Geophysical Research Abstracts, Vol. 7, 05041, 2005
SRef-ID: 1607-7962/gra/EGU05-A-05041

A Method For Measuring Shear Wave Splitting With S Phases Independently Of Source Side Splitting, With Application To Southern California Seismic Network Stations

F. Tilmann (1) and J. W. Chaloner (2)

(1) Department of Earth Sciences, University of Cambridge (tilmann@esc.cam.ac.uk) (2) Department of Physics,University of Cambridge

The shear wave splitting community generally prefers to measure vertically averaged horizontal anisotropy with core phases such as SKS because their initial polarization is well known, and any source side splitting will have been removed by the conversion to a compressional wave at the core-mantle-boundary. However, particularly for temporary deployments, the number and distribution of well-recorded SKS phases is often too small to unambiguously determine the anisotropy, particularly if it cannot be easily described by a one-layer model. It is thus desirable to be able to carry out measurements with S phases. Whereas it is possible to relax the assumption of known initial polarisation by imposing linearity of the corrected waveform, the ambiguity between source side and receiver side splitting has been harder to tackle. Measurements from deep events below $\sim$300 km are generally considered valid because dislocation creep is not thought to operate at large depths but the recent indications of anisotropy within the transition zone near subduction zones make questionable even this assumption.

We present a method for measuring the receiver side splitting of S phases unbiased by source-side splitting by comparing waveforms with reference stations, whose anisotropy is well characterised (e.g., an IRIS station near a temporary network). Synthetic and data examples demonstrate the applicability of the assumptions underlying this method, and we present measurements at Southern Californian stations.