Reprocessing 3C-3D seismic data from Manitou Lake, Saskatchewan

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ABSTRACT

Last year, we presented a paper called "Searching for sand reservoirs: Processing 3C-3D seismic data from Manitou Lake." It was found that the *PP-PS* results were not promising. We revisited this 3C-3D data set, and found that the geometry of the vertical and radial components did not match. The vertical and radial component data have been reprocessed, and significantly better results have been obtained for the radial component volume.

INTRODUCTION

The vertical and radial component Manitou Lake data have been reprocessed after correcting some geometry issues (Hall et al., 2007), and improved results have been obtained for the radial volume. Figure 1 shows a base map for this survey (from Lu et al., 2006). All processing followed the flows presented by Lu and Margrave (1998) and Lu and Hall (2003), and is identical to that of last year, with the exception of: 1) geometry, and 2) efforts that were previously made to find reflections in the radial component volume, such as restricting traces used for stacking based on source-receiver offset and trace mixing.

Results

Figure 2 shows the CDP and ACP fold maps resulting from the new geometry with the same binning grid. We would expect these maps to be the same as previously shown, but there are some differences. Notably, the crossline CDP fold is more continuous in the northern part of the map (cf. Figure 3a; Lu et al., 2006).

The final migrated results for inline 86 and crossline 91 are shown in Figures 3 and 4. The vertical component results are similar to last year, but there is a noticeable improvement in the radial component data. The receiver stack used to generate hand statics was more trustworthy than previously (Hall et al., 2007). The result is that the radial component migrated sections have reflections that are more laterally continuous, have more consistent amplitudes and a higher frequency content than our previous results.

Figure 5 shows the western end of inlines 111 (vertical component; Figure 12a; Lu et al. 2006) and 109 (radial component; Figure 12b; Lu et al., 2006) with the synthetic seismograms from last year overlain. Note that crosslines 95-160 have been renumbered 1-65 in this report.

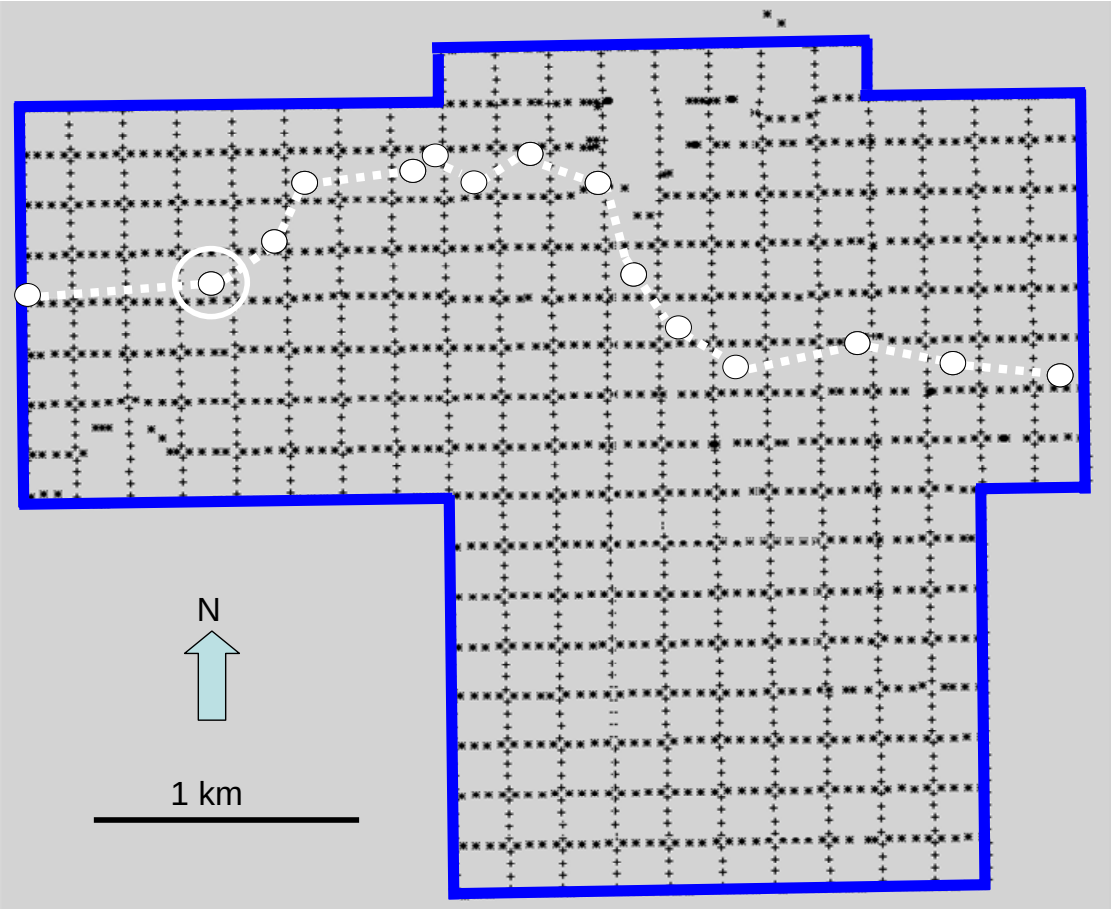


FIG. 1. Manitou Lake base map. Receiver lines are north-south, source lines are east-west. Dashed line and circles (white) show wells that follow a Colony sand member channel. The circled well location is 11-17 (From Lu et al., 2006).

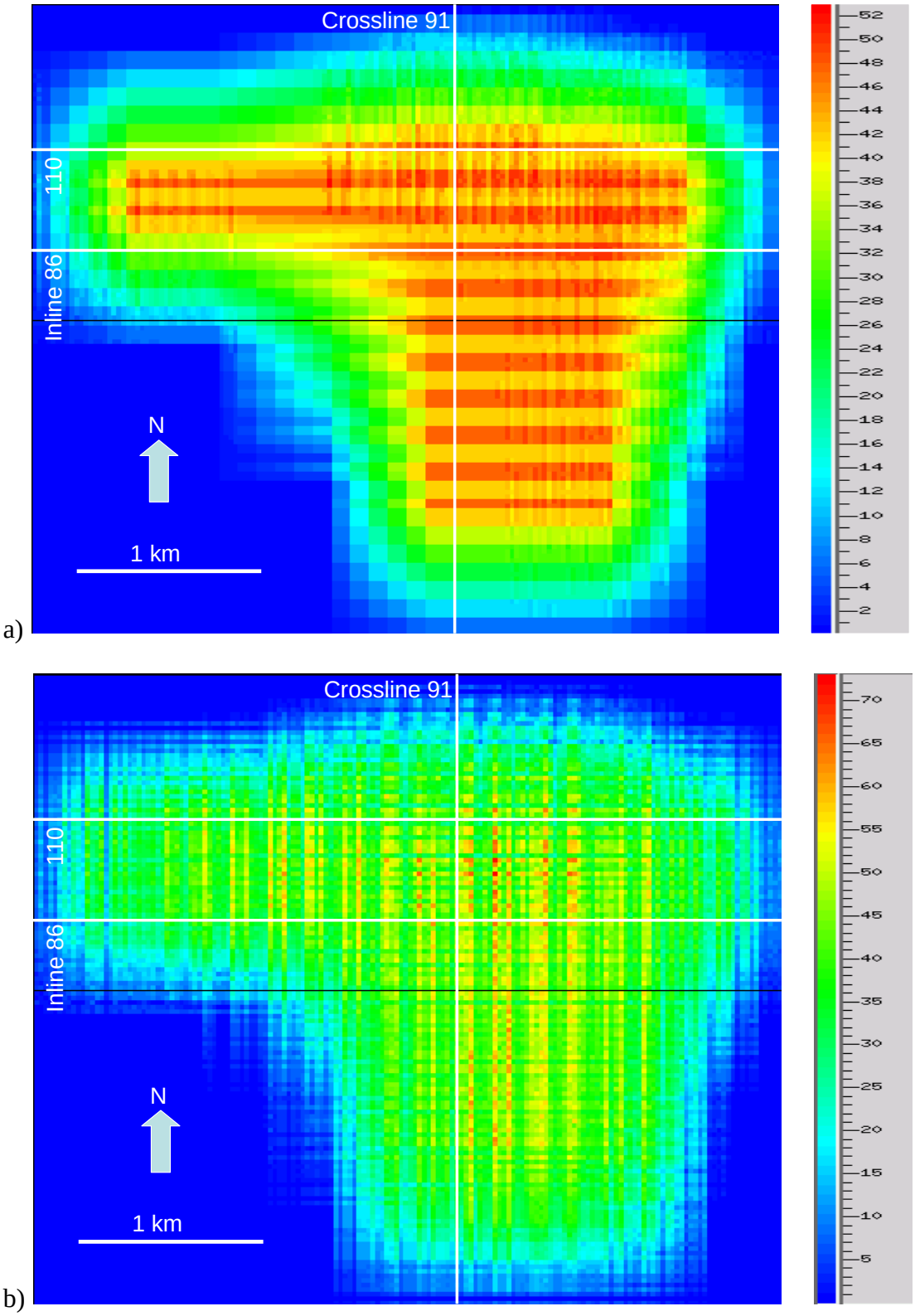


FIG. 2. CDP fold (a) and ACP fold (b) assuming V_P/V_S=2.3 for a 50x50m bin size (cf. Figure 3, Lu et al., 2006). Inline 86 and crossline 91 are shown in Figure 4. Inlines 109 and 111 are shown in Figure 5.

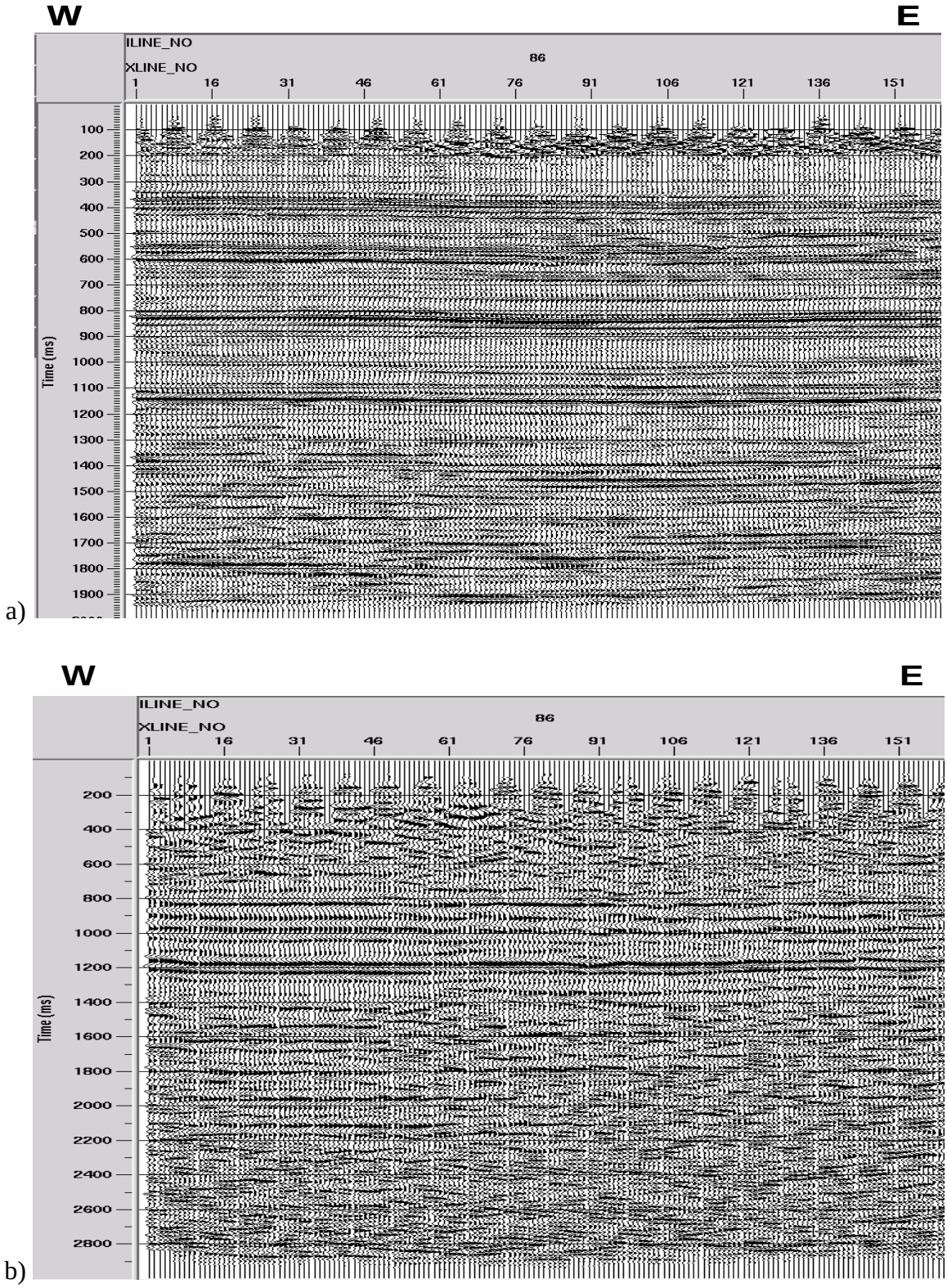
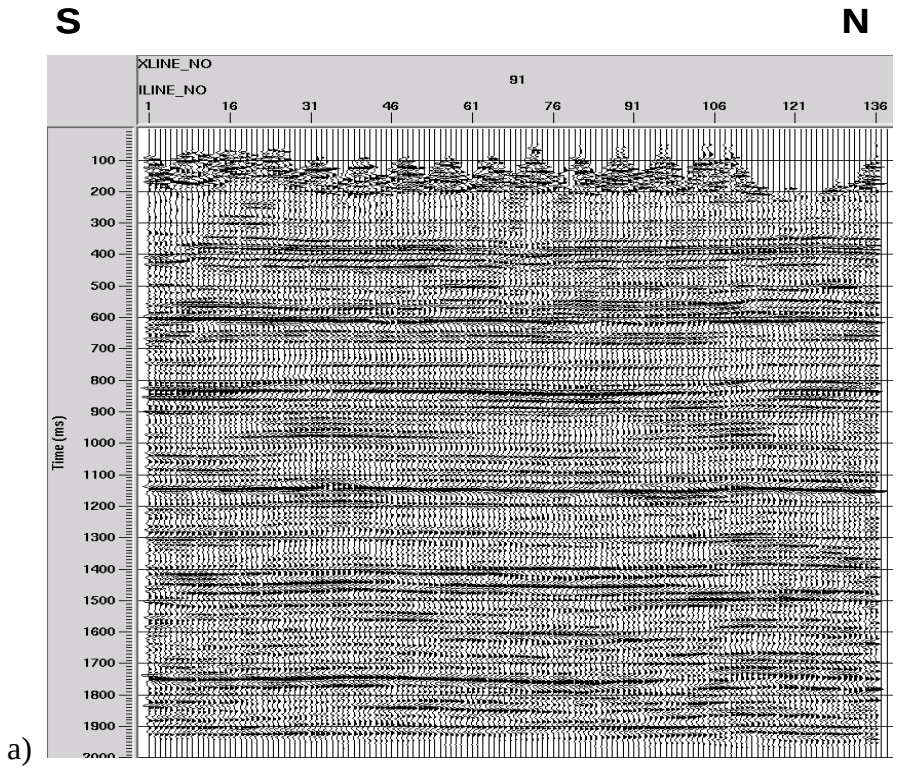
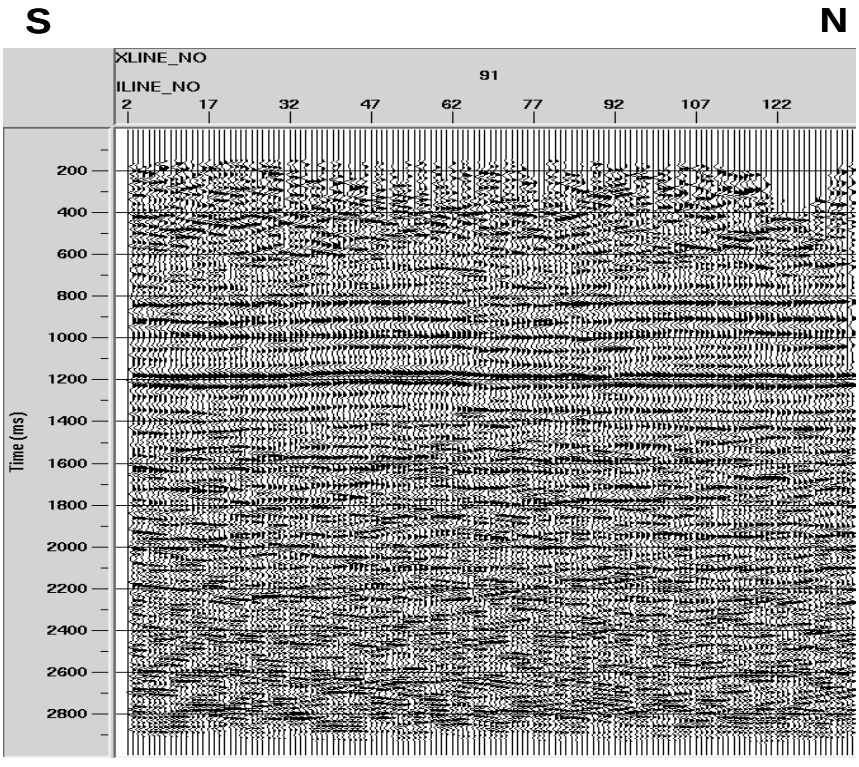


FIG. 3. Vertical component (a) and radial component (b) migrated inline 86.



a)



b)

FIG. 4. Vertical component (a) and radial component (b) migrated crossline 91.

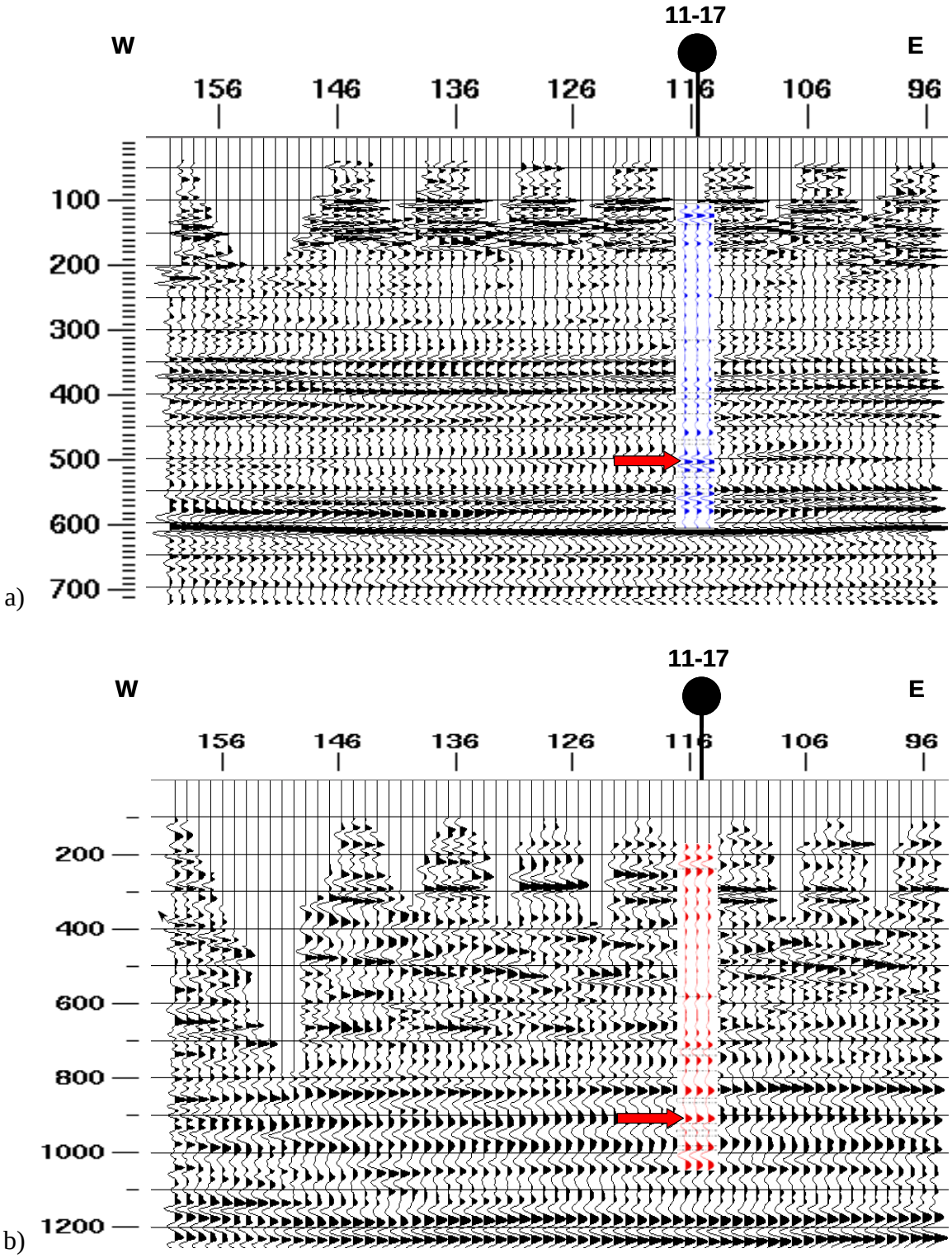


FIG. 5. Vertical (a; inline 111) and radial component (b; inline 109) results. Red arrow shows top of Colony sand member (cf. Figure 12; Lu et al., 2006).

DISCUSSION

A new interpretion and inversion of these vertical and radial component volumes, including horizon amplitude slices, can be found in Varga et al. (2007).

ACKNOWLEDGEMENTS

We would like to thank Calroc Energy Inc. for providing this dataset to CREWES, Landmark Graphics Corporation and Hampson-Russell for the use of donated software (ProMAX and GLI3D respectively). We would also like to thank all CREWES sponsors and NSERC for funding.

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