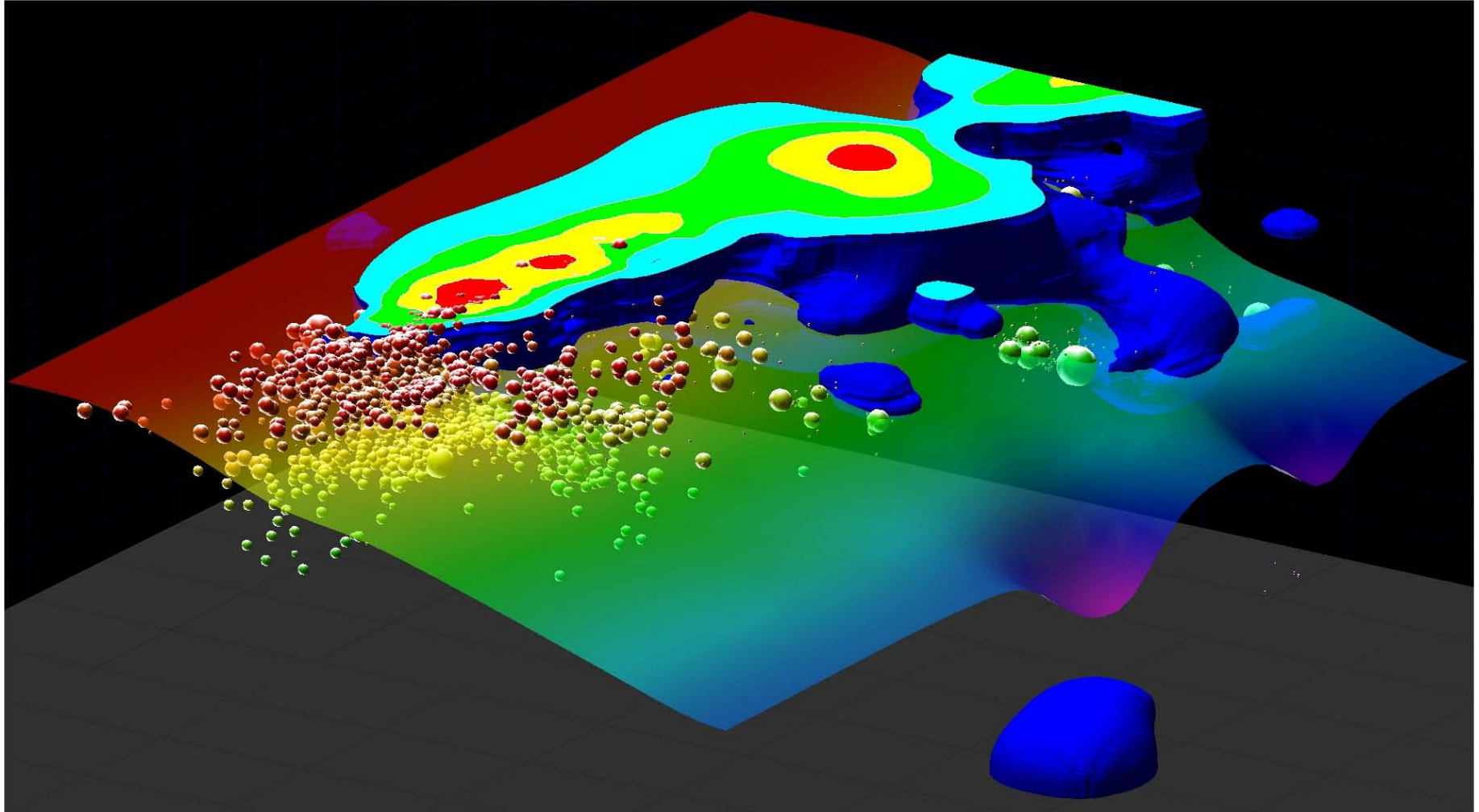


# West-to-East Profile of Seismic Events





# Seismicity & Inferred Plate Subduction Boundary Along the Chilean Coast

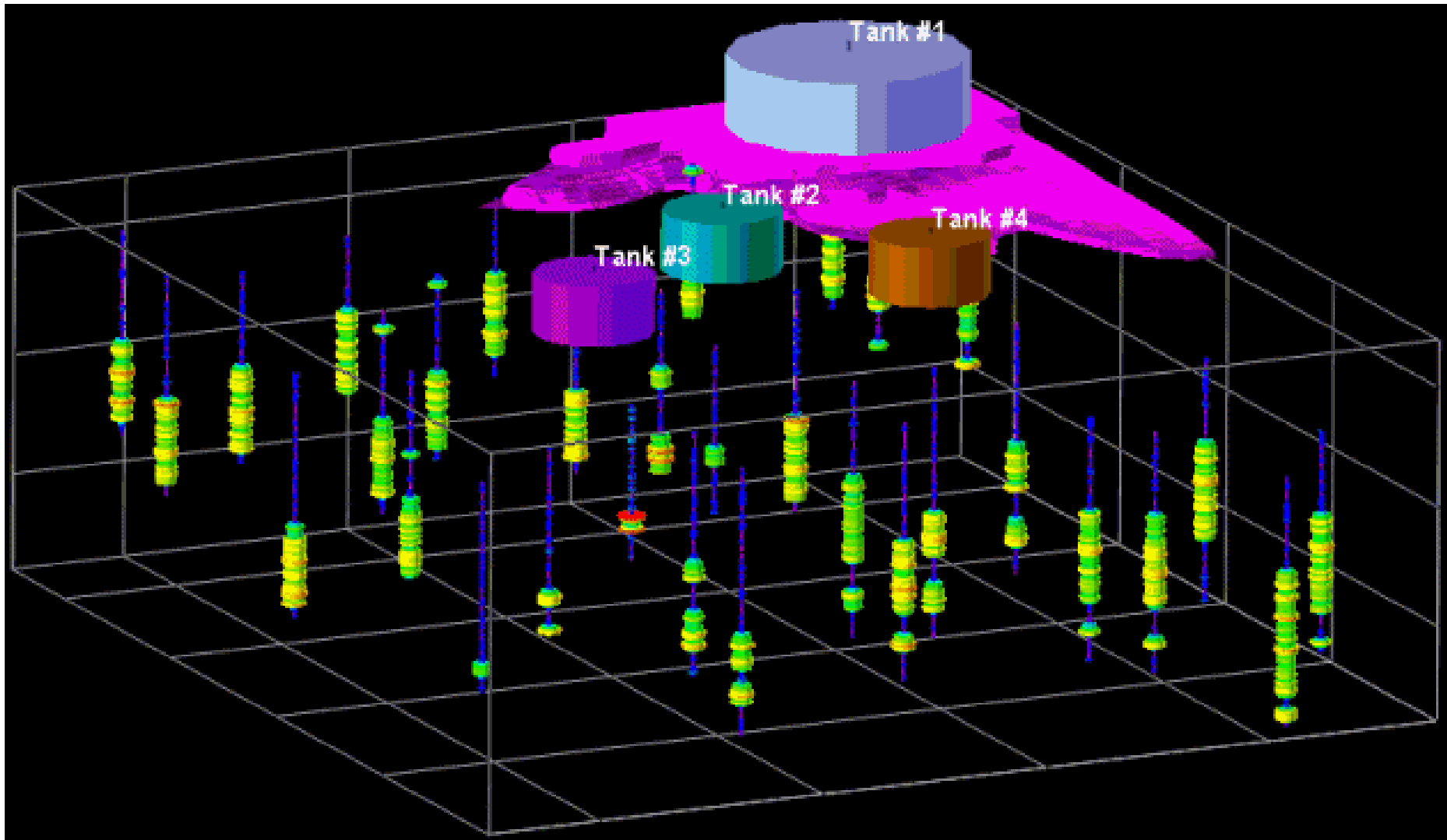


# Pros & Cons of 3-D Visualization

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# Intimidate Enemies (Opposing Counsel)



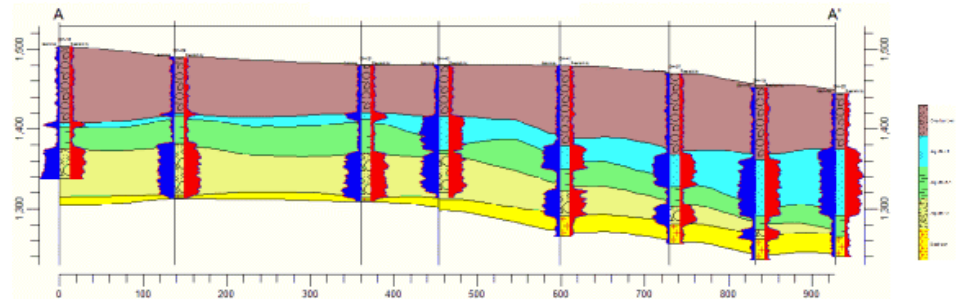
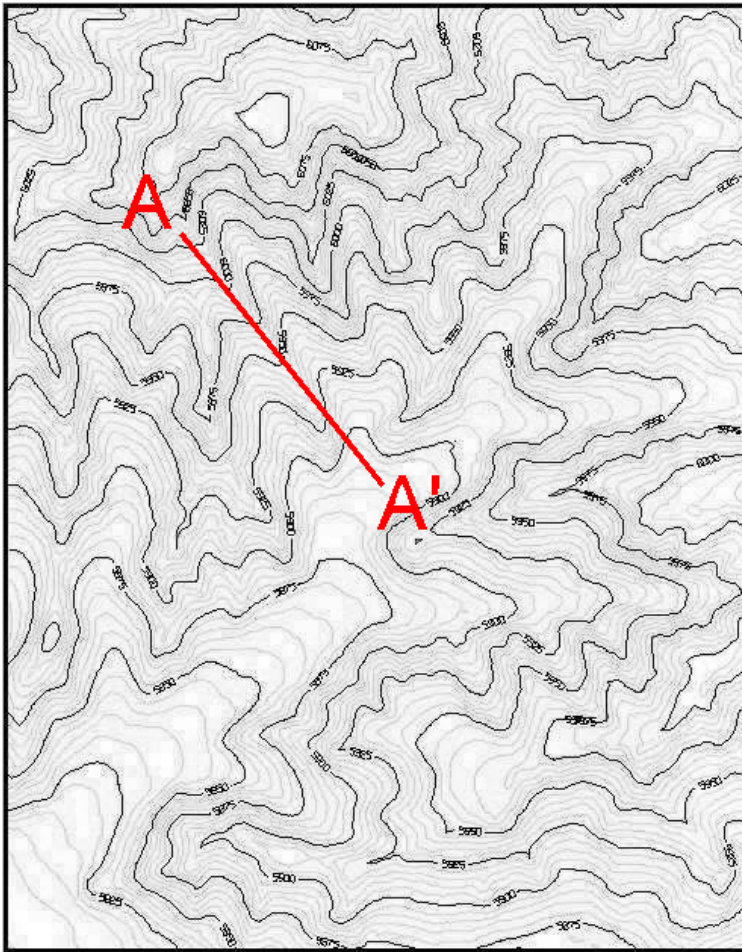
# Pros & Cons of 3-D Visualization

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# The “Wimp” Factor



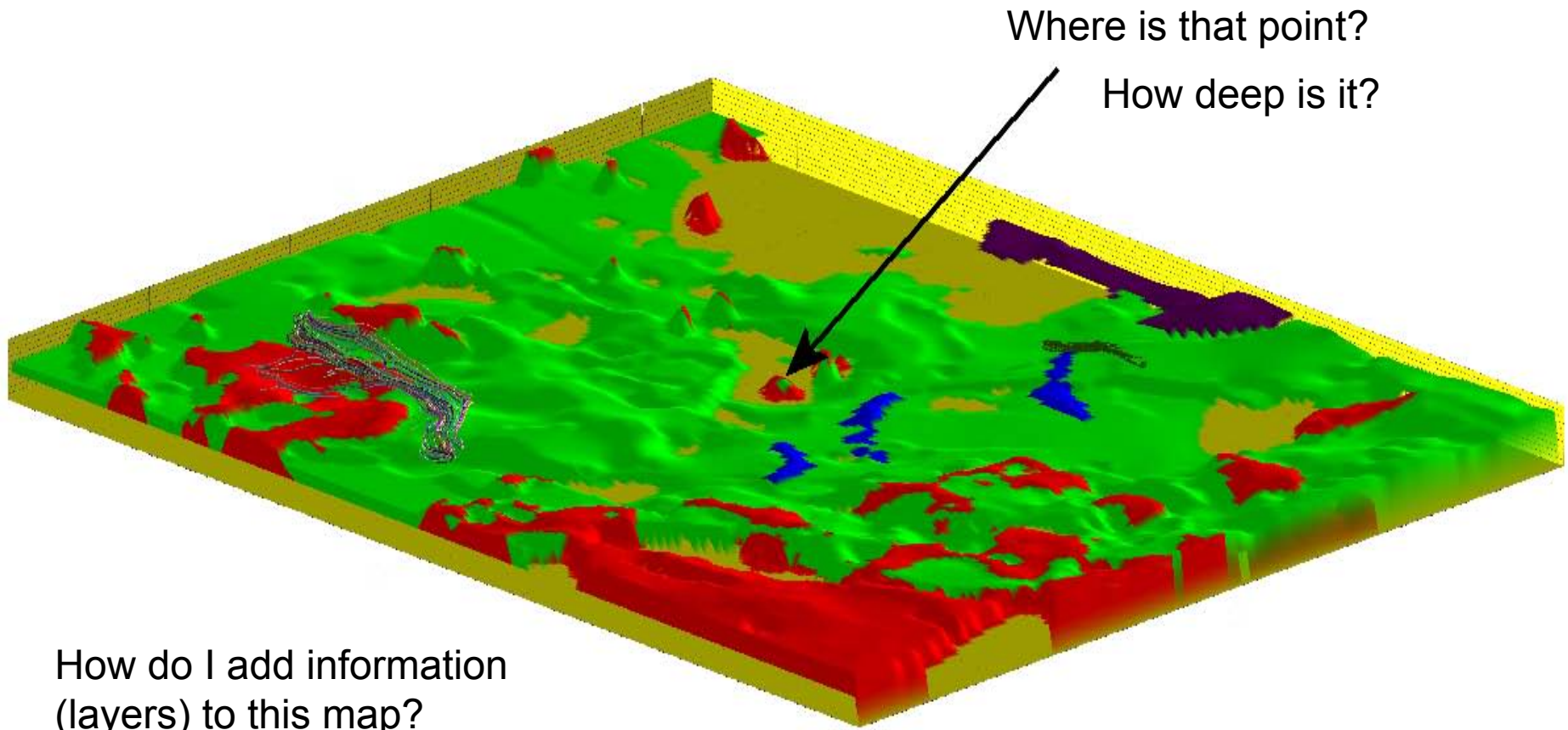
If you can't understand this ...  
... you're not a real geologist.

# Pros & Cons of 3-D Visualization

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<ul style="list-style-type: none"><li>• Conveying Complexity</li><li>• Non-Technical Audience</li><li>• Speed</li><li>• 3D-Only Data</li><li>• Interactive Diagrams</li><li>• Impress Friends</li><li>• Intimidate Enemies</li></ul>	<ul style="list-style-type: none"><li>• “Wimp” Factor</li><li>• <b><u>Unworkable Hardcopy</u></b></li><li>• No Standards</li><li>• Easily Cluttered</li><li>• Dangerously Realistic</li><li>• Hardware Intensive</li></ul>

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# Working With 3-D Hardcopy



# Pros & Cons of 3-D Visualization

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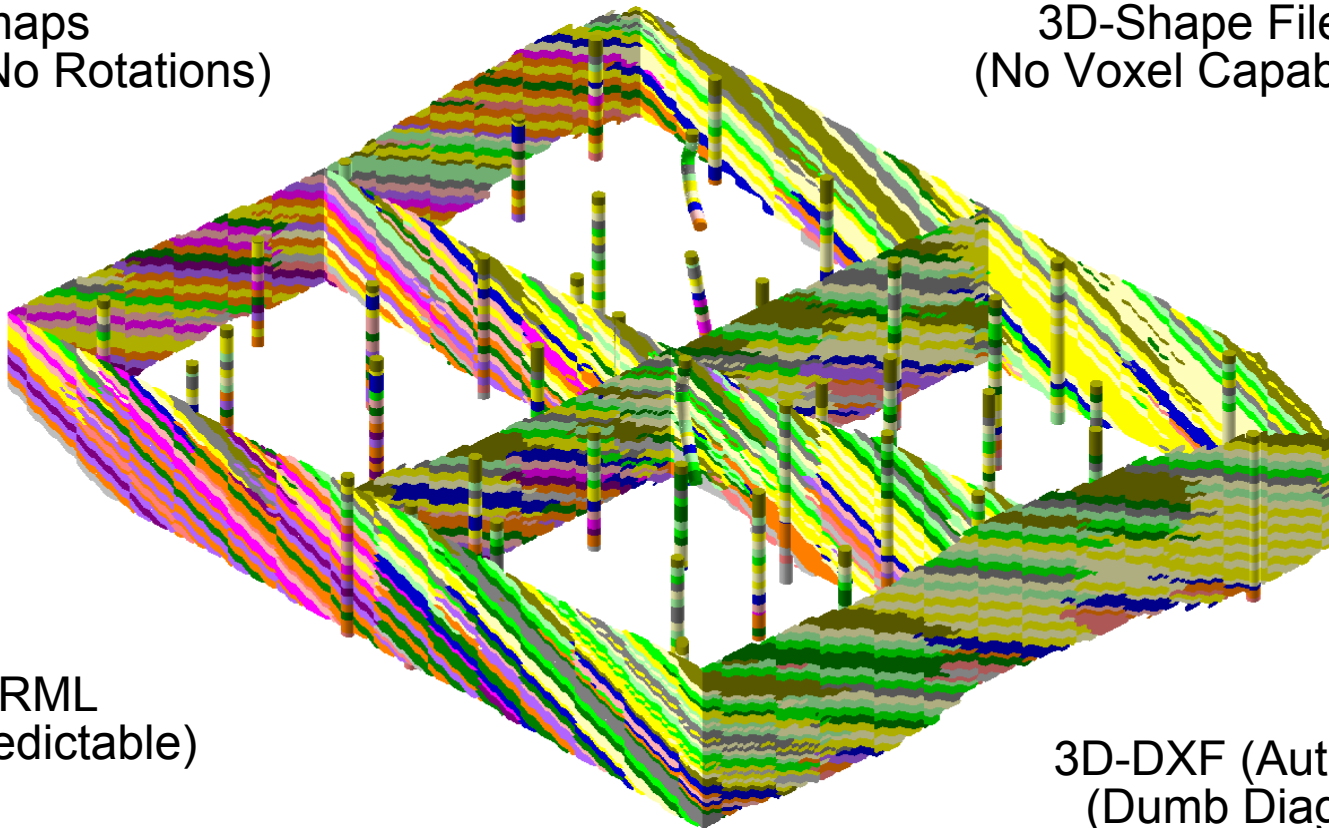
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# No Standards For 3-D Data or Graphics

Bitmaps  
(Static – No Rotations)

3D-Shape Files  
(No Voxel Capability)



VRML  
(Unpredictable)

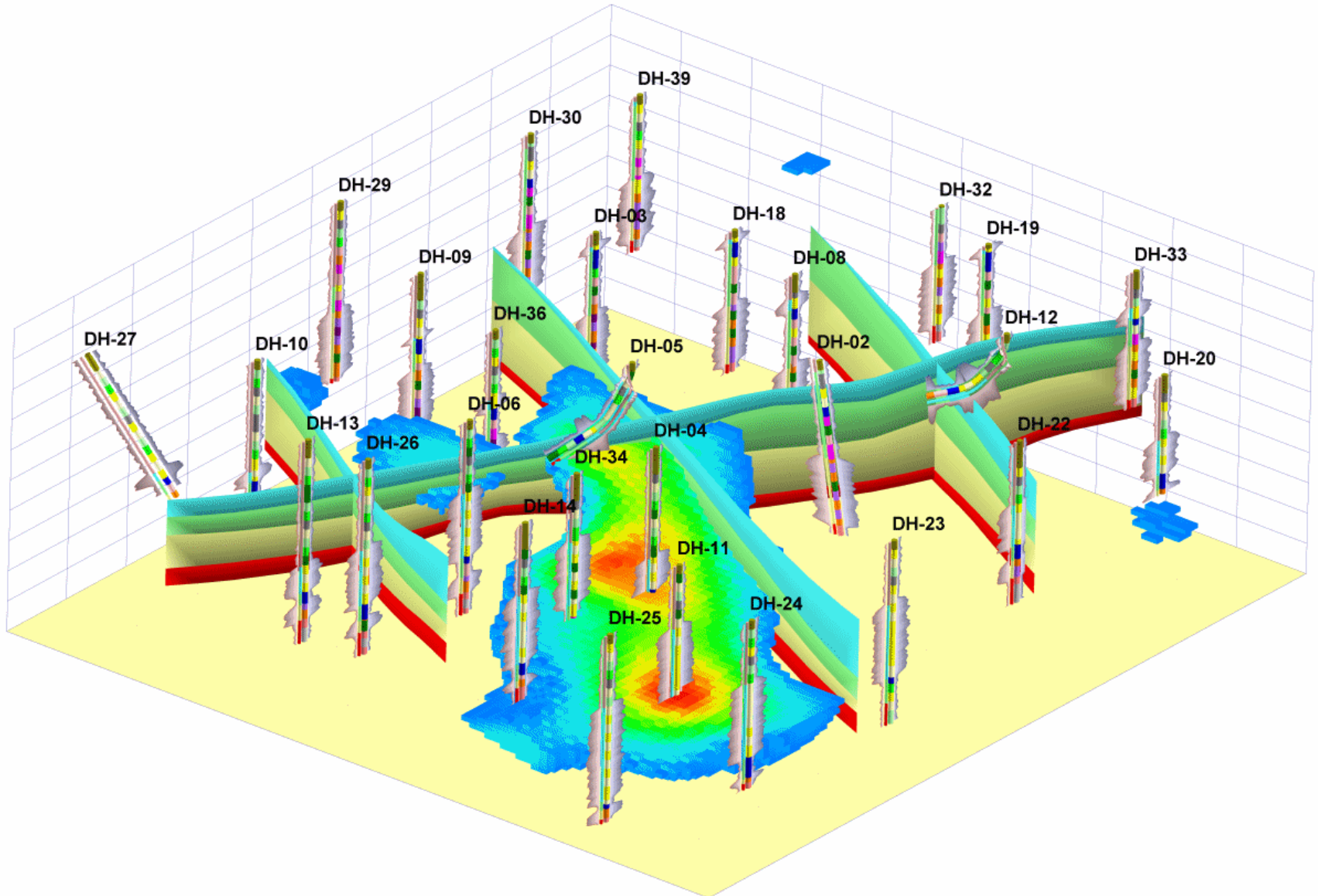
3D-DXF (AutoCAD)  
(Dumb Diagram)

# Pros & Cons of 3-D Visualization

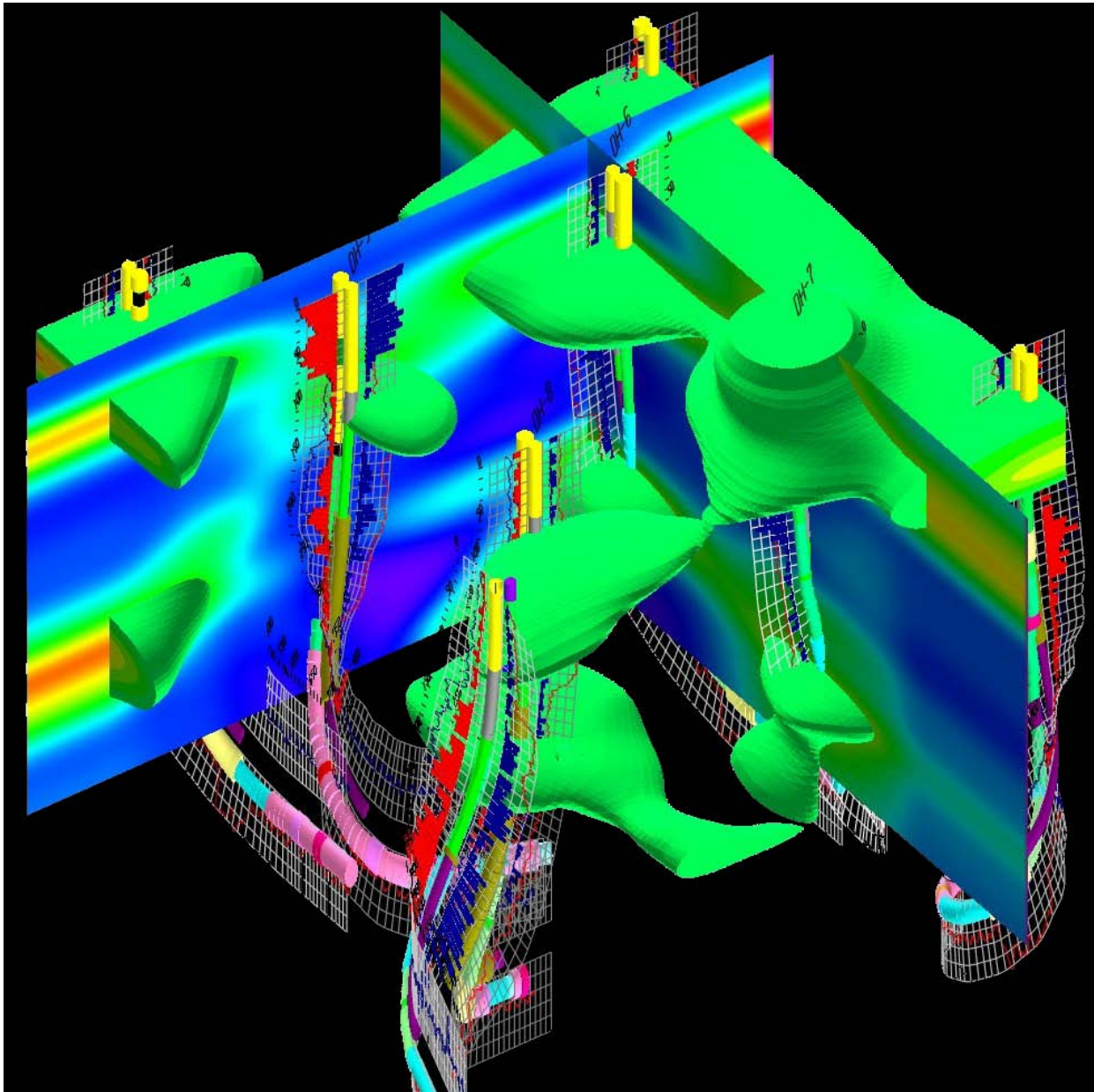
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3D diagrams must be stripped down to their “essence”.



# Interesting But Worthless Diagram



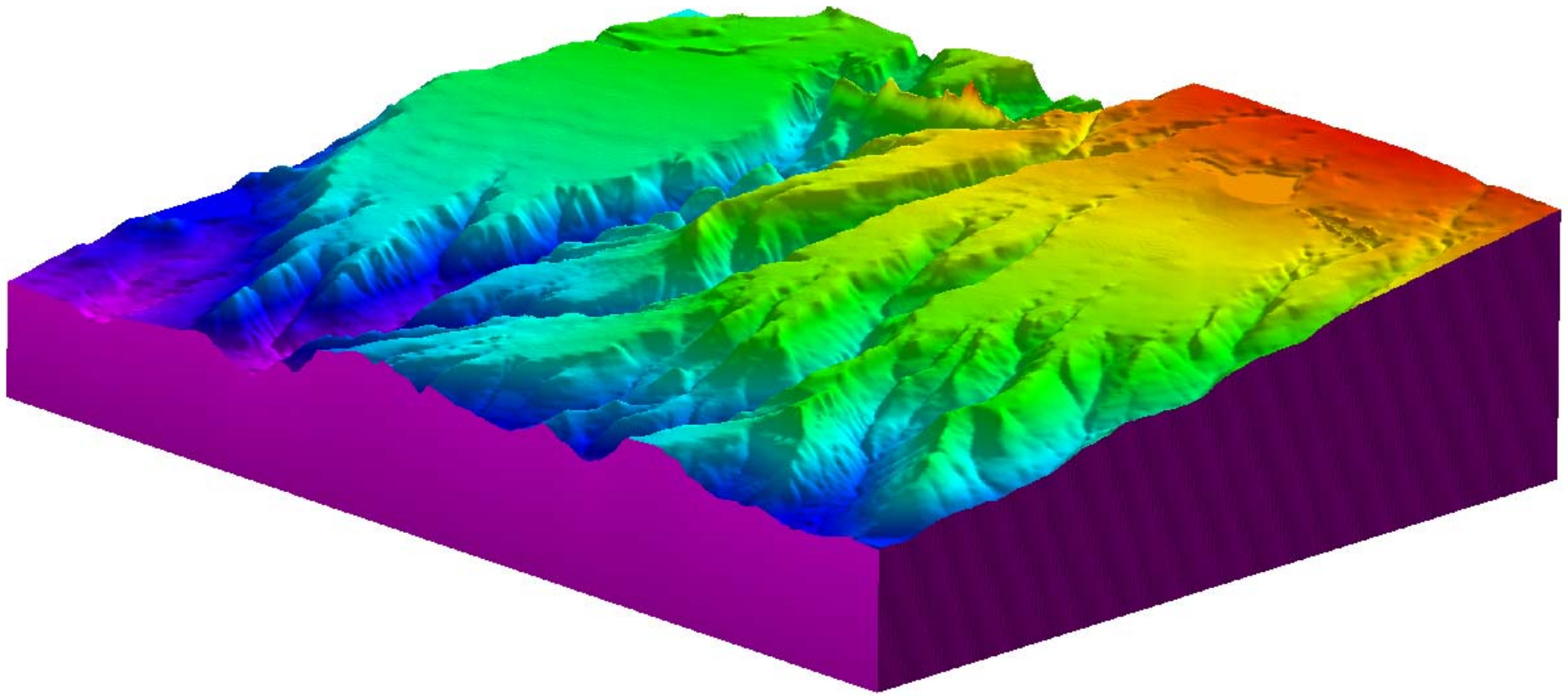
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Implicit realism can produce  
misplaced trust.

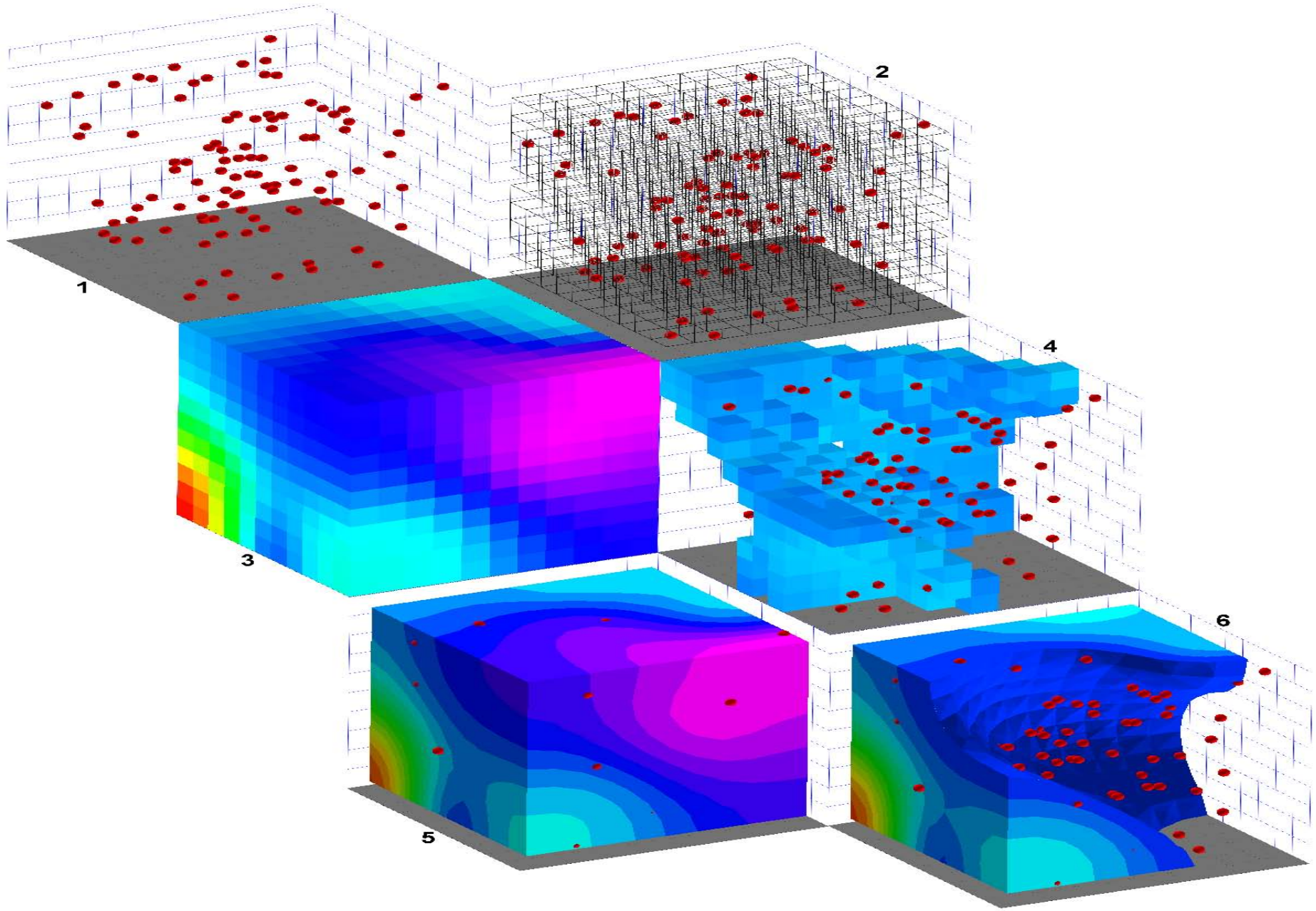


# Pros & Cons of 3-D Visualization

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# 3D Is Hardware Intensive



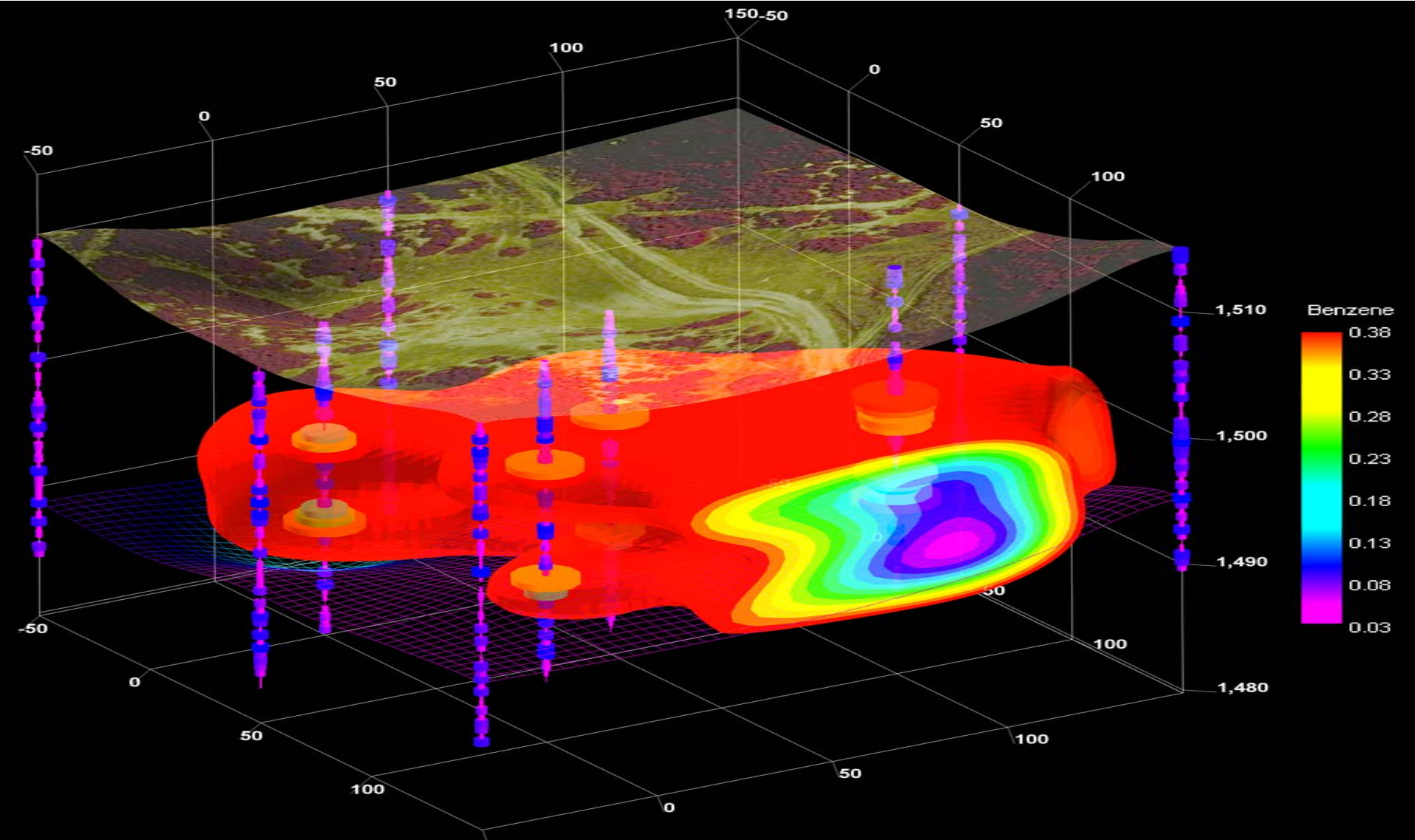
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# Differentiate Between The Observed & The Conjectural





# The End

