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THE APPLICATION OF CSEM (CONTROLLED SOURCE ELECTROMAGNETIC) TECHNOLOGY AS A TOOL TO COMPLEMENT 3D SEISMIC INTERPRETATION AND AVO ANALYSIS IN A DEEPWATER PROSPECT: A CASE STUDY ON PROSPECT B, BLOCK 2F, OFFSHORE SARAWAK.

WONG ENG YAO

PETRONAS Petroleum Management Unit

The Controlled Source Electromagnetic (CSEM) method has emerged into the oil and gas exploration industry, especially in deepwater exploration, and provides geoscientists another tool to assess a prospect by looking at another physical property, i.e. resistivity, besides acoustic properties that can be derived from seismic and AVO analysis.

In this context, CSEM technology is no doubt a tool to complement seismic interpretation and AVO analysis by offering an independent data set to exploration work. However, as the technology is purely based on resistivity contrast down-earth, there is still room for debate as to whether or not the technology is capable enough to help in delineating the true geology of an area.

This paper presents the result of a 2D CSEM survey over Prospect B of Block 2F, Rajang Delta, offshore Sarawak. The 3D seismic of the prospect shows a high amplitude anomaly at both crest and flanks of the structure (Figure 1); while AVO analysis over the crest of the structure gives a Class III AVO response which hints at an existence of a gas cap (Figure 2). The CSEM response displays a positive magnitude build-up which indicates a resistive body lying beneath (Figure 3).

The question left here is the geological model that would explain all the responses obtained whilst honoring the geological (stratigraphic) information from wells drilled in the area before; Whether what lies beneath is truly a sizeable and quality gas reservoir, or, considering the limited resolution of seismic and stacking response of CSEM technology, just thinly-bedded siltstones that wouldn't bring much excitement.

A discussion will be presented in this paper based on the Depth Migration result of CSEM method.

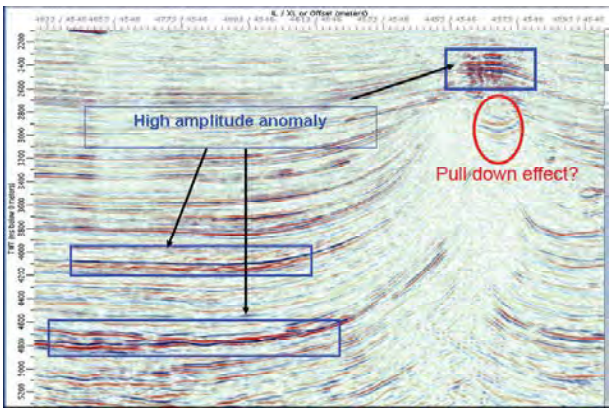

Figure 1: 3D seismic section showing high amplitude anomalies of Prospect B.

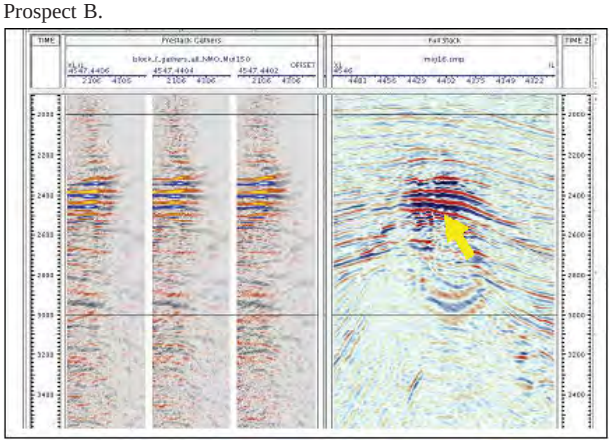

Figure 2: AVO analysis of Prospect B. Note that there's Class III AVO anomaly at the crest of the structure.

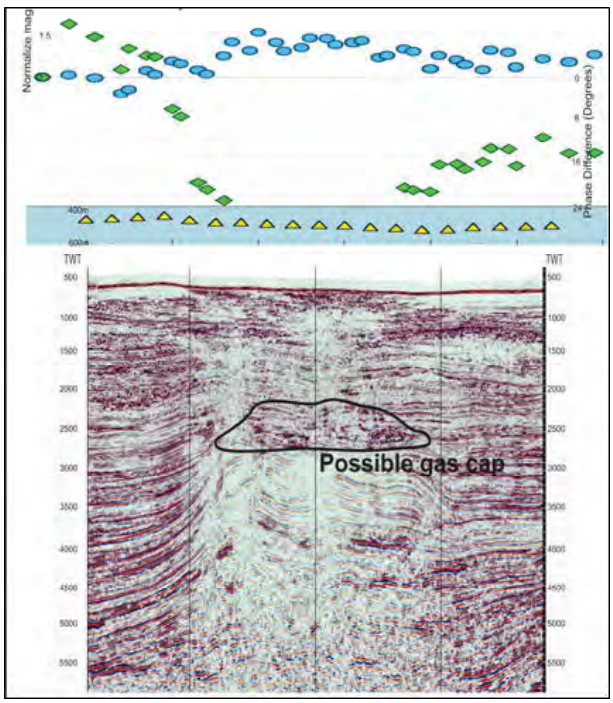

Figure 3: CSEM response of Prospect B. Intermediate offset refers to intermediate depth and the positive magnitude build-up (blue plots) are derived from the high amplitude anomaly seen in seismic.

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