

Multiple suppression in the t - x - p domain

Ghosh, S.¹, Fomel, S.¹

ashaunakrateds@gmail.com

1. Jackson School of Geosciences, The University of Texas at Austin, Austin, TX

Over the years many attempts have been made with varying degrees of success to attenuate multiple reflections. Multiples are conventionally suppressed using information on their periodicity or velocity discrimination. Some of the popular methods to suppress multiples involves using the Radon transform. However, some of the Radon transform methods face challenges when the water column is shallow and there is little difference in velocity between multiples and corresponding primaries. In addition, an invertible hyperbolic Radon transform can be computationally expensive.

We propose a novel approach for suppression of multiples using the t - x - p domain, where p is the local slope of seismic events, and discuss the merits and demerits of this approach. We take CMP gathers and transform them from the original t - x space to the extended t - x - p space. We pick the velocities for primary reflections and form filters as functions that go to unity for primaries and zero for multiples. Multiplying the gather in the extended space by such filters and stacking along the p axis produces a gather with multiples suppressed. Synthetic and real data examples demonstrate the potential of the proposed approach.

Keywords: multiples, radon transform, CMP gathers, velocity, periodicity, t - x - p , filters, synthetic, real