

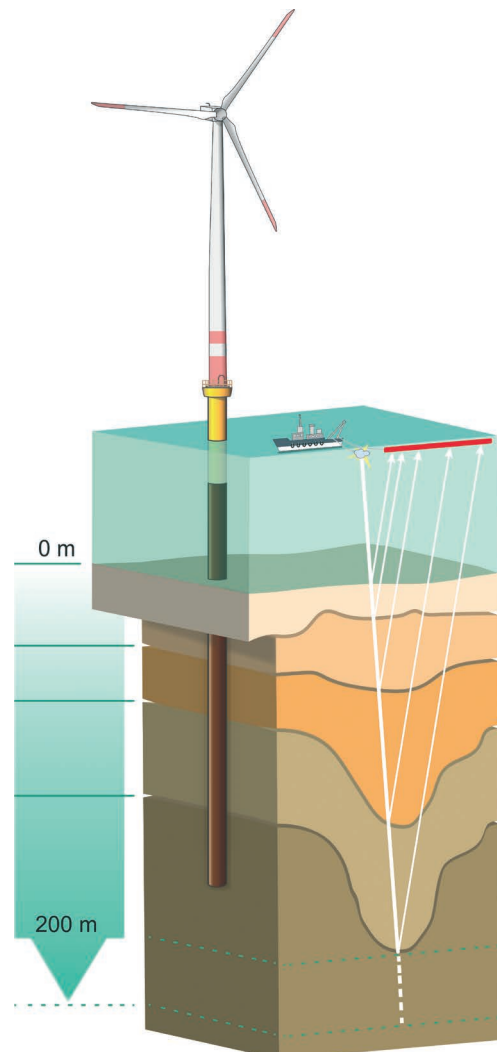
Data and facts

Ultra High Resolution Seismic System Fraunhofer IWES Subsurface Investigation

Fraunhofer IWES carries out extensive research and industry projects focused on ultra high resolution (UHR) seismic imaging as well as geological model building. It operates a flexible 2D/3D UHR multichannel seismic system developed specifically for offshore wind farm site surveying to deliver optimal data acquisition, processing, and interpretation as a basis for ground model building. The system comprises a single-hydrophone streamer system optimized for UHR seismic measurements along with sparker signal sources, a high-precision global navigation satellite system (GNSS) positioning solution, as well as in-house data handling, processing, and interpretation workflows. Since 2018, over 12,000 km of seismic profiles have been commercially surveyed. Fraunhofer IWES offers flexible fit-for-purpose surveying solutions and continuously works on improving seismic surveying techniques for the benefit of offshore renewables.

Our competences at a glance: UHR Seismic System

- 2D/3D digital solid streamer system
- Single-hydrophone channels with 1 m spacing
- Double-deck sparker signal source with 300-1,200 Hz bandwidth
- Custom-tailored GNSS front- and tail-buoy setup
- In-house software solutions for geometry setup
- In-house tailored workflows for data processing and integrated seismic interpretation
- Over 12,000 km surveyed commercially since 2018



Technical specifications

Data recording: Seamap Seamux3 digital solid streamer

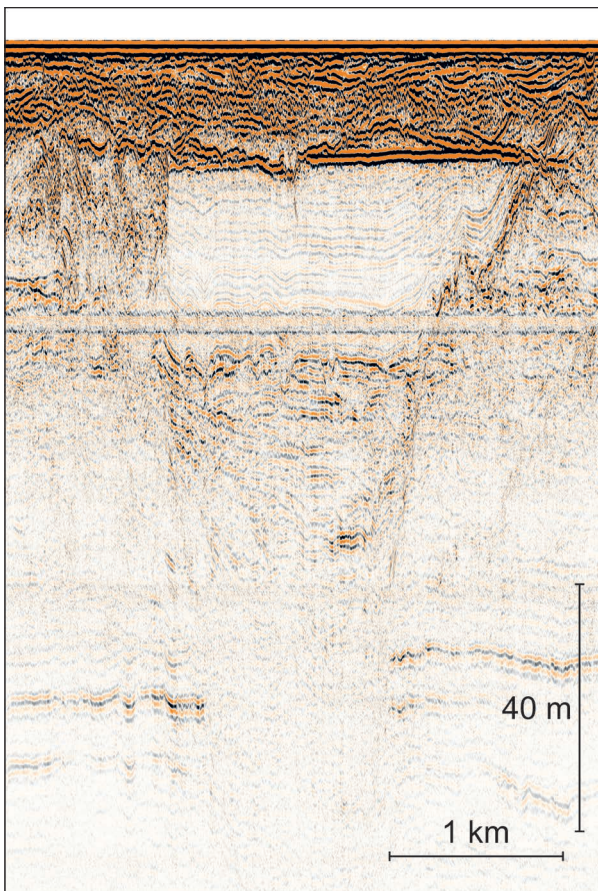
- Channels: 96+ (flexible setup)
- Single-hydrophone channels with 1 m spacing
- Sampling frequency: 4 kHz (upcoming 8/16 kHz)
- Sampling depth: 24 bit
- Hydrophone: PVDF
- Sensitivity: -194dB Volt re $1\mu\text{Pa} \pm 1.0\text{dB}$ at 40 Hz
- Bandwidth of channel: 125 – 8,000 Hz at $\pm .5$ dB
- Depth control: ION DigiBIRD II

Signal source: DuraSpark400+400 sparker

- Bandwidth: 300 – 1,200 Hz
- Pulse length: 0.5 – 1.5 ms

Positioning: GNSS AsteRx-U antenna

- Positioning: Deck, front-buoy, tail-buoy, sparkers
- Correction: Fugro Marinestar
- Positioning accuracy: < 15 cm



Data example from the southern North Sea showing the detailed imaging of glacial geological structures and deposits

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Further information

Fraunhofer IWES secures investments in technological developments through validation, shortens innovation cycles, accelerates certification procedures, and increases planning accuracy by means of innovative measurement methods in the wind energy and hydrogen technology sectors. At present, there are more than 300 scientists and employees as well as around 150 students employed at the eight sites: Bochum, Bremen, Bremerhaven, Görlitz, Hamburg, Hanover, Leuna and Oldenburg.

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