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Local scale grid-based model for 3D finite difference modeling of basaltic region

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The main purpose of this abstract is to suggest, that local grid-based models, which are becoming available from the oil industry could be included in a Data Base containing a reference model for Europe. Forward modeling is becoming more and more important in the oil industry, and with that the need for detailed grid based models. When these local models of sizes up to 100 km in horizontal directions and 10 km in depth and with a grid spacing of e. g. 5 m becomes available in the oil industry they can serve as a priori models (bounded or constrained) for earthquake locations, body wave travel time inversions, surface wave inversions, and forward modeling of body and surface waves in order to obtain accurate sizes of earthquakes and more accurate elastic and viscoelastic model parameters of the whole lithosphere. As an example of available information from the oil industry, realistic data generated in order to be applied for testing of processing and migration tools for basaltic regions are shown. The data are generated by applying a three-dimensional higher order finite difference (FD) code, TIGER, made by Sintef and paralellized by the author. The parallel code enables us to apply seismic sources in large-scale realistic geological models, where multiple processors are used in order to manipulate subsets of large amounts of data simultaneously. The code is for general anisotropic models and the wavefield is computed on a staggered grid. The 3.5 km deep geological model, which covers a large part of a real 37 km long shot line, has been constructed by using the compound modeling software from Norsk Hydro. The vertical parameter distribution was obtained from observations in two wells and includes a basalt horizon covering the whole sub surface layers.
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