sound wave, acoustic wave) signal that travels downward through the Earth, is reflected, and, upon its return, is recorded using one or more seismic receivers disposed on or above the subsurface region of the Earth. The seismic data recorded by the seismic receivers may then be used to create an image or profile of the corresponding subsurface region.

[0005] Over time, as hydrocarbons are extracted from the subsurface region of the Earth, the location, saturation, and other characteristics of the hydrocarbon reservoir within the subsurface region may change. As such, it may be useful to determine how the image or map of the subsurface region changes over time, such that the operations related to extracting the hydrocarbons may be modified to more efficiently extract the hydrocarbons from the subsurface region of the Earth.

SUMMARY

[0006] A summary of certain embodiments disclosed herein is set forth below. It should be understood that these aspects are presented merely to provide the reader with a brief summary of these certain embodiments and that these aspects are not intended to limit the scope of this disclosure. Indeed, this disclosure may encompass a variety of aspects that may not be set forth below.

[0006a] According to a first aspect of the present disclosure, there is provided a method of seismic exploration above a region of subsurface containing structural or stratigraphic features conducive to determining a presence, migration, or accumulation of hydrocarbons, the method including: accessing at least a portion of a seismic source survey, wherein the seismic source survey corresponds to a seismic source excitation, wherein the seismic source excitation is produced by a seismic source, and wherein the at least a portion of a seismic source survey comprises data corresponding to at least one time before a time of the seismic source excitation; separating a coherent signal from the at least a portion of a seismic source survey via a combing and deblending operation, wherein the combing and deblending operation

is an iterative operation configured to predict at least a portion of weak-coherence signals caused by the seismic source excitation, and wherein the combing and deblending operation is based at least in part on a gather comprising the at least a portion of a seismic source survey corresponding to the at least one time before a time of the seismic source excitation; recovering at least a portion of leaked or misallocated signals via an attenuation of noise at least in part by allocating the noise to a time before the time of the seismic source excitation, wherein the leaked or misallocated signals are caused by a separation of primary signals; and producing a receiver gather based on the separating and the coherent signal, wherein the receiver gather is a recording of multiple source excitations on a receiver,

[0006b] According to a second aspect of the present disclosure, there is provided a tangible, non-transitory, machine-readable media, including instructions configured to cause a processor to: determine a residual associated with input seismic data received from a seismic source, wherein the residual is indicative of a difference between expected input seismic data and the input seismic data, and wherein the input seismic data is configured to be combed with an expanded window such that the expanded window comprises data generated by an earlier seismic source excitation and received before a time of a seismic source excitation that generated an input seismic trace corresponding to the input seismic data; determine a deblended output based at least in part on the residual; update the deblended output based at least in part on a result from performing one or more recovery operations configured to recover coherent signals from non-coherent signals of the deblended output, wherein the coherent signals comprise a matching parameter; filter the deblended output to remove a portion of the deblended output that is before the time of the seismic source excitation or before a predicted earliest arrival time of a seismic wave travelling from the seismic source to a receiver, to generate an improved deblended output comprising less noise than the deblended output; and transmit the filtered deblended output for use in generating a seismic image, wherein the seismic image represents hydrocarbons in a subsurface region of Earth or subsurface drilling hazards.

[0006c] According to a third aspect of the present disclosure, there is provided a device, including: a first processor configured to: determine a residual associated with input seismic data received from a seismic source, wherein the residual is indicative of a difference between expected input seismic data and the input seismic data, wherein the input seismic data is configured to be combed with expanded windows such that the expanded windows comprise data generated by an earlier seismic source excitation and received before a time of a seismic source excitation that generated an input seismic trace corresponding to the input seismic data; update a value of the residual based at least in part on a separation operation that separates coherent signals from noise signals in an output associated with the residual determined to be remaining energy for separation or a sum of the residual and a primary signal estimate; extract non-coherent or weak-coherent energy from the coherent signals; in response to satisfying an end condition, determine a deblended output comprising the coherent signals; filter the deblended output to remove a portion of the deblended output that is before the time of the seismic source excitation or before a predicted earliest arrival time of a seismic wave travelling from the seismic source to a receiver, to generate a filtered deblended output comprising less noise than the deblended output; and transmit the filtered deblended output for use in generating a seismic image, wherein the seismic image represents hydrocarbons in a subsurface region of Earth or subsurface drilling hazards.

[0007] Seismic acquisition utilizing sources and seismic receivers may be useful in the generation of, for example, seismic images. Seismic images may be used, for example, in the determination of hydrocarbon deposits (e.g., areas within a subsurface that contain hydrocarbons) and/or subsurface drilling hazards. Seismic images are generally produced based on seismic waveforms produced by a source that reflect off regions within a subsurface and are received by seismic receivers. The seismic image may be constructed using a high resolution seismic velocity model, such as a full