Seismic Simultaneous Sources in Land: Challenges & Opportunities

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In 2010 Saudi Aramco conducted a series of seismic simultaneous sources acquisition tests employing a fixed receiver super-spread. A fleet of 18 vibrators was employed and constrained to operate in isolation mode in 3 x 6 sectors, where each sector was 1.8km x 1.8km. Using this configuration more than 44,000 VPs were acquired in 24 hours. Processing of this optimally designed seismic blended dataset without applying any deblending algorithm produces satisfactory results. To improve the prestack analysis such as first break picking, noise removal and velocity analysis, deblending methodologies and workflows were also applied.

In this paper, we present processing results related to land simultaneous sources acquisition. Novel deblending schemes will be shown along with their effectiveness in a production environment. Statics, surface consistency, noise attenuation and velocity estimation are seen as the main challenges for the processing of land blended data. Current processing schemes rely mostly on deblending so that conventional workflows can be subsequently employed for data analysis. Full blended data processing in land is still an open issue. Current practice dictates that we have to have well in advance near-surface and velocity macromodels in order to proceed. Migration will do the rest. The real question therefore is:

- a) Do we develop tools to fully process blended data? or
- b) Do we develop effective deblending algorithms & proceed in a conventional manner?

We all know the answer...it can be found in the middle!!!

Of course everything starts with acquisition...do we play the game safe and acquire optimally distance-separated data or go wild and acquire data in a random fashion? Processing now becomes the key. In short, seismic acquisition and processing must be considered simultaneously!!