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Quasi-Newton algorithm using Fresnel wavepaths and frequency increase for P-wave tomography inversion: application to a landslide in the South French Alps

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Abstract

We propose a Quasi-Newton algorithm based on the Fresnel-wavepath and the frequency increase to invert P-wave velocity field. The proposed algorithm is simple to use, easy to implement, and converges fast to a local minimum and is consistent with a variety of evidence.

Introduction

The use of seismic tomography is widely used in geophysics to improve our understanding of the Earth's subsurface. The Quasi-Newton algorithm is a powerful tool for this purpose, as it can handle high-dimensional problems and converge to a minimum at a faster rate than other methods. In this paper, we present a new approach to seismic tomography inversion using the Fresnel wavepath and frequency increase, which we call the Fresnel wavepath frequency increase (FWFI) method. The FWFI method has several advantages over other methods, including its simplicity, ease of implementation, and fast convergence to a local minimum. It can also handle large datasets and is consistent with a variety of evidence.

Materials and Methods

The FWFI method is based on the Fresnel wavepath and the frequency increase to invert P-wave velocity field. The algorithm is simple to use and easy to implement, and converges fast to a local minimum and is consistent with a variety of evidence.

Results

The FWFI method was applied to a dataset obtained from a landslide in the South French Alps. The results showed that the FWFI method was able to invert the P-wave velocity field accurately and consistently. The FWFI method also showed that it was able to handle large datasets and was consistent with a variety of evidence.

Conclusions

The FWFI method is a powerful tool for seismic tomography inversion and can handle large datasets. It is simple to use and easy to implement, and converges fast to a local minimum and is consistent with a variety of evidence.

References


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Biographies

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