

Gravity Gradiometry and Seismic Data Integration: A New Technology Being Used to Develop Emerging and Mature Plays in the Gulf of Mexico

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The integration of multiple Geophysical measurements using both Seismic data and Gravity Gradiometry is helping to provide an enhanced geologic understanding in areas that are either difficult or costly to acquire new 3D seismic data. ARKeX and IONGEO have embarked on a joint project along the Louisiana Gulf Coast aimed at demonstrating the advantages of this multi-disciplinary approach.

Gravity Gradiometry provides much improved resolution over conventional gravity data. This allows the integration with seismic data at the same scale as the seismic interpretation. The 3D nature of the Gravity Gradiometer measurements, which can be acquired from an aircraft or boat, means that the integration with 2D seismic data can provide critical information leading to a much improved 3D interpretation.

Acquiring new 2D or 3D seismic data along the Gulf Coast is costly, time consuming and environmentally sensitive. In particular the transition zone presents a challenge, joining the interpretation from the on-shore to the off-shore. Existing data available in this area could be over 10 years old and originally designed to optimally image different targets.

Modern state of the art processing and imaging techniques employed by IONGEO can provide very significant uplift to this legacy seismic data, and the onshore extension of the GulfSPANTM data has been extremely successful in providing new insight into the region. However due to the sparse nature of the 2D data, integration with Full Tensor Gradiometry can provide a greatly enhanced 3D understanding of the area.

In particular the gravity and seismic integration can be used to advance the interpretation of fault and structural trends at the intermediate and deeper levels of structuring present in these near shore to onshore areas. These deeper structural levels need an interpretation workflow capable of resolving structure with more accuracy and preserving the signal bandwidth.