

Climbing the Never Ending Road of Seismic Densities

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ABSTRACT

It is well known by all geophysicists and geologists that the main obstacle to reach a reliable seismic data set for Quantitative interpretation is the near surface and all its negative impacts on seismic data.

The solution is to acquire Ultra dense data sets, with a broadband seismic bandwidth in a cost effective way. There has been a continuous increase of seismic density in the recent years so far nobody has claimed that “enough is enough” and data quality improve with seismic density.

Given a seismic density there are many ways to reach this value with variation of the source density and the receiver density, from equal values to really unbalanced ratio up to 20 times. If one does not want to increase the number of channels on seismic crews, the alternative is to increase the source density.

The best set-up needs to be found which will offer the highest productivity and the lowest Operating expenses. In some cases distributed designs will be the most effective and in other case the nodal designs will be the most interesting.

Some innovative technologies will have a great weight on driving down the cost while keeping ultra-high seismic densities. One of them is using blended sources instead of Distance Separated Slip Sweep or Distance Separated Simultaneous Sweeps. Also Source automation (full or partial) and receiver lay-out mechanization are important tools to keep acquisition costs under control. Whatever the designs used, these seismic crews will have a lot of challenges to handle, such as monitoring surveys and manage resources. A new operational model based on Command and Control needs to be implemented to manage such Mega-crews.

In conclusion very high surface seismic density data may be acquired with new technologies over a broad seismic bandwidth. One of them is to use blended sources (unconstrained vibrators) to alleviate the cost of using many seismic channels.