

GeoFrame Spectral Decomposition Reduces Exploration Risk

Case study: Enhanced delineation of potential prospect helps PEMEX improve risk assessment

Challenge

For PEMEX it was critical to obtain more detailed information for an improved risk assessment in a region located onshore Mexico in the Sierra de Chiapas sedimentary basin of the Gulf Coast before making any decisions to drill expensive exploration wells.

Solution

To more accurately evaluate the risk associated with this prospect, the PEMEX exploration team implemented new seismic attribute techniques in the GeoFrame* integrated reservoir characterization system. GeoFrame Spectral Decomposition enabled PEMEX to extract the maximum amount of information from the available seismic data.

Results

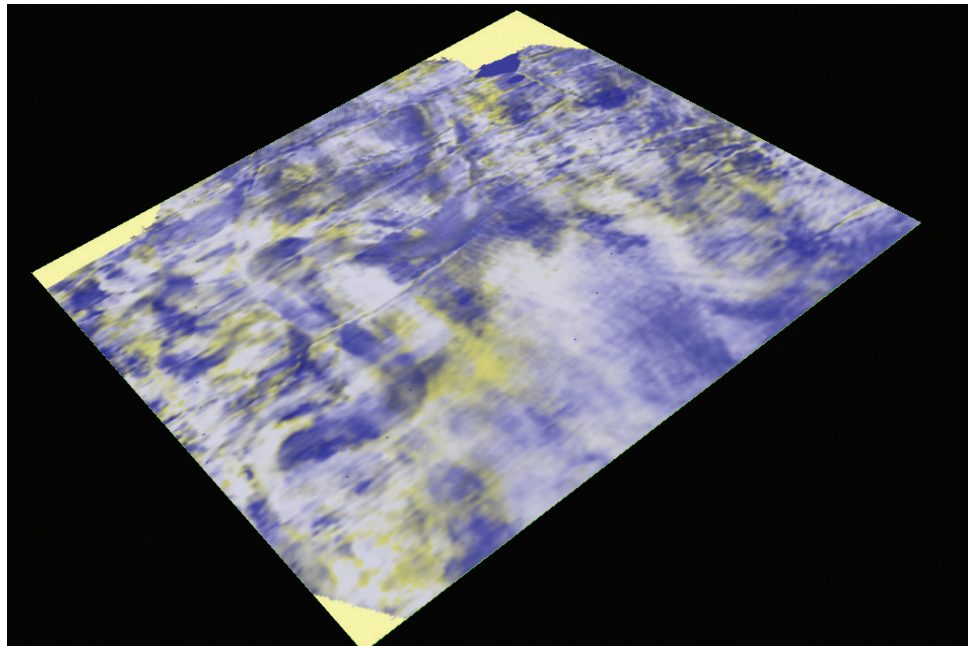
Animation of the results in the GeoViz* 3D interpretation and visualization application provided a key input in the assessment of potential exploration targets because of an enhanced delineation of a channel and the faults in the area.

Improved risk assessment

In a region located onshore Mexico in the Sierra de Chiapas sedimentary basin of the Gulf Coast, a mature field is currently producing from dolomitic and limestone reservoirs of Mesozoic age. PEMEX is taking advantage of existing 3D seismic data in the area to look for new exploration targets in Tertiary sands.

The seismic interpretation revealed a specific area where a structural high and related faulting could provide the required trap and seal for the accumulation of hydrocarbons. Extraction of traditional seismic attributes along the horizon interpretation showed some evidence of a channel going through the anticline structure.

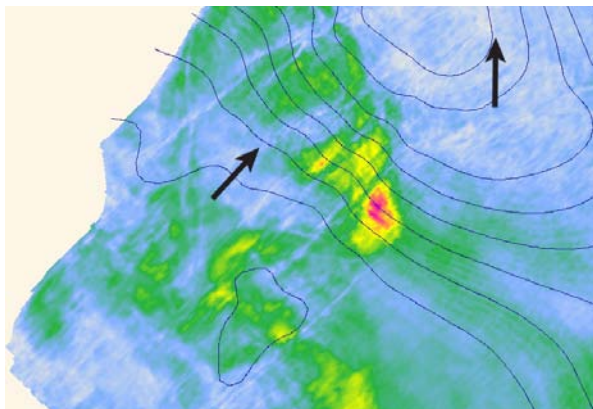
The resolution of these traditional seismic attributes did not provide an ideal delineation of the channel and the potential reservoir. Therefore, it was critical to obtain more detailed information for an improved risk assessment of the area before making any decisions to drill expensive exploration wells.



The results from GeoFrame Spectral Decomposition reveal valuable insight into the depositional history of a region. The image shows a frequency slice for 10 Hz, which highlights a channel and faults in the area. This information helped the asset team determine ideal locations for new wells.



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The integrated seismic magnitude attribute shows the existence of a channel, but the limits of the channel are difficult to infer, particularly in the upper part of the structure where there is a potential for hydrocarbon accumulation.

New seismic attribute techniques

To more accurately evaluate the risk associated with this prospect, the PEMEX exploration team implemented new seismic attribute techniques in the GeoFrame integrated reservoir characterization system. GeoFrame Spectral Decomposition enabled PEMEX to extract the maximum amount of information from the available seismic data.

GeoFrame Spectral Decomposition was run on 3D seismic data using a time window along the horizon interpretation. The result from this

process was a multifrequency cube, which provided images that delineated different geologic features tuning in and out as the frequency changed. The images also presented a better definition of the faults in the prospect area, which was essential to supply a seal for a potential reservoir and reduce the risk of drilling a dry well.

Animation of the results in the GeoViz 3D interpretation and visualization application revealed new channel systems that were not previously identified. This can provide key insight into the depositional history of the basin and improve the understanding of possible hydrocarbon migration paths in the region.

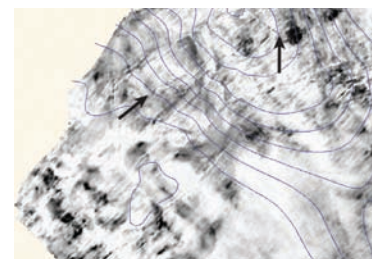
Reduced exploration risks

GeoFrame Spectral Decomposition provided PEMEX a more complete analysis of the 3D seismic data, and as a result, an improved assessment of risk. The results provided a key input in the assessment of potential exploration targets because of an enhanced delineation of a channel and the faults in the area.

The ability to process the data and view the results within one integrated environment saves time and money by avoiding unnecessary input and output of data between applications, and reduces the chances of making costly mistakes that may occur during such information transfers. The saved time can be used to analyze and interpret results, and implement the workflow in other areas to look for new exploration opportunities. Reducing cycle time ultimately leads to increasing the number of successful wells. PEMEX has now added this key technology to their subsurface workflows in order to help pinpoint ideal locations for new exploration wells.

“GeoFrame Spectral Decomposition provided PEMEX with an improved delineation of the channel and the faults in the area. This information was critical in order to determine the ideal location for new exploration wells.”

PEMEX E&P team



Frequency slice extracted with GeoFrame Spectral Decomposition shows the channel limits more accurately. The image also reveals faults in the area, which may provide a seal for the structure.

For more information contact your local SIS office or e-mail sisinfo@slb.com.

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