

**SEG Workshop: W-18 New Advances in Migration**  
**ISS direct depth imaging without knowing or needing a velocity model or other**  
**subsurface information:**  
**Recent advances and the road ahead**

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October 2, 2014

The inverse scattering series (ISS) communicates that all processing objectives can be achieved directly, and without subsurface information.

Below please find a list of seismic processing tasks that have distinct isolated task ISS subseries (each of these task specific subseries of the ISS have the same ISS starting point, and the same mathematical physics logic in their derivations), and can directly achieve their seismic processing objective without subsurface information:

- (1) free surface multiple elimination
- (2) internal multiple attenuation, and elimination
- (3) **depth imaging**
- (4) non-linear direct AVO
- (5) direct Q compensation without knowing or needing Q

In this presentation, we will review the evolution of this unique promise and will focus on **depth imaging** capability, exemplified with synthetic and field data examples. The confluence of: (1) advances in more capable and complete seismic acquisition, (2) faster computers and (3) the industry trend to more complex and ill-defined subsurface geology, for offshore and on-shore conventional and unconventional plays, can, under those circumstances, make the ISS methodology the appropriate choice within our seismic processing toolbox. Open issues and plans will be discussed.

## 1 References

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