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(54) **Title:** METHODS AND APPARATUS FOR ESTIMATING SEISMIC DEPTH UNCERTAINTY

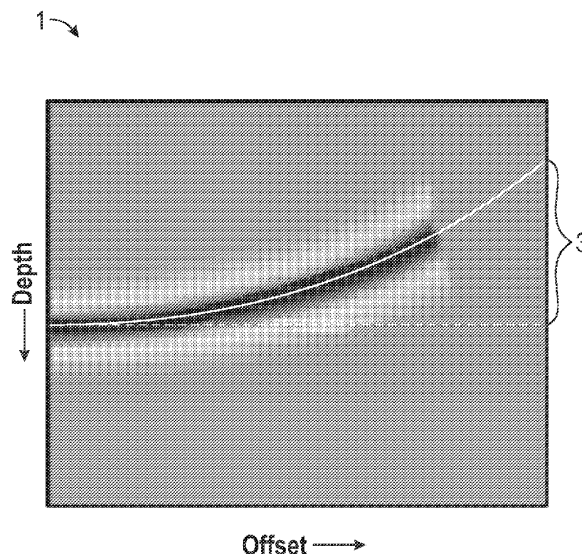


FIG. 1

(57) **Abstract:** A method for estimating uncertainty in seismic-derived depth prognoses of a subsurface region includes receiving an initial velocity model of a subsurface region based on seismic data associated with the subsurface region, performing a seismic de-migration on initial post-migration seismic data obtained from the initial velocity model to obtain pre-migration seismic data, and perturbing one or more of the components of the initial velocity model to produce a plurality of perturbed velocity models that are each different from the initial velocity model. The method further includes performing a seismic migration of the pre-migration seismic data using the perturbed velocity model to obtain perturbed post-migration seismic data for each of the plurality of perturbed velocity models, estimating a depth error from a depth prognosis obtained from a selected subset of the perturbed velocity models based on characteristics of the perturbed post-migration seismic data, and estimating a depth uncertainty from the estimated depth error.

[Continued on next page]

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