in strategic manner. The presence of ghosts & multiples creates strong fictitious layers that are very much ambiguous in demarcation of the major velocity contrast boundaries as shown in Figure 1. The conventional processing on conventional data is unable to handle the complex nature of ghosting and demultiple that results in poor imaging below basalt (Figure 2).

The deghosting and various demultiple steps in multiple domains with model based and moveout based subtraction in the conventional dataset have brought out the sub-basalt events (Figure 3 through 6). In addition, recently developed modelling and subtraction of interbed multiple partly attenuate the multiples below basalt that increases the visibility of sub-basalt structures (Figure 7). The final stack after new processing technologies on old dataset capable of delineating the base basalt as well as structural framework below basalt (Figure 8). The old dataset have proven the capability of exploring beneath the basalt with the advanced velocity model building & imaging techniques (Figure 9 & 10). The FWI for model update in the shallow able to incorporate the high frequency information and also stabilizes the model for depth migration. The RTM output better preserves the steep dipping events, images faults in better way, enhances the signal strength thereby providing an improved picture of the structural part below basalt.

The event standout, the dipping events below trap bottom are better in PSTM image of new data with new technology than the earlier processed old data PSDM image in time domain (Figure 15). The FWI, tomography, HRHD velocity analysis on new data set have shown improved velocity field around anomalous velocity zones that suggest the presence of gas in the wells (Figure 16). In addition to that, the areal extent of the low velocity anomaly is better demarcated in the velocity volume. The RTM method efficiently image the steeping dipping events and preserves the fault planes in better way than the PSDM & PSTM image(Figure 17). The strength of the fault pattern and the continuity in coherence cube slice within the trap are quite comparable in all the outputs (Figure 18). However, the detailed of the fault pattern is better revealed in RTM image.

Conclusions

The conventional processing technology might be obsolete in applications to the complex sub-surface regime of volcanic basins where the objectives are focused within and below trap. In contrast, the new processing technologies with old data are able to explore the sub-basalt feature to an extent. But, the new broadband data with new technology has more potential to image the low frequency events below basalt. In addition, the images in the tertiary sequences (above basalt) have gained good interpretability in terms of S/N and resolution.

However, the limited offset and the narrow azimuth nature of the broadband streamer data itself limit the application of processing technologies like FWI, AVAZ analyses of the deeper zones of sub-basalt which are the prime exploration targets. Again, the narrow azimuth data is unable to delineate the detailing of structural complexity and their variable dipping nature, the abrupt lithological contrast, the presence of extrusive like dykes, sills below basalt.

The views expressed in this paper are exclusively of the authors and need not necessarily match with official views of ONGC.

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