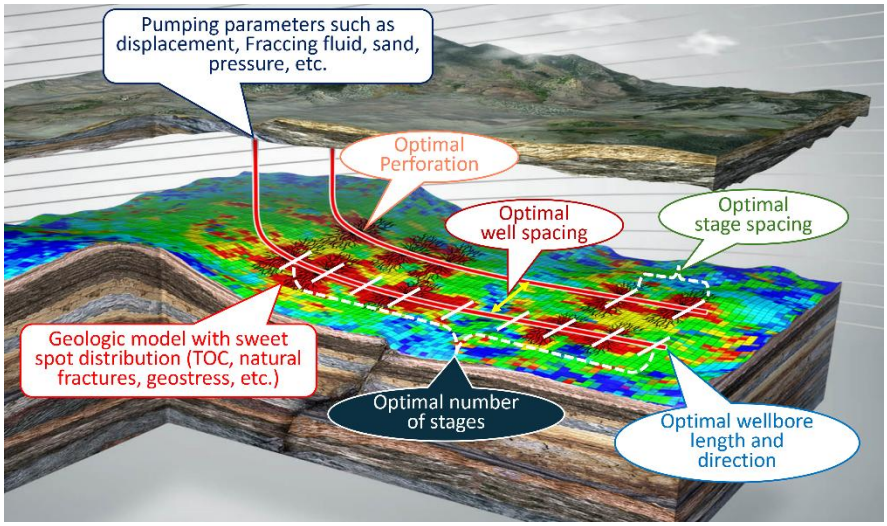
FracMAX

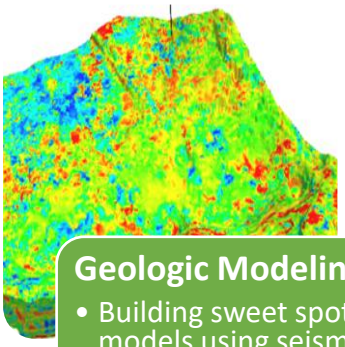
Integrate Geology and Geomechanics and Maximize Return of Your Unconventional Reservoirs

The vital **factors** affecting the return of your unconventional reservoirs:

- Optimal location to drill
- Optimal wellbore direction
- Optimal wellbore length
- Optimal number of fracturing stages
- Optimal stage spacing
- Optimal perforation position
- Optimal pumping parameters
- Optimal well spacing

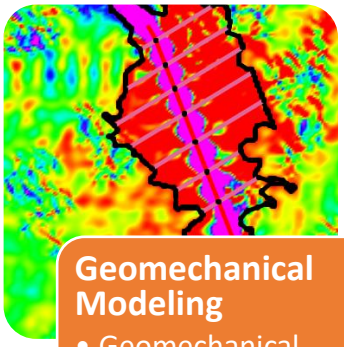


Our solution: **FracMAX.** **FracMAX** is an **integrated Geology/Geomechanics** software with our unique Material Point Method geomechanical modeling features. **FracMAX** includes 3 modules:



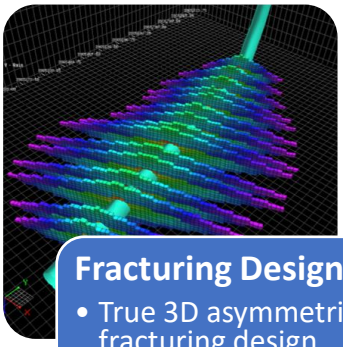
Geologic Modeling

- Building sweet spot models using seismic data and well logs
- Determine where to drill



Geomechanical Modeling

- Geomechanical modeling
- Optimal stage numbers and spacing
- Geostress mapping



Fracturing Design

- True 3D asymmetric fracturing design
- Constrained by the results of geomechanical modeling

Geologic Modeling:

Using seismic and well logs to build sweet spot models such as porosity, TOC, brittleness, Young's modulus, Poisson's ratio, pore pressure, in-situ stress, natural fractures, etc. Methods include deterministic, geostatistical, and artificial intelligence.

Geomechanical Modeling:

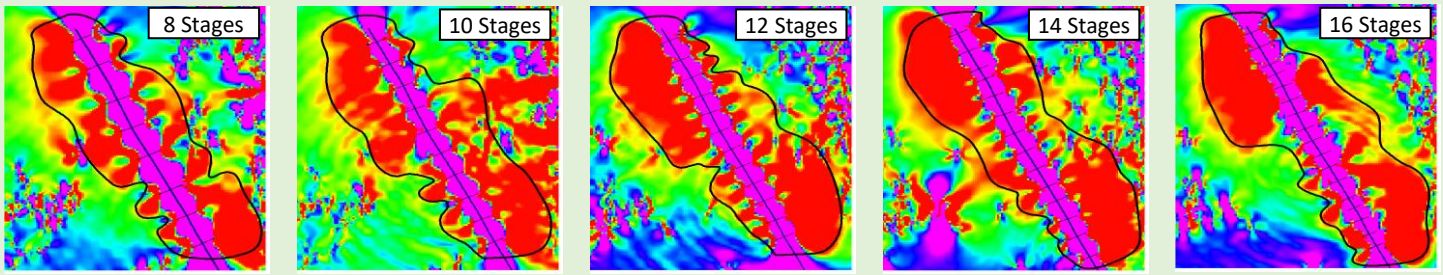
Simulates strain field generated by fracturing and the interaction between stimulated and natural fractures on heterogeneous geomodel, and provides half-length constraints for asymmetric fracturing design, and simulates differential stress field and microseismic.

Fracturing Design:

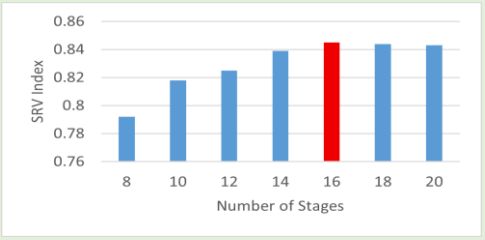
True 3D fracturing design on 3D geomodel with asymmetric half-length constraints from geomechanical modeling, obtaining fracture height, length, width, proppant and conductivity distribution generated by fracturing.

www.fracmax.net Email: info@fracmax.net Tel: 858-210-1230 Address: 5343 Renaissance Ave, San Diego, CA 92122, USA

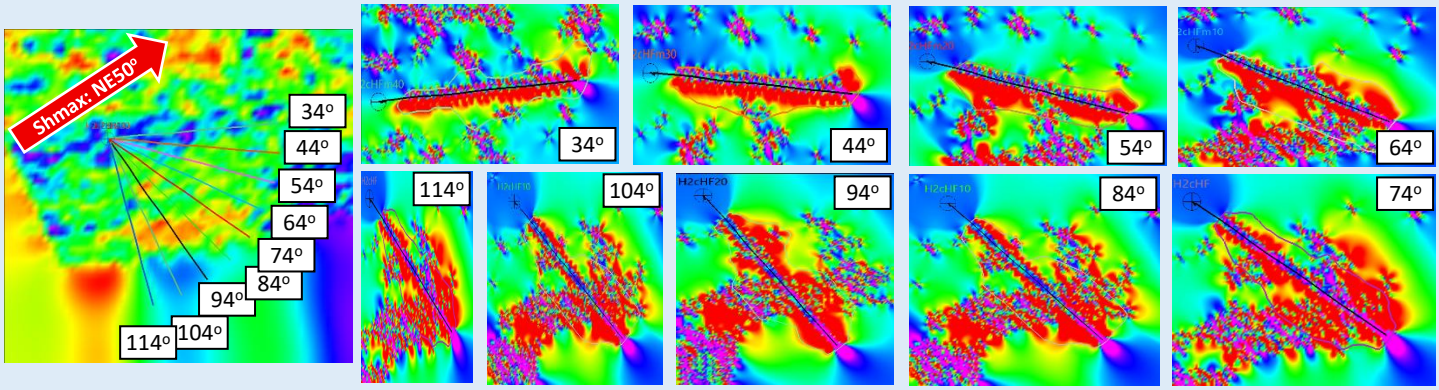
Case Study 1, Task: to obtain the optimal number of fracturing stages



To identify the optimal fracturing scheme, we used geomechanical modeling to simulate 8, 10, 12, 14, 16, 18 and 20 fracturing stages and compare their SRV performance. The 16-stage design delivers the maximum SRV.

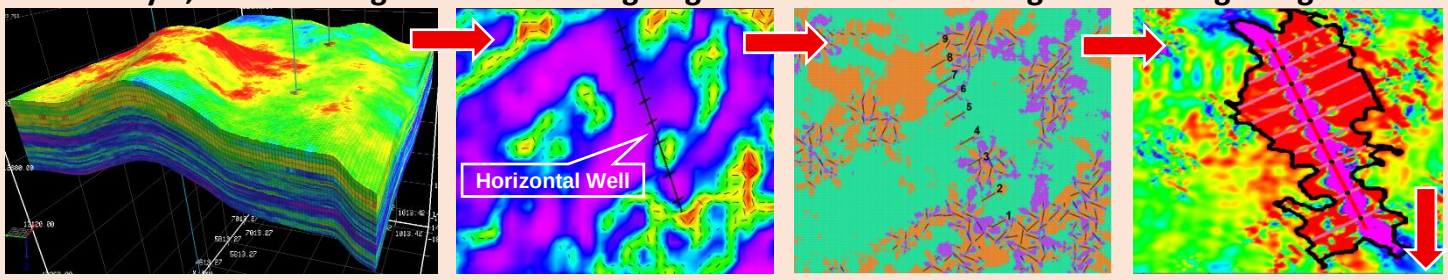


Case Study 2, Task: to obtain the optimal wellbore direction



Geomechanical modeling was performed to simulate wellbore directions ranging from 34° to 114°, aiming to identify the optimal orientation by evaluating SRV. The 74° angle between the wellbore and Shmax delivers the largest SRV, owing to existing natural fractures.

Case Study 3, Task: from geomodel building to geomechanical modeling to fracturing design

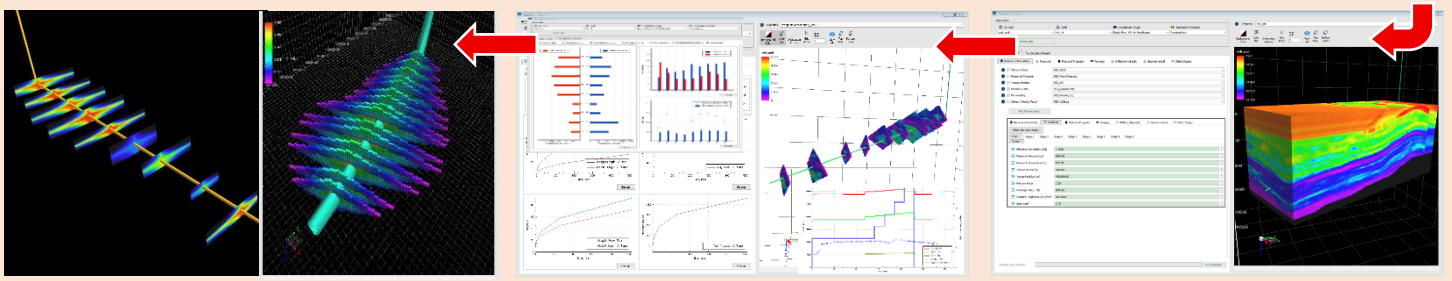


1. Build a 3D geologic model with geologic and geomechanical sweet spots using seismic and well logs…

2. Extract equiv. natural fracture model from the geologic model…

3. Calculate the differential stress distribution...

4. Obtain optimal stage spacing and asymmetric half-length using geomechanical modeling...



7. Visualization of conductivity generated by fracturing, and output the grid to reservoir simulators if necessary.

6. Obtain frac length, height, width, etc. and their histograms, and output the recommended pumping curve…

5. Use the near-well 3D geomodel with the half-length constraints obtained from step 4 to carry out asymmetrical 3D fracturing design...

www.fracmax.net Email: info@fracmax.net Tel: 858-210-1230 Address: 5343 Renaissance Ave, San Diego, CA 92122, USA