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二维菲涅耳带共反射面元叠加方法研究

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摘要 大量研究证明CRS叠加能提高地震勘探的信噪比，但是能否提高分辨率的关键在于如何确定CRS叠加孔径.本文详细探讨了地震波反射过程中菲涅耳带的特征，认为起伏地形下菲涅耳带可以采用椭圆予以近似，在此基础上提出了一种通过菲涅耳带来确定CRS叠加孔径的方法，并应用于泌阳凹陷陡坡带的地震剖面.结果表明，由于菲涅耳带确定的叠加范围使地震信号的能量达到最佳，相对于CMP叠加，菲涅耳带CRS叠加同时提高了地震资料的信噪比和分辨率，特别显示了中深部较弱的地震信息，而常规的CRS叠加则只在于提高资料的信噪比和改善浅部的地震信息.

关键词 菲涅耳带 CRS叠加 叠加孔径 分辨率 泌阳凹陷
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Two dimensional common reflection surface stack based on the Fresnel zone

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Abstract The Common Reflection Surface (CRS) stack can improve signal-to-noise ratio of seismic exploration. However, the key issue to improve the resolution is how to set CRS stack aperture. In this paper, we discuss the characteristics of Fresnel zone during the reflection of seismic waves and suggest that the Fresnel zone at the condition of undulate layers can be approximated with ellipses. Then we bring forward a method to determine the aperture size of CRS stack based on Fresnel zone and use it to deal with seismic profile of the steep slope of Miyang Depression. The results show that Fresnel zone based CRS stack improves both the signal-to-noise ratio and resolution because the stacking scope determined by Fresnel zone maximizes the energy of seismic signals. Particularly, weak seismic information in deep zone is preserved and displayed, while the normal CRS stack can only improve the signal-to-noise ratio and the shallow seismic information.

Key words Fresnel zone; CRS stack; Stacking aperture; Resolution; Miyang depression

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