

Distributed Acoustic Sensing (DAS)

Webinar Outline

Importance/Application of DAS

- Exceptional Spatial Resolution: DAS provides channel spacing at the few-meter scale, enabling fine-grained acoustic monitoring.
- Eliminates Costly Surveys: Continuous data collection is possible without dedicated ship time or costly marine operations.
- Shore-Based Operation: Simply connect a land-based interrogator at the shore.
- Advanced Sensing Technology: The interrogator is responsible for sending laser pulses and processing backscattered light signals.
- Broad Spatial Coverage: Utilizes extensive existing fiber optic cable networks for massive spatial coverage.
- Multi-Signal Detection: Capable of simultaneously receiving and distinguishing various types of acoustic signals (e.g., ships, whales, earthquakes, currents).

DAS data is dominated by temperature changes caused by internal waves, ocean current, diurnal heating/cooling of the environment.

- <https://dosits.org/hot-topic-sound-waves-from-earthquakes-can-reveal-changes-in-ocean-temperature/>
- <https://dosits.org/people-and-sound/research-ocean-physics/how-is-sound-used-to-measure-temperature-in-the-ocean/>

DAS data is dominated by surface gravity waves moving at a few to a few tens of m/s.

DAS data is dominated by microseisms traveling at a few thousands of m/s (Scholte waves).

- <https://dosits.org/science/movement/how-does-sound-propagate-through-sediment/>

DAS data contains seismic activities, i.e., T-waves.

- <https://dosits.org/decoding-the-hum-of-submarine-volcano-eruptions/>
- <https://dosits.org/people-and-sound/examine-the-earth/earthquakes/>
- <https://dosits.org/people-and-sound/examine-the-earth/volcanoes/>
- <https://dosits.org/science/sounds-in-the-sea/noise-field-in-the-arctic/>

DAS data contains biological signals (whales, fish, other marine life) and anthropogenic signals (ships, pile driving, airguns, other human activities).

- <https://dosits.org/animals/effects-of-sound/anthropogenic-sources/seismic-airguns/>
- <https://dosits.org/decision-makers/tutorials/sound-source/pile-driving/>
- <https://dosits.org/animals/effects-of-sound/moderate-or-eliminate-the-effects-of-human-activities/ship-quieting-technologies/>
- <https://dosits.org/animals/effects-of-sound/moderate-or-eliminate-the-effects-of-human-activities/>