FULL-WAVEFORM SEISMIC INVERSION FOR ESTIMATING AQUIFER DIMENSIONS AND HYDROLOGIC PARAMETERS

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This study aims at developing computational tools to estimate aquifer dimensions and hydrologic parameters using seismic data. The poro-elastic signature from an aquifer is simulated and using this signature we estimate water-table level and aquifer porosity, and infer the location of aquifer-basement boundary. We use discontinuous Galerkin method to solve the forward model that characterizes the propagation of seismic waves in coupled poro-elastic-elastic media. The inverse problem is solved in a Bayesian framework, which enables to take into account modeling uncertainties. For the inverse problem, we use the Bayesian approximation error method, which reduces the overall computational demand. At this stage, results for a 2D synthetic model are presented to illustrate the potential of the algorithm for hydrogeological applications.