The Baikal Rift region is geologically complicated. The rift, an archean craton, and 6 km of sediment in the Baikal Lake influence seismic paths. This structure requires modeling of seismic waveforms that will focus on finding an optimal solution efficiently.

The standard approach to seismic waveform modeling is using a grid search. This method is at best cumbersome, which produces a broad solution set. At its worst a grid search is an impossible task that would take years to perform.

An improvement to the grid search approach is simulated annealing. This method perturbs an initial model, searching for better models but allows other models to be accepted with a decreasing probability. This allows the choice of models to move out of local minimums to find the global minimum.

This technique works if there is a clear global minimum but with complicated structure, as in the Lake Baikal region, simulated annealing has no guarantee of finding a global minimum. Multiple objective optimization takes a different angle perturbing a solution, accepting a less accurate model that is close to a set of dominant models based on the parameters to be minimized. This prevents the solution from diverging from the best solutions and performing unnecessary calculations making this technique more efficient.