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4D Streamer-Streamer Processing in the Campos Basin: High quality results with fast delivery

Celso Moreira Neto (Petrobras), Marcella Rapini (PETROBRAS; Petróleo Brasileiro SA)

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Introduction

Is it still worthwhile conducting streamer-streamer seismic surveys for 4D?

The feasibility of monitor surveys using streamer technology for reservoir monitoring applications is a pertinent issue in the current geophysical context. Ocean Bottom Node (OBN) survey technology is considered the most effective for ensuring repeatability in data acquisition, as it allows for more stringent control over the positioning of receivers and minimizes the impact of surface obstacles. Despite the benefits of this strategy, the need to reduce operational costs in established fields still leads to the execution of streamer-type monitor surveys, even when aware of the risks associated with decreased repeatability due to cable drift and operational issues such as interference from platforms and rigs. This study aims to demonstrate that, with the advancement of seismic processing algorithms and aligned with a solid methodology and workflow, it is feasible to continue using streamer surveys for 4D data acquisition in post-salt fields of the Campos Basin, with processed data deliveries a few weeks after the completion of the monitor acquisition.

Method

This work is based on the implementation of enhanced ghost attenuation and noise attenuation algorithms, combined with effective pre-processing that facilitates the 4D matching stages. These advancements aim to increase the similarity of traces in the overburden layer and highlight the time-lapse 4D effects in the reservoir. The results of the 4D streamer-streamer processing proved promising for the study of fluid displacement, evidenced by the comparison between monitor and base data. Additionally, the processing flow was optimized to enable the delivery of processed data to the production Asset 4 weeks after the completion of the monitor acquisition.

Results and Conclusions

The 4D streamer-streamer processing was applied to the seismic surveys of the Barracuda and Caratinga fields, using data acquired in 2010 (base) and 2024 (monitor). The results demonstrated that it is possible to achieve processing with a good signal-to-noise ratio, which, combined with a satisfactory 4D seismic response, resulted in NRMS (Normalized Root Mean Square) values in the range of 6%. This study reinforces the feasibility of 4D streamer-streamer projects for monitoring post-salt reservoirs in the Campos Basin, even in challenging scenarios.