AVO analysis of a shallow reverse polarity in Sydney Basin
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A vast shallow reverse polarity which is extended across the PEP11 block in offshore Sydney basin and the lack of any wells in the area has wondered the interpreters about the mechanisms which has caused such a seismic signature in the area. This study aims to characterize this reverse polarity using the AVO analysis and pre stack inversion techniques in a pilot study. Baleen 2004 2-D towed streamer data are the only recent seismic data acquired in PEP11 block. Shallow depth water has left significant amount of multiple energy in shot records. The presence of a very high velocity sequence of layers which terminate at the shore line cause a strong ray bending letting small amount of the energy penetrate to deeper parts. The reverse polarity reflector is part of a sequence of progradational sediments which are accommodated at the top of the high velocity layer.

To characterize the reverse polarity, we have processed 1 second TWT of two perpendicular lines by preserving the relative amplitude up to pre stack time migration. Assuming clastic environment, AVO analysis of the reverse polarity over the lines shows different signatures across a steep normal fault. The shallow parts at the up-thrown part of the fault indicate the wet trend despite different reflectivity strength across the line. However, the deeper parts correspond to down-thrown shows the AVO class III. Pre-stack inversion confirms low impedance in areas with class III and higher impedance in areas which show the wet trend.