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Another approach to Kirchhoff Prestack Depth Migration

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Depth migration schemes are key tools in subsurface seismic imaging. Kirchhoff Prestack Depth Migration is one of the most widely used imaging schemes. Nevertheless, it is known that the quality of the depth images is strongly dependent in the aperture. Kirchhoff algorithm would produce better images if the area of the model that contributes to a reflection event was known. In two dimensions an estimate of the approximate location of the reflection points can be determined from the data by the tau-p transform. We present a revised Kirchhoff depth migration algorithm (PSDM) in which the obliquity factors are calculated from the semblance of the tau-p transform. The tau-p provides the plane wave decomposition of the seismic wave-field revealing information of the direction from which the reflected energy is coming to the receiver array. A simple synthetic seismic data set simulating a dense deep seismic reflection experiment is calculated to test this PSDM algorithm. The main features included in the simple velocity model that consist of vertical and steeply dipping structures. Different approaches, including different initial velocity models, are used to verify all the possibilities of this PSDM algorithm. The resulting seismic image clearly differentiated the subvertical structures in the velocity models that enables this new approach for a future applications to field seismic data sets. This scheme can be also used to migrate dense wide-angle seismic records.