
Integration of Remote Sensing Data with Geology and Geophysics – Case Study from Bahrain

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The objective of integration of remote sensing data with surface geological and geophysical data is to improve seismic survey design and data processing. Remote sensing data from satellites provides densely sampled information about the earth surface. When integrated with surface geological data, estimates of the elastic properties of the surface can be obtained to assist planning seismic survey data acquisition. In particular, multispectral remote sensing data are interpreted for geomorphological characteristics such as sabkha and karst features, which are known to degrade seismic data quality. Developing surface elastic property estimates prior to the start of the seismic survey supports the selection of vibrator sweep parameters tailored to surface conditions, thereby improving survey data quality. This case study from the Awali field in Bahrain shows how integration of multispectral data and surface geology could improve surface seismic data quality. The success of the method is demonstrated through a karst feature (doline) and coastal sabkha.

The results are presented in a Petrel database, which allows further integration with subsurface geological and geophysical data to improve the understanding of hydrocarbon reservoirs in the Middle East. The visualization comprises map images, virtual 3D images, and virtual fly-through movies. The project shows, in a reservoir database, the benefits from combining surface seismic data and satellite imagery.
