

Please fill in the name of the event you are preparing this abstract for.	International Petroleum Technology Conference, 26-28 March 2019, Beijing, China	
Please fill in your 5-digit IPTC manuscript number and IPTC Control number.	IPTC-19337-MS 19IPTC-P-808-IPTC	
Please fill in your abstract title.	Abstract Title "Improved Seismic Imaging with Re-processing – A Case Study in SCS Deep Offshore"	
Please fill in your author name(s) and company affiliation.		
Given Name	Surname	Company
Mu	Guo	Total E&P Asia Pacific Pte. Ltd, Singapore
Yantao	Deng	Total E&P Asia Pacific Pte. Ltd, Singapore
Wenyong	Shi	Data Processing Co. Geophysical-China Oilfield Services Limited, Zhanjiang, Guangdong, China
Zhiwei	Dan	Data Processing Co. Geophysical-China Oilfield Services Limited, Zhanjiang, Guangdong, China
Mengxiong	Yang	CNOOC China Limited, Shenzhen Branch
Ching-Lung	Tien	CPC Corporation, Taiwan

## Abstract

### Objective/Scope

Re-processing of old seismic data can be cost and time effective for exploration companies. To ensure success of any re-processing projects, a team of experienced geophysicists is essential to guide the process of value creation from old seismic data. We publish the recent work of 2D pre-stack time migration for South China Sea and show how the quality improvement makes it a solid step in the value creation chain of exploration activities.

### Methods, Procedures, Process

There are 6 vintages of 2D seismic data ranging from 1979 to the most recent survey of 2009 with various source and streamer configurations. All of them have been processed prior to 2018 by various contractors. Lack of proper documentation of the past processing presented a real risk of failure for the re-processing undertaking in 2018.

Pre-stack time migration with an emphasis on the pre-processing to reduce sea floor induced multiple contamination, and other noise in the data has proven to be the right strategy in dealing with the old vintage data. The new sections, when contrasting with the legacy, brings much insight for understanding the regional tectonic setting and basin history of the study area.

### Results, Observations, Conclusions

Sea floor induced multiple elimination with the application of 2D SRME has changed interpretation for several lines. With a strong sea floor reflectivity, the amplitude of sea floor multiples that survived the legacy processing is stronger than real reflections in the legacy data (Figure 1).

Multiple of diffraction is another hazard in the area for some lines. A more specialized method is employed to remove them with good results (Figure 2).

Migration velocity analysis is a key step for 2D PSTM. Over and under migrated artifacts are noted on the legacy data, and some target areas are imaged with several iterations of velocity update, in order to properly image the structure (Figure 3).

Broadband processing is not used for the legacy processing. The 2018 re-processing aims to bring data of different vintages to the widest common bandwidth possible, without over-boosting the low and high ends of the spectrum. Receiver depth ranges from 7 to 14 m, with different receiver notch, source signature and bubble characteristics (Figure 4). At the post-migration stage, matching filters are designed to bring the oldest vintage prior to 1988 to close proximity of 1999 vintage for the spectrum shape.

### **Novel/Additive Information**

The added value from the re-processing could facilitate further seismic study with better resolution on a more focused target. The interpretation pitfalls using legacy seismic section need to be recognized. Interpreters gain insight from a better understanding of seismic imaging principles and these insights go a long way towards exploration success.