

SUMMARY

[0010] According to an aspect of the present invention~~exemplary embodiment~~, a method, stored in a memory and executing on a processor, for generating an ~~optimized~~ receiver-based ghost filter from recorded data comprises generating mirror data, from the recorded data, ~~during a premigration stage~~; transforming the recorded data and the mirror data from a time-space domain to a frequency-space domain; adding a phase coefficient for correcting timing differences between transformed recorded data and transformed mirror data; generating an initial ghost filter by jointly inverting the transformed recorded data and the transformed mirror data ~~with a least squares technique~~; and generating the optimized ghost filter by iterating through the transformed recorded data and minimizing a ghost delay time based on a difference between a ghost filter associated with a previous iteration and a ghost filter associated with a current iteration ~~wherein the previous iteration and the current iteration are sequential~~.

[0011] According to another aspect of the present invention~~exemplary embodiment~~, a node for generating ghost-free receiver-based seismic data comprises recorded seismic data; one or more processors configured to execute computer instructions and a memory configured to store the computer instructions wherein the computer instructions further comprises a mirror data component for generating mirror data of the recorded data; an engine component for transforming the recorded data and the mirror data from a space-time domain to a frequency-time domain and for adding a phase coefficient to correct for time differences between transformed recorded data and transformed mirror data; a ghost filter component for generating an ~~optimized~~ ghost filter based on predicting an initial ghost filter and calculating a final~~optimizing the initial~~ ghost filter based on minimizing a ghost filter delay time associated with the transformed

recorded data; and an output component for applying the ~~final~~ optimized ghost filter to the transformed recorded data and outputting the ghost-free receiver-based seismic data.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate one or more embodiments and, together with the description, explain these embodiments. In the drawings:

[0013] Figures 1 and 2 show various aspects of an exemplary marine seismic survey system in which various optimized receiver based ghost filter generation embodiments can be implemented;

[0014] Figure 3 shows various aspects of recorded, mirror and deghosted data;

[0015] Figure 4 shows various aspects of time shifted recorded, mirror and deghosted data;

[0016] Figure 5 shows various aspects of stacked reverse time migration for recorded, mirror and deghosted data;

[0017] Figure 6 shows various aspects of an outer cable gather for recorded, mirror and deghosted data;

[0018] Figure 7 shows various aspects of stacked 3D PSDM images for recorded and deghosted data;

[0019] Figure 8 shows various aspects of 0-5 Hz images and 1600 meter depth slices for recorded and deghosted data;