



Particle Swarm Optimization for Scholte-wave inversion as part of offshore foundation soil analysis

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The FINO3 project is aimed at the construction of an offshore research platform in the north-sea, hosting research projects dealing with offshore wind energy topics. As part of FINO3 our subproject deals with the development of new seismic acquisition and inversion concepts for offshore-building foundation soil analysis. We are focussed on the determination of seismic parameters and structural information of the building plot of the platform. As part of this work we present the determination of shear-wave velocity structure by spectral analysis of Scholte-waves. We designed an inversion strategy using a particle swarm optimization method as effective algorithm to solve the problem of multimodal functions optimization. The particle swarm method was earlier described as a new tool to invert geophysical data. We implemented a modified particle swarm method using a crossover operator to add a particle-reproduction property to the swarm. In May 2006 we conducted a pre-investigation of the site of the platform to be constructed including three 2 km airgun profiles recording Scholte-waves with Ocean-Bottom-Seismometers. For those profiles we applied an inversion of local wavefields on equidistant offset points resulting in pseudo-2D shear-wave velocity models. The inverted layers of shear-wave velocity document three shear-wave velocity units ranging from 130 m/s to 420 m/s.