

## Combining DAS and air-gun: a cost-effective medium change monitoring system

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The large-volume air-gun systems have been installed in several water reservoirs to excite high similar signal. The air-gun signal can be detected up to 150 km that make it possible to monitor medium change at large scale. The deployment cost of monitoring system can be significantly reduced with the low-cost DAS system. Two DAS air-gun experiments were conducted at two sites with different settings. A telecommunication fiber-optic cable in urban area was used in the first experiment. After stacking, the air-gun signal emerges on the 30-km DAS array at about 9 km epicentral distance. A 5-km cable was deployed starting from the air-gun source to about 2 km away. About 800-m cable was frozen into the ice above the air-gun and provided clear single-shot signals. The rest cable was lay on the road and the part across a fault is cemented. On the stacking multiple shots' records, the wavefield in fault zone emerges too. These two experiments demonstrate the feasibility of using various fiber-optic cables as dense array to acquire air-gun signal in different environments.

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