

VSP course

Lecturer: Robert Cousins (Baker Hughes)

- Essentials: Fundamental concepts, data acquisition and processing, survey configurations
 1. Basic Theory
 2. VSP Geometries
 3. VSP Acquisition
- Basic Applications of rig source VSPs
 4. Velocity survey
 5. Acoustic log calibration and synthetic seismograms
 6. Zero-offset VSP processing
- Advanced applications of VSPs
 7. Uses of ZVSPs – Q and Vp/Vs
 8. Offset VSPs for imaging
 9. VSP Multiples
 10. VSP Planning and Survey Design
 11. Seismic while drilling (SWD)
 12. Advanced applications of VSP

Borehole acoustics - Part I

Lecturer: Dr. Tim Geerits (Baker Hughes)

The borehole acoustic Logging While Drilling (LWD) and wireline measurement will be explained. Emphasis will be on physical measurement principles (E.g., source types) and measured wave types (E.g., refracted body waves and borehole guided modes). To understand data handling and processing of borehole acoustic waves special attention will be given to cylindrical waves. Where in surface seismic applications it is common to decompose the measured wavefield in plane waves (Fourier analysis), in borehole acoustics it is common to apply a cylindrical wave decomposition. This part of the course will take 1 day.

The second part of this course will be concerned with slowness analysis and processing of waves measured in a fluid-filled borehole in both the wireline and LWD configuration. A distinction will be made between dispersive and non-dispersive slowness analysis. The latter is often referred to as Slowness Time Coherency (STC) analysis (E.g., “Semblance”). The former is often referred to as Slowness Frequency Coherency analysis (SFC) and typically applies to borehole guided modes that often show strong ‘velocity dispersion’. The slowness analysis methodologies as well as their application in real data processing will be discussed in detail and various real data examples will be presented. This part of the course will take 2 days.