Abstract

**Objectives/Scope:** We acquired the first 3D pilot program onshore Abu Dhabi using blended acquisition with independent simultaneous sourcing and dispersed source array, namely ISS and DSA, to prove these concepts in a 3D manner. In this paper, we introduce this pilot program and the resulting acquisition productivity.

**Methods, Procedures, Process:** For ISS and DSA, a swarm of sources is independently, simultaneously and flexibly operational in a decentralized manner with no attempt to synchronize their sourcing activities. In addition, for DSA, the swarm consists of different narrow-frequency-banded sources instead of identical broad-frequency-band ones. The frequency-banded sources can be non-uniformly distributed, and emit spectrally banded, distinguishable, thus deblendable wavefields. We acquired a 3-D pilot program with ISS and DSA, i.e. two surveys in the same pilot area, after a 3-D production survey with managed spread and source (MSS) in which the sources fire based on a conventional time-distance rule.

**Results, Observations, Conclusions:** The pilot area is 9600 m by 7200 m in the source spread, containing about 28000 shot points. For ISS, the number of sources is 24. Each source covers a shot-point spread of 4800 m by 600 m, where a single broad-frequency-band source fires at every shot point in its independent sourcing area (ISA). The sweep length is 18 s. Besides, for DSA, the number of sources is 24 for eight fleets, i.e. three frequency-banded sources per fleet. Each fleet covers a shot-point spread of 4800 m by 1800 m, where multiple frequency-banded sources independently fire at every shot point in its ISA. The sweep length is about 6 s each. We analyzed the acquisition productivity, each for the ISS and DSA surveys, compared to an MSS survey supposed for the pilot area as the benchmark. The results show that: these methods significantly enhance the productivity compared to the benchmark. This is mainly because of: increasing the number of sources while decreasing the independent sourcing area for ISS; decreasing the sweep length by a factor of the number of frequency bands for DSA. This higher productivity can lead to shorter survey time, lower survey cost and less greenhouse-gas (GHG) emission.

**Novel/Additive Information:** It should be noted that some concepts of spatial sampling could further enhance the acquisition productivity: non-uniform sampling introduced from compressive sensing; multi-scale sampling introduced from DSA in which frequency-banded sources are distributed based on its own Nyquist criterion. In the coming processing, we will apply decimation to mimic ISS and DSA with non-uniform sampling and multi-scale sampling, followed by deblended-data reconstruction, thereby to validate these concepts.