From Wiggins' MED to Compressive Sensing: Sparsity in Seismic Data Processing

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The field of compressive sensing has revitalized interest in the development of methods that use sparse representation models for seismic data processing. However, it should be noted that sparsity-driven methods for seismic signal processing are not new to geophysicists.

I would like to use this opportunity to discuss early ideas of sparse signal representation for blind deconvolution (MED), velocity analysis, high-resolution Radon transforms, and Fourier synthesis for wavefield reconstruction. I will also discuss their connection to new developments arising under the field of compressive sensing, paying particular attention to the conceptual simplicity of these methods, assumptions and proven industry-strength results rather than to algorithmic considerations.