Estimativa de anisotropia local através de dados sintéticos das ondas qP de walkaway VSP

Determination of local anisotropy from qP-wave synthetic walkaway VSP data

Ellen N. S. Gomes [1)], Ivan Pšenčík [2)], Jessé C. Costa [1)]

1) CPGG, Universidade Federal de Pará, Av.Tavares Bastos, 1485 Bloco 15, Belém, Pará 66615-005, Brazil. E-mail ellensg@ufpa.br
2) Geophysical Institute, Acad. Sci. of Czech Republic, Boční II, 141 31 Praha 4, Czech Republic. E-mail ip@ig.cas.cz

Summary

Inversion scheme for the determination of anisotropy in a vicinity of a receiver situated in a borehole from the data obtained during a multi-azimuth multiple-source offset VSP experiment is studied using synthetic data. The data consist of travel times and of polarization vectors of direct and reflected qP waves recorded at several nearby receivers and generated along a single profile. The tests were inspired by the inversion of real data from the Java Sea region, see the contribution by Gomes et al. in the Report 13. Effects of the choice of a reference medium, of the wave normal, of the strength of anisotropy, of different levels of noise on the results of inversion are analyzed. Sensitivity of the inversion scheme to the number of sources along the profiles, to the number and type of waves considered is also studied. Study of sensitivity and stability of the inversion scheme indicates that only some from recoverable parameters can be recovered reliably. The tests show that the use of a single profile limits the possibility of the inversion scheme considerably. In inversions of data from a single profile, it is impossible to determine the type of anisotropy of the medium. It is, however, possible to distinguish which of two or more proposed models of medium satisfies better the observed data. It is also shown that the determination of parameters of the medium depends strongly on the choice of the P-wave velocity in the reference isotropic medium and only slightly on the choice of the normal of the wavefront in the reference medium.

Keywords
Weak anisotropy, qP waves, travel times, polarization vectors, walkaway VSP experiment.

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