

On S-waves generated by conventional sources: a numerical experiment

Saul E. Guevara and Gary F. Margrave

ABSTRACT

Field experiments and theoretical studies have shown that S-waves can be generated by conventional sources of energy, such as vibrators or explosives. However they are rarely identified in conventional surface seismic data. A synthetic model experiment illustrates these events as well as the possibility of generating an image using PreSTM applied to SS reflections. The relation with real data is also considered.

Fig. 1 illustrates the geological model and Fig. 2 shows the horizontal component record of a synthetic shot, obtained with a 2-D elastic FD algorithm. Fig. 3 shows the PreSTM section for SS waves, using the Kirchhoff algorithm.

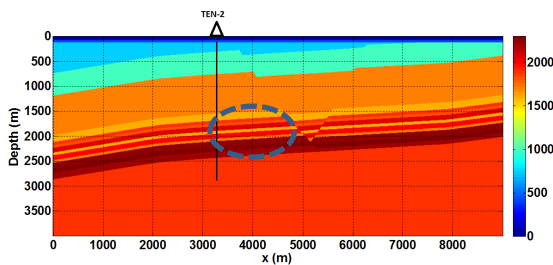


FIG. 1. Geological model used to generate the synthetic data.

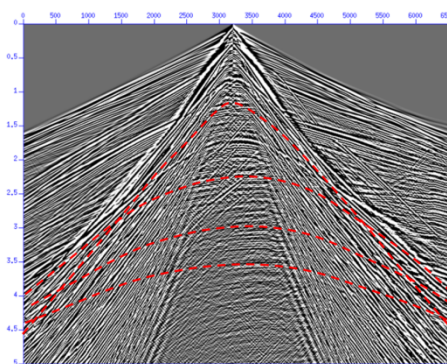


FIG. 2. A shot gather, horizontal component. The dashed red lines correspond to the calculated arrival time of SS waves, according to the geological model.

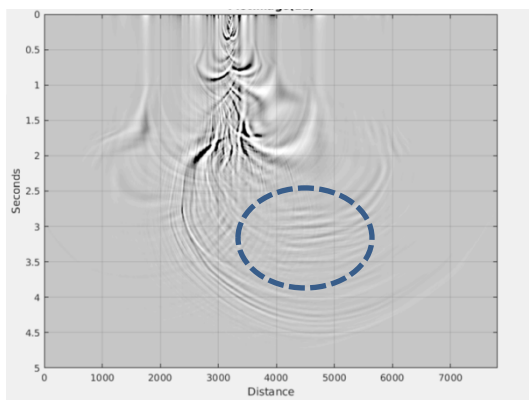


FIG. 3. PreSTM of the shot gather in Fig. 2. The events inside the dashed blue circle correspond to the expected arrival time from SS reflections from the interfaces in the blue dashed circle of Fig. 1. Notice the artifacts at earlier times, which can be caused by SS and other reflections (e.g. PS) and by surface waves.