

ABSTRACT

METHODS AND SYSTEMS FOR IMAGING SUBTERRANEAN FORMATIONS WITH PRIMARY AND MULTIPLE REFLECTIONS

Systems and methods for imaging subterranean formations using primary and multiple reflections are described. An exploration-seismology vessel tows a seismic source, a receiver acquisition surface located beneath a free surface, and a source acquisition surface positioned at a depth below the source. The receiver acquisition surface is used to measure pressure and normal velocity wavefields and the source acquisition surface is used to measure direct, down-going, source pressure wavefields generated by the source. The down-going source pressure wavefields in combination with the down-going pressure wavefields and up-going pressure wavefields computed from the pressure and velocity wavefields are used to compute images of the subterranean formation associated with primary reflections and multiple reflections.

FIG. 4B