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论文

地表旋转控制照明叠前深度偏移

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摘要： 基于炮集数据的常规叠前深度偏移波场外推的计算量非常大，控制照明叠前深度偏移是基于快速的组合炮技术，通过在目的层上控制震源波场，高效实现对地质目标的高质量成像. 组合炮所需的合成算子，由在目的层定义的震源波场反向外推到地表建立. 本文提出一种更快速的地表旋转控制照明方法，直接在地表对震源波场进行面向目标的照明控制，实现目标区域高质量成像. 该方法只需对某一核合成算子进行简单的几何旋转建立合成算子函数，避免了复杂的波场外推. 这种新的控制照明方法与快速的一般组合炮偏移效率相同，但对复杂目标区域的成像能力显著增强. 应用本文方法对Marmousi模型进行计算，得到深层复杂构造非常理想的成像结果.

关键词： 控制照明 组合炮 合成算子 震源波场

Prestack depth migration by surface rotation controlled illumination

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Abstract: The conventional shot record prestack depth migration costs a very expensive amount of computations for wavefield extrapolations. Based on the fast areal shot technology, the controlled illumination prestack depth migration aims to efficiently achieve the high quality image of the target structure by controlling the source wavefield at the target. The synthesis operators needed for areal short records are obtained by inversely extrapolating the predefined source wavefield at the target upward to the surface. We propose the surface rotation controlled illumination, as a more efficient scheme of controlled illumination. This scheme performs target oriented illumination control over source wavefield directly at the surface and can produce high quality image of the target zones. A surface synthesis operator function is simply constructed by geometrically rotating a certain kernel synthesis operator, instead of complicated wave extrapolations. This new controlled illumination method is as efficient as the general areal shot record technology, moreover, it is more powerful to image the complicated target zone. The application of the proposed technique to the Marmousi model gives a very ideal image of the deep complex structure.

Keywords: Areal shot record Controlled illumination Synthesis operator Source wavefield.

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